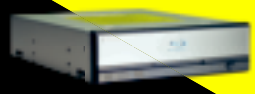
Meet the Kitchen PC
Is HP's hot new touch-screen rig right for your galley?

CPU Breakthrough!
The full scoop on Intel's 45nm next-gen part!

Blu-ray Blues?
Can Sony's latest burner break the streak of bad re



MAXIMUM PC

MINIMUM BS • APRIL 2007

HARDCORE HARDWARE

HEAD to HEAD

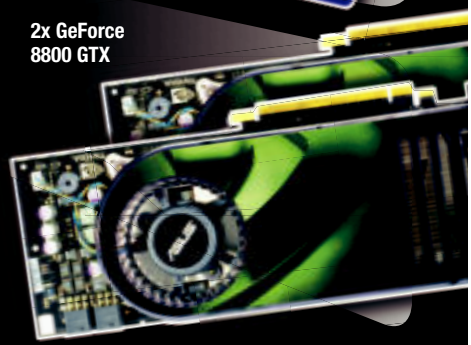
Athlon 64 X2 6000+

Core 2 Duo E6700

Premium Flash Memory

Budget Flash Memory

1x GeForce 8800 GTX



2x GeForce 8800 GTX

We pit 32 products against their archrivals in our brutal benchmarking showdown

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Ed Word

Another Reason Not to Upgrade to Vista

*Please send Frosted Mini-Wheats Big Bites to **will@maximumpc.com.***

The terribly confusing and consumer-unfriendly state of upgrading to Windows Vista is proof that Microsoft has serious communication problems. The upgrade SKUs—the cheap boxes sold at CompUSA that contain upgrade discs for your existing Windows install—are a horrific mess that will result in returns, broken systems, and heartache for everyone involved.

The problem began when a committee of geniuses decided that choosing an OS wasn't difficult enough and expanded the number of retail versions of Windows from two to four—with each version offered in full and upgrade versions. A full version will install on a new machine, but to install an upgrade version, you need to have an existing Windows license. Simple enough, right? Wrong.

You see, you can upgrade certain versions of Windows XP only to certain versions of Vista. To further complicate matters, you can't upgrade the hardcore, power-user version of Windows XP (XP Pro) to the analogous version of Windows Vista (Home Premium) using the upgrade process. In order to upgrade the Pro version of XP to Vista, you need to purchase either the Business version, which omits Media Center functionality, or the ridiculously overpriced Ultimate Edition. (Who did Microsoft consult before making this decision? The same people who write Mac commercials?) Of course, you probably won't figure out your purchasing mistake until after you've opened the box and the upgrade fails, rendering your purchase nonrefundable.

Now, if you want to move from XP Pro to Home Premium you can just back up your data, wipe your drive, and do a clean install, right? Wrong again. You see, the brain trust at Microsoft decided that upgrade versions should be incapable of performing clean installs—if you boot from the CD. In order to work, the upgrade process requires that you start from a working version of Windows. This fundamentally idiotic requirement will make disaster recovery a two-step process. Instead of simply checking to ensure that you own Windows XP during the install process, the Vista upgrade disc forces you to first install Windows (it can be XP or a demo version of Vista), then upgrade to the version of Vista you purchased. It's a good thing Microsoft streamlined the Vista install process, isn't it?

If you buy the wrong version of Vista, you won't be able to upgrade XP with it. You'll have problems doing a clean install, and you probably won't be able to get a refund, either. It makes me wonder if anyone at Microsoft has ever actually installed and used Windows before. If they haven't, why should I?

Will Smith

Features

MAXIMUM PC

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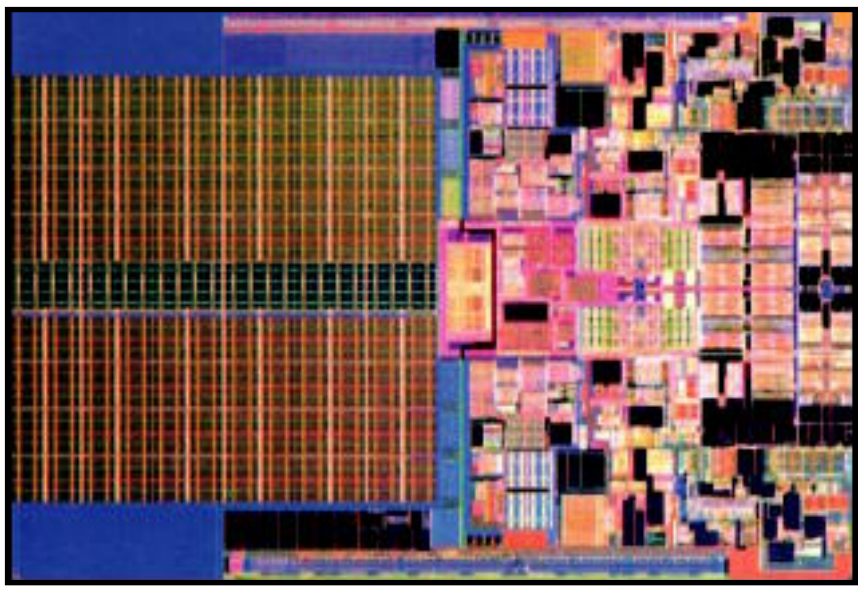


Intel's upcoming Penryn CPU, shown in this die shot, will pack 820 million superfast transistors on a single chip when configured as a quad core.

Laid out by Intel cofounder Gordon Moore in 1965, Moore's Law states that transistor density on chips will double every 18 months. In recent years, as advances in chip design have slowed, the rate's slowed down, and experts have doubted that the law could continue unchallenged. However, new developments in high-k plus metal technology are expected to keep the ride going for at least a few more years.

Intel recently held a press conference to announce its upcoming 45nm CPUs will use high-k dielectric and metal gate transistors, which will double transistor density while offering 10 times less gate leakage and a 20 percent boost in switching speed. Described by some industry insiders as the holy grail of computing, high-k dielectric gates will replace the silicon dioxide gates in use today, while metal (instead of polysilicon) would be used to construct another part of the gate. If you think of a transistor as a simple on/off switch, the high-k and metal structure would equal the actual toggle and insulation components. By using smaller and more efficient insulators, the switch can handle more power while switching faster. Put simply, Intel's first CPU to use this technology—the Penryn—could run as fast as 4GHz while using the same or less power than today's 65nm processors. Oh, and it will pack 50 percent more cache.

Although Intel claimed AMD wouldn't have similar technology until it hit a 32nm process, IBM and AMD chimed in soon after Intel's news to say that they too have high-k and metal transistors ready for their 45nm parts. Intel, however, said it's already pumping out wafers and test CPUs using high-k plus metal parts.

Like Intel's Core 2 CPUs, the 45nm Penryn will be a native dual-core chip, with quad-core processors fashioned by joining two chips at the front-side bus. The dual-core Penryn will feature 410 million transistors versus the Core 2's 281 million transistors, with the quad version doubling the transistor count. Intel hasn't disclosed the amount of L2 cache or the clock speeds, but predictions are that it will have a 6MB cache and buzz in at speeds greater than 3GHz, which is where the Core 2 Extreme tops out. Penryn will feature new SSE4 instructions and further enhancements to the microarchitecture to increase performance over Conroe. Intel is already fabbing test CPUs using the new transistors and is expected to enter full production at the end of the year, with availability soon after.

AMD hasn't said much about its CPU based on 45nm technology, but it's not expected until mid 2008 at the earliest, as the company is just now ramping up production of its 65nm CPUs. This summer, AMD is expected to release a native quad-core CPU code-named Barcelona. Barcelona will feature microarchitecture tweaks and AMD has publicly said it expects the CPU to be 40 percent faster than Intel's current quad-core counterpart.

INTEL'S PROCESS ROADMAP

PROCESS NAME	P1262	P1264	P1266	P1268	P1270
LITHOGRAPHY	90nm	65nm	45nm	32nm	22nm
1ST PRODUCTION	2003	2005	2007	2009	2011
LAUNCH CPU CODE-NAME	Prescott	Presler	Penryn	Westmere?	Unknown
USED IN	Pentium 4, Pentium 4 Extreme Edition	Pentium D, Pentium Extreme Edition, Core 2 Duo, Core 2 Quad, Core 2 Extreme, Core Duo	Unknown but likely a Core 2 derivative	Unknown	Unknown

MusicGiants Hires a Music Giant

Record producer extraordinaire Elliot Mazer joins online music retailer as 'Music Czar'

How do you compete with an online juggernaut like Apple's iTunes Music Store? MusicGiants does it by selling songs that sound dramatically better, thanks in part to the prodigious talent of Elliot Mazer.

Mazer has produced the likes of Neil Young, Linda Ronstadt, and Janis Joplin during his 40-year career. His job at MusicGiants is to oversee the ripping and encoding of commercial CDs from his New York recording studio. Mazer uses Microsoft's WMA Lossless codec to encode the tracks at 88.2kHz sampling rates with 24-bit resolution to produce very high-definition stereo and surround-sound recordings.

"People have forgotten how good music can sound," Mazer told us. "The PC can be a quality audio product, but only if you feed it quality music files. We're providing that premium fuel."

MusicGiants' high-res music downloads sound fantastic, but we could do without the DRM.

Vista Gets Serious about Upgrades

We've all used Windows upgrade discs to do a clean install of Windows. It's simple: You start the install, then at some point during the process, you have to insert the old disc and validate your install. Of course, Vista "fixes" this problem.

You see, in order to install Vista using an upgrade version of the disc you need to have a working OS installed—you can't just validate the install using your old XP CD. The Vista upgrade process is significantly better than any we've used before, but it's still less than perfect.

Luckily, there's an easy way to do a clean install. You just need to install Vista twice. Install the version of Vista that you bought, but do not put in an activation key when you're prompted. When the install is complete, reinstall your upgrade version, using your key, on top of the first install of Vista. It's that easy!

Netflix Rolls out a Streaming Service

By summer, all subscribers to Netflix will be able to stream additional movie and TV content to their PCs—at no extra charge!

A subscriber with a $17.99 plan, for example, will be eligible for 18 hours of streamed content per month, in addition to the usual disc delivery service.

TOM HALFHILL

Intel's Transistor 'Breakthrough'

Intel's announcement of metal-gate transistors with high-k gate dielectrics swept the mass media by storm in late January. Mainstream news outlets that don't know a transistor from a resistor scrambled to find industry analysts who could explain the technology in newbie terms. Intel's accomplishment was touted as a major breakthrough—the biggest advance in transistor design in more than 30 years.

Within hours of Intel's announcement, IBM pushed its top engineers in front of microphones to assure a nervous world that they too have developed metal-gate transistors with high-k gate dielectrics.

What's amazing about this furor is that Intel's "news" is more than three years old. On November 5, 2003, Intel issued a press release announcing exactly the same thing. (I still have my copy.) The day after that announcement, Intel presented a technical paper on the subject at a conference in Tokyo. Intel's press release from November 2003 reads almost word-for-word like the news stories that broke in January 2007. The press release even said that the new transistors could appear in Intel processors "as early as 2007, as part of the company's 45nm manufacturing process"—an uncannily accurate prediction.

PR flacks should study this incident. It's a good lesson in exploiting the news media's short attention span.

Intel's 2007 announcement did include two details missing from the 2003 release, although many news stories omitted those details. One of the new dielectric materials is hafnium, which replaces silicon oxide. (The metal-gate material is still a secret.) And the new transistors will indeed appear in an Intel processor manufactured in the company's 45nm fabrication process this year. (It's Penryn, the next Intel Core 2 Duo.)

I don't minimize Intel's accomplishments. The new transistors significantly reduce current leakage and switching power, allowing Intel to build faster, cooler, lower-power processors. But I view this step as more evolutionary than revolutionary. Similar advances in recent years include silicon-on-insulator transistors, strained silicon, and copper interconnects. Future advances in the same vein are liquid-immersion lithography and tri-gate transistors, both coming soon.

Engineers everywhere are busting their butts to prolong the life of Moore's Law. Intel's engineers deserve a big share of the credit—which, in this case, was 39 months overdue.

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

GAME THEORY

THOMAS MCDONALD

Wandering the Fringes

The past few months have been pretty thin for new PC gaming releases, leaving me wandering the web in search of new and better ways to waste my time. The Troy mod for Rome: Total War did the trick for a bit, but it ultimately sent me looking deeper into the wonderfully weird world of fringe gaming.

There are entire subcultures of people on the net using computers to simulate strange and possibly illegal things. Pure flight sims have always baffled me. I can't understand going through the trouble of taking off and landing an aircraft without killing someone or blowing something up in between. Various train sims sustain a loyal online community, which I guess is a logical extension of the rail-fan hobby. I still spend most of my train time channeling Gomez Addams.

But trains, planes, and automobiles are mainstream compared to Ship Simulator 2006 (**www.shipsim.com**) and 18 Wheels of Steel Haulin' (**www.scssoft.com**), which cater to folks with a secret need to sit at home and pretend they're either a water-taxi captain or long-haul trucker. These are jobs I wouldn't do for all the cheddar in Vermont, but somehow, reduced to a screen's size and given simple but effective 3D graphics, they leave the realm of the banal and become quixotic little adventures.

Both feature gameplay that largely revolves around picking stuff up, bringing it someplace, and then dropping it off. They're not likely to sustain the interest of people without a passion for the subject matter, but they don't have to. They're made *by* enthusiasts, *for* enthusiasts, and they can still provide an hour's diversion for the mildly curious.

Strangely, these games gave me hope at a time when I was down on PC gaming. These games would never exist on consoles. Fringe gaming, whether weird text adventures or historical battles or bike messenger sims, are solely the domain of the PC. They bubble up from below, driven by the enthusiasm of fans and programmers and show us that PC gaming is a vital well that's far from dry.

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

Another Blow for AACS

Hot on the heels of BackupHDDVD, a utility that circumvents the copy-protection in commercial HD DVD discs, BackupBluray has been released to do the same for Blu-ray media.

The hacks exploit AACS encryption—the core protection technology found in both formats (in slightly different implementations)—which was painstakingly developed at much time and cost to protect against just such a breach. (While backers of Blu-ray have touted that format's additional protection, called BD+, the feature is apparently not present in current Blu-ray releases.) The utilities are just part of the equation, however; a user must provide necessary crypto keys to rip the unlocked content, and evidence suggests those keys can be found in the unencrypted memory of software players—CyberLink's PowerDVD and Intervideo's WinDVD have both been implicated. In fact, on its website, the AACS Licensing Authority is placing the blame squarely on poor player implementation.

While you can bet that studio execs and the AACS LA are reeling from the relative speed at which their digital rights management was compromised, they weren't unprepared for the scenario. The AACS system was designed to be "self healing." Any new disc pressed after vulnerability is discovered will either not work on a player that has failed to abide by the AACS Compliance and Robustness Rules or the player will be automatically updated with new encryption mechanisms. How long it takes to "fix" broken players remains to be seen.

One thing is for sure, you can expect a long, protracted struggle between consumers and content providers.

When PCs Attack

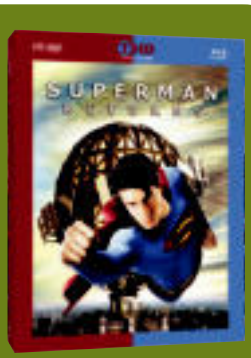
At this year's World Economic Forum, a panel of Internet experts surmised that as many as one-quarter of all computers connected to the Internet are being used in botnets. Botnets are networks of PCs that have been compromised without their owners' knowledge. They're used for dastardly deeds, such as sending spam, spreading viruses, and mining passwords, and could, say experts, threaten the survival of the Internet.

MaximumPC Podcast

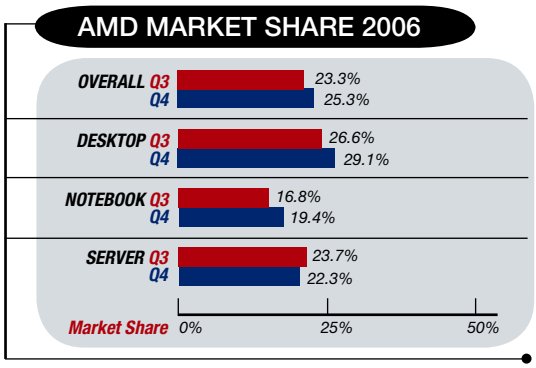
You too can listen to the Maximum PC editors as they discuss the latest issues concerning power users (*and* hear Senior Editor Gordon Mah Ung's weekly rant about everything from PopTarts to annoying Acrobat Reader updates).

To subscribe to our podcast, you need iTunes (**www.itunes.com**) or another podcast aggregator, such as Juice (**juicereceiver.sourceforge.net**). In iTunes, go to the music store, then search for Maximum PC. In Juice, go to the Subscriptions tab, click the "Add new feed" button, and enter our feed's URL: **http://feeds.feedburner.com/maximumpc/1337**. Yeah, that's right, 1337.

Bridging the HD Divide



At this year's CES, Warner Bros. announced its solution to the HD format wars: optical discs that can hold dual-layer Blu-ray on one side and dual-layer HD DVD on the other. Dubbed Total HD, the discs would free consumers from being shackled to one type of player. Of course, the dual-format disc's usefulness will depend on studio participation. Expect Total HD releases from Warner Bros. in the second half of 2007.



Alternative x86 chipmakers make up a fraction of the market, so AMD wins translate into Intel losses.

The Second Fiddle Plays On

Despite Intel's recent wins over AMD in high-performance parts, AMD continues to steal x86 market share from its archrival. In the fourth quarter of 2006, AMD achieved its highest percentage of chip shipments yet: 25.3 percent, up from 21.4 percent a year earlier. And the company was up from the previous quarter in all markets except servers, according to Mercury Research.

Norway Drops the Hammer on iTunes

DRM woes continue for Apple

Add Norway to the list of European nations that have taken legal action against Apple over its iTunes DRM scheme. The country's consumer ombudsman has alleged that Apple's DRM scheme is illegal because it limits how users can play songs they purchase from the online music store. He has given Apple until October 1 to either license its FairPlay DRM scheme to other vendors or face having its iTunes site in Norway shut down. In August, Apple agreed to make changes to its terms-of-use agreement for iTunes but has held firm against opening up its FairPlay technology.

In a recent online essay, Steve Jobs admitted to the absurdity of DRM but insisted it's necessary for appeasing the major music labels—he recommended the European countries redirect their ire at them.

As the shaded areas show, Northern Europe is the world's first no-iTunes zone.

Broadcast Battles

Yarrgh! Man the guns and raise the sails, a battle's brewin' on Capitol Hill and the flags are flyin'. Broadcast flags, that is. As one group of senators is attempting to attach stronger copy protection to streaming radio providers, another senator is trying to permanently take down the FCC's broadcast flag.

Sponsored by senators from California, Tennessee, Delaware, and South Carolina, the Platform Equality and Remedies for Rights Holders in Music Act would require all non-over-the-air radio providers to attach copyright protection to all streaming media formats. With this protection in place, listeners would be able to record only allowed satellite or Internet radio programming. "Specific programs, time periods, or channels as selected by or for the user," could be recorded, according to the bill. But, listeners would no longer be allowed to make recordings "based on specific sound recordings, albums, or artists."

Concurrently, a bill introduced by Senator John Sununu (R-NH) is attempting to block the FCC's ability to impose new copyright protection initiatives on an already existing marketplace. His primary target is the broadcast flag, a tiny signal attached to broadcast media that would allow the content creator to specify the exact terms of viewing.

The FCC has already tried to force the manufacturing industry to support broadcast flags, but the regulations were squashed by the U.S. Court of Appeals for the District of Columbia in May 2005.

FUNSIZENEWS

THE RETURN OF THE I740?

When Intel leaped into discrete graphics in the 1990s, analysts predicted the end for ATI and Nvidia. It didn't work out that way, but Intel might be giving that market another go. A recent Intel job posting sought engineers for the company's Visual Computing Group, specifically to work on a discrete graphics product. Is it true? The word "discrete" was scrubbed from the ad, and Intel tells us it can neither confirm nor deny.

JUSTICE PREVAILS

In January, Jeffrey Brett Goodin became the first person in the U.S. to be convicted under the 2003 CAN-SPAM Act. The law forbids email marketers from sending false or misleading messages, and that's clearly what Goodin did when he used compromised Internet accounts to request updated billing information from America Online users. In this phishing scheme, the emails pointed people to mock AOL pages that Goodin controlled. The maximum possible penalty is 101 years.

HD DVD ONE-UPS BLU-RAY, LITERALLY

One advantage Blu-ray has boasted over rival format HD DVD is capacity. While current dual-layer Blu-ray media is capable of storing 50GB of data (25GB per layer), dual-layer HD DVD discs are capped at 30GB. But the tables are about to turn now that Toshiba has announced a triple-layer HD DVD disc capable of storing 17GB per layer—that's 51GB total, folks. And in this battle, every gig matters. Expect the media to reach retail later this year.

DX10 ON A BUDGET

Not content to leave money on the table, even with ATI still on the sidelines of the DX10 GPU market, Nvidia has unveiled a cost-reduced 8800 GTS reference design. The new cards, available now from the usual suspects (EVGA, BFG, et al.) have 320MB frame buffers, compared to the 640MB buffers on the pricier models. Nvidia expects them to fetch between $299 and $329 online.

HIGH-TECH BIG SHOTS

Bill Gates **vs.** Steve Jobs

One's been the *enfant terrible* of the tech industry for the better part of 30 years. The other's the richest man in the world. Together, they're two of the most influential names in business, and they're no strangers to both sparring as bitter rivals and working together in reluctant partnerships.

Since the prospects for a Bill Gates–Steve Jobs reality TV show (let's call it *Reality... Distorted!*) just don't seem to be in our favor, we decided to take an exceedingly serious look at how the two leaders match up when it comes to a few key criteria. No, we don't mean net worth or company stock price, we're talking about cutting to the issues that really make the man. You know... like pants.

BY CHRISTOPHER **NULL**

BILL GATES
Chairman, Microsoft

round 1

FASHION SENSE

Good lord, how to choose between two so very stylish men? Bill Gates is typically seen attired in a button-down dress shirt, with or without a contrasting sweater, a semi-functioning Microsoft product in hand, and the occasional pie to the face. Steve Jobs, on the other hand, is rarely seen in anything other than blue jeans, his signature black mock turtleneck, and a little surprise stowed in his pocket. (You know: "And one more thing....")

But how do the fellas do out on the catwalk? While Jobs really owns the outfit, strutting on stage like he's Heidi Klum, Gates gets enveloped in his comfy duds like he's Mr. Rogers finally retiring after a long game of cribbage. It's not just a more comfortable look, the Midwestern grandpa thing never gets old. But Jobs's black-and-denim affair, yikes, that went out of style in 1989.

WINNER: GATES

round 2

EDUCATION AND EMPLOYMENT

Bill Gates attended Harvard University but quit in order to found a company known as "Micro-Soft" in 1975. He's worked there ever since, a remarkable tenure. Steve Jobs attended Reed College for one semester but also dropped out, though he credited a course in calligraphy with inspiring the idea of offering multiple fonts on the Mac. Jobs and pal Steve Wozniak launched Apple Computer in 1976, but in 1985, in one of the tech industry's most bitter management fights, he was forced out of the company he founded. Jobs went on to found NeXT and purchase Pixar in the late 1980s, then managed an amazing coup: He convinced Apple to buy NeXT for over $400 million *and* bring him back as CEO after a 12-year exile. Now that's a trick you don't see very often.

WINNER: JOBS

ILLUSTRATION BY MARTIN ABEL

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WINNER: JOBS

ILLUSTRATION BY MARTIN ABEL

round 3

HOBBIES

While he was running NeXT, Steve Jobs made the little purchase of Pixar, which he tinkered with until he finally sold it to Disney for about a thousand times what he paid for it. Not bad for what many Pixar staffers termed a "hobby" job for Jobs. He also practically invented computing as a hobby with the launch of the original Apple computer. A huge music enthusiast, Jobs is a rabid Barbra Streisand fan and reportedly once dated Joan Baez. He is also quoted as saying that taking LSD was "one of the two or three most important things he has done in his life."

On the other hand, Gates is a newly minted card-carrying VIP at Hooters and gets to eat there for free.

WINNER: GATES

round 4

SOCIAL CONSCIENCE

On a serious note, Bill Gates—with his wife Melinda—is the world's largest philanthropist. The Bill & Melinda Gates Foundation now has an endowment of $31.9 billion, most of the money originating from Gates's Microsoft fortune, with funds going to education and health concerns around the world. Yet for all of Jobs's billions, he does not appear to have done much with his cash other than hoard it under his mattress and invest in sneakers. And though Microsoft's enormous blister-packed software boxes don't make the company an environmental hero, Apple's record is even worse. It wasn't until 2006 that the company rolled out a free recycling program for its old hardware, and PC vendors' programs remain superior to Apple's across the board. Cheapskate!

WINNER: GATES

round 5

NOTABLE FAILURES

Gates has been behind the wheel of a number of huge missteps, with Windows Millennium Edition and Microsoft Bob being his company's most visible abject failures. With lackluster reviews for Windows Vista pouring in, things don't look much better for Gates, who's also faced serious criticism for Windows' draconian DRM, the Zune, the continued employment of sweaty dance machine Steve Ballmer, and, perhaps worst of all, pioneering product activation. Jobs's failures are minimal in comparison, dating back to the Lisa and Apple III era for outright disasters. Apple's more recent missteps—the Newton and G4 Cube—are barely even failures at all, having impressively spawned modder groups and fan clubs.

