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Take a look at pages 20 and 21. C'mon, humor me. Just do it. Back again? Great. Now ask yourself: Can you believe you once played Wolf-3D and actually thought it was the best thing since mustard in a squeeze bottle? Hoo-wee, how times have changed! Today, the graphics in Wolf-3D couldn't earn third place in a high-school science fair. But back then? We felt like we were navigating through a state-of-the-art military simulator.

And Wolf-3D was fun too, which just goes to show that gameplay does matter—and this is ever-more obvious in February 2002, a month in which we get to witness a very intriguing nexus of 3D gaming technologies.

On one side of the nexus we have Aquanox and Ballistics, two games that boast state-of-the-art 3D visual effects, care of DirectX 8 and the programmable pixel and vertex shaders built into the nVidia GeForce3 and ATI Radeon 8500 video chipsets. These two titles are absolutely, unequivocally, 100 percent gorgeous, replete with bump-mapping, reflections, refractions, and motion blur that just weren't feasible at acceptable frame rates with last-generation technology.

But Aquanox and Ballistics aren't all that deep once you get past the stunning visuals. Sort of like having a supermodel girlfriend who begins to bore you once those two hot weeks in Paris are over.

On the other side of the nexus we have Return to Castle Wolfenstein, a game with incredibly satisfying gameplay, but rendered with last-generation technology. Don't get me wrong. RTCW is a visual orgy, but it doesn't look dramatically different than other games based on the Quake 3 engine. Nonetheless, I'd still rather spend a rainy Sunday afternoon with RTCW than with either Aquanox or Ballistics. Like all other games from id Software, RTCW has incredible depth and is addictive from beginning to end.

RT CW shows just what an id-supported developer (Gray Matter) can do with last year's engine, but one can only dream at what the future will bring. Raven Software, a long-time id partner, is currently working on Quake IV. Simultaneous to this, id itself is working on Doom III. Both games will use id's new Doom engine, which, when completed, will most assuredly be the best showcase of programmable shader power ever (we should expect nothing less from Carmack and company). You might have to wait until 2003 to play both games, but when their times arrive, we suspect they'll offer the best in both uncompromised 3D visuals and compelling gameplay.

In the meantime, if you happen to own a GeForce3 or Radeon 8500, give either Aquanox or Ballistics a chance, even if you don't consider yourself a gamer. No other games expose the computational power of modern PCs quite so vividly.

— JON PHILLIPS
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THIS MONTH'S FEATURES

26 Heal Your PC
Is your PC illin'? Even if it isn’t right now, it may be someday. We introduce you to a slew of helpful utilities that can diagnose and fix any rig’s ailments.

44 PC Showdown
How do the indie PC makers measure up to the big boys? We review nine systems from nine smaller vendors to see if the extra TLC they offer really translates into better performance.

40 3D Splendor