WINNER: JOBS

STEVE JOBS
CEO, Apple

And the Winner Is...

It's a close race, but Bill Gates's penchant for giving away all his money really pushes him over the top. While Gates may be oft-maligned as an evil warlord running one of the world's most unsavory companies, he's a true technologist who, until recently, was known for spending long hours in the trenches. Jobs, however, seems more obsessed with his own celebrity and his onstage showmanship than in the goings-on at Apple, though his frequent, well-rehearsed song-and-dance numbers never fail to leave even us impressed.

Still, we wouldn't complain if Microsoft delivered products that worked well, arrived on time, and looked good. Nor would we raise a ruckus if Apple enacted an across-the-board 20 percent price cut on its entire line of products. But that's probably just spewing crazy talk. MPC

Murray, watchdog of the month

Our consumer advocate investigates...

✓Skype Abuse ✓Vista Driver Support ✓Western Digital RAID Problem

FREE SKYPE ENABLES ABUSE

When *Maximum PC* reader Barry G. started receiving hang-up phone calls between 1 a.m. and 4 a.m. last spring, he first thought it was a mistake. When the calls extended to his cell and work phone and continued for weeks, Barry knew he had a problem.

He tried to *69 the caller, tried blocking the phone number, and then bought a $100 call-blocking device that couldn't stop the calls either. Next, Barry turned to his telco and police department, but ultimately, neither could help him. The calls were "untraceable," the telco told Barry.

Using the conventional method to track down a person making harassing phone calls, a police detective obtained a subpoena for telco records in an attempt to help Barry, but all it turned up was what Barry already knew from his caller ID log: The calls came from 000123456. For those with Skype accounts, that number is familiar. It's the default number for the free version of the service. Originally begun as a free computer-to-computer conduit, the enormously popular Skype service started a trial in May 2006 that let people make free calls from the Skype network to any landline in the U.S. or Canada. All one needed was a valid email account.

When contacted, a Skype official told the Dog that she hadn't heard about Barry's predicament. Most problem calls made via Skype occur from computer to computer, she stated, and this is one reason many women no longer use feminine-sounding usernames or list their sex in their profiles. However, someone using the SkypeOut feature to harass people via POTS (plain old telephone service) was "unheard of," she went on to explain. But is it?

Nope, says Mark Menz, a high-tech crime expert with M.J. Menz & Associates and a member of the Northern California chapter of the High Tech Crime Investigation Association (HTCIA). "What a lot of people do is use the [communication method] that is least expensive and the first to come to mind," Menz tells the Dog. That's typically a pay phone and a pocketful of quarters. But recently, Menz has seen more and more cases of Skype being used. However, he said the percentage is still very small and the use of caller ID spoofing services is probably more prevalent. But Skype poses new challenges: Because of its high-tech nature, most police departments aren't equipped to handle calls from VoIP services.

Using VoIP services for harassing phone calls stymies most authorities.

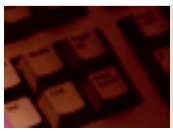
Part of the problem is in training, Menz said. While the HTCIA trains police on how to deal with Skype and similar services, most departments without high-tech crime units get stymied by the trail that has to be followed. Police must obtain a subpoena for the local telephone company's records first and then one for the VoIP provider's records. After receiving the subpoena, Skype would turn over the IP address of the system the calls originated from and the times they occurred. Next, police would have to get a subpoena for information from the ISP on its customer. All this also has to be done before the ISP dumps its records, which can take place from seven to 20 days after a call is made. Finally, connecting an actual person to the call is the real clincher. Menz said that in one recent case he worked on, the problem boiled down to connecting the person to the PC. That's just impossible sometimes, as the record companies know from trying to sue people for downloading music. If it's a shared machine, who broke the law?

And if you think an ISP or Skype is going to be helpful if you complain about months of harassing phone calls, think again. Barry said his complaints to Skype went unanswered.

Menz said he thinks he knows why. Many companies don't want to release information because they're afraid of being sued for violating a customer's privacy—even if the person is doing something that's possibly illegal. Most corporations will ignore pleas for help from mere consumers because it's safer than risking a lawsuit.

Menz suggested one option for Barry—file a small claims suit naming John Doe as the defendant. The judge in the case can then issue a subpoena against the telco, the VoIP carrier, and the ISP. The information is given to the judge who decides what to do with it.

Fortunately for Barry, after enduring early morning hang-up calls for months—sometimes every night for weeks on end—the calls magically stopped. Barry doesn't know why, but the Dog has a theory: Skype's free trial started in May, which coincides with when the calls began, and they stopped in December—the same time Skype's free trial ended and you had to pony up a credit card and $30 to continue the service.



Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic the Dog on them by writing **watchdog@maximumpc.com.** The Dog promises to answer as many letters as possible, but only has four paws to work with.

ONE GEEK'S TRASH IS ANOTHER GEEK'S TREASURE

Nvidia apparently doesn't think the nForce2 is worth supporting with Vista. A lot of things on my Asus A7N8X Deluxe work in Vista, but other things, like SoundStorm, don't. These boards may not be top of the line, but they're not trash either, and they're not that old. Is this the kind of support we can expect from Nvidia?

—Darcy Grexton

The Dog contacted Nvidia officials, who confirmed that the company had drawn a line in the sand. Those with nForce, nForce2, and nForce3 boards are to report to the closest disintegration booth while owners of nForce4, nForce 590, and nForce 680 boards can continue on. Why? The company set the demarcation line at the graphics interface. Boards with nForce chipsets 1 through 3 are AGP only, while nForce4 and later boards are PCI Express. The Dog understands Nvidia's point of view on the nForce and nForce2, as those chipsets support the fairly old Athlon XP processors. The nForce and nForce2 also have another issue that makes them suited for termination: custom audio.

The nForce and nForce2 both feature a very advanced audio engine borrowed from the original Xbox that can encode surround sound audio into Dolby Digital in real time. When Creative effectively cornered the market on PC 3D audio, Nvidia jettisoned its PC audio unit, which developed the chip. The reason there's no audio driver support for those boards is because there's probably no one left at Nvidia who could create it. The situation is exacerbated by Vista's particularly draconian view of PC audio that makes writing a new driver more challenging. So, while nForce2 users will be rankled, it is a five-year-old chipset at this point.

The nForce3, however, really isn't that old. The Athlon 64 nForce3 150 was introduced in late 2003. An updated version dubbed the nForce3 250Gb came out in the spring of 2004. The nForce3 didn't feature the custom audio portion that the nForce and nForce2 had, so audio wasn't a good reason to dump it.

Is AGP really that much trouble? Apparently not to Intel and VIA. Intel will make the cutoff for Vista drivers with the 845 chipset but offer drivers for everything above that part, including the 865 and 875P AGP chipsets that were introduced in the spring of 2003. VIA supports its chipsets as far back as the KT400 AGP, which was also introduced in the spring of 2003.

So, who's right? The Dog understands Nvidia's decision to terminate nForce2 support (the audio-component issue is just a bit too thorny) and make a clean break from AGP, but the nForce3 150 and 250Gb are too young to Soylent Green.

A firmware update for Western Digital's YS series of SATA II drives can fix RAID problems.

Of course, the real lesson here for anyone contemplating an upgrade to Windows Vista is to take stock of Vista's driver support before you make a change. Many hardware and software vendors will see this as the time to suffocate the stragglers, so you should know what to expect before you purchase a Vista upgrade. Woof.

WESTERN DIGITAL DROPS RAID

Dog, you should tell your readers about a problem Western Digital is having with some of its SATA drives dropping RAID. Woof!

—Steve Ashkenazy

Indeed. Western Digital has released a firmware update for some of its high-mean-time-between-failure drives (including the WD1600YS, WD2500YS, WD4000YS, and WD5000YS models) that fixes a problem in which the drive would "drop out" from RAID sets. The only way to fix the problem was to reboot the system, which wasn't a solution since these 1.2 million MTBF drives are aimed at 24/7 applications. Western Digital says the problem relates to an internal routine that helps increase the life span of the drive.

According to WD's support site, "While the drive is running this routine, if the drive encounters an error, the drive's internal host/device timer for this routine is NOT canceled, causing the drive to be locked in this routine, never becoming accessible to the host computer/controller…. WD has resolved this issue by making a change to the firmware, so when a disk error is encountered, the host/device timer is checked first and then the routine is canceled, allowing the drive to be accessible to the host computer/controller."

WD notes that the dropout occurs only if the drive hits an error. If you are having problems with RAID dropouts, download the firmware update by going to www.westerndigital.com, clicking Support, and searching the knowledge base for WD5000YS. Answer ID item 1493 will give you more information on the issue and a link to the firmware update. MPC

MAXIMUM PC presents

The Ultimate PC Hardware and Software

FACE-OFF

Is quad core or dual core faster? Does fast flash memory matter? Is Vista faster than XP? We answer all your burning tech questions in our most brutal hardware head to head yet!

INSIDE

BY THE MAXIMUM PC STAFF

on-hardware action, we're also answering all your most pressing tech questions. Is fast flash really faster? How much of a performance hit does ? Read on to learn the answers to these conundrums.

d benchmarks and declare winners based on raw performance. It's time

INSIDE

BEST HIGH-END GPU

OVERCLOCKED 8800 GTS VS. STOCK-CLOCKED 8800 GTX

We'd prefer to pit an ATI/AMD GPU against Nvidia's best in this category, but that wouldn't be fair to either company. Until AMD reveals its DX10 graphics hand, Nvidia's only real competition is itself—at least at the high end.

So now that Nvidia has made it possible for end users to overclock its 8800-series GPUs, we decided to see how an overclocked EVGA 8800 GTS ($410, www.evga.com) compares to a stock-clocked Asus 8800 GTX ($660, www.asus.com). But overclocking comes with a catch: It voids the warranty on your videocard, and possibly your entire system. The danger is real, but only if you're reckless. After probing the limits of an EVGA 8800 GTS, using Nvidia's nTune and the stock cooler, we had the card running stably with its core clock speed goosed from a stock 513MHz all the way to 660MHz and its 640MB of memory running at an amazing 962MHz (up from 792MHz). Your results may vary.

Our benchmarks consisted of Quake 4 (ultra quality), FEAR (soft shadows on), and 3DMark06's Shader Model 3.0 tests. We ran everything at 1920x1200, with 4x AA and 16x aniso. Overclocking the GTS delivered a major boost in performance, but it wasn't enough to overcome the 8800 GTX's sheer brawn—especially with Quake 4.

BENCHMARKS	STOCK-CLOCKED 8800 GTS	OVERCLOCKED 8800 GTS	STOCK-CLOCKED 8800 GTX
3DMARK06 GAME 1 (FPS)	20.8	23.4	**25.5**
3DMARK06 GAME 2 (FPS)	19.6	21.6	**23.6**
QUAKE 4 (FPS)	65.6	72.9	**92.1**
FEAR (FPS)	52	65	**69**

Best scores are bolded.

HARD DRIVES: SPEED VS. SIZE

WESTERN DIGITAL 150GB RAPTOR X VS. SEAGATE 750GB BARRACUDA

Mmm. Storage. Sure, buying a new hard drive isn't as sexy as, say, installing a honkin' new GeForce card. But if you want the fastest rig on the market, it's truly important to consider your storage options. And as you'll see, size isn't always the most critical factor.

In this showdown, we pit David versus Goliath: Western Digital's 150GB Raptor X drive ($290, www.westerndigital.com), which wins the beauty race with its pretty see-through window, against Seagate's 750GB Barracuda ($500, www.seagate.com). While the Barracuda clearly wins in size, what *isn't* obvious is speed. Does the Barracuda's increased areal density match the performance of the Raptor's upped spindle speed? That's what we wanted to find out.

To test the drives, we used HD Tach, which measures a hard drive's read, random access, and interface burst speeds across various locations on the surface of a drive.

The Raptor X topped the Barracuda in nearly all categories. This doesn't come as a surprise, as the Raptor spins at 10,000rpm, while the Barracuda taps out at 7,200rpm. Granted, the Raptor sacrifices quite a bit of capacity to achieve its speeds, but in random access times and average read speeds, the Raptor scored substantial boosts over the larger hard drive.

The Raptor's random access time is nearly 40

percent lower than the Seagate's; that means it takes the Raptor less time to find bits and pieces of data on the drive. Average read times were another feather in the Raptor's speedy hat. Although the Barracuda was able to output a substantially faster overall burst speed, the Raptor's higher average sequential read speed is a much more relevant metric and makes the smaller drive worthy of the overall speed crown.

The decision of speed versus capacity is yours to make, but if you care just about performance, **you can't go wrong with a Raptor.**

BENCHMARKS	RAPTOR	BARRACUDA
RANDOM ACCESS (MS)	**8.3**	13.4
AVERAGE READ (MB/s)	**77.9**	66
BURST SPEED (MB/s)	98.8	**236.9**

Best scores are bolded.

BEST LOSSLESS CODEC

APPLE LOSSLESS VS. FLAC VS. WMA LOSSLESS

Think one lossless codec is as good as the other? One of these three emerged as the clear winner when we compared them based on audio quality, depth of support, and efficiency.

Using Creative's X-Fi Elite Pro and Ultrasone's Proline 750i headphones, we could detect an extremely subtle loss of quality with Apple Lossless tracks when compared to the original CD. When we listened to the solo acoustic guitar that opens Ben Harper's "Give a Man a Home," we heard distinct overtones on the CD and on the tracks encoded with FLAC and WMA Lossless that were missing from the Apple Lossless track. We had presumed there wouldn't be any difference.

WMA Lossless performed best in terms of efficiency: It created the smallest files and was nearly as fast as FLAC. Apple Lossless was not only an order of magnitude slower than the other two but also created the largest files. But **FLAC is the obvious winner,** thanks to widespread industry support, pristine audio quality, and terrific efficiency (see this month's In the Lab for details).

BENCHMARKS	APPLE LOSSLESS	FLAC	WMA LOSSLESS
COMPRESS SCHUBERT CLASSICS (MIN:SEC)	6:50	**2:25**	2:26
COMPRESS FIGHT FOR YOUR MIND (MIN:SEC)	8:35	**2:45**	3:04
SCHUBERT CLASSICS COMPRESSED FILE SIZE (543MB ON CD)	243MB	241MB	**237MB**
FIGHT FOR YOUR MIND COMPRESSED FILE SIZE (687MB ON CD)	419MB	416MB	**402MB**

Best scores are bolded.

FASTEST MIDRANGE CPU

INTEL CORE 2 DUO E6700 VS. AMD ATHLON 64 X2 6000+

Despite the excitement over AMD's Quad FX platform, the company hasn't given up on Socket AM2 and has introduced its fastest processor ever for that platform: the Athlon 64 X2 6000+ ($600, www.amd.com). This new 3GHz 90nm processor is basically one half of a Quad FX FX-74 setup, but instead of two dual-core 3GHz CPUs, you get one dual core. Although AMD hasn't said it quite yet, it's looking like the FX will handle the dual-processor segment while the X2 (and X4 quad core) will control the single-proc AM2 platform. In other words, we don't expect another CPU named FX in AM2.

To see how the $600 processor stacks up, we put it up against Intel's top midrange CPU: the 2.66GHz Core 2 Duo E6700 ($530, www.intel.com).

What's the difference between these chips and the budget procs we look at on page 26? Besides the obvious clock-speed differences, the other significant issue is cache size. Intel and AMD both disable half the cache in the lower-binned parts. The Core 2 E6300, for example, features 2MB of shared cache versus the 4MB in the E6700. The X2 4200+ has only 512KB of L2 per core while the X2 6000+ has 1MB per core. To measure the midrangers, we put the Core 2 Duo E6700 into an EVGA 680i board and slapped our Athlon 64 X2 6000+ into an Asus 590 SLI motherboard. Both boards were equipped with GeForce 7900 GTX cards, a single 74GB WD Raptor drive, 2GB of Corsair Dominator DDR2/800 RAM, and clean OS installs. To keep things fair, we manually set the memory timings on both systems and used the latest BIOS and drivers available for the respective platforms.

BENCHMARKS	CORE 2 DUO E6700	ATHLON 64 X2 6000+	WINNER IS FASTER BY X
3DMARK06 CPU	**2,385**	2,322	2.7%
3DMARK05 CPU	**9,470**	8,123	16.6%
VALVE PARTICLE TEST	**39**	31	25.8%
FEAR (FPS)	**266**	201	32.3%
QUAKE 4 LOW RESOLUTION (FPS)	**150.1**	139.7	7.4%
PREMIERE PRO 2.0 HDV (SEC)	**2,065**	2,504	21.3%
PHOTOSHOP CS2 (SEC)	**220**	265	20.5%
SCIENCEMARK 2.0	1,510.35	**1,661.78**	10%
CINEBENCH 9.5	825	**835**	1.2%
NERO AVC ENCODE (SEC)	**35.54**	36.50	2.7%

Best scores are bolded.

The result? The Core 2 Duo E6700 motors by the X2 6000+ in 3DMark05, Valve's particle gaming test, FEAR, Premiere Pro, and Photoshop CS2 by double-digit percentages. The X2 6000+ manages a face-saving 10 percent win in ScienceMark 2.0, but its only other win is by a mere 1.2 percent in Cinebench. We're calling this one for the Core 2 Duo E6700, as it easily trounces AMD's fastest X2 in almost every test we used. Even uglier, the new X2 6000+ has a wholesale price of $607, while the Core 2 Duo E6700 is listed at $530.

We'd have to say that it's getting pretty bad for the Athlon 64; we haven't seen any good news for the chip since the Core 2 made its debut. The X2 6000+ is simply **outclassed at every turn by the Core 2 E6700,** and we can't see any reason to recommend it over the Intel part today.

BEST CORE 2 CHIPSET

NVIDIA NFORCE 680I SLI VS. INTEL 975X

The conspiracy theory goes something like this: Intel's inside knowledge of its CPUs always gives it an edge in chipset performance. But that's not exactly true. In battles between Intel's top-shelf 975X and other chipsets, we've found that Nvidia has done quite well. Using the exact same Intel Core 2 Extreme X6800, the same RAM, the same graphics card, and the same hard drive, we saw the 680i SLI–equipped motherboard just edge the 975X in a majority of our tests. Of course, this alone isn't enough to justify a win. With modern chipsets—including those with memory controllers—the choice usually comes down to features, features, and more features.

BENCHMARKS	INTEL 975X	NVIDIA NFORCE 680I
SISOFT XI	5,445	**5518**
QUAKE 4 LOW RESOLUTION (FPS)	**194.7**	194.3
3DMARK2001 SE	46,552	**46,688**
3DMARK03	25,683	**25,692**
3DMARK05	11,389	**11,490**
FEAR (AVG)	**301**	276
PCMARK05 OVERALL	8,061	**8,188**
PCMARK05 CPU	7,503	**7,545**
PCMARK05 RAM	6,072	**6,197**
PCMARK05 GPU	9,008	**9,210**
PCMARK HDD	5,762	**6,142**

Best scores are bolded.

That's where **the 680i SLI (with its support for Nvidia's SLI) really slams the 975X to the ground.** The 975X lets you run dual cards, but only ATI's CrossFire cards. With the purchase of ATI by AMD last year, we're not going to hold our breath that future DirectX 10 CrossFire cards will come to Intel's rescue. When you factor in some of the 680i's other cool south bridge features, such as hardware firewall support, port teaming, and packet prioritization, the 975X looks like the old-as-granny chipset that it is.

QUAD CORE VS. DUAL CORE

INTEL CORE 2 EXTREME QX6700 VS. INTEL CORE 2 EXTREME X6800

You have $1,000 burning a hole in your pocket, and you don't know what to buy: Intel's dual-core 2.93GHz Core 2 Extreme X6800 or its quad-core 2.66GHz Core 2 Extreme QX6700. To test the two, we installed the procs in motherboards using the 975X chipset. Both mobos had the same hardware and software installed. We selected applications that would spawn enough threads to keep the dual core and quad core busy.

The result? In applications that support enough threads to keep all four cores busy, the quad core spanks the dual-core processor. That's because the quad core is actually two of the dual-core CPUs connected under one heat spreader. Even though the dual core is about 267MHz faster, that clock speed can't make up for the two additional cores in the quad core. However, in apps that don't spawn enough threads, the extra two cores in the quad core sit idly and the dual core pulls ahead. So what's right for you? It depends on how far into the future you can see.

In the majority of today's applications, the dual core will be faster. But as more and more applications are updated to take advantage of multithreading, the quad core will pull ahead. We can recognize that **quad core and beyond is the future** of computing. To not spend your $1,000 on the quad core today—even with its clock-speed penalty—would be a mistake.

BENCHMARKS	2.66GHZ CORE 2 EXTREME QX6700	2.93GHZ CORE 2 EXTREME X6800
PREMIERE PRO ADVANCE PROFILE (SEC)	**1,088**	1,291
BIBBLE LABS RAW CONVERSION W/ NOISE NINJA (SEC)	**1,450**	1,725
3DMARK06 CPU	**3,897**	2,522
QUAKE 4 (FPS)	173.3	**195.0**
FEAR (FPS)	258	**268**

Best scores are bolded.

FASTEST CPU UNDER $200

INTEL CORE 2 DUO E6300 VS. AMD ATHLON 64 X2 4200+ ENERGY EFFICIENT

To measure our budget procs, we put the Core 2 Duo E6300 ($185, **www.intel.com**) into an EVGA 680i board and slapped our Athlon 64 X2 4200+ EE ($175, **www.amd.com**) into an Asus 590 SLI motherboard. Both boards were equipped with GeForce 7900 GTX cards, a single 74GB WD Raptor drive, 2GB of Corsair Dominator DDR2/800 RAM, and clean OS installs. To keep things fair, we manually set the memory timings on both systems and double-checked the clock speeds of the GPUs.

The winner? Intel's 1.86GHz Core 2 Duo E6300 led the way in a majority of our tests—including Adobe's Premiere Pro 2.0 HDV video editing test and the Photoshop CS2 image editing benchmark. The Core 2 also pulls away fast in FEAR and Valve's gaming particle test. But the 2.2GHz X2 bests the Core in ScienceMark 2.0 and Cinebench by a bit. The upshot? We give the Core 2 the edge in most media-handling chores and games that aren't GPU-bound, but the X2 beats the Core 2 in some floating-point and scientific applications. Considering the Athlon's almost 400MHz clock advantage, **we're calling this one for the E6300 for its overall speediness.**

BENCHMARKS	CORE 2 DUO E6300	ATHLON 64 X2 4200+ EE	WINNER IS FASTER BY X
3DMARK06 CPU	**1,671**	1,654	1%
VALVE PARTICLE TEST	**34**	22	54.5%
FEAR (FPS)	**175**	143	22.4%
QUAKE 4 (FPS)	**127.2**	123	3.4%
PREMIERE PRO 2.0 HDV (SEC)	**2,800**	3,305	18%
PHOTOSHOP CS2 (SEC)	**284**	332	16.9%
CINEBENCH 9.5	580	**618**	6.6%
NERO AVC ENCODE (SEC)	51.33	**50.14**	2.4%

Best scores are bolded.

BEST AM2 CHIPSET

ATI CROSSFIRE XPRESS 3200 VS. NVIDIA NFORCE 590 SLI

Unlike GPU-makers, who duke it out tooth and nail, motherboard-chipset vendors tend to be more cordial with each other. Not! Case in point, ATI's early south bridge sucked so badly that most board vendors subbed a ULi-provided part for it. Nvidia then bought ULi, and board vendors were faced with a mysterious parts shortage for their ATI boards while consumers barked about lack of driver support. Like we said, it gets ugly. Fortunately, newer CrossFire Xpress 3200 boards use ATI's SB600 south bridge; however, we still saw problems in a showdown between an nForce 590 SLI board and a CrossFire Xpress 3200.

Using the same 2.8GHz Athlon 64 FX-62, RAM, hard drive, GPU, drivers, and RAM timings, the nForce 590 SLI generally landed ahead of the CrossFire Xpress 3200 board in the benchmarks. The new SB600 south bridge also delivered worse hard drive performance than the 590 SLI. Of course, whether Nvidia will continue to deliver chipsets for AMD processors is a big question mark. Both Nvidia and AMD claim that rock 'n' roll will never die, but like Van Halen without David Lee Roth, we think Nvidia and AMD are heading for their own VH1 *Behind the Music* special. Despite the drama, for now **the winner is the nForce 590 SLI,** but we'd be lying if we didn't say we're not sure where Nvidia will be building AMD hardware next year.

BENCHMARKS	CROSSFIRE XPRESS 3200	NFORCE 590 SLI
QUAKE III NORMAL (FPS)	533	**581**
SISOFT SANDRA 2007	**8,556**	7,300
3DMARK05	11,018	**11,168**
PCMARK05	6,770	**6,823**
PCM CPU	5,716	**5,587**

Best scores are bolded.

$200 HARD-DRIVE SHOOT-OUT

HITACHI VS. SAMSUNG VS. SEAGATE VS. WD

Buying a new hard drive doesn't have to be an outrageously expensive proposition. In fact, we're not going to let it be. We've rounded up drives from four top manufactures—with one special catch: Each drive has an MSRP of $200 or less. Yes, it's the battle of the cheapies, but just because they're inexpensive doesn't mean they aren't solid hunks of storage.

The grand melee consists of Hitachi's 500GB Deskstar E7K500 ($200, www.hitachi.com), Samsung's 500GB SpinPoint T166 ($190, www.samsung.com), Seagate's 400GB 7200.8 Barracuda ($190, www.seagate.com), and Western Digital's 500GB Caviar SE16 ($200, www.westerndigital.com).

Emerging from the brawl as the speed victor is Western Digital's Caviar drive. Not only did the drive perform admirably on our HD Tach random access test, but more importantly, it had the highest average read speed of all four contenders. And that isn't just because it was spinning faster; the platters on each drive in our showdown run at 7,200rpm.

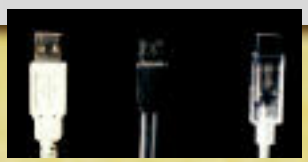
As expected, the PATA drive was the worst performer in all categories. Come on, Seagate—where's the cheap, high-capacity SATA?

BENCHMARKS	HITACHI	SAMSUNG	SEAGATE	WD
HD TACH RANDOM ACCESS (MS)	**12.9**	14.1	15.2	13.5
HD TACH AVERAGE READ (MB/s)	64.2	70.3	61.3	**72.6**
HD TACH BURST SPEED (MB/s)	206.4	**219.9**	94.0	204.9

Best scores are bolded.

THE FASTEST CONNECTION

FIREWIRE 800 VS. USB VS. ESATA



First, thou shall take out the external hard drive. Then thou shall connect using three methods: FireWire 800, USB 2.0, and eSATA. But selecting the speed victor among these three options isn't as obvious as picking out a black sheep in a white herd—USB loses hands down, but FireWire 800 puts up a worthy fight against eSATA.

We tested all three interfaces using the fastest SATA drive in the Lab, the Western Digital Raptor X hard drive. This helped ensure that we were testing the interface, not the drive. We hooked the Raptor up to a plain ol' external enclosure that supported both USB and eSATA interfaces and proceeded to run HD Tach on both interfaces.

FireWire 800 is a bit more elusive on external enclosures, so we connected a WiebeTech SATADock to a PCI-based FireWire 800 card in our test bed and attached the Raptor to the SATADock via SATA. Ta da!

Watching the USB benchmarks come through brought a sad tear to our eye. If we're talking purely in terms of speed, USB's usefulness as an efficient transfer mechanism is dead—dead, rotting, and rolling in its grave at the thought of its faster brethren, eSATA and FireWire 800.

As for those two, well, we find ourselves at a bit of a loss. As noted, our HD Tach benchmark showed virtually no difference between the Raptor's average read speeds via a FireWire 800 or eSATA connection. CPU usage is nearly identical, with the only difference between the two mediums coming from burst speed, the highest rate data will zip to the drive.

With that said, eSATA ekes out the win. Not only is its 300MB/s cap larger than the 100MB/s cap of FireWire 800, but it also ever-so-slightly squeaks out faster read speeds.

BENCHMARKS	ESATA	FIREWIRE 800	USB 2.0
CPU UTILIZATION	1%	2%	**0%**
RANDOM ACCESS (MS)	8.3	**8.1**	8.4
AVERAGE READ (MB/s)	**77.9**	76.0	36.7
BURST SPEED (MB/s)	**128.8**	87.9	37.6

Best scores are bolded.

NETWORKING BATTLE

POWERLINE NETWORKING VS. 802.11N

We've wanted to stream high-def video from room to room for years, but for a long time, the only way to make that happen was to run CAT-S Ethernet between the rooms. Fortunately, there are alternatives to cabling: powerline networking and the latest Wi-Fi standard, 802.11n.

We tested using two Netgear products, the HDX101 Powerline Ethernet Adapter ($130 each, www.netgear.com) and the WNR854T draft-802.11n Wi-Fi router ($160). First, we ran a basic file transfer test in which we copied a 238MB file from a wired machine to a wireless machine. Next, we tested the hardware's ability to stream high-definition video across the interface.

Our results were interesting, to say the least. With the HDX101, which uses a different (and incompatible) chipset than previous powerline products, we transferred our test file in about 87 seconds. HD streaming worked flawlessly. Wi-Fi fared poorly in our real-world test environment, although in the Lab it worked reasonably well. It took about 207 seconds to transfer our test file over the 802.11n connection in the real-world environment, and we weren't able to stream HD video. In the Lab, with a direct line-of-sight between the router and the laptop, we managed to transfer the test file in 36 seconds. With one wall between the router and the laptop, that time dropped to 65 seconds.

Granted, we're still working with draft-802.11n hardware, and we expect the finalized spec to perform better. But, if you want to stream HD video across your home today, your best choice is a powerline product using DS2's chipset.

PREMIUM VS. STANDARD FLASH

2GB ULTRA II SANDISK SD VS. 2GB STANDARD SANDISK SD

Buying flash memory is like trying to pick out a toothbrush. The products make tons of promises, but it's tough to measure actual performance gains. And just like the promise of whiter teeth, does the expensive extra speed *really* get you anything? To test that theory, we put a basic 2GB SanDisk SD card ($70, www.sandisk.com) against a 2GB SanDisk Ultra II SD card ($80, www.sandisk.com). The standard card has no speed rating, but the Ultra II promises 9MB/s reads and 8MB/s writes. As a control, we also tossed in a 2GB Extreme IV Compact Flash card that claims read and write performance of 40MB/s, or 266x. The Extreme IV's performance, however, is gated by the fact that the camera or card reader must support UDMA mode 4 or Ultra ATA 66 speeds. Few do, and in fact, we ended up using a SanDisk card reader capable of only 20MB/s speeds for part of our testing. For a real-world test, we used Canon's EOS-1D Mark II N, which is capable of shooting 8.2MP images at 8.5fps for 48 frames. At full tilt, this camera sounds like an M-249 SAW. We also used straight file-copying tests on a quad-core machine and ran some synthetic benchmarks to back up the tests.

The result? If taking pictures in a hurry is important to you, **memory cards with higher ratings are worth the extra cash.** The Ultra II SD card, which cost about 15 percent more, cleared the write buffer on our Canon EOS from 58 percent to 100 percent faster than the standard card. On our PC tests, the faster SD card was about 48 percent faster in writes, but interestingly, read speeds were a wash. On the PC, the Extreme IV card really unleashed pain on both SD cards by writing 2GB of data almost 300 percent faster than the slow SD card and 170 percent faster than the Ultra II SD card. The upshot is that it's worth paying for some speed. However, with even today's fastest camera unable to write beyond 10MB/s, it doesn't make sense to pay for bleeding-edge speed until the camera technology catches up.

BENCHMARKS	ULTRA II SD	STANDARD SD	EXTREME IV CF
TIME TO WRITE 184 RAW ON PC (SEC)	363	534	**135**
TIME TO READ 184 RAW ON PC (SEC)	187	190	**110**
CAMERA TESTING			
WRITE 50 JPG ISO 100 (SEC)	**17**	27	18
WRITE 26 JPG ISO 3200 (SEC)	**19**	38	22
WRITE 22 RAW (SEC)	**20**	37	21

Best scores are bolded.

8800 GTX SLI: A GOOD INVESTMENT?

SINGLE 8800 GTX VS. 8800 GTX SLI

When it comes to graphics firepower, can you ever have too much? The answer depends on two factors: the size of your display and the power of your CPU.

Nvidia doesn't recommend even benchmarking a pair of 8800 GTX cards running in SLI at less than 1600x1200 resolution because the CPU becomes a performance bottleneck, leaving the GPUs to twiddle their thumbs waiting for work. In fact, Nvidia suggests that even single-card 8800 GTX benchmarking be conducted on a 30-inch panel at 2560x1600 resolution. But some of us find gaming on such large displays a disorienting, neck-straining experience—especially with shooters. Our current test panel is a 23-inch ViewSonic VP2330wb, which delivers 1920x1200 pixels with a 16:10 aspect ratio. Is it worthwhile to run two 8800 GTX cards at that resolution?

To find out, we tested a single 8800 GTX ($575, www.asus.com) card and then paired it with an Nvidia reference-design 8800 GTX. We installed both cards in an EVGA nForce 680i SLI 775 motherboard with 2GB of memory and an Intel Core 2 X6800 CPU stock-clocked at 2.93GHz. The videocards ran at their stock clock speeds (576MHz core, 900MHz memory). Benchmarks consisted of Quake 4 (ultra quality), FEAR (soft shadows on), and 3DMark06's Shader Model 3.0 games. We tested everything at 1920x1200, 4x AA, and 16x aniso.

Running in SLI boosted frame rates by 80 percent or more in our 3DMark06 and FEAR benchmarks when compared to our machine's single-card performance, but we saw "only" a 56-percent improvement in our Quake 4 score. That renders SLI—even with the screamin'-fast 8800 GTX—a worthy investment in our book. If your rig is outfitted with a lesser CPU, on the other hand, you'll likely be better off making that upgrade first.

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

Best scores are bolded.

WHAT'S THE PERFORMANCE HIT FOR RUNNING BITLOCKER?

Vista Ultimate and Enterprise include BitLocker, a utility that encrypts your hard drive in real time using industry-standard 256-bit AES technology. We love encryption, but we haven't spent a lot of time with whole-disc encryption—instead, we encrypt only sensitive files and directories. After all, we don't want to slow down our entire system just to encrypt our tax returns.

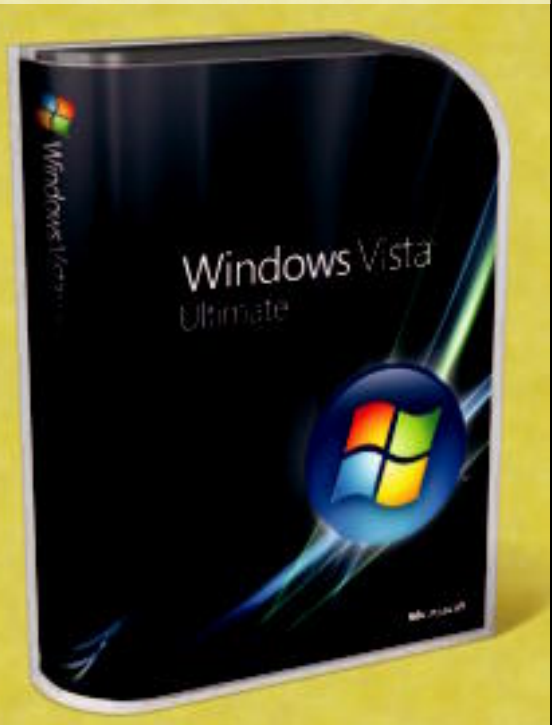
With that in mind, we set out to find out what BitLocker's impact is on different types of apps, and our results were interesting, but somewhat expected. In applications that don't require frequent hard drive access, like games, there was virtually no difference between the encrypted and unencrypted drives. However, when we busted out the hard-drive-intensive benches, we immediately saw as much as a 20 percent hit on the encrypted system. We're not sure the PCMark06 slowdown represents real-world performance, but our Photoshop script, which includes tons of hard-drive-intensive reverts, showed a 10 percent hit as well.

What's the bottom line? We're not going to enable BitLocker on systems that don't hold crucial, mission-critical data.

BENCHMARKS	UNENCRYPTED DRIVE	BITLOCKER ENCRYPTED DRIVE
FEAR (FPS)	56	**57**
3DMARK06	8,071	**8,082**
PCMARK06 HARD DRIVE SUITE	**6,133**	4,948
PHOTOSHOP CS SCRIPT (SEC)	303	**330**

Best scores are bolded.

WINDOWS VISTA VS. WINDOWS XP



The OS is final. The drivers are done. It's time to put Microsoft's new operating system to the benchmarking test. We set up one of our standard test beds with a GeForce 8800 GTS board and the latest drivers for both XP and Vista (97.92 and 100.59, respectively) and then fired up FEAR, Quake 4, Company of Heroes, and 3DMark06 to see what was what.

We ran all tests at 1600x1200 with all in-game visual quality settings maxed, 8x antialiasing and 16x anisotropic filtering enabled, and hardware sound disabled in XP. When testing in Vista, we ran with User Account Control and Aero Glass enabled to mimic a real-world Vista install.

As you can see in the chart below, XP walloped Vista in every benchmark we ran—by more than 10 percent in some tests. Vista's OpenGL performance, in particular, was poor; our test rig's Quake 4 performance was a full 10fps slower in Microsoft's new OS than it was in Windows XP.

We were especially interested in the performance of Vista's Aero Glass user interface, but unfortunately, our number one tool for measuring desktop performance—SYSmark—isn't compatible with Vista yet. We'll revisit this test when we have a Vista-enabled version of the desktop application suite.

We're certainly not Vista apologists, but it's important to put these scores in context. We're comparing mature drivers based on a product that's been available for more than five years with first-gen drivers for a product that's been available for a couple of weeks. That applies to not only the videocard but the other hardware in the test rig as well—in Vista, everything from the soundcard to the motherboard is using either beta or first-gen drivers, and these results aren't necessarily representative of the final performance of the operating system.

Still, if we're playing the role of devil's advocate, we have to consider that Vista could just be slower. When we look at the number of background services running in Vista—from the search indexer to SuperFetch—it's easy to see why this might be the case. The operating system's just doing more. And, while we usually choose a lean 'n' mean PC, we're not averse to trading CPU cycles and memory space for some of the additional functionality that Vista provides.

So, where does that leave gamers? Unless your rig is pushing heavy iron in the GPU department—think SLI'd GeForce 7800s or better—**you might not want to face the frame-rate hit that a switch from Windows XP to Vista will entail.** If you're running new high-end cards, you might not even notice the Vista performance penalty. We're also confident that performance will improve as the drivers mature; however, we have no idea how much (or how soon) things will improve.

And, of course, when DirectX 10 apps like Crysis ship, Vista's going to be the only operating system they're compatible with. MPC

BENCHMARKS	WINDOWS XP PRO	WINDOWS VISTA ULTIMATE
FEAR (FPS)	**61**	56
COMPANY OF HEROES (FPS)	**69.4**	60.1
3DMARK06 (FPS)	**8,151**	8,071
QUAKE 4 (FPS)	**84.4**	74.3

Best scores are bolded.

MAXIMUM PC's FIFTH ANNUAL SOFTY AWARDS

BY THE MAXIMUM PC STAFF

10 kick-ass applications win our highest praise—and a shiny, shiny statue

It's true that amid all our oohing and aahing over cutting-edge hardware and benchmark results, software often gets short shrift. But that's not to say the ones and zeros don't excite us. An email program that anticipates our needs, an app that uses the Internet to build a personal VPN, a utility that gives Windows the white-glove treatment—that kind of stuff makes us giddy. That's what the Softy Awards are all about. Our annual bacchanal gives us a chance to salute the programs and utilities that have truly improved our lives.

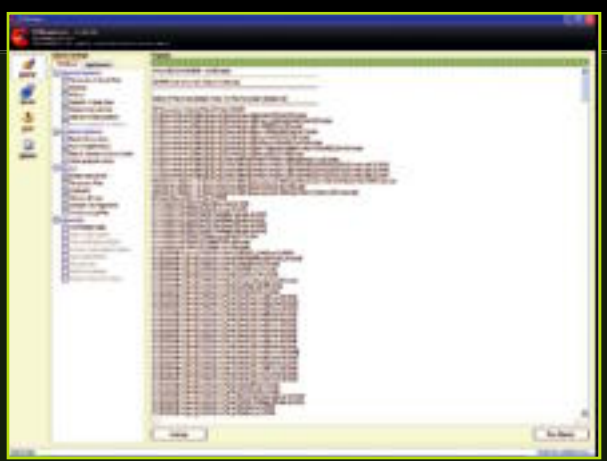
Whittling down dozens of hopefuls into a standout handful is no easy task, and this year our task was even more difficult. We expanded our rigorous selection criteria to include applications that extend the power of mobile devices and web browsers. In the end, the software we present here was unanimously chosen by the uber-finicky Maximum PC staff—and all of it is free.

So, without further ado, let's get on with the ceremony!

CCleaner

It's like a high colonic for Windows XP

You're probably feeling a little like Harcourt Fenton Mudd, the way we constantly nag you to empty your Recycle Bin, clear out old chkdsk file fragments, and zap old prefetch data. Well, good news: CCleaner, aka Crap Cleaner, does the dirty work for you. With the push of a button it dumps Windows XP's useless detritus and clears out those log files that, umm, you don't want anyone to know about. Best of all, this handy app comes at the right price—it's free. Run it once a month to shut old Stella up. www.ccleaner.com



Your OS will be frolicking like a clean install once it's been freed of its bloat.

Skype 3.0

Go ahead and throw out your phone

Skype allows you to make crystal-clear, absolutely free, encrypted calls to anyone who also has a Skype account—no matter where they are—and calling to a land line or cell phone can cost as little as 2.1 cents a minute. Conferences, video calls, file transfers, and instant messaging are just a few of the other features we love that are included in this program. And with the service installed on your smartphone, you can make low-cost or free international calls from anywhere you can get a Wi-Fi connection. www.skype.com

Call anyone—and stick it to the telecoms—with Skype.

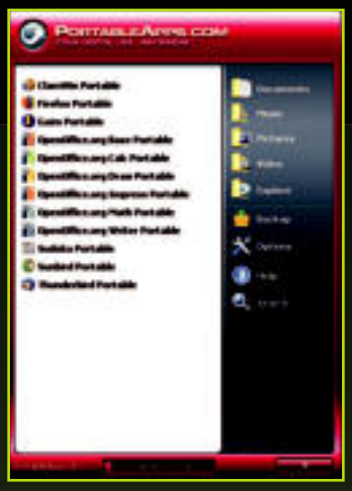
MAXIMUM PC'S FIFTH ANNUAL

SOFTY AWARDS

PortableApps Suite 1.0

You CAN take it with you

Forget about U3 and Ceedo, we've got a better portable application package! PortableApps delivers a free bundle of computing goodies that can be loaded onto any device—thumb drive, hard drive, iPod, whatever! Plug your drive into any computer and you'll be rocking a fully customized PC experience—from your personal Firefox bookmarks, to your Thunderbird email, to IM contacts, to OpenOffice documents; plus, you get portable antivirus and backup programs. All apps run from within the secure and anonymous confines of your PortableApps environment—unplug the drive and remove any trace of your activities. http://portableapps.com



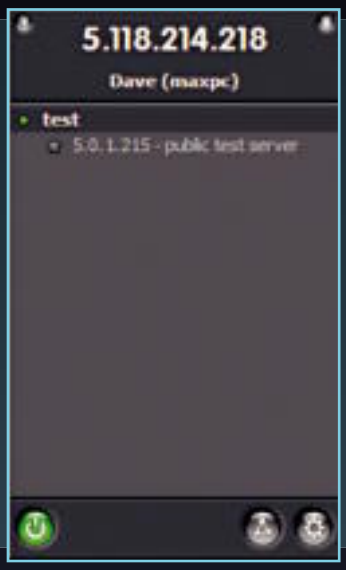
A handy menu reveals all the personalized programs you can run off your thumb drive with PortableApps installed.

LogMeIn Hamachi

VPN for noobs

How do we love thee, Hamachi? Let us count the ways, even though there's really just one. But, boy, are we smitten. Hamachi makes it possible to effortlessly (and we mean *effortlessly*) set up a VPN connection between any computers jacked into the Net.

Once you've connected your rigs, you get secure access to any network function imaginable—fire up your iTunes shared music; rock an old-school, network-based game (IPX, anyone?); spin up your favorite remote desktop application; you name it. And did we mention that the process is effortless? www.hamachi.cc



Three buttons to rule them all; Hamachi's network interface is that simple.

Torpark

The secret-agent web browser

We take the Vegas approach to web surfing: What happens on the web stays on the web. Or so we hope. The Torpark browser, though, helps provide peace of mind. Designed to fit on a USB thumb drive, Torpark keeps the sites you visit from knowing who you are by running page requests through the Tor network, allowing you to enjoy an anonymous web experience. The network can be slow, but you have the option of "flushing" the circuit you are on for a faster connection, and should you decide to come out in the open, you can seamlessly jump off the Tor network for speedier web browsing. www.torrify.com

By using the Torpark browser, your web whereabouts remain private.

WinAudit 2.1

A journey through your PC's every nook and cranny

Really get to know your system with this PC audit and inventory software. The self-contained program, which requires no installation or configuration, runs a thorough scan of all the hardware and software on your PC and presents the information in a comprehensive, categorized, browser-friendly format. You'll see your system in a whole new light: Learn which extensions, instructions, and technologies are enabled in your processor; peruse a log of all your application errors; learn whether any of your hard disks are at risk of failure; and even discover which motherboard is in your Aunt Edna's PC. It works with all flavors of Windows from 95 through Vista. **www.pxserver.com/winaudit.htm**

Pick and choose exactly which aspects of your system WinAudit reports on.

Last.fm

Finally, intelligent internet radio

Other Internet radio stations have promised to intuitively create a mix of music we'd love, but their limited song libraries and imperfect track selections have failed to impress us. Last.fm, however, has us dancing in our seats. In addition to selecting artists or styles of music, with Last.fm you can tag songs as well as create custom stations based on tags, so it's easier to refine your listening experience and find the music you want. With its great range of artists, expansive search functions, and spot-on recommendations, Last.fm is where we go to discover new music. **www.last.fm**

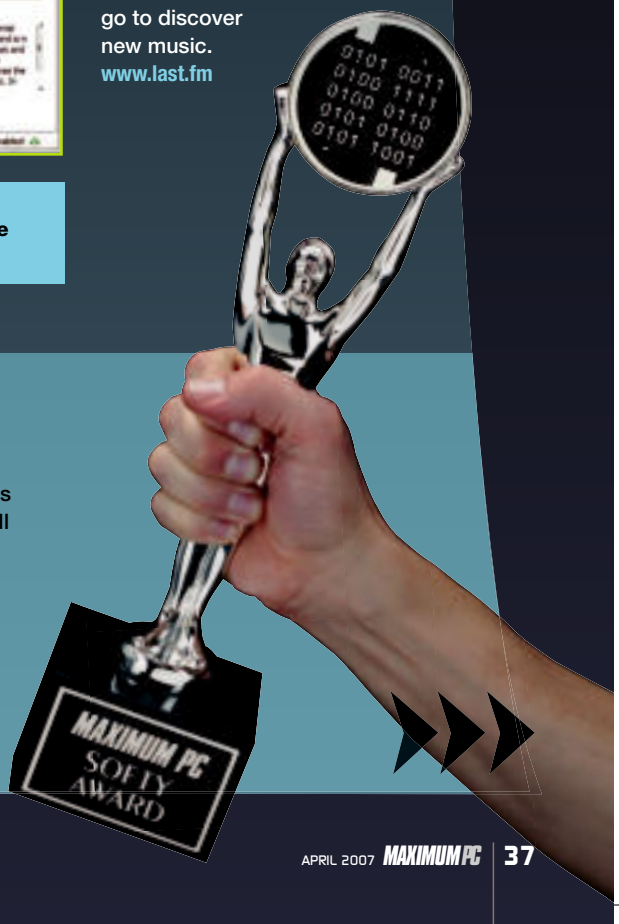
Using Last.fm's tag feature, we discovered our new favorite progressive folk-metal band, Orphaned Land.

Other Web Apps Worth Checking Out

WRITELY: Google's web-based word-processing app offers Word functionality and lets you store and share your documents online. **www.writely.com**

BACKPACK: It sounds goofy, but sharing your to-do list and notes online is eminently useful. **www.backpackit.com**

SPOTBACK: Get personalized news and customize a front page of all your RSS feeds, complete with updated lists and mouse-over summaries of the latest stories. **http://spotback.com/**



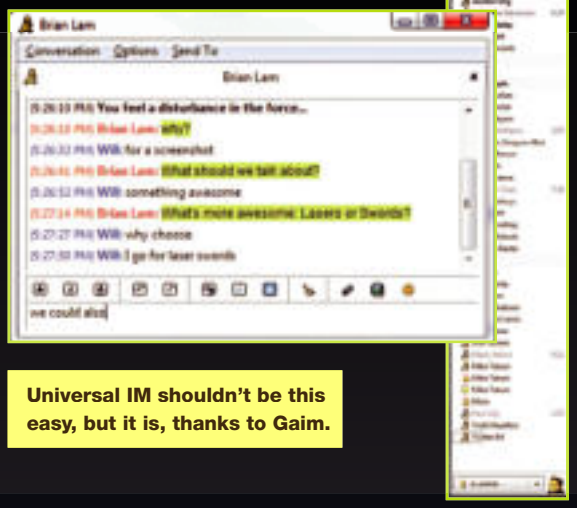
MAXIMUM PC'S FIFTH ANNUAL

SOFTY AWARDS

Gaim

Taking over the IM world, one emoticon at a time

While Trillian users enter their third year without a major update, Gaim aficionados (we call them Gaimers) are on the cusp of an instant-messaging revolution. Even in beta form, Gaim 2.0 has brought the open-source instant messenger to the pinnacle of Softyness. By eschewing unnecessary features and focusing on rock-solid core functionality, the crazy kids behind Gaim have stolen our hearts, in 300 characters or less. http://gaim.sourceforge.net



Universal IM shouldn't be this easy, but it is, thanks to Gaim.

Thunderbird 2.0

Tag, you're it!

Thunderbird 2.0 has finally brought Gmail-style tags to *your* desktop email client. Instead of sorting your messages cave-man-style by placing them in static folders—where they'll rot for all eternity—Thunderbird lets you apply as many tags as you like to any message. This allows you to build dynamic search folders based on your tags (or subject, sender, or date received, for that matter). Thunderbird kicks ass! www.mozilla.com

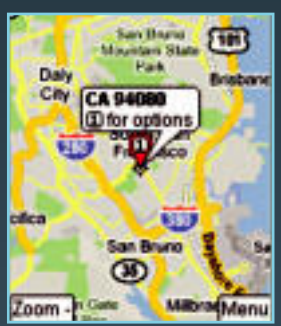
Bringing the power of Gmail's tagging system to your desktop.

Google Maps Mobile

Never get lost again

How many maps are in your car? What about on your laptop? Do you own city, region, and state maps, just in case you need to make a quick run for the border? We didn't think so.

Google Maps Mobile works on most any cell phone and does exactly what its name implies—provides Google Maps on the go. Just think: You never have to be lost again. The app will work on virtually any phone with a data plan that runs Java apps. You can pan, zoom, generate directions, or even look at satellite photos. www.google.com/gmm



Everywhere you go/ everything you do/ Google Maps Mobile/ has a map for you.

Other Mobile Apps Worth Checking Out

OPERA MINI
In many ways, this free Java-based browser is better than its $24 brother, Opera Mobile. Think crazy-useful Start screen, for one.
www.operamini.com

CELL PROFILE SWITCHER
Automatically change the profile on your Windows Mobile phone according to the cell tower you're connected to. Genius!
http://maniac.fschreiner.de/ MPC

A spotlight on CASES

PHOTOGRAPHY BY SAMANTHA BERG

We examine seven new cases, from supersized to shrinky-dink, to find the perfect enclosure for power users

Without computer cases, geeks and gamers alike would have run through the world's Styrofoam, cardboard, and duct tape reserves years ago. Without cases, there would be nothing to prevent an errant pop can or frisky feline from falling upon a host of precious, pricey PC parts. Without cases, legions of bright young men and women would face utter loneliness, for there would exist no fancy LED fans, masterful window etchings, or screwless drive bays with which to woo the opposite sex at LAN parties.

Yes, that's right. Without cases, a computer enthusiast's life just wouldn't be worth living. In many ways, a case is even more important than what goes *inside* it. Consider the facts: If you're serious about high-performance computing, your case is likely to outlast your peripherals. It's also, literally, the first thing people see when it comes time to peacock your PC (unless, of course, you're using an acrylic box).

So, what then makes for a great case? Partly, it's pure aesthetics. Still, there are some make-or-break issues when it comes to finding a great computer chassis, and we've spelled out everything you need to know in the next few pages. Before you get started though, we need to tell you that we've found one case that's so awesome, so amazing, so ass-kicking, it surpasses all others. Join us on a magical mystery ride through Caseland, USA!

BY DAVID MURPHY

Choosing the Perfect Case

Before purchasing your next case, consider the following

CONSTRUCTION

The materials that make up your prospective case don't really matter *that* much. What does impact the equation—and your arms—is the case's weight. If a case is cumbersome *before* you put anything into it, imagine its heft once it's stuffed with optical drives, hard drives, videocards, water-cooling reservoirs, etc.

With that said, you'll only infrequently tote your case, so don't skimp on quality just to get a lighter case. It's also important that the outside of your case is durable. If it gets all marked up the second you run your fingernail across it or if it feels flimsy to the touch, move on. What good is a sweet enclosure that turns ugly—or worse, broken—within a few weeks?

COOLING

Whether your cooling solution will involve water or air will have a major bearing on the case you purchase. For the most part, modern case designs tend to favor air cooling, but models can be found that make allowances for water setups. At the very least, look for a case equipped with a number of potential fan locations—better yet, look for a case that comes with fans.

A fan's size dictates the speed—and thus noise—necessary to produce proper airflow; we like 12cm fans because they move lots of air while spinning relatively slowly and quietly. You'll want air to be sucked in through the front of your case and over your hard drives, with one or more exhaust fans located elsewhere to suck the air out of your case. Vacuum cleaners need not apply.

FEATURES

Your case's features can range from the truly useful to the simply cool. A slide-out motherboard tray, for example, is a feature we're always keen on. Toolless drive bays are also welcome. You should also take into account the accessibility of a case's I/O ports—if you know your case will be sitting on the ground, top-mounted ports are handy. Then, of course, there's all the whiz-bangery (or lack thereof) to consider: We're talking LED fans, built-in gauges, locking systems, etc.

Case innovation can be a slippery slope, though, as sometimes these features are actually more irritating than useful (we can't count the number of poorly implemented screwless PCI holders we've broken). A feature doesn't have to be new to be unique—the simple addition of changeable side panels to a case kicks ass, and there's nothing overly fancy about replacing a window.

AESTHETICS

Simply put, you don't want an ugly case. But far be it from us to decide what's atrocious versus what's attractive, as everyone has his own personal sense of style. While we personally hate cases that look like they were pulled straight out of the *X-Files* prop shop, some people are into that sort of thing. Of course, these same people might very well hate a case that's covered in branding for a particular professional gamer.

While we try not to give a case's overall looks a lot of weight in our reviews, we certainly do consider the quality of the craftsmanship and the achievement of a unified aesthetic—be it slick and simple or extraterrestrial.

THERMALTAKE EUREKA

A dream come true for the indecisive

Even though it's a server case, Thermaltake's Eureka manages to include some gamer-rig-style goodies—think out-of-the-box water-cooling support—but the Eureka's only "fancy" add-ons are 12cm blue LED fans at the front and rear of the case.

That's not to say the Eureka is without any neat bits. For starters, the case is extremely easy on the eyes, especially for a full-tower case. The swinging front door is astonishingly sturdy and opens to reveal a front panel that epitomizes the term "ease of use." Popping off the bezels to install devices is as easy as, well, popping them off by using a handy little tab.

While adding drives to the Eureka's six 3.5-inch bays still requires screws, the pull-out drive bays make the process relatively simple. Too bad Thermaltake couldn't have been as thoughtful in the design of its hideous, screwless PCI-card holder, which forces you to quasi-unattach every card whenever you make an adjustment.

With built-in support for water cooling and EATX motherboards, the Eureka caters to all crowds. It might not be a 20th-level fighter in any one category, but it certainly makes for a solid bard.

THERMALTAKE EUREKA **8**

$160, www.thermaltake.com

ENERMAX ECA 3092 PHOENIX

Meet the Ron Jeremy of enclosures

Enermax's Phoenix isn't much to look at, nor does it boast the special features or advantages of its peers. What makes the Phoenix stand out, however, is its monstrous unit… cooling unit, that is: a 25cm fan built directly into the side panel.

And that's it. You can toggle the fan to spin in one direction or the other, but other than that, the Phoenix is fairly ho-hum. Worse, we could never get the fan to actually spin up without first removing the side panel and giving it a li'l nudge. Performance anxiety, perhaps?

ENERMAX ECA3092 PHOENIX **4**

$150, www.enermax.com

COOLER MASTER CM MEDIA 280

It lives, it lives! One part media PC, one part desktop

Mash Henry Jekyll and Edward Hyde into a case design and you've got Cooler Master's CM Media 280. It's the first hybrid media center/desktop enclosure to hit our Lab—flip it horizontally for a low and wide silhouette that will slide into an entertainment console or stand it up vertically for traditional use.

Cooler Master could have made the case transformation a bit easier, but by the same token, this case isn't designed to be reoriented on a whim. To go from a desktop to a media center, you have to pop panels, reorient hard drives, adjust drive bays… it's a process.

At least Cooler Master eases the pain by including a handy Windows-themed remote with the case, as well as a four-inch fluorescent display for the case's front panel that shows you the typical media center stuff—album titles, song listings, etc. The little extras are enough to put the CM Media 280 on the side of good rather than evil, but barely so.

COOLERMASTER CM MEDIA 280 **7**

$200, www.coolermaster.com

ANTEC NINE HUNDRED

This case rocked us like a hurricane

Antec's Nine Hundred is solidly constructed and surrounded by enough air cooling to bring Dorothy back home to Kansas. Shoot, *we* were effectively "blown away" by the Nine Hundred, hereafter dubbed "the 900," which is a fine example of case craftsmanship, despite a few minor flaws.

The case's internals are pleasantly predictable. Three 5.25-inch bays and six 3.5-inch bays reside behind the case's stylish front panel, and the full grill not only looks sharp but also improves the 900's ability to generate ample airflow. Two 12cm blue LED fans suck air across your hard drives and into the eye of the storm, and a 20cm fan churns on the 900's ceiling.

And that's not all! Another fan at the rear of the case helps make the 900 an ideal solution for those who prefer air cooling to water cooling. Heck, you can even install an additional fan on the case's side window grill—a pleasant bit of overkill. "Hurricane" is an apt term to describe the force produced by the 900's fans at full tilt, but if going deaf isn't your thing, Antec has wisely given users the ability to customize speeds via a little switch on each fan.

The 900's few flaws—a hard-to-remove side panel, a ton of drive-bay thumbscrews, and no eSATA port—are hardly enough to dump rain on this case's parade.

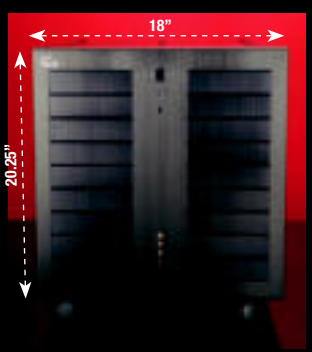
ANTEC NINE HUNDRED **9**

$150, www.antec.com

LIAN-LI PC-343B

It's built like a friggin' tank!

Cubes have figured prominently in many of nerddom's best moments: *Hellraiser's* Puzzle Box and *Star Trek*'s Borg immediately come to mind. And now you can add Lian-Li's PC-343B modular case to the list because this chunky black square represents a monster of PC configurability—on wheels, mind you.



With space for up to 18 5.25-inch devices or 30 hard drives, two water-cooling radiators or power supplies, and up to 11 fans, this case is perfect for the person who can never have too much hardware.

Configuration-wise, the PC-343B comes with a series of replacement panels, including three different options for the top "window"—pure acrylic, a grill, or fans. Now *that's* foresight.

Still, for a case that seemingly has everything, the PC-343B lacks front-panel eSATA support. And we're curious why Lian-Li went with thumbscrews for the PCI slots instead of screwless mounting. Adding insult to injury, the exterior of the case is prone to scratches.

If you want a true "build it yourself" kind of machine, look no further than the PC-343B; just don't use it as a footrest. Trust us.

LIAN-LI PC-343B **9**

$350, www.frozencpu.com

THERMALTAKE MOZART TX

Beauty. Simple beauty

Thermaltake was wise to name this case the Mozart TX, for its design is equal to the virtuoso's musicianship—spectacular. Only the most meager of flaws detract from the whole, if at all.

This entertainment-center case is by no means petite—it's truly geared for someone who wants an all-in-one solution that's capable of anything. And to that end, the Mozart TX certainly delivers. There's a ton of space to work with, including room for up to 10 12cm fans, five 5.25-inch components, and seven 3.5-inch hard drives (add three more if you use the included additional rack).

The bays themselves use screwdriver-free mounts, and installing PCI cards is a breeze with the pleasant tool-free clips. We have to ding the case for allowing only one power supply, and the secondary side of the case (the side without the motherboard) seems underutilized.

Still, the Mozart fares quite well against its competitors. While we might ultimately wonder about the kind of person who *needs* a case this size, we applaud Thermaltake's ability to accommodate such excess in style.

THERMALTAKE MOZART TX **9** MAXIMUM PC KICKASS

$250, www.thermaltake.com

Say Hello to DTX

AMD introduces a new motherboard formfactor for small rigs

Although most of the cases in this feature are geared toward computing enthusiasts—aka people who use more than one PCI slot on their motherboard—there's no denying the escalating trend in small formfactor (SFF) boxes. AMD's certainly not overlooking the market—the company just introduced a new motherboard spec, dubbed DTX, that it hopes will become the de facto SFF standard.

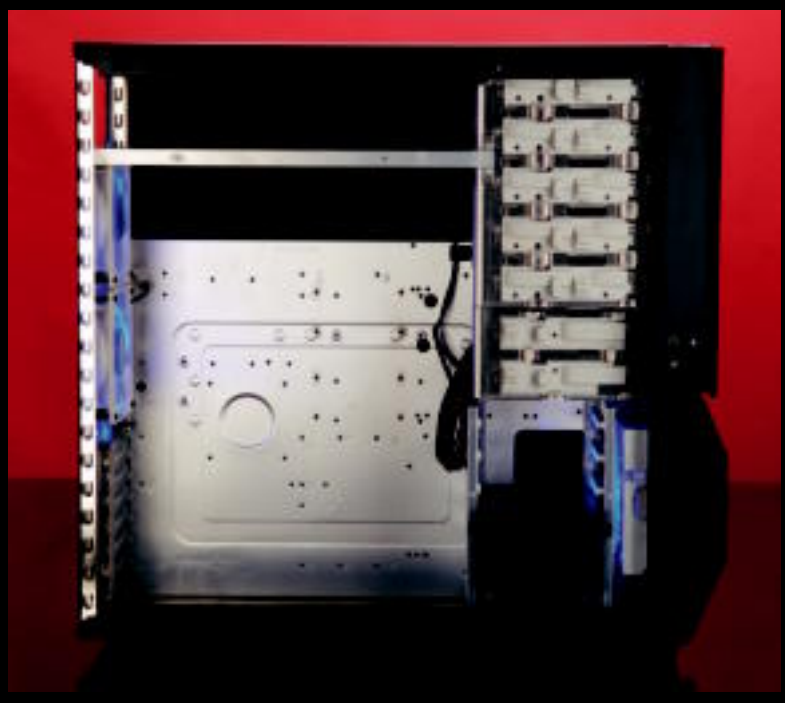
As it stands, SFF boards run the gamut from proprietary designs, to micro-ATX, to BTX (Intel's flagging board standard, which never caught on with the AMD crowd). DTX mobos will run about two inches smaller in width than their micro-ATX counterparts. The spacing of the motherboard mounting holes will still allow installation in ATX-based cases, although these boards aren't likely to populate many gaming rigs—DTX-based motherboards are spec'd for just two expansion slots. On the plus side, the DTX specification will include support for all processors.

But AMD didn't create the specification just to flip the proverbial bird at Intel; DTX could come as a boon for manufacturers, especially those looking to cut costs on motherboard creation. When ATX-based motherboards are cut from a single printed circuit board (PCB), the result is two motherboards per panel, with a good amount of wasted PCB left over. By contrast, manufacturers can chip four DTX boards out of a single PCB, which might very well encourage greater adoption of the standard.

Industry-wide adoption will be AMD's biggest hurdle—it might even require Intel to jump on board, lest DTX follow the same path to irrelevance as… well… Intel's BTX spec.

GIGABYTE 3D AURORA 570

Ho. ly. Cow



Before we begin, we're compelled to set the stage for an introduction worthy of Gigabyte's 3D Aurora 570 case. Go to your CD collection—specifically, the section of music you haven't touched in 10 years. Grab the *Jurassic Park* soundtrack. Fire up track two and wait for that one part. You know, the bit when the high strings crescendo into the main theme? Yeah. That part.

Now sit back, hit the repeat-track button, and allow us to present one of the best cases we've seen—period. Removing the 3D Aurora 570 from its cardboard packaging is as awe-inspiring an experience as encountering your first dinosaur. The case is a triumph of design, wrapped in a solid aluminum shell that's attractively accented by the glow of three 12cm blue LED fans.

The front of the case is home to a key-lockable door that magnetically "snaps" to the front of the case. It's a great solution to the annoying "swinging door" problem we've experienced with some cases, and it's a touch that adds to the overall slick package—no press-in, pop-off doors on this beauty! A front I/O panel below the door is set off with stylish blue trim and sports the usual array of connectors: one FireWire, two USB, two audio jacks, but sadly, no eSATA port.

One of the more surprising and delightful highlights of the Aurora is a stealthed logo on the lower front of the case, which is projected onto the unit's resting surface. By default it reads "Aurora," but you can create your own design on a piece of acetate film. It's a geeky gimmick, for sure, but neat nevertheless.

Out of the box, the case comes with a grill side panel, but Gigabyte also includes a replacement window for enthusiasts who prefer an unobstructed view of their case's guts. Now that's catering to the consumer.

And the conveniences don't stop there, as everything on the inside of the Aurora is screwless—at least the important stuff. Sure, you still need a screwdriver to remove fans, install the motherboard, and remove the crossbar, but everything from hard drives, to 5.25-inch devices, to PCI cards is virtually effortless to install. And speaking of PCI, there's plenty of room for all your next-generation big-assed videocards. The Aurora is anything but cramped for space.

Two rubberized water-cooling holes help round out the list of unexpected extras. They're easily fat enough to hold half-inch tubes, but more to the point, they *look* good. This isn't just some half-assed, let's-punch-some-holes-in-our-case kind of deal; this design makes for a sophisticated-looking water-cooling setup and is hardly a blemish for those folks who choose to stick with air.

1) Cut a hole in the case. 2) Put your tube in the case....

On a macro level, the Aurora is utterly flawless. But even in the small details, Gigabyte has managed to get just about everything right. And all the interesting little additions easily shuffle the Aurora ahead of its brethren and more than make up for Gigabyte's occasional, ever-so-brief lapses in case creation. MPC

GIGABYTE 3D AURORA 570

$170, www.gigabyte-usa.com

10 MAXIMUM PC KICKASS

Clean Your PC the Right Way

The inside of your PC can be a scary place. No, we're not afraid of our gear, but we're terrified of the grime!

TIME 02:04 HOURS:MINUTES

You're the kind of guy who's serious about keeping his file system clean. You archive every revision of every file you've ever worked on. Your MP3 collection is indexed more ways that Rob Gordon's. Giving your photos proper names and tags isn't enough for you—you geotag each shot with its latitude and longitude. Your desktop isn't filled with icons. You have the cleanest hard drive ever.

But, that's just data. When you crack your rig's case, you find a dirty, stinking mess inside. Your case hasn't been taken over by dust bunnies; you've got dust elephants in there—and they're out for revenge! But don't worry. Cleaning your computer is fairly easy; you just need a can of air, some lint-free cloths, and a few hours. The benefit: Not only will your PC look better, but your cooling devices will move more air and run more efficiently. Before you get started, you'll want to disconnect your machine from the rest of your hardware and move it to a clean work area.

BY THE MAXIMUM PC **STAFF**

MATERIALS

- CANNED AIR
- GLOVES
- PAPER TOWELS
- DISHWASHER
- 95% ISOPROPYL RUBBING ALCOHOL
- FLASHLIGHT
- PHILLIPS SCREWDRIVER
- SWIFFER SWEEPER CLOTH
- MASKING OR DUCT TAPE

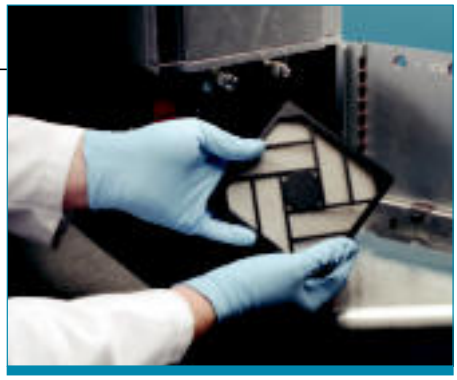
A can of compressed air makes it easy to blast the dust and grime that gets caked onto your fans.

CLEAN YOUR CASE FILTERS AND FANS

The very first thing you need to do is pop off the front bezel and clean out the dust and cruft from around the fans. If your case is really dirty, there's going to be dust caked around everywhere air moves into the case.

If your case already sports filters, carefully remove them, wash them with warm water, and let them air dry for a day or two. Once they're dry, remount them. If your case doesn't have filters, don't worry; we'll show you how to make them.

Next, clean the dust out of your intake and exhaust fans (skip your CPU fan for the time being, we'll take care of it later). First, use compressed air to knock off as much dust as possible. It's likely there will still be dust left after this step, so next, you'll need to wet a towel with isopropyl alcohol and carefully wipe each blade. Depending on the direction the fans face, you might need to actually remove them from the case in order to fully clean them. Removing a fan from your case is usually as simple as either removing the four screws that hold it in place or unclipping a retaining mechanism. After you've cleaned the fan, make sure you remount it facing the same direction—the fans should suck air through the front of the case and exhaust it out the rear.



If your rig comes equipped with a filter, you'll need to clean it occasionally. Take it out of the holder and give it a good rinsing!

BLAST YOUR CPU FAN AND COOLER

Gunked-on grime can be challenging to remove. You may need to use some rubbing alcohol and a paper towel to get your fan blades clean.

Cleaning your CPU cooler is a little trickier. We firmly subscribe to the "if it ain't broke, don't fix it" school of thought, so we generally recommend against disconnecting the cooler from the system. However, if you can't clean the cooler when it's mounted to your mobo, you can remove it. Blasting the dust from dirty CPU coolers has given us hefty cooling improvements in the past.

We recommend holding a paper towel on one side of the CPU cooler and blowing compressed air at it from the other side. While this isn't totally effective at keeping dust from spreading to other areas of your case, it makes it easy to see where the dust is going and is definitely better than doing nothing. Once you've pushed all of the dust out of your cooler's fins, you should start working on the fan and the exterior of the cooler with an alcohol-soaked paper towel. When you're cleaning the fan, be very careful not to push down on the blades with too much force. You don't want to break the fan by bending its shaft.

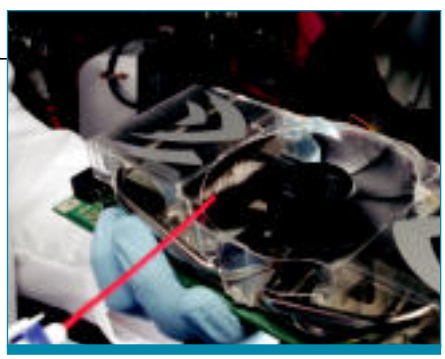
CLEAN YOUR VIDEOCARD

The next component on Felix Unger's tour of your PC is the videocard. You'll want to pull your videocard (or videocards) from your system to give the fans a good going over. If your card sports one of those fancy two-slot coolers—complete with heat pipe and air shroud—you're going to want to affix the straw to your canned air's nozzle and use it to blow all the dust out of the end of the air tunnel.

Before you can clean your videocard, you'll need to remove it from its slot.

If your card has a standard cooler, you'll still want to take a look at it with your flashlight and make sure you blow the dust off of the fins. It's fairly simple to do, but if you miss any large chunks of grime, you can actually make your GPU cooling situation worse by blocking airflow when you previously had no problems.

Once you've blown the dust off, take a look at the fan blades and the rest of the card. Using your alcohol-moistened paper towel, wipe the fan blades down and clean off any other dust you see. Leave the videocards out of your case for the time being.



Compressed air comes back into play with the GPU cooler. Give the cooler a few quick blasts to clear away dust.

REMOVE AND CLEAN YOUR MOBO

It's rarely necessary to remove your motherboard to make your machine look right, but anyone who's upgraded an older machine knows that the area under a motherboard is usually smothered in dust. True, it's not critical to clean it out, and no one else will know it's filthy under there. But if you're a completist, it's only a moderate pain in the ass to clean out the nether regions beneath your mobo; all you need to do is disconnect all the cables, unscrew the mobo, and remove it from the case. Once you've done that, wipe down the bottom of the case to get the dust out.

With the cables disconnected, it's a good time to give them a quick once-over; the SATA and PATA cables are the worst culprits for dust and grime collection. Take your alcohol-moistened towel and run it along each cable. This will remove dust buildup and leave them looking brand new. Finally, pull your memory and give the heat spreaders

We like to take a moment or two to give our cables a good cleaning. It won't make your rig faster, but it will look better!

on the sticks and the area between the slots a quick wipe. Then reinstall your memory, put the board back in the system, and reinstall your videocards.

If air moves over your memory, it can get covered in dust. Wipe the sticks with some rubbing alcohol to clean them.

CLEAN YOUR KEYBOARD

Most avid computer users are intimately familiar with the condition known as keyboard crud—that coating of accumulated dust, crumbs, spilled drinks, and even animal fur that not only looks disgusting but also impedes your keyboard's performance. Well, you can easily clean that Petri dish of a peripheral by running it through the dishwasher. We've done it. It works. It won't destroy your keyboard (probably).

First, give your board a good shaking to remove any loose debris. Use a Zip tie to bundle up the keyboard's cord, so it doesn't flop around in the wash. (We don't recommend using this technique with wireless keyboards.) Place the keyboard on the top tray of the dishwasher, with the keys facing down. Add just a smidge of dishwasher soap—approximately one teaspoon. Make sure the dishwasher's heated dry cycle is disabled—it could melt your keyboard. If you can't deactivate heat dry, try the gentle cycle or make sure you stop the dishwasher before drying starts. Once the board has been washed, let it drain facedown on a towel for a few days—shake it to ensure no water remains inside. To speed up the drying process, you can pop off the keys and dry the parts manually.

In our before shot, you can see that this keyboard was absolutely filthy.

After a run through the dishwasher and a four-day drying, our keyboard looked brand new, and worked well to boot!

INSTALL FILTERS

We've run this tip before, but it's too good not to share again. Installing filters over your case's intakes is quick, easy, and painless. And, it's the simplest way to make sure you don't have to clean out your case again anytime soon.

To make your filters, you'll want to get some dry Swiffer pads or a similar floor-dusting product. These cloths attract and trap a ton of dust, aren't particularly expensive, and can be cut to fit pretty much any size fan. Just trim the Swiffer to cover the fan and the area around it, then tape it down, leaving no gaps for air to leak into. MPC

If your case doesn't come with filters, you can make some using a Swiffer pad.

Ask the Doctor

Diagnosing and curing your PC problems

USB-ORKED

I cannot figure out what is going on with my front-panel USB ports! Every now and then, when I plug in a device, my computer does a hard restart. I initially thought maybe the front panel wasn't grounded correctly and was shorting out the motherboard, but oddly enough, a few weeks later my brother experienced the same problem. We both have Gigabyte GA-8S661FXM-775 mobos housed in different cases.

—Matt Lazarow

The Doctor hasn't seen that particular SiS chipset–based motherboard, but an issue was reported with Windows XP SP2 and certain SiS USB controllers. The fix from Microsoft (Microsoft Knowledge Base item 892050) indicates a problem with devices not being detected, not spontaneous rebooting. The Doc suspects you have a hardware problem, but not necessarily a problem with your motherboard.

You need to double-check that you connected the USB header correctly to the board. You should also check to see if the USB cable going to the front of the case is shorting out inside the case. Oddly, low-quality power supplies can also cause problems with USB devices.

The Doc also recommends that you unplug all the USB devices going into the machine and uninstall any USB devices from the Device Manger. Restart and let XP redetect the devices. Finally, make sure the devices you're plugging into the machines don't have issues. It's unlikely, but maybe you're both using faulty USB devices.

BURNED CD BLUES

If I burn an audio CD using either Windows Media Player in Windows or Serpentine in Ubuntu Linux, my car stereo won't play it. Yet if I use Nero, it works. I tried using a different brand of CD-R, but that didn't make a difference. What's weird is I can sometimes coax the CD into playing in my car stereo by hitting the Track button rapidly after inserting the CD.

Do Windows Media Player and Serpentine physically burn CDs differently than Nero, or is this a DRM issue of some sort? Again, CDs that I burn with Nero and normal audio CDs work fine.

—Andrew Robertson

The Doctor's car stereo does exactly the same thing. The solution is simpler than using a different app to burn your discs. All you have to do is burn the disc at a slower rate, as some older CD audio players just can't handle discs burned faster than 24x.

Just burn that audio CD a little more slowly, and you'll be rocking out in no time.

Also, make sure you're actually burning your discs as audio CDs instead of data CDs. Some players can't read files with certain audio extensions (like WMA) but will more than happily read CDs that have been burned to a strictly audio format.

JUST CHILLIN'

I have a Compaq Presario s4000t I bought in 2003, and it has gone cold, literally! It won't boot if the temperature is below 55 degrees. All the fans come on, and that's about it. I'll push the Power button and after about two minutes, I reboot and my computer will work.

I have upgraded from the stock 250-watt power supply to a 400-watt PSU, and the CPU still has the stock TaiSol heatsink and fan on it. Is this a power-switch issue? Do you think I need to replace the heatsink and fan? A friend told me to try editing the BIOS—disable the cache, reduce memory clock speed, and check temperatures. Any other ideas?

—Dave Howell

You have an odd problem that the Doctor has not seen before, but he can take a shot. Your problem may not actually be related to winter temperatures, as 55 degrees is hardly that cold and most computers prefer colder climates to warmer ones. But maybe, just maybe, the humidity is a factor at the colder temps. The Doc is guessing that some component in your PC doesn't like the dampness in the winter months. One other possibility: bad capacitors. Get a flashlight and look at the capacitors on the motherboard. If any are bulged out or oozing, they may be defective—a problem that was endemic in machines and motherboards of that vintage.

WHERE'S MY KEYBOARD?

I have a PC that is a couple of years old. The problem is that the keyboard doesn't work 99 percent of the time. The POST screen sometimes goes so far as to say "no keyboard detected." I have tried multiple keyboards, including PS/2 and USB ones. I tried clearing the CMOS and letting the BIOS reload to its default settings, but no luck. Am I looking at a bad motherboard, or is there another problem?

—David Downie

Hot-plugging a PS/2 keyboard in can very well fry the keyboard controller chip or super I/O chip on the motherboard, but that shouldn't affect a USB keyboard.

Your problem might not be a keyboard issue, though. It's possible you blew the PS/2 controller, which would cause PS/2 board problems. Your USB keyboard problems could actually be related to the vintage of your motherboard. You didn't say what model you have, but it sounds old as dirt.

It's also possible that your BIOS is not correctly configured to recognize a USB keyboard. Just to make sure the problem is not the OS install (it doesn't sound like it is), boot the machine using a Windows 98 boot disk (available from www.bootdisk.com) and see if the PS/2 keyboard works fine in Windows 98. If it does, your OS may be wonky. More than likely though, you'll have to replace the board.

RENEGOTIATING THE REINSTALL

I am currently running Windows XP on an MSI 945P Neo2-F motherboard with a single-core processor. The motherboard does not support a Core 2 Duo processor. I want to go to a dual-core system but want to do so without the headache of

Continued on page 52➔

Ask the Doctor

Continued from page 51

having to reinstall Windows.

I was thinking of buying a Neo3 board with a Core 2 Duo processor and replacing my existing motherboard and processor, using all the same memory, peripherals, etc. The only difference in the new system would be that it would have the Neo3 board with the Core 2 Duo processor.

My question: What are the chances that the Neo3/Core 2 Duo system would need a reinstallation of Windows, and is there a way of making the change without getting the BSOD?

—Pete Mac

You actually stand a very good chance of transferring your system over without having to reinstall Windows. Although this method is not recommended, it works for many people nonetheless. The Doc doubts that the BIOS issue would impact a reinstall and knows people who have successfully migrated from one CPU/chipset platform to another without any complaints.

You may have an issue with XP activation. If you are running a full retail version of the OS, transferring the activation will not be an issue. If you are running an OEM version, there is a small chance that Microsoft will deny the activation.

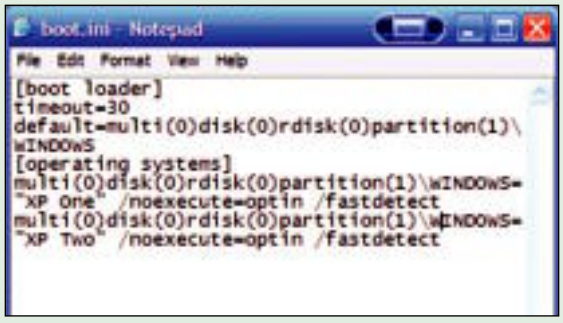
If that happens, all isn't lost. OEM copies of the OS are tied to the motherboard. When the motherboard dies, the OS is supposed to die as well. Just tell the guy on the phone that you're replacing faulty hardware, not upgrading.

JUST GOTTA GAME

I am a poor college student, and I thrive on playing old PC games. In particular, I like to play Deus Ex. The problem I have is the game spontaneously changes the speed at which it runs. I played it on an older computer and it ran fine; the problem occurs when I run it on my laptop. The video usually runs faster, but it sometimes runs at normal speed. For instance, sometimes the text on the screen scrolls faster, but the audio plays at the normal speed. The characters also run faster and perform actions faster, but the most annoying part is the spontaneous changes and the audio cutting out early. I'm trying to run it on a Dell Inspiron 5150 with Windows XP Pro.

—Ross Sermersheim

It sounds like your problem might be related to Intel's SpeedStep technology, which automatically shifts your CPU speed up or down to conserve power. To disable SpeedStep, open your Power control panel and switch the power profile to Home/Office Desk or Always On. That will disable SpeedStep.



Make sure you nuke the right line in the boot.ini file—otherwise, you will not be thrilled with the results.

WHICH WINDOWS?

I recently put together a new computer with Windows XP. When I moved my old hard drive over to the new case, I somehow got two versions of Windows installed. When my computer boots, I have to pick which one to start. How do I get rid of the second Windows option?

—Brian Matthews

Ahh, an irritating problem indeed. Thankfully, there's an easy solution. Hop on over to your Windows control panel and fire up System Properties. Click the Advanced tab, which should give you three additional options and three corresponding settings buttons to pick from: Performance, User Profiles, and Startup and Recovery. Click the Settings box under Startup and Recovery, and on the following window, hit the Edit button that corresponds with the prompt to manually edit your startup options.

Just in case something goes wrong, copy everything from the file that pops up (your boot.ini file) and paste it into a new text document. Now, look for the "[operating systems]" subhead in the file. The name of each XP option rests in quotes, so replace "Microsoft XP Professional in each entry with "XP One" and "XP Two." Restart your computer and boot from each—you want to figure out which option to keep. After you've done that, go back to the boot.ini window you were at earlier. To delete one of the boot options, just delete the entire chunk of text that corresponds with the nonworking option—the line starts with the phrase "multi." As long as you delete everything, you'll be fine.

AN UNSURE UPGRADE

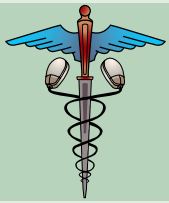
I'm thinking of upgrading my eMachines T2865, so my son can play PC games like Rise & Fall. I've been looking at all the different videocards out there, and I'm totally lost on what type of card to buy. Is there a site like Crucial.com that I can use to find out what types of cards my machine can handle?

—Rick Musgrave

Short answer: no. Long answer: no—because figuring out your path to a videocard upgrade is a lot easier than you think. In your case, the motherboard in your eMachines comes with only an AGP slot, rather than the PCI Express interface of modern-day motherboards. Consequently, you'll want to be on the lookout for videocards that are AGP based. While these cards won't perform as well as the best of the PCI Express models, they are more than adequate for your Rise & Fall needs.

With that said, we recommend you upgrade your entire system rather than spend money on a dead spec. If you insist on sticking with AGP, you should look for cards based on Nvidia's 7600 GS chipset.

And since you brought it up, you might want to head on over to www.crucial.com and start gathering information for a RAM upgrade—at 512MB, your eMachines system is going to chug when it comes time for a little Rise & Fall action. A great videocard goes a long way, but not when its speed is being bottlenecked by other parts of your system! MPB



April showers bring bad clichés, but they also bring computer bugs! And problems! And Vista! And thunderstorms! And exclamation points! Seriously, the Doctor is way too excited about the lovely weather that's on the horizon—if you want to spite him, and receive helpful answers to your computer queries in the process, send a detailed description of your problem to **doctor@maximumpc.com**. We promise, he'll answer your questions instead of going outside to play kickball.

White Paper: Holographic Storage

Impossible dream or inexorable future? Holographic storage could one day deliver terabytes of storage on a single optical disc.

BY GORD **GOBLE**

Many of us got our first taste of holography when pint-size R2-D2 projected a grainy 3D video of a desperate Princess Leia pleading for Obi-Wan's help in the first *Star Wars* movie. But holographic technology has a firmer footing in reality than you might think: Scientists have been researching the concept since the late 1940s, and it could deliver the next quantum leap in data storage.

Apply holography to digital storage and you'll be writing and reading data to and from the interior dimensions of discs, instead of just their surfaces. And one disc will have the capacity to house the entire *Star Wars* collection—bonus content and all—with room to spare. With space for two to four terabytes of data—or even more—holographic storage could eventually replace not only optical drives, but magnetic hard drives, flash memory, tape, and every other storage media in use today, assuming the final roadblocks to the technology can be cleared.

LIGHT READING

With today's optical disc drives, a beam of light generated by a laser passes through a layer of clear protective plastic to reach the surface of a spinning disc. The data stored on the disc is arranged in a continuous spiral of aberrations (pits and lands or opaque and reflective spots, depending on the technology) representing ones and zeros. An optical pickup monitors and interprets these transitions.

Holography can produce a three-dimensional image of an object using patterns of light produced by a split beam of laser-generated light. Applying the concept to the storage of bits requires an input device called a spatial light modulator (SLM). SLMs are similar in function to LCDs, but they're many times smaller. They produce an image reminiscent of the static-filled TV screen from *Poltergeist*. Examine the image closely, however, and you'll discern a structured checkerboard pattern in which bright pixels (which allow light to pass through) and dark pixels (which block the passage of light) represents ones and zeros.

To create this image, the laser light is split into a signal beam and a reference beam. The signal beam passes through the SLM and toward a photosensitive storage medium. The reference beam is directed onto a mirrored surface and bounced back toward the signal beam. When the two beams intersect, they create an interference pattern consisting of light and dark regions. This interference pattern instigates chemical and/or physical alterations within the storage medium, producing a tiny holographic image.

InPhase Technologies' first-generation holographic disc drive.

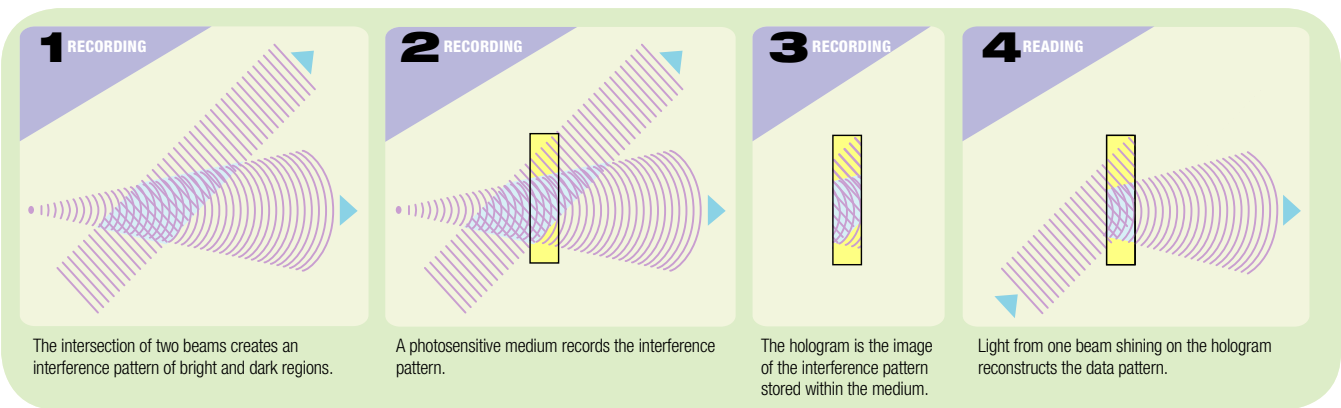
Holographic storage achieves its staggering capacity by utilizing the *depth* of the storage medium in addition to its two-dimensional coordinates. By making minute changes in the angle between the signal and reference beams or by tweaking the laser's wavelength, the drive can store additional images at the exact same X and Y coordinates but at different Z coordinates. Researchers at IBM believe the theoretical limit of holographic storage approaches the tens of terabits per cubic centimeter.

Only the reference beam is needed to retrieve data. The light shines on the hologram and projects an image of it to an optical detector, which reconstructs the pattern of ones and zeros and converts them back into data.

ALL THAT AND SPEED, TOO?

All that capacity would be useless if it took an eternity to stash and retrieve data to and

HOW IT WORKS — Holographic technology stores data in intricate patterns



from it, but holographic drives promise speed, too. With each flash of laser light, an SLM is capable of producing a hologram containing one million bits of data. Holographic drives use lasers that are faster than the magnetic heads currently used in hard drives, and they can deliver data transfer rates in excess of 20MB per second. Advocates of the technology claim that 1GB/s transfer speeds are well within the realm of possibility.

Holographic storage promises unheard of capacity and staggering speed, so why aren't these drives dominating the storage market right now? As is often the case, the technology's hype has been painfully slow to coalesce into manufactured goods. It took 20 years from its conception for holography to move into the storage arena; 40 additional years passed before it moved out of the R&D labs and into a commercial product.

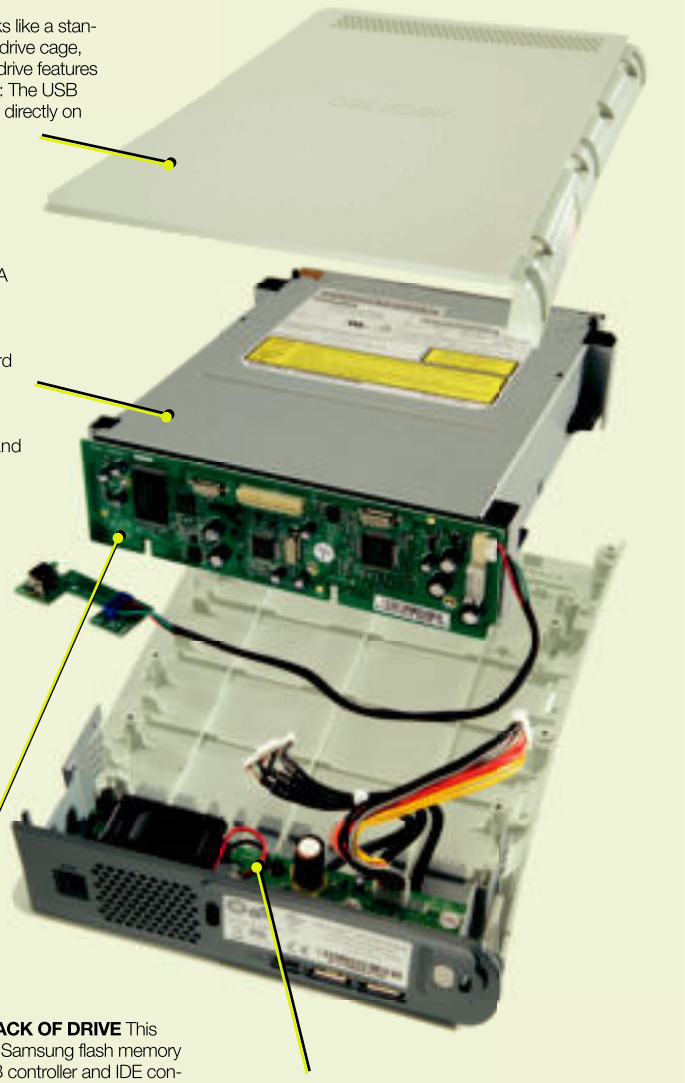
The hurdles have been steep and numerous. The composition of the recording material was one of the most intractable problems: Researchers had trouble concocting a formula that was sufficiently sensitive, stable enough for long-term archiving, and inexpensive enough for commercial use. Operational temperature ranges were too limited, and fabricating lasers that were accurate enough to do the job has been tricky. The SLMs and detectors were prohibitively expensive, too, although this last problem was eventually solved by using LCD technology to produce SLMs and charge-coupled devices (the CCDs used in digital cameras) to serve as detector arrays.

InPhase Technologies is one of the most notable players in today's holographic-storage market: The company was spun off from Lucent Technologies in 2000 (Lucent itself is a spin-off from the legendary Bell Labs), and it shipped the first holographic drive—the Tapestry HDS-300R—in late 2006. InPhase's first-generation Tapestry drive is capable of burning 300GB of data—the equivalent of 460 CDs or 64 DVDs—to a single 5.25-inch disc at a data rate of 20MB/s. This is WORM (write-once, read many) technology; the company is still working on a rewritable drive. It plans to introduce 800GB discs with 80MB/s transfer rates by 2008 and 1.6TB discs with 120MB/s transfer rates by 2010.

But don't whip out your checkbook just yet. The Tapestry HDS-300R costs a cool $15,000, while the Maxell discs needed to feed the beast cost between $100 and $125 each. This is clearly an enterprise product, and the first customers will be organizations needing to archive vast amounts of information: Think government agencies, financial institutions, and media companies. It'll be a few years before consumers are tripping the light holographic. MPC

Xbox 360 HD DVD Drive

We were shocked when Microsoft began selling its HD DVD add-on for the Xbox 360 for just $200. We were even more shocked when we learned it works with Windows. Our shock reached new plateaus of ludicrousness when we discovered that HD DVD playback works. And, our shock reached previously unimaginable heights when we cracked the case and saw the hardware's unexpected design.



CASE Though it looks like a standard external optical drive cage, Microsoft's HD DVD drive features a fairly unique design: The USB controller is mounted directly on the back of the drive.

OPTICAL DRIVE Toshiba's SD-S802A looks like a typical internal 5.25-inch optical drive, but instead of a standard IDE connector, it sports a laptop IDE connector, which delivers both data and power connectivity.

GREEN PCB ON BACK OF DRIVE This PCB hosts a 256MB Samsung flash memory chip as well as a USB controller and IDE controller. These chips convert the IDE signal produced by the drive into a USB signal, allowing you to connect the drive to your PC or Xbox using a simple USB cable.

POWER SUPPLY Like many other consumer electronics devices, the HD DVD drive sports an open power supply. If you take yours apart, be extremely careful of the large capacitors, as they can hold a charge even after the device is unplugged.

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

GORDON **MAH UNG**

Wonders If Your Power Supply Is Already Obsolete

Think your one-kilowatt power supply delivers enough juice? A new spec may render it useless

I believe that Nvidia, ATI (err, AMD), and the power supply manufacturers are playing with our emotions. In the space of three years, we've gone from needing two four-pin Molex connectors to power high-end GPUs to needing a single six-pin, then two six-pins, and finally *four* six-pins to run two GeForce 8800 GTX cards in SLI.

Don't get me wrong; I'm not complaining about the 8800 GTX cards—they bring a smile to my face—but I am confused by the apparent lack of coordination among the various vendors.

Just when you thought it was safe to go back into the power-supply waters, there's a plan to change the connectors yet again. Apparently, 75 watts from each six-pin plug and 75 watts from the PCI-E slot isn't enough.

Next-generation cards from AMD, I've been told, will need 300 watts of power, and Nvidia has been hunting for more power, too. In fact, an early engineering-sample 8800 GTX card I saw had a six-pin and an *eight*-pin connector.

Power supply vendors tell me the design was yanked at the last minute out of fear that a tyro PC builder would jam the existing eight-pin plug that should go into the motherboard into the GPU. It's tough to do, but with enough force it's actually possible, and the result would be disastrous. A former coworker of mine once jammed a Molex plug into a solid-state hard drive *upside-down* and whoosh!

An early engineering-sample GeForce 8800 GTX sports a six-pin connector as well as a new eight-pin connector.

So what's in store? No one knows for sure yet. I've heard different stories from different power supply vendors, but a decision may come soon. The PCI-SIG, the user group for PCI, is currently working on a new spec that should standardize power connectors as well as address thermal issues and the mechanics of heavy graphics cards. The early draft I saw showed only a single eight-pin connector delivering power for 225-watt and 300-watt cards, but is it enough? One PSU vendor I spoke with said high-wattage cards would likely need eight-pin and six-pin connectors. The spec will be debated and finalized later this year, but let's hope they build in enough headroom to support at least another generation of cards.

Michael Brown

Tests Lossless Codecs

FLAC is yet another open-source success story

I went into the Lab thinking I wouldn't hear a bit of difference between Apple Lossless, open-source FLAC, and Microsoft's WMA Lossless. And I might not have had I used something less than Ultrasone's Proline 750i headphones and Creative's X-Fi Elite Pro soundcard (the Proline 750i's are divine, and the Elite Pro is outfitted with higher-quality DACs than other X-Fi's).

Even then, I could detect sonic differences only with repeated A-B-C comparisons of Ben Harper strumming his acoustic guitar to produce a sustained chord. Without vocals or other instruments, the guitar just hangs there, naked. Once the rest of the band kicked in, I couldn't discern any of the compressed tracks from the tracks on the CD. So why pick FLAC over the others? Because in the back of my mind, I know I'm missing something, even if I can't detect it in most listening sessions.

Besides, FLAC is widely supported by audio-streamer manufacturers, including Slim Devices, Roku, Olive, and Sonos. Roku and Slim Devices also support Apple Lossless, but support for WMA Lossless is much harder to find.

Apple Lossless is the big winner on the portable-device front, thanks to the iPod. The TrekStor Vibez and Cowon iAudio X5 are among the few players that support FLAC, and Toshiba's Gigabeat S-series of players are the only devices we know of that support WMA Lossless. Note to Microsoft: If you want the industry to support your lossless codec, try supporting it in your own hardware instead of consciously stripping it out of the Gigabeat-based Zune.

How We Test

Real-world benchmarks. Real-world results

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

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

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

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

Adobe Photoshop CS2: We start with a RAW photo shot with a Canon EOS 20D, and apply a crapload of filters and other tasks from CS2 to see just how fast a rig can chew through the workload. Because we use every filter we can, the test is more fair and balanced than the usual cherry picking of Photoshop tests.

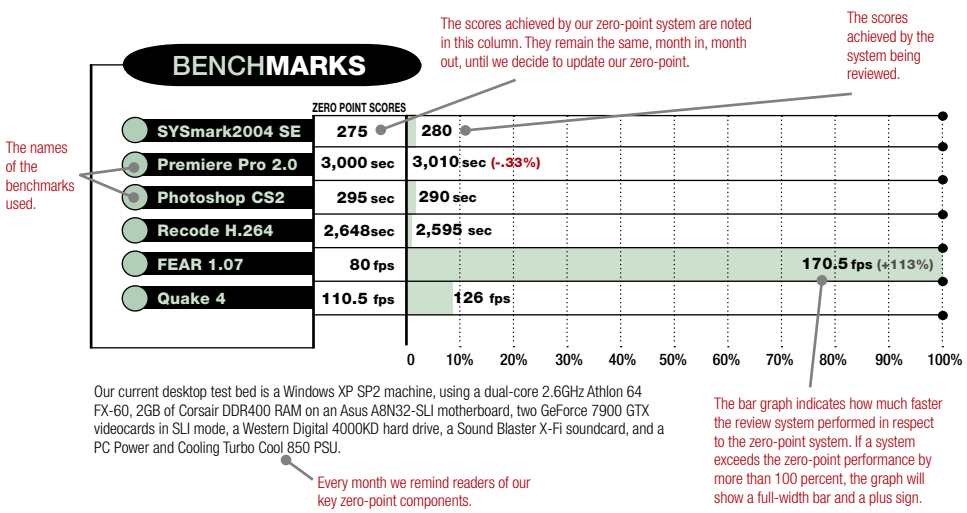
Ahead Nero Recode 2.0: Nero Recode 2.0 is one of the fastest video-transcoding utilities. We copy unencrypted VOB files to the hard drive, then convert the movie to an H.264 file formatted for the Apple iPod's screen. The version included with Nero 7.5, is the only multithreaded H.264 encoder we've found thus far and is optimized for dual-core CPUs.

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

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

How to Read Our Benchmark Chart

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



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

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

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

BEST OF THE BEST

Our monthly category-by-category list of our favorite products. New products are in red.

High-end videocard
Asus EN8800 GTX

Midrange videocard
Sapphire Radeon X1900XT (256MB)

Soundcard
Creative Labs X-Fi Xtreme Music

Hard drive
Seagate Barracuda 750GB 7200.10

External backup drive
Western Digital Dual-Option Media Center 320GB

Portable USB drive
Maxtor One Touch III 100GB

DVD burner
Plextor PX-755SA

High-end LCD monitor
Dell 2407FPW

Budget LCD monitor
Samsung SyncMaster 206BW

Socket AM2 Athlon 64 mobo
Gigabyte GA-M59SLI-S5

Socket 775 Core 2 Duo mobo
Asus Striker Extreme

HD-based MP3 player
Apple iPod

Flash-based MP3 player
SanDisk Sansa e280R

5.1 speakers
M-Audio Studiophile LX4 5.1 (LX4 2.1 with 5.1 Expander System)

2.1 speakers
M-Audio Studiophile LX4 2.1

Midtower case
Antec Nine Hundred
Who can say no to a 20cm fan?

Full-tower case
Gigabyte 3D Aurora 570
Being roomy and customizable and having a clean design makes it our top pic

Games we are playing
Rainbow Six: Vegas, Supreme Commander, World of Warcraft: The Burning Crusade, Company of Heroes, Battlefield 2

HP TouchSmart IQ770

Introducing the PC as kitchen appliance

When HP designed the TouchSmart IQ770, it must have been thinking of that old saying, "No matter where I serve my guests, it seems they like the kitchen best." This PC is tailor made for serving up—and scarfing down—digital media in the kitchen.

By combining the keyboard-free convenience and built-in display of a tablet PC with the I/O ports and features of a media-center desktop computer, the company has created a unique machine. We'd be even more excited about the IQ770 if HP had created software that took better advantage of its capabilities. But let's examine its positive attributes first because there are many.

The 19-inch widescreen display makes this machine look massive, but it measures just 14.5 inches wide and 10 inches deep at its base (the motherboard tray extends an additional two inches, left and right, over the base). You'll need 22.5 inches of width and between 16 and 19 inches of height (with the display fully elevated) to accommodate the entire unit, but we set it up on a bar-height, 27-inch-square table in our kitchen and had just enough room for two plates of spaghetti and two glasses of Chianti (this with the wireless keyboard parked in its garage beneath the CPU tray). Cozy, but doable. And the TouchSmart is blissfully quiet.

The machine ships with Windows Vista Home Premium, which integrates both Tablet PC functionality and Windows Media Center, so you can use one fingertip to control the entire machine. We recommend using the provided stylus, however; who wants to stare at a screen covered with fingerprints? The touch screen was usually very responsive and accurate, but there were times when the machine would beep in response to a stylus tap and then do nothing. On other occasions, a tap would activate the window *behind* the one we were trying to manipulate. These anomalies, however infrequent, will confuse novice users and annoy experts until they grow accustomed to the machine's response times.

We found the touch screen particularly useful for web browsing, assuming your favorite sites are bookmarked and you don't need to search. When tapping won't cut it, you can wield a wireless keyboard, a two-button scroll-wheel mouse, or a TV-style remote control. (The former two use RF, the latter IR.) The display itself is very bright but also highly reflective—particularly when you're working in a dark room.

We got a kick out of walking up to the machine and using it like a kiosk, and we can easily visualize it as the information hub for a busy family home; it's far better suited to such a task than an inexpensive laptop would be. We're more than a little disappointed, however, in HP's TouchSmart software. HP SmartCenter *looks* as though it could be customized to boil the entire user interface down to a dozen hyperlinks. The UI features three large buttons and up to nine smaller ones; we set the three large buttons to display important information: the current date (with a link to the HP SmartCalendar), the time (with a link to two additional time zones), and the current weather conditions (with a link to a weather forecast).

But when we went to customize the other nine buttons, we encountered a nonsensical roadblock: Most of them serve fixed functions. You can choose to display or hide a button, but you're given just *three* fully customizable buttons. You can't change the photo-editing button, for instance, to launch Photoshop Elements instead of HP's very limited PhotoSmart Touch. You can create a *new* button to do that, but remember, you have only three

The 12-watt amp and stereo speakers bordering the IQ770's 19-inch display make for a merely adequate sound system.

UNDER THE HOOD

BRAINS	
CPU	1.6GHz AMD Turion TL-52
MOBO	HP proprietary board
RAM	2GB PC2-4200 DDR2 SDRAM (two 1GB sticks)
LAN	Gigabit Ethernet; 802.11a/b/g, Bluetooth
HARD DRIVE	320GB (7,200RPM SATA)
OPTICAL	Slot-load 8x SuperMulti DVD burner with Lightscribe
BEAUTY	
VIDEOCARD	GeForce Go 7600 (445MHz core/500MHz RAM)
SOUNDCARD	Integrated Analog Devices SoundMAX HD
CASE	HP Custom
BOOT: 155 sec.	DOWN: 32 sec.

BENCHMARKS

3DMARK06 GAME 1 (FPS)	5.3
3DMARK06 GAME 2 (FPS)	8.7
QUAKE 4 (FPS)	29.4
FEAR (FPS)	17

All benchmarks run at display's native resolution of 1440x900. 3DMark06 tested with no AA and 8x aniso. FEAR benchmarked with no AA, soft shadows on, and 8x aniso. Quake 4 benchmarked at High Quality, 4x AA, 8x aniso.

slots. What's worse is that while you can change the home page that the Internet button navigates to, you'll have to use another of those three slots if you'd prefer Firefox to display that page instead of Internet Explorer.

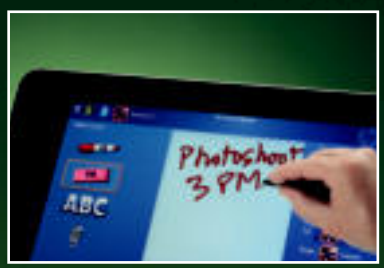
We appreciate the HP SmartCalendar's ability to maintain schedules for both individuals and groups, but why can't it synchronize with our increasingly ubiquitous smartphones? Meanwhile, the novelty of scrawling handwritten notes and recording voice memos within HP SmartCalendar wears off quickly.

Most of the IQ770's I/O ports are up front, so the only cord sticking out of the back of our test unit was the power cable. This enabled us to push the whole shebang tight against a wall. We'd like to have more than just two USB 2.0 ports up front (there's a IEEE-1394 port here, too), but four more are in the back. The backplane also hosts a gigabit Ethernet port, mini-VGA output, 5.1-channel analog audio output (1/8-inch stereo connectors), a 5.1-channel digital audio output (coaxial), an IR output, and a second IEEE-1394 port.

HP's TouchSmart IQ770 could never serve as our primary PC—we knew going into this review that it wouldn't compete with our zero-point reference platform, and it's clearly not designed for hardcore gaming—but we'd rather have multiple PCs dedicated to particular tasks than one machine that's crappy at everything. This one has definitely earned a place in our dream kitchen.

—MICHAEL BROWN

The front panel houses a slot-load DVD burner and an 8-in-1 media-card reader that handles just about every flash memory standard you can think of, including xD.



We thought we'd dig writing notes on the touch screen, but we've since decided to stick with Post-it notes.

You can tuck one of HP's smaller PhotoSmart printers into this space atop the IQ770. Coax connectors for the built-in TV and FM-radio tuners are mounted on the left side.

HP TOUCHSMART IQ770

MOM'S KITCHEN

Well designed, great display, very good touch screen, relatively small footprint.

HELL'S KITCHEN

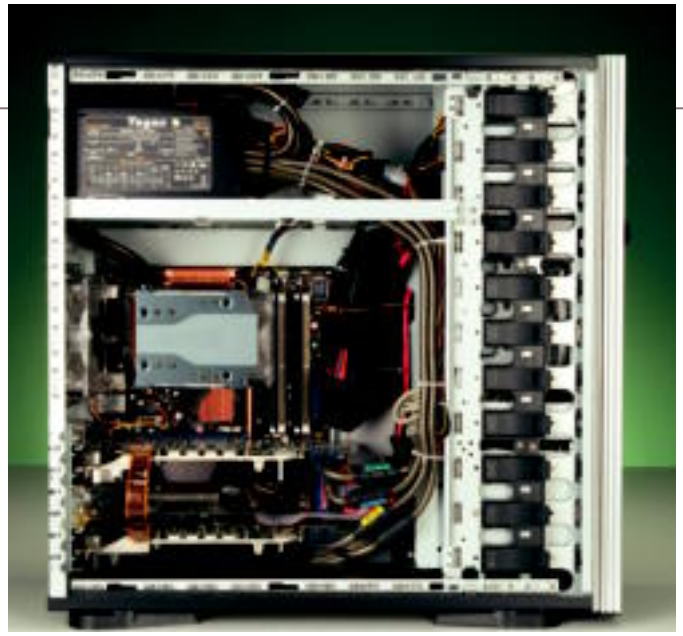
HP's TouchSmart applications are so limited that they're virtually worthless.

8

$1,800, www.hp.com

Vigor Gaming Force Recon QXN

As useful as Sideshow Bob in a field of rakes



See that wiring job? Now that's quality work. At least your new footrest will *look* great.

Welcome to another edition of *Maximum PC Theater*. For our main attraction this evening, we're featuring a play by Vigor Gaming entitled *Force Recon QXN*. There's a scene in act 1 in which the computer utterly fails to run in any useful capacity… it brings tears to our eyes. Be sure you don't miss it.

Or, rather, *do* miss the Force Recon QXN. As has become an unfortunate tradition at Maximum PC, we again find ourselves with a system that looks sweet on paper but utterly fails the quality assurance part of the benchmarking process. In layman's terms, *it does not work*. It fails to boot consistently. It fails benchmark runs.

The case itself is quite pretty, but good luck lifting the thing. 'Tis a wee bit heavy.

We blame overly aggressive overclocking for this electronic disaster. Like those who came before it, Vigor cranked an Intel QX6700 quad-core processor from the stock speed of 2.66GHz to a mighty 3.46GHz. But we certainly don't blame the company for doing so; in today's extreme-computing (and non-multicore-supported) environment, a stock-clocked quad-core processor simply can't hold up to dual-core clock speeds.

If only Vigor had spent as much time testing the machine as it put into its appearance, we might have had an actual working computer. This system is loaded with more tweaks than any of the similarly configured quad-core machines we've reviewed, so we were a bit surprised to see lower frame rates in all of our gaming tests (when they ran). Our quad-champion Maingear F131 (reviewed in our January 2007 issue) destroyed the poor Force Recon by almost 15fps in FEAR and 20fps in Quake 4.

Application testing painfully highlighted the Force Recon's stability problems, particularly our standard video encoding test, in which we use Nero Recode to transform a DVD-quality rip of *Terminator 2* into an H.264-based video iPod file. It's as if the Force Recon took one look at the project and decided to head out for a smoke break. The process took nearly 40 minutes to complete, almost double the 22-minute score the Maingear laid down.

We were beginning to wonder if we should just take this sick machine out back and shoot it, but the Force Recon didn't even make it out the door. The machine officially died during our Premiere encoding test. No blue screen, just random restarts.

When SYSmark caused the same problems, we set all the components back to stock clock speeds, but the system got progressively worse. After Force Recon started to reboot spontaneously, we gave Vigor a call, and the company sent us a recovery-disc image.

Said recovery disk ended up destroying what was left of the system. Windows barely made it to the loading screen before blue-screening.

The final nail in the Force Recon's coffin is that it actually ran slower than all of the other nonworking systems we've tested, at least in the benchmarks we got to run. That's certainly not something to be proud of.

—DAVID MURPHY

UNDER THE HOOD

BRAINS	
CPU	Intel Core 2 Extreme QX6700 (OC'd to 3.46GHz)
MOBO	Asus P5N32-E-SLI Nvidia nForce 680i SLI
RAM	2GB Corsair DDR2 OC'd to 933MHz (two 1GB sticks)
LAN	Dual Gigabit LAN
HARD DRIVE	Two 150GB WD Raptors in RAID-0, one 500GB WD (7,200rpm)
OPTICAL	NEC 16X dual-layer DVDRW/ 24x CDRW)
BEAUTY	
VIDEOCARD	Two GeForce 8800 GTXs in SLI (576MHz core/900MHz RAM)
SOUNDCARD	Creative X-Fi XtremeMusic Platinum
CASE	Vigor Force
BOOT: 39 sec.	DOWN: 13 sec.

VIGOR GAMING FORCE RECON QXN

IGNIGNOKT

The case looks great, the front panel looks great, even the little lit-up feet look great.

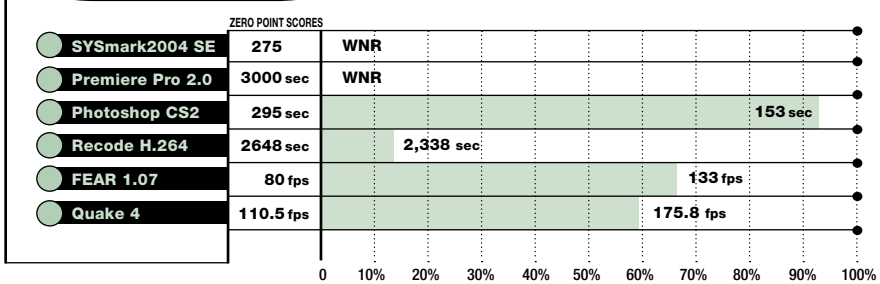
BOSTON

Even when it "works," it's worse than any other quad-core rig we've tested.

3

$4,668, www.vigorgaming.com

BENCHMARKS



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Sony BWU-100A Blu-ray Drive

Still a little too 'next-gen' for our blood

The BWU-100A: It looks great, but it's just as slow as other Blu-ray burners we've tested.

Most folks aren't prepared to choose sides in the battle between Blu-ray and HD DVD—and who can blame 'em, given the scarcity of HD content and the exorbitant cost of drives and media. But for the gotta-have-it-now early adopters, Blu-ray remains the only next-gen disc you can burn. The HD DVD camp has yet to release a burner, while Sony's BWU-100A marks the third Blu-ray burner we've reviewed in the last six months. And with each new model, we're seeing improvements.

The BWU-100A is the nicest-looking HD optical drive we've tested, with a sleek, stylish bezel that would do right by any case faceplate. It's also the least expensive: The comparably spec'd Plextor PX-B900A we reviewed in our December 2006 issue is still priced at a grand; the BWU-100A costs $750. Granted, that's still a pretty penny for a product of dubious usefulness.

And, sadly, nothing about this drive's performance makes it any more compelling than the others we've reviewed. Like the Plextor and IO Data drives we tested in December (both were actually rebadged versions of the same Panasonic model), the BWU-100A reads and writes to CD, DVD, and Blu-ray media (both single- and double-layer) at theoretical maximum speeds of 24x, 8x, and 2x, respectively. In reality, the BWU-100A filled a single-layer DVD+R in 9:08 (min:sec), with an average write speed of 6.78x. And using the bundled CyberLink Power2Go burning software, we filled a 22.5GB BD-R disc in 42:19. It took an hour and 33 minutes to burn the same data to rewritable media.

So if you've got time to kill or want to author your own HD video discs, Sony's BWU-100A is the best bargain we've tested, but if you're primarily interested in convenient, large-capacity data storage, you're far better off with an external hard drive.

—KATHERINE STEVENSON

SONY BWU-100A BLU-RAY **7**

$750, www.sonystyle.com

BENCHMARKS

	SONY	IO DATA	PLEXTOR
DVD WRITE SPEED AVERAGE	**6.78x**	6.76x	**6.78x**
DVD READ SPEED AVERAGE	**6.17x**	6.15x	**6.17x**
ACCESS TIME (RANDOM/FULL)	160ms/317ms	**157ms/315ms**	160ms/318ms
CPU UTILIZATION (8X)	34%	47%	**31%**
TIME TO BURN 22.5GB TO BD-R (MIN:SEC)	**42:19**	43:12	42:26
TIME TO BURN 22.5GB TO BD-RE (HOUR:MIN)	**1:33**	**1:33**	1:34

Best scores are bolded. Our test bed is a Windows XP SP2 machine, using a dual-core 2.6GHz Athlon 64 FX-60, 2GB of Corsair DDR400 RAM on an Asus A8N-SLI motherboard, an ATI X1950 Pro videocard, a Western Digital 4000KD hard drive, and a PC Power and Cooling Turbo Cool 850 PSU.

SanDisk Sansa e280R Rhapsody

Some products deserve a second chance

It's a safe bet that the Sansa e280R's price will drop even lower once SanDisk ships the Wi-Fi-enabled Sansa Connect, which was announced at CES.

We liked almost everything about SanDisk's Sansa e260 flash-memory digital media player when we reviewed it in November 2006, but we slapped it with a verdict of 5 because we activated its voice recorder every time we picked the damned thing up. The Sansa e280R fixes that problem and adds two more gigs of memory for good measure.

The e280R also features a special connection to Rhapsody, our favorite music-rental service: The player comes preloaded with Rhapsody channels and playlists, which you can synchronize with your Rhapsody library. If you're already a Rhapsody To Go subscriber—or if you're not interested in becoming one—SanDisk's e280 is the very same device minus the preloaded music.

Rhapsody has two paid subscription models: With the Unlimited plan, you can stream and download as much music as you'd like to up to three PCs for $10 per month. The To Go plan allows you to transfer the tracks to up to three digital media players. DRM strings attached to both plans see to it that your listening rights expire when your subscription ends and prohibit you from burning tracks to CD unless you purchase them. The e260R comes with a free two-month subscription to the To Go plan.

SanDisk fixed the voice-recorder problem by tweaking the player's firmware to give you the option of having a window pop up that asks you to confirm your intent to record. You can also turn the record feature off altogether. We also noticed, however, that the button on this unit offers much more resistance than the previous model's, so you might not need to fiddle with these settings at all.

We still don't like the e280R's undersized buttons, which are situated too close to the scroll wheel for our not-so-big thumbs, but the audio and video quality is just as good as the e260's, and the microSD card slot is superhandy. With a street price hovering around $200, the e280R is one of the best flash-based media players on the market.

—MICHAEL BROWN

SANSA E280R RHAPSODY **8**

$250, www.sandisk.com

FXhome EffectsLab Pro

Think of it as a Glock in a box for your home movies

If the dazzling star wipe isn't having the same impact on your home movies it used to, maybe it's time to add a little pizzazz to your vacation videos. We're talking muzzle flashes, explosions, and lightsaber battles.

Welcome to the world of FXhome's EffectsLab Pro. Spawned from the popular AlamDV, EffectsLab Pro is the go-to app for, well, automatic weapons fire and lightsaber effects. We know that sounds odd, but these effects are exactly what most budding YouTube viral cinematographers want. EffectsLab Pro lets you add smoke- and fire-particle effects, falling meteorites, color correction, masking, and other visual effects galore, in addition to the phasers and .44 Magnum effects that built its reputation.

The latest version of EffectsLab Pro adds multithreading support, which was able to utilize about 70 percent of the quad-core machine we tested it on. You'll want as much computer as possible too, handling HDV content made even our quad-core box feel pokey. True to the product's simple-to-use reputation, we shot a DV-res movie and added muzzle blasts to create a quick zombie movie in just a couple of hours. As a bonus, the program has a loyal community filled with folks who'll help you add everything from sniper scopes, to night vision, to X-ray vision effects—for free!

Overall, we were very pleased with the muzzle flash and lightsaber effects (the company even makes lightsaber sound effects available for download), but some of the eye candy, such as the built-in fire preset, fell into cheese land. We've seen output from more experienced users that looked satisfying, so it can be done, but not as quickly and easily as the other effects. You shouldn't expect Industrial Light & Magic in a box. This is a $150 program, not a $150 million EFX company. But for adding that little special-effects touch to your short movies, EffectsLab Pro is far easier and far cheaper than the alternatives, and a whole lotta fun to boot.

Adding shotgun muzzle flashes to you home videos has never been so easy!

—GORDON MAH UNG

EFFECTSLAB PRO **9**

$150, www.fxhome.com

Hitachi Deskstar T7K500

500GB of meh

We'll get the bad news out of the way first. Hitachi's Deskstar T7K500 hard drive, with an easy-to-remember 500GB of storage, is unremarkable. More than that, it underperforms when compared to similarly featured, similarly priced (if not cheaper!) products.

Although the Deskstar's speedy random access time of 13.2ms is faster than times posted by all of the similarly outfitted 500GB models we've looked at, that's all this drive has going for it. The Deskstar's average read time, which is a pretty good reflection of a drive's performance across the entirety of the disc, taps out at an average of 64.2MB/s.

When compared against the sea of drives that sit in our Lab, the Deskstar's average read speed is barely better than the Seagate 400GB Barracuda 7200.8's—a PATA drive, mind you. And SATA models from both Samsung and Western Digital (which have feature sets that are nearly identical to the Deskstar's) utterly destroy the Hitachi in our benchmarks, as both push read speeds upward of 70MB/s. These results were slightly curious to us, as the Deskstar sports three platters of approximately 166GB apiece. That gives it quite a boost in areal density when compared to the Western Digital Caviar's measly four-platter 125GB setup. As we've seen in the past, drives with juicer areal densities tend to run faster. But not in the Deskstar's case!

BENCHMARKS

	HITACHI DESKSTAR T7K500	WESTERN DIGITAL CAVIAR SE16
AVERAGE READ SPEED	64.2MB/s	**72.6MB/s**
BURST SPEED	127.2MB/s	**204.9MB/s**
RANDOM ACCESS SPEED	**13.2ms**	13.5ms

Best scores are bolded.

The drive's features—a 16MB buffer, a SATA 3G interface, and NCQ—do little to push it past the competition.

So, what then is the good news? If Hitachi's new terabyte drive helps lower the price of the company's smaller models, the cost-to-benefit ratio of the T7K500 could, in the future, make it a nice solution. That's about the only silver lining we see.

—DAVID MURPHY

HITACHI DESKSTAR **7**

$200, www.hitachi.com

Soundcard-a-Palooza

Tired of hearing data move across your USB bus thanks to your onboard audio? These three soundcards will bring a smile to your ears

Auzentech's commendable X-Meridian 7.1 sports user-replaceable amplifiers and a front-panel audio header.

And you thought the soundcard was dead? OK, maybe it's been beaten black-and-blue, thrown out of the ring, and had a folding chair smashed over its head, but it just keeps coming back for more—like Indiana Jones.

But just between you, me, and the 8800 GTX card, the soundcard is still far superior to anything we've ever heard mounted on a motherboard. This month, we look at two very different interpretations of the same chip and a cheaper version of an already good soundcard, so sit back and listen, Dr. Jones.

—GORDON MAH UNG

AUZENTECH AUZEN X-MERIDIAN 7.1

Soundcards, like videocards, tend to have cookie-cutter designs; products that use the same chipsets look virtually the same.

That wasn't the approach Auzentech took when it put down the traces for its Auzen X-Meridian 7.1 card. Auzentech says it carefully crafted a custom PCB and added components to get the best possible audio from the card, which is based on C-Media's top-shelf CMI8788 Oxygen HD "audio processor." We believe it, too. The board's traces, layout, and components are vastly different than those of the Razer AC-1 soundcard, which also uses the CMI 8788 Oxygen HD chip.

Optical SPDIF lovers will appreciate separate input and output ports, and we particularly dig the industry-standard front-panel header. Unlike Creative's cards, which force you to build a custom harness for front audio jacks, the Auzentech card allows you to just plug your case's audio connector into the card and voilà, your front headphone jacks work. But the unique feature of the card is its upgradeable operational amplifiers. Op-amps can have great sway over the flavor and timbre of the analog sound that pumps out of your card. This board comes with a stock set of AUK S4580P op-amps, which can be popped out and replaced with different ones.

Sound good? Mostly. While we appreciate many of the loving touches taken with the card, we did hear slight distortion during our close listening tests using 24-bit material and Etymotic Research ER-4 earbuds. The transience occurred only when listening at very high levels, and for the most part, our subjective taste tests found the X-Meridian to be the equal of the Razer AC-1, which claims a 117dB signal-to-noise ratio. That's a bit better than the 115dB SNR of the X-Meridian card. SNR isn't everything, though. We actually found Creative's X-Fi card to have more low-end response.

The X-Meridian's biggest weakness, however, is in gaming. Using the latest drivers from Auzentech, the card consistently performed more slowly than the other two cards we reviewed. While the frame-rate hit isn't fatal, we would look to the other products for gaming needs. The X-Meridian 7.1 is probably best left to home media center work. With its real-time Dolby Digital encoding capability, dual optical ports, and upgradeable op-amps, the card's real forte is home theater.

AUZENTECH AUZEN X-MERIDIAN 7.1

6

STEVIE WONDER

Replaceable op-amps, FP Audio headers.

STEVE CASE

Oddly slower than the Barracuda AC-1, which uses the same chip and drivers. Works only with five-volt PCI.

$200, www.auzentech.com

BENCHMARKS

	X-MERIDIAN 7.1	BARRACUDA AC-1	X-FI XTREMEGAMER FATAL1TY PRO SERIES
FEAR 5.1 MIN (FPS)	66	68	**76**
FEAR 5.1 AVG (FPS)	140	141	**154**
FEAR 5.1 MAX (FPS)	276	282	**308**
FEAR DOLBY DIGITAL LIVE MIN (FPS)	52	**59**	N/A
FEAR DOLBY DIGITAL LIVE AVG (FPS)	113	**126**	N/A
FEAR DOLBY DIGITAL LIVE MAX (FPS)	226	**247**	N/A
3DMARK03 2.1 0 SOURCES (FPS)	81.5	**85.7**	85.5
3DMARK03 2.1 24 SOURCES (FPS)	72.7	75.1	**77.1**
3DMARK03 2.1 60 SOURCES (FPS)	64.4	**73.3**	71.1
3DMARK03 DDL 0 SOURCES (FPS)	82.1	**85**	N/A
3DMARK03 DDL 24 SOURCES (FPS)	64.7	**77**	N/A
3DMARK03 DDL 60 SOURCES (FPS)	62.7	**71.4**	N/A

Best scores are bolded. Our killer rig consisted of an Athlon 64 FX-60, 2GB of DDR400, 400GB 7,200rpm, and a GeForce 7950 GX2 running Windows XP Professional.

The Barracuda AC-1 features a proprietary DVI-like connector that can be used with Razer's multichannel headphones.

The X-Fi XtremeGamer Fatal1ty Pro Series is essentially the original two-year-old card without the extras.

RAZER BARRACUDA AC-1

As we said with the Auzentech, we're impressed when companies go above and beyond reference designs for products. Razer's Barracuda AC-1 is such a product. Though it uses the same C-Media Oxygen HD chip as the X-Meridian, you wouldn't think the two cards were related.

The AC-1 gives you a proprietary DVI-like connector that you can directly connect to the Razer's HP-1 headset (or your standard speakers using the included dongle). And like the X-Meridian, the AC-1 features dual optical ports, but this card is definitely intended for gaming. And that's where it gets interesting. The CMI8788 isn't a DSP, like the X-Fi, it's more of a super I/O chip that passes data from the PCI bus to the various components on the AC-1 at a very efficient clip.

Most of the filtering for 3D effects, including Dolby and other processor-intensive chores, is done on the computer's CPU. In FEAR, for example, the X-Fi's DSP gives it about a 10 percent frame-rate advantage over the other cards in analog mode. (Dolby Digital encoding adds even more overhead to the Razer card, but the X-Fi is incapable of real-time DD5.1 encoding.)

We've been wondering if our stance against host-based audio was outdated in the age of multicore CPUs, but a 10 percent hit is still painful—it's like dropping the CPU down a rung or two.

Of course, the DSP doesn't always work against the AC-1. In 3DMark03, which uses simpler audio routines, the AC-1 performs the same as or better than the X-Fi. Performance could also improve if the drivers for the AC-1 were multithreaded.

In gaming fidelity, the AC-1 fared well in our tests, with one exception. In Battlefield 2, we noticed dropouts in audio. The same happened with the X-Meridian, so we suspect it's a problem with the chipset or its drivers that is induced by the tremendous amount of audio BF2 throws at you.

Where does that leave the AC-1? At $200, it's pretty expensive. In fact, the AC-1 costs more than the X-Fi with its fancy schmancy (and so far useless) onboard X-RAM. It doesn't help that the AC-1 lacks OpenAL support and sounds inferior to the Creative card in many of the games we tested.

RAZER BARRACUDA AC-1

THE RUTLES
Doesn't include Creative's software bloat.

THE BEATLES
Five-volt keying makes the card ineligible for PCI-X slots.

8

$200, www.razerzone.com

CREATIVE LABS X-FI XTREMEGAMER FATAL1TY PRO

If you read our original review of the X-Fi way back in November 2005, you already know about this card. Back then, Creative packaged this exact same card with a drive bay and remote and charged an impossible to justify $280 for the X-Fi Fatal1ty FPS soundcard.

We ended up recommending its cheaper sibling, the X-Fi XtremeMusic instead.

Fast-forward a year and a half, ditch the remote and drive bay, and you've got the XtremeGamer Fatal1ty Professional Series priced at $130 less than the original. But does the X-Fi age like a fine wine or a punch-drunk palooka? For Creative, it's pure vino!

Unlike the other two boards we tested here, the X-Fi continues to use a true DSP with "10,000 MIPS of power." We don't know how true that 10K figure is, but in our tests, the X-Fi remains the boss, especially when compared to the CMI8788, which is nothing more than a glorified I/O chip. In FEAR with graphics options cranked down and audio options cranked up to emphasize soundcard performance, the X-Fi led by 10 percent across the board. However, if C-Media ever releases multithreaded audio drivers, the day of the DSP will likely fade.

Of course, a good soundcard isn't just about frame rates. In close listening using reference-quality earphones, two Maximum PC editors favored the X-Fi's bottom-end push while listening to a variety of 24-bit audio.

We also give the edge in gaming fidelity to the X-Fi, as the subtle audio cues in games (in particular, Battlefield 2) stood out with this card. This may be due in part to the developer-relations money Creative spends to help developers utilize its technology. Most top games today support Creative's OpenAL initiative, which is the only way to get hardware-accelerated positional audio in Microsoft Vista.

Although we think the X-Fi is the best of the cards tested here for general PC use, the real-time Dolby Digital encoding of the two other cards and optical SPDIF make them far better suited for home theater use. We must also note that the now-defunct XtremeMusic version of this card can still be found and is a better value. But for gamers, the X-Fi is the best choice.

X-FI XTREMEGAMER FATAL1TY PRO

MIKE BOLTON
DSP gives it a performance edge.

MICHAEL BOLTON
Pointless X-RAM.

9

MAXIMUM PC KICKASS

$150, www.creativelabs.com

Belkin SportCommand Wireless iPod Controller

A remote for the extreme side of life

The Belkin SportCommand iPod remote is designed for individuals who engage in activities that pose substantial risk to life and limb but wish to keep their iPods safe while doing so. The device's flexible cloth controller attaches to your clothing and sends signals to a 4.5-inch RF receiver that connects to your iPod, allowing you to tuck your iPod away inside your coat or backpack to protect it from the elements. Of course, you still have to run a wire for your headphones.

The remote's large, water-resistant buttons are easy to use and responsive—even if you are wearing gloves. The unit can withstand a fair amount of abuse; after a week of use, the SportCommand came out looking pretty good, even after we washed some mud off of it. The controller covers just the basics: power, play/pause, previous or next track, and volume (you can't switch playlists), but when exercising, we're not necessarily concerned with navigating a full interface.

The included neoprene and Velcro strap is best suited for use with ski gear. It even stayed secure on our coat, with no slippage or shifting, but the strap isn't particularly comfortable when worn with lighter clothing. We definitely appreciated the inclusion of a sturdy carabiner, which we used when we went on a long run.

The SportCommand's promised range of 50 feet was easily met, and we had no problem connecting to our iPod through coats or backpacks; however, without wireless headphones, it's unlikely you'll ever need to test the limits of the unit's range.

The SportCommand's fabric remote is both durable and responsive.

We're pleased with the SportCommand's performance, but it's a little spendy for a remote. One potential issue is that the device's lower operating-temperature limit is -10 C, which means you could run into some trouble on the slopes; however, we didn't encounter any problems in our tests. The device's construction is solid, though some minor fraying occurred along the remote's seams and detaching the battery cover required a bit of surgery.

—TOM EDWARDS

BELKIN SPORTCOMMAND **7**

$80, www.belkin.com

Doghouse Electronics RoverTv Wide Screen

Leave this puppy at the pound

Doghouse Electronics's RoverTv sits up and begs comparison to the Archos 604, which we named the best digital media player of 2006. But we found this dog just a bit mangy.

It's not that the device is buggy or doesn't perform as advertised; it's just that we think the Archos 604—which we found to be selling for around $315 online—is significantly better. The RoverTv Wide Screen sells for $350 and has a slightly smaller screen—4 inches, versus the 604's 4.3-inch display; both deliver the same resolution: 480x272 pixels. Doghouse would be quick to inform you of the need to add Archos's $100 DVR Station to the 604 to match the RoverTv's video-recording capabilities, but the difference in storage capacity more than makes up for the price difference between the two units.

You see, the RoverTv relies solely on MMC or SD flash-memory cards for storage and comes with a 2GB SD card; the Archos 604 features a built-in 30GB hard drive. If you're not interested in recording TV programs at all, the 604 actually costs $35 *less* than the RoverTv—but we'll assume this is a feature you want.

The recording process is straightforward, but the device itself is dog-gone dumb. You plug one end of a proprietary A/V cable into the RoverTv and RCA plugs at the other end into the A/V outputs on your TV, set-top box, or DVD player. The RoverTv doesn't have any of the features we've come to expect from a DVR—it can't power-up an external tuner, change channels, distinguish between new episodes and repeats, or even record more than one event at a time—it simply starts and stops recording at whatever times you designate. Oddly enough, it has only a 24-hour clock, so if you want to record *Desperate Housewives*, you'll need to convert 10 PM to 22:00 hours.

The RoverTv Wide Screen is outfitted with an odd-size headphone jack—you'll need to use the provided adapter if you don't like the earbuds that come with it.

The RoverTv Wide Screen's bright display delivered good performance with both photos and video, but its user interface is as rudimentary as can be. The photo directory, for example, can't even display thumbnails. We love mutts, but this one's just too damned dumb.

—MICHAEL BROWN

ROVER TV WIDE SCREEN **4**

$350, www.rovertv.com

Cambridge SoundWorks PlayDock Zen

Better than the average boom box

Creative's Cambridge SoundWorks division has come up with a terrific docking speaker system for anyone who owns a Zen digital media player: The PlayDock Zen takes advantage of nearly every feature those players offer, and it'll run on batteries, to boot!

The PlayDock Zen delivers very good sound with excellent bass response, thanks to a built-in subwoofer powered by a 24-watt amp (the main speakers receive 12 watts per channel). It crosses the border into the land o' distortion if you push it too hard, so don't expect it to fill a big room, but it's more than adequate for near-field listening or as a bedroom system. It doesn't sound nearly as lush as the exquisite Majestic Diamond I speakers reviewed on page 72, but it's also less than half the price and delivers more features than those micro monitors.

The dock has stereo line-in, headphone-out, and video-out ports, so you can hook it up to your TV and watch movies or view photos at 640x480 resolution (we're happy to report that Cambridge includes the proprietary cable needed to use this feature). A telescoping FM antenna is on the back, too, but it works only with the FM tuner in the 60GB Zen Vision: M—a string antenna is provided for folks who have the 30GB model.

Cambridge provides a system of plastic adapters and neoprene sleeves so that any Zen model will fit tightly into the dock. The 30GB Zen Vision: M we used for this review was well supported and didn't budge when we pushed its buttons. (The unit also comes with a full-function wireless remote.) But there's no mechanism for absolutely locking the player into the dock, so we turned the combo upside-down and shook it to see what would happen: The player flopped back and forth and slid a fraction of an inch off its connector, but it didn't fall out. Still, we'd be wary of toting around a docked player.

The PlayDock Zen has a built-in handle and runs on either AC or eight C-cell batteries, so you can lug it around the house or take it to the beach.

—MICHAEL BROWN

PLAYDOCK ZEN **8**

$200, www.cambridgesoundworks.com

Microsoft Entertainment Desktop 7000

Is this the perfect media center lapboard? No

The problem with having a PC in your living room is simple. It's the mouse. Mousing on the couch is a royal pain in the ass. Resting your mouse hand on your leg, on a couch arm, or on one of your couch buddies just doesn't work. That's why we were excited to see that Microsoft's new living-room keyboards ship with an integrated mousing surface. We just didn't understand why the company also included a wireless mouse.

The answer became clear after a few moments with this keyboard. The mousing area just doesn't work particularly well. Set it at a slow enough speed to be accurate and reliable, and it takes forever to navigate the screen. Set it fast enough to zip from side to side, and it's very twitchy. We couldn't find a happy medium.

The pad does include a few nifty tricks, though. Flip a switch above it, and it changes to D-pad mode, which is good (although slightly twitchy) for navigating through the Media Center interface. We also really dig the fact that in mouse mode the mouse buttons are located on the far side of the keyboard, so you move the cursor with one thumb but click with the other. Were the mouse surface slightly better tuned, it would have been a perfect design.

The keyboard's layout is a little goofy; the home keys are off center, and the entire keyboard is slightly warped. It's not a major problem, since we figure you'll use this keyboard more for typing URLs and instant messages than for banging out your first novel.

The placement of the media keys is excellent, and eminently useful, whether you're using Media Center or just iTunes, and we especially like the inclusion of dedicated buttons that open Media Center and the Windows menu. We're still annoyed by the presence of proprietary keys—like the Windows Messenger Live call button on this board—but they're easily reprogrammed to serve other functions. The mouse is a decent rechargeable.

If Microsoft improves the performance of the mouse surface and ditches the then-unnecessary mouse, this could be a killer living-room keyboard.

This keyboard-and-mouse double whammy is designed to fit right into your media center.

—WILL SMITH

MS ENTERTAINMENT 7000 **7**

$150, www.microsoft.com

Razer Tarantula

Wow, that's CEAWFJM awesome!

It's happened to all of us: In the midst of a heated deathmatch, while you're desperately circle-strafing your opponent, you both run out of ammo simultaneously. Unfortunately, when you press your Reload button, your keyboard locks up due to too many simultaneous key presses. Then you die.

Razer's new Tarantula keyboard won't lock up under duress. In our tests, we were able to press 10 buttons simultaneously without hanging the keyboard. Naturally, this gives hardcore shooter and RTS players a serious advantage. On the other hand, if you don't encounter constant lockups, you probably won't notice a difference between this plank and any other.

The Tarantula also includes a variety of programmable buttons suitable for media playback and in-game macros. The included software for programming macros is extremely difficult to use and challenging to adjust on the fly. We would much prefer software that lets you create macros in-game by pressing the appropriate keys on the keyboard rather than manually entering key presses and timing information outside the game.

However, we love the addition of headphone- and mic-in ports on the back of the keyboard, as well as a two-port USB hub. The keyboard even draws power from two USB ports, so it works with devices that don't necessarily like unpowered USB hubs. We're intrigued by the possibility of Tarantula-specific accessories (they'll connect to a special mini-USB port on the top of the keyboard)—Razer has demonstrated a light that would be great for late-night gaming.

There are a few problems with the Tarantula though. The keyboard uses a slightly modified layout and places two columns of macro keys on either side of the main typing area, which caused some miskeys. Additionally, the block of keys that normally houses Home, Insert, Delete, and End is arranged in a nonstandard and annoying way.

Finally, there's the price. At $130, the Tarantula costs as much as a great wireless keyboard and four times what other wired keyboards cost. That just seems like a lot to us.

The Tarantula offers great performance and some interesting features, but unfortunately, it's stupid expensive.

—WILL SMITH

RAZER TARANTULA **8**

$130, www.razerzone.com

TBI Audio Systems Majestic Diamond I Speakers

These pint-size speakers deliver 10-gallon sound

We're accustomed to big sound from tiny speakers because we review a lot of 2.1 configurations that have beefy subwoofers to serve up generous portions of bass. So we were skeptical of the "audiophile quality" claims TBI Audio Systems made for its diminutive—and sub-less—Majestic Diamond I audio monitors. Well, we're believers now.

It's not just the size of these speakers that renders them atypical of the products we usually review; they're also passive, which means you'll need an external amplifier to drive them (TBI provided us with Sonic Impact's remarkable $40 Portable T-Amp for this review.) The Majestic Diamond I's aren't magnetically shielded, but they use a low-gauss magnet, and TBI says the speakers can be placed in close proximity to a CRT. LCD monitors, of course, aren't affected by magnetic fields.

Listening to Steely Dan's "My Rival" (from *Gaucho*), we were struck by these speakers' ability to deliver silence between the notes in the song's arrangement. You don't hear that in lesser speakers, because they can't stop resonating between tightly packed notes. We then turned to the guitar and vocals of "If This Is Goodbye" from the Mark Knopfler, Emmylou Harris collaboration *All the Roadrunning*.

The Diamond I's proved as adept at delivering Knopfler's mellifluous baritone as they were at producing Harris's alto. Listening to "Beyond My Wildest Dreams," however, we found ourselves craving just a bit more bottom end, down where the kick drum lives, and for a taste more in the upper register—we wanted more of the drummer's rim shot laying down its half-time rhythm.

The Majestic Diamond I speakers are outfitted with just three-inch full-range drivers, but they sound better than much larger speakers.

If ever there were an audio system that proves what a tragic mistake it can be to judge the quality of audio components by spec charts, this combo is it: The speakers are rated to handle just 25 watts RMS, while the tiny amp is rated at just 15 watts per channel; heck, the amp can run on eight AA batteries. If you're looking for a high-end yet transportable audio setup for your digital media player or notebook PC—and have a generous budget—you can't do much better.

—MICHAEL BROWN

MAJESTIC DIAMOND I SPEAKERS **9**

$400, www.tbisound.com

Belkin Cable-Free USB Hub

At what cost wireless?

When we heard about Belkin's Cable-Free USB Hub, our first thought was, "Yes! Now we can move our iPod A/V dock next to our TV in the living room and still sync the player with iTunes on our PC in the den." Ha! This device's range is so poor it barely reaches across the room.

To be fair, Belkin doesn't make tremendous claims for the device: The box states that the USB hub has "30 feet of wireless range" and that you can "transfer files at speeds up to 480Mb/sec." That obviously won't fulfill our multiroom mission, but the device doesn't deliver on its stated specs, either. We were lucky to get 10 feet of range, even when—as the manual recommends—we maintained a clear line of sight between the dongle and the hub.

Potential buyers shouldn't get too excited about getting rid of cables, either. You'll need an electrical outlet to plug in the four-port hub and a free USB port on your PC to plug in the cable for Belkin's dongle stand. Plugging the dongle directly into the back of your PC will likely prevent it from pairing with the hub no matter where you put it. And since the dongle half of the equation isn't a Certified Wireless USB device, it will never be compatible with future devices that *do* comply with that standard. Belkin considers the combo a closed point-to-point network.

To test file-transfer speeds, we copied 412MB of random files from our desktop PC's hard drive to a freshly formatted 6GB USB hard drive. We achieved a data-transfer rate of 24.9Mb/sec with the drive plugged directly into our PC. When we repeated the test with Belkin's hub (with the dongle just a few inches away) the data-transfer rate dropped to 9.4Mb/sec. We then moved the hub about six feet from the dongle and repeated the test; this time, the data-transfer speed dropped to a mere 5.3Mb/sec.

If Belkin's Cable-Free USB Hub is any indication of what we can expect from other wireless USB products, the technology's future is bleak.

Considering you can buy a wired four-port USB hub for around 30 bucks, you'd have to be nuts to spend $200 for this wireless model.

—MICHAEL BROWN

BELKIN CABLE-FREE USB HUB **2**

$200, www.belkin.com

Norco DS-500

This hard-drive enclosure is no beauty, but it's no beast, either

If every other external enclosure we've reviewed has been a Chevy Nova, then Norco's DS-500 external SATA storage, um, block is easily a Humvee. For this device not only performs solidly but also weighs as much as everyone's favorite urban assault vehicle. And that's *before* we stuffed five hard drives into it.

Setting up the DS-500 couldn't be easier. Although we encountered some sharp edges on the five hot-swappable drive trays as we went to extract them from the hulking chassis, this is a nitpicky complaint; you literally just pull out a tray, slap a hard drive onto it, and stuff it back into the DS-500. By default, Windows immediately recognizes each drive as its own separate entity.

If you want to get a fancy RAID configuration up and running, Norco makes the process painless. Using the included CD, you just flash the device's onboard BIOS to a RAID configuration, and *voila*!—the included SataRAID5 software takes care of the rest. And if BIOS-flashing isn't your thing, Windows' default disk-management utility will do the same job.

We raise a frosty mug in the air to Norco's inclusion of an eSATA PCI/PCI-X controller card with the DS-500. While a number of "next-gen" cases are arriving with eSATA ports built right into the front I/O panels, it's good to see that those without such electronic accoutrements won't get left in the dark. And since the controller has four ports, it should surely fit the external-storage needs of even the biggest power users.

One concern we have with the DS-500 is that it's strangely quiet for an enclosure—normally, that's a good thing. In this case, however, it means not a lot of internal cooling is going on. Sure, the device comes with a 9.2cm fan, but we're not entirely convinced that it's big enough to chill five hard drives at once.

The DS-500 isn't the prettiest drive enclosure on the market, but it gets the job done with no questions, concerns, or crashes.

If money's no object, the DS-500 should suit your storage needs perfectly. Stick five drives in there, and it could even double as a wheel stop for your jet.

—DAVID MURPHY

NORCO DS-500 **8**

$500, www.norcotek.com

NeatReceipts Scanalizer

It's time to empty out that shoebox full of receipts

If your receipt-organization strategy is to stuff slips of paper in your wallet until it won't fit in your back pocket, it may be time to harness technology and get organized.

The NeatReceipts Scanalizer will help you do just that. Using a sheet-fed 600dpi USB color scanner, the Scanalizer makes keeping track of your receipts not just easy but—dare we say it—fun. To test the Scanalizer, we grabbed a stack of receipts—crushed, wadded up, and flatted by coworkers—and then scanned them. The process and results were problem-free.

But the fun really starts with the Scanalizer application, which will automatically record and store the merchant's name, the date, and the amount paid. The app stores grayscale scans of the original receipt and can also create rudimentary reports based on how you've classified each receipt. Was one purchase for a Dream Machine project while another was for a budget PC? You can keep it straight with the Scanalizer.

The application also does double duty as a business-card scanner and document organizer. Cards and docs can be scanned in color, but receipts are kept in grayscale to "save space," which is too bad. We'd prefer an option to enable color scans for folks with spacious hard drives.

Not all was perfect with the product. We found the interface to be a little clumsy and unintuitive. Moving receipts from one folder to the other, for example, requires a cut-and-paste command instead of a simple drag-and-drop. We also think it's clumsy to move from the business-card software module to the receipt module—the entire app feels like it needs a central starting point. We also couldn't figure out how to manually key in tips on dining bills without changing the amount paid. Optimally, we'd like to track both how much we paid and how much we tipped. The app lets you automatically add a tip based on a percentage of, say, 15 percent, but what about that one time the waitress filled our coffee cup only six times?

These are fairly minor quibbles though. We were very impressed by the performance of the Scanalizer.

—GORDON MAH UNG

The Scanalizer organizes your receipts and does double duty as a business card scanner.

SCANALIZER **9**

$230, www.neatreceipts.com

A Mouse for Your House

Which rodent makes for the best fragging?

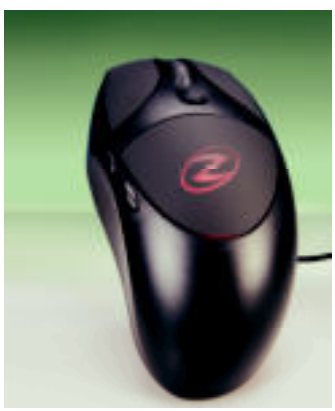
Choosing the right mouse is an intensely personal endeavor. Not only do you demand high performance, plenty of buttons, and adjustable sensitivity, you also need a mouse that's comfortable enough not to cramp your style during a 20-hour Burning Crusade session. That's hard to find.

—WILL SMITH

IDEAZON REAPER

We were quite surprised when an optical mouse turned up in the Maximum PC Lab—we're deep into the laser generation—and even more surprised when it turned out to be good. Is the latest, greatest tech not always best?

The Reaper's 1,600dpi optical sensor is, technically, less sensitive than the laser sensor in the Logitech G5 or the Fatal1ty mouse (also reviewed here), but you'd not know it when you're playing games. Tracking is supersmooth, even in high-speed, twitch games, and the Reaper delivers a smoother-feeling action than we remember other optical mice having. While it didn't help us get more frags in Counter-Strike: Source, we could definitely AK snipe n00bs from across the level with it.



The Reaper performs well, but it's just not comfortable for long gaming sessions.

Our main complaint about the Reaper is with its shape. While it sports a whopping seven buttons—including three conveniently placed for thumb use—the Reaper isn't very comfortable to use. Unlike more ergonomic mice we've tested, the Reaper has a low profile and somewhat odd button placement, which makes it difficult to use during long sessions. It also lacks the hand support we really need in a mouse—if you're at your PC for 10 hours a day, comfort is crucial.

Ideazon is one of the few companies to nail driverless resolution switching on a mouse. Even without the company's software installed, pressing a button will cycle your rodent through three settings: sensitive, supersensitive, and stupid-crazy sensitive. By using the different sensitivities effectively, you can easily switch your movement speed on the fly. This is great for games like Battlefield, in which you need low sensitivity for infantry ops but high sensitivity when you're driving vehicles.

If it were a few bucks cheaper, the Reaper would be a strong contender in the budget-gaming-mouse category, but as it stands, for $6 more, you can get the vastly superior Logitech G5, which includes many of the same features and is more comfortable to use over long sessions.

IDEAZON REAPER

8

COTSWOLD
Loads of buttons, sensitivity adjustments, and really good motion.

CHEEZ WHIZ
Uncomfortable for long gaming sessions.

$40, www.ideazon.com

CREATIVE FATAL1TY PROFESSIONAL LASER

When an unnamed editor was eight, all he wanted for his birthday was an authentic William "The Fridge" Perry jersey. A cheap knockoff wouldn't do, nor would the condescending sized-down jerseys. Needless to say, he was left disappointed, but not as disappointed as he would have been once he tried on the authentic jersey, which contained as much fabric as a circus tent.

What's the moral of this story? Sometimes, what's good for a pro isn't good for an amateur. That's definitely the case with the Fatal1ty mouse. Despite what the Creative marketing apparatus might want you to believe, it takes more than a fancy laser mouse to play like Fatal1ty.

At first glance, the mouse has all the right parts to excel in gaming: It tracks extremely well, it features adjustable sensitivity (sans drivers), and it sports enough buttons. Heck, it even features an adjustable weight system, like the Logitech G5. However, for most users, the physical shape of the mouse will leave much to be desired.

The stumpy Fatal1ty mouse—aka the Cr1ppler—performs great but leaves much to be desired in the ergonomics department.

Unlike other mice, which are designed for you to rest your hand on, you're supposed to mimic Fatal1ty's claw-like grip when using his mouse. Unfortunately, Fatal1ty's grip is crippling if you use it for an extended period of time—you have to contort your hand into a claw to use all the buttons on the mouse. In our unscientific Counter-Strike test, we increased our frag count by using the claw technique; however, we eventually suffered terrible hand cramps from holding the position too long.

The problems continue when you use the mouse for common mousing tasks, web browsing, and desktop work. While the precision is great, the device is just not comfortable for extended periods of time. After only two hours at work, our hand was already cramping from the utter lack of support this rodent delivers.

Like the Fridge's jersey, this item is designed for pros who are willing to suffer in order to attain maximum performance. We just can't recommend it to folks who use the same mouse for games and desktop work.

CREATIVE FATAL1TY LASER

6

DUBLINER
Great performance, adjustable weight system, and a five-button design.

AMERICAN SLICES
Not suitable for extended use; this mouse will cripple you.

$70, www.creative.com

ProShow Gold 3.0

The gold standard just got better

ProShow Gold has long been the, umm, gold standard for wedding, portrait, and studio photographers who want to show work to clients on a DVD, and we can see why. With its smooth user interface and dizzying number of effects and customizations, ProShow Gold instantly became our favorite slide-show program.

Version 3.0 is quite a major update from 2.6, and one of the key changes is right up our alley: multicore support. On a dual-core machine, we saw both cores operating at 100 percent—just the way they should be. After all, if you paid for the hardware, you should be able to wring every bit of performance out of it. Also new is the ability to output your video to Adobe Flash format, QuickTime, Windows Media, or HD-resolution AVI files.

When testing ProShow Gold 3.0 we created a high-quality first-pass photo slide show within an hour. The UI is easy to use, but not quite as simple as our previous fave, CodeJam's MemoriesOnTV 3.0. It isn't that ProShow is particularly difficult to use, it's that the sheer number of options, switches, and sliders available can overwhelm a newbie. For example, MemoriesOnTV 3.0 features several pre-canned multislide effects that you can apply in a few seconds. Achieving the same effects in ProShow Gold 3.0 takes quite a bit of tinkering. The same tinkering, however, gives you much more nuanced control over your final product. And while there are a few things you can do in MOTV 3.0 that you can't do in ProShow Gold 3.0, ProShow Gold does many more things better.

So what's there to complain about? We have a few minor UI quibbles: You should be able to screw around with a slide and click Cancel if you don't want to commit to a change. As it is now, your actions are applied as you experiment.

The layers in ProShow Gold 3.0 are powerful, but the number of options can be overwhelming.

You can perform a simple undo, but we'd rather just be able to click Cancel. Adding a second audio stream for narration is clumsy, but removing the narration is even clumsier. Regardless, we're really just digging for problems because overall this is our new favorite slide-show app.

—GORDON MAH UNG

PROSHOW GOLD 3.0 **9**

$70, www.photodex.com

MAXIMUM PC KICKASS

Memeo AutoBackup

Baby got back(up), barely

At first glance, Memeo's AutoBackup reminds us of the delicious pairing of Mr. Jack Daniels with Ms. Coca-Cola—if Jack were a backup utility and Coke were automation.

On paper, this program presents the perfect solution for those of us who often forget to run a weekly backup of that-which-is-mission-critical on our hard drives. In practice, however, the cocktail's a little watery. AutoBackup performs adequately enough to keep us buzzed but contains enough annoyances to keep us shy of outright drunken enthusiasm.

The program's simple to use. You first select where you want your files backed up—locations from a Memeo-provided Internet storage account to a network drive to an iPod are supported. You then select the file types (or folders) you want Memeo to watch, and the program will automatically sync your new, deleted, and changed files with said backup device—all without you ever having to touch the program again. Sounds great, right?

While it works in the end, AutoBackup takes a ton of setup time: The program has to pore over your drive, assemble the files for backup, verify the files being backed up, etc. Even on a fairly slimmed-down machine, this was a process measurable in hours, not minutes.

AutoBackup's Restore feature is fairly perplexing in that the program won't overwrite old material at your backup location until it's crammed to the brim with files. So when you restore some lost data saved on your 20GB iPod, you'll have to dig through 20GB of files, which almost certainly includes a bunch of stuff you don't necessarily want to restore as part of a batch operation.

The program also has some issues working with USB devices, especially

This program gives you a ton of places to stash your stuff.

ones that power down after a certain period of nonuse. We frequently received a "pending" message, which indicated that AutoBackup was waiting for our external drive to become available… even though the drive was completely accessible in Windows Explorer. *Ce qui?*

These little drops of programming poison sour an otherwise worthy selection. The drink isn't ruined; we're just hesitant to order it.

—DAVID MURPHY

MEMEO AUTOBACKUP **7**

$30, www.memeo.com

Supreme Commander

This most definitely ain't your father's RTS!

You can zoom out for a bird's-eye view of the entire map without losing one bit of control over your units—you can even put the strategic map on a secondary display!

When Total Annihilation came out nearly 10 years ago, it gave the RTS genre a major kick in the arse, bringing 3D units and terrain, downloadable units, and a level of battlefield chaos that was over-the-top for its time.

Why the hell are we talking about a decade-old game? Supreme Commander is the brainchild of TA's daddy, that's why. It may not be called TA II, but Supcom is very much the spiritual successor to that genre-redefining game. And, as with TA, our expectations for an RTS are forever changed after playing Supcom.

This is quite simply the biggest, most explosive, most visually gratifying RTS we've ever played. Everything about this game screams B-I-G, from the size of its units and maps to the size of its explosions—and system requirements.

The game serves up three single-player campaigns featuring three very visually distinct factions—all vying for control of the galaxy. The story is well told and backed by top-notch production values. Each campaign may include *only* six missions, but each mission grows in size as various objectives are met, and most missions take several hours to complete. (And you get deep skirmish and multiplayer options, too.)

You control an Armored Command Unit, which is basically a King Kong–size robot that you use to construct a base and raise

The Armored Command Unit is your on-field general: Lose it and it's game over.

an army. Lose this unit and it's game over. (The same rule applies to your enemies.)

The primary ace up Supcom's sleeve is the scale of its maps, which are simply ginormous—think hundreds of square miles, not a couple of football fields! You can have up to 500 units in your army at once, as can each enemy commander on the map, and up to eight players can go at it on multiplayer maps. The math adds up to mass carnage, and it also makes for a game that feels much more like real war than anything we've played yet.

Units are expendable! Base defenses are strong, and it'll take hundreds of units to storm a large installation. The name of the game is combined arms: finding the right balance of units to win the day.

Supcom's interface and camera system are simply brilliant, which means the game is never hard to manage despite the scale of war erupting on your screen. You can zoom out until units are no more than chits, and you can zoom in until you can see the whites of their eyes. Your level of control over the game never changes.

By holding down the Shift key and right-clicking you can do just about anything in the game: queue build commands, set patrols, tell units to assist each other, and of course, order attacks. It's all so elegantly simple, which means you are free to concentrate on strategy and tactics rather than worry about micromanagement. This freedom is also bolstered by the fact that you only need to worry about harvesting two resources—energy and mass—to keep your army running.

Supcom is a bloody fantastic game—even if you don't like strategy games, you will like this one. However, this is also the most system-intensive RTS we've ever seen. Don't even think of playing it with all the bells and whistles on unless you have an 8800-class GPU and a multicore CPU. Even then, it will likely bog down at times. Nevertheless, this is one game that's definitely worth the upgrade hassles.

—STEVE KLETT

Work your way up the tech tree and you'll have nukes to play with—and when they're pretend, they're a helluva lot of fun!

SUPREME COMMANDER

+ EYE GRATIFICATION

Huge maps, tons of units, great control scheme; dual-monitor support is cool.

– SLEEP DEPRIVATION

Extreme resource hog! AI gets a bit dumb in the largest battles; faction units are a bit too samey.

10

MAXIMUM PC KICKASS

$50, www.supremecommander.com, ESRB: E 10+

Sam & Max

Proof that adventure gaming isn't dead! Honest!

Not only does Bosco run the "inconvenience store," he's a world-class inventor as well.

We've waited for over a decade for the return of Sam and Max, the caricatured freelance detectives from the deranged mind of Steve Purcell. After LucasArts's controversial cancellation of the duo's highly anticipated adventure in 2005, Telltale Games came to the rescue to bring these lovable gumshoes back to PC gaming. We're happy to report that fans will not be disappointed.

—NORMAN CHAN

EPISODE 1: CULTURE SHOCK

The first of six planned episodes for the invigorated franchise quickly reacquaints you with the twisted world of Sam & Max before immediately launching you into a puzzling case involving washed-up child actors and fitness gurus. You control Sam, the laid-back canine with a sharp wit, who is followed by Max, a maniacally insane rabbit who provides most of the game's physical humor. Fans will love the faithfully re-created style and art direction from the last game (but now in stunning 3D) and will appreciate familiar set designs and characters. Yes, the DeSoto is back, too!

You're charged with investigating the strange behavior of the Soda Poppers, a group of former child stars vandalizing the town and harassing Bosco, the "inconvenience" store owner. The puzzles that must be solved to unravel the mystery range from completing very simple acts (dropping a bowling ball on someone's head) to undertaking obscure challenges involving car chases and tear gas. We were sometimes stumped by the more difficult puzzles near the end of the game, but exploring hilarious dialogue trees for clues and revisiting each location eventually did the trick. The designers have ensured that solving a tough puzzle to progress the story is incredibly rewarding, but also that you're consistently entertained by the minor details of the game world, even when you're stuck.

One thing we would've liked is the inclusion of more minigames to further extend the life of the game. We completed the story in about five hours, including exhausting all possible conversation paths we could find. But for less than a Hamilton, you're still getting a lot of great game. This first episode is a success not only for the adventure-game genre, but for episodic gaming as well. The crafty writing and well-polished game design prove to be winning ingredients in a long-awaited dish.

CULTURE SHOCK **9**

$9 or $35 for a season pass, www.telltalegames.com, ESRB: NR

The car-chase minigame has you tailing rats and pulling over innocent drivers.

EPISODE 2: SITUATION: COMEDY

The second episode of Sam & Max not only brings a new case to the private eyes but also hints at the overarching mystery that'll tie the entire season together. Characters from the first episode return to take on new roles, and the puzzles get harder in order to stress your problem-solving skills. The novelty of the dynamic between Sam and Max wears off a little, but we have to give props to the writers for continuing to create laugh-out-loud scripts for the game.

This time, an Oprah-esque talk show host is holding her audience hostage, and it's up to you to find a way into her studio. The mystery is clearly broken down into three challenges that you can complete in any order: filming a television pilot, winning a recording contract, and being featured in a tabloid. The Soda Poppers come back to judge an *American Idol*–inspired singing competition, and Sybil (who was a psychiatrist last time) returns as a gossip journalist. Many of the environments are reused in new capacities (Bosco's store, the office), but plenty of new sets keep the episode from feeling like too much of a rehash.

We can't help but chuckle at the creative character design.

You might breeze through much of the first episode, but the puzzles here would have even MacGyver scratching his head. In one segment, we baked a cake with lard and squid tentacles but weren't given any indication of how or where to use it. We ended up trying to "apply" it to every object and character in the game before getting it to the right person. One suggestion: Be sure you save before the final scene—branching dialogue options make it easy to get lost if you're not paying close attention.

We walked away from the second installment satisfied but not as enthralled as we were after playing the first. Like any good serial, the whole (so far) is more enjoyable than its individual parts. We can't wait to see how the rest of the arc pans out.

SITUATION: COMEDY **8**

$9 or $35 for a season pass, www.telltalegames.com, ESRB: NR

Win Rig of the Month AND WIN BIG!

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

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

SO WHAT'S STOPPING YOU?

TO ENTER: Your submission packet must contain your name, street address, and daytime phone number; no fewer than three high-res JPEGs (minimum size 1024x768) of your modified PC; and a 300-word description of what your PC represents and how it was modified. Emailed submissions should be sent to **rig@maximumpc.com.** Snail mail submissions should be sent to Rig of the Month, c/o Maximum PC, 4000 Shoreline Court, Suite 400, South San Francisco, CA 94080.

The judges will be *Maximum PC* editors, and they will base their decision on the following criteria: creativity and craftsmanship.

ONE ENTRY PER HOUSEHOLD. Your contest entry will be valid until (1) six months after its submission or (2) March 7, 2007, whichever date is earlier. Each month a winner will be chosen from the existing pool of valid entries, and featured in the Rig of the Month department of the magazine. The final winner in this contest will be announced in the April 2007 issue. Each of the judging criteria (creativity and craftsmanship) will be weighed equally at 50 percent. By entering this contest you agree that Future US, Inc. may use your name and your mod's likeness for promotional purposes without further payment. All prizes will be awarded and no minimum number of entries is required. Prizes won by minors will be awarded to their parents or legal guardians. Future US, Inc. is not responsible for damages or expenses that the winners might incur as a result of the Contest or the receipt of a prize, and winners are responsible for income taxes based on the value of the prize received. A list of winners may also be obtained by sending a stamped, self-addressed envelope to Future US, Inc. c/o Maximum PC Rig of the Month, 4000 Shoreline Ct, Suite 400, South San Francisco, CA 94080. This contest is limited to residents of the United States. No purchase necessary; void in Arizona, Maryland, Vermont, Puerto Rico, and where prohibited by law.

We tackle tough reader questions on...

✓FPS Overkill ✓Print Errors ✓CableCard ✓Bags ✓TI-99/4As ✓Music Stores

FRAME-RATE MADNESS!

I don't care who says what, once you hit 60fps in any media, that's it—unless you happen to be from Krypton or $6 million was spent rebuilding you. I engineer systems and networks for graphics, video, and audio clients.

This also means I tend to build home systems for these folks. Since the first 3D cards hit the consumer market in the '90s I have been doing my own benchmarks. This allows me to see what I can offer my clients for the best possible price. I do all the testing blind, and I do not run benchmarks until after I see the user experience. I know those benchmarks are going to show a huge jump in performance, but the only time users can actually discern these performance jumps is when they go from a low-end PC to a high-end rig or when they see the benchmark scores.

Simply put, I have seen only one occasion in which a human actually saw any performance leap from 65fps to 80fps. Yet I keep reading in your mag how cool it is to jump from 80ish frame rates to the 100s.

—Frank Mondana

SENIOR EDITOR GORDON MAH UNG RESPONDS: Frank, I agree with you that going from a steady 80fps to 100fps is difficult or impossible for mortal gamers to see, but as one of the last few here from the old *boot* days, I can tell you that nothing has changed.

I can still hear Senior Editor Andrew Sanchez saying that most people can't see any difference above 60fps. However, we recommend videocards that deliver greater than 60fps for two reasons. First, cards that hit higher frame rates give you breathing room for future games that will stress your hardware more. A rig that delivers 60fps on average today will not do so in games that come out six months from now.

Second, we publish the average frame rate, because that's what most benchmarking tools report. However, the more telling number is actually the minimum frame rate during the run—when a game's frame rate drops below 60fps, people notice, and the result is unpleasant. In FEAR on machines that average 60fps, the minimum frame rate can dip as low as 20fps. Not good.

You should also remember that today people push 24-inch panels with resolutions of 1920x1200. Even if a machine ekes out 60fps at that resolution, it's not going to run at the same speed on super-high-resolution 30-inch panels.

WE'RE VERY, VERY SORRY

Page 59 in the March 2007 issue is one of the worst pages I've ever tried to read in a magazine. My only conciliation is that the product on that page [Philips' amBX speakers] was rated so low that I guess I didn't miss much. You value substance over style with your product reviews, so please remember that philosophy in the layout.

—Hollis Jackson

EDITOR IN CHIEF WILL SMITH RESPONDS: As someone with spectacularly bad vision, I can assure you that we didn't intend for that page to look as it did. Unfortunately, in some issues, a printing error caused the page to be exceptionally difficult to read. We've taken steps to ensure that the problem won't occur again, as you can see on page 59 of this issue. If you received an affected copy of the magazine, please contact me at will@maximumpc.com and I'll send you a PDF of the amBX review.

WE'LL CALL IT THE CRAPCARD

I was surprised to read in Will Smith's "10 Reasons You Don't Need Vista Today" (February 2007) that "Vista won't support CableCard for the vast majority of users." I just read about ATI's new OCUR CableCard, which is supposed to come out in mid

CUTCOPYPASTE

Our review of Roku's SoundBridge Radio (January 2007) incorrectly reported that Roku Labs does not provide its own server software: The company's open-source Firefly Media Server is at version 1.0. The company also tells us it will add WPA security with version 2.7 of its SoundBridge software, which was in beta at press time.

Sure about the Sansa?

Your review of the SanDisk Sansa e260 digital media player (November 2006) was generally positive, but you raised a major objection to the Record button, which was too easy to push, and gave the player a 5. I've heard that newer releases in the E series have upgraded firmware with a software-activated lock for the Record button. How would you rate those players?

—Dave Braune

The Sansa e280r fixes many of the problems that plagued its predecessor, but we're really excited about the upcoming Wi-Fi-equipped version.

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: We actually review the Sansa e280R in this issue (see page 62) and can confirm what you've heard about the firmware. Being able to lock the Record button resolves our biggest complaint about this player, but we still don't care for the undersized buttons. SanDisk showed us a new player at CES—the Sansa Connect Wireless—that has a completely different button/wheel interface, but it'll be a couple of months before we can get our hands on one of those. Stay tuned!

2007. I've been waiting for this type of product; will it not work with Vista?

—Roy Gavilan

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: ATI's OCUR card will work with Vista; unfortunately, ATI cannot sell the product at retail because of the licensing agreement it signed with the cable industry. These cards can only be purchased as part of an OEM system in order to guarantee an unbroken chain of DRM (at least that's what ATI and Microsoft have promised the cable industry). If you're looking for a CableCard tuner you can drop into a home-brew system or add to another PC, you're SOL.

WHERE DID YOU GET THAT WONDERFUL BAG?

The must-have tools article in the March 2007 issue ["Maximum PC's Ultimate PC Trauma Kit"] was really great, but where did you get that awesome bag!?

—David Kovach

SENIOR EDITOR "JOHNNY GAGE" UNG RESPONDS: Whoops. We used a Dyna Med Maxi-Medic, which is available from Galls.com for $60. It's soft-sided, includes a ton of removable dividers, and features a waterproof bottom.

MAXIMUM CLASSIC COMPUTING

Thanks for running the Commodore 64 Autopsy (March 2007). My first computer was a TI-99/4A. This computer originally came out in 1981 and sold for around the same price as the Commodore 64, but the TI-99/4A was a little more advanced for its time—it had the first 16-bit TMS9900 microprocessor. Besides having to program in BASIC, you had to use hexadecimal (base 16) code to turn on and off individual pixels to write a graphics program. It was nice to be reminded of how far we've come.

—Mike K.

EDITOR IN CHIEF WILL SMITH RESPONDS: My first PC was a TI-99/4A too, Mike. And I definitely remember the "fun" of typing in 500-line programs, only to learn I had a typo someplace.

MARK REALLY LIKES ITUNES

I'm a huge tech enthusiast and own my own computer business. I love your magazine, but the Head2Head comparing Apple's iTunes and the Zune Marketplace (March 2007) is pathetic. It must have been written by someone who does not use iTunes.

ITunes is a fantastic program with a feature set that makes the Zune Marketplace look like a broken Yugo. You were too nice in this article. More than a billion songs have been purchased through iTunes. I taught my seven-year-old how to use it in one minute. The fact that you can't back up your purchased music from the Zune store to CD or DVD is a joke.

—Mark Ronning

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: Well, as the story's headline states, our comparison was between the iTunes Store and the Zune Marketplace, not between the iTunes software and the Zune software (although we did compare the CD-ripping experience). As far as being "too nice" to the Zune Marketplace, I think you're overlooking the fact that we didn't give Microsoft a win in a single category.

Apple says the iTunes store has sold *2 billion* songs since its launch in 2003 (along with 50 million TV shows and 1.3 million movies). But the RIAA reports that 705.4 million CDs were sold in 2005 alone. With an average of 12 tracks per CD, that's nearly 8.5 billion songs sold in one year. Clearly, we're not the only ones who still think buying music that's uncompressed and unencumbered with DRM is a good idea.

NEEDS MORE LINUX

Why is it that on the CD that comes with your magazine, I never see anything for Linux users? Since most everything Linux is open source, I don't see the problem with packing a little bit on to please users of both Windows and Linux. You might even be able to turn more people on to Linux by doing this. Personally, I'm having an issue with a Dell E1705 running Fedora Core 5, so new drivers or little-known apps would be a GREAT thing to find on my Maximum CD every month.

—SGT Gregory Levi liams

EDITOR IN CHIEF WILL SMITH RESPONDS: The problem with including Linux apps is twofold. First, many of the Linux distros package their applications in different ways; what works on Fedora won't work on Debian or Gentoo, and vice versa. So, in order to accommodate the vast majority of Linux users, we'd have to include three or more versions of each application. Additionally, the Linux distros we recommend these days include excellent application-management apps that will automatically download and install virtually any application we could provide. MPC

LETTERS POLICY: *MAXIMUM PC* invites your thoughts and comments. Send them to **input@maximumpc.com.** Please include your full name, town, and telephone number, and limit your letter to 300 words. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.

COMING NEXT MONTH IN MAXIMUM PC'S

CRAZIER-THAN-AN-ASTRONAUT MAY ISSUE

COPY YOUR MUSIC AND MOVIES!

Take media matters into your own hands! We'll show you how to back up all your purchased music and movies for safekeeping and unfettered use on any device. It's your right, dammit.

LIVING LARGE!

Overkill, shmoverkill. We're good and ready to ditch our 24-inch LCDs now that even larger desktop displays are available at costs that are only semi-exorbitant. Next month, we review six massive monitors!

GEEK QUIZ

Better crack the books and start popping the smart pills, cuz next month your knowledge of all things computing will be seriously put to the test. It's time to earn your geek wings!

JACKIE MCGATHA'S

Dragon Knight

Jackie McGatha is a self-described science fantasy addict, so when it came time to build his first mod, his love of all things World of Warcraft, EverQuest, and Vanguard, led him to the theme for this Rig of the Month, Dragon Knight.

What you see here is actually Jackie's second attempt at a mod; after first trying to make the case out of only wood, he decided he needed more support for internal components. By bolting two metal frames together and then building a wooden case around them, Jackie created the structure necessary to support all the internal components—and left plenty of space for upgrades.

Jackie's biggest worry was that after spending months carving these panels they wouldn't fit on the metal frame. Luckily, everything matched up perfectly!

The pine case can't dissipate much heat, so to keep things cool, Jackie installed four fans and a water-cooling system. The flip side of not shedding much heat, though, is that this rig runs really quietly!

Two green cold cathodes and a pair o ultraviolet lights produce the glow that emanates through the etched glass.

Pine provided just the right mix of durability and softness, allowing Jackie to do detailed woodwork but create a case that could still withstand a fair amount of abuse.

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

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

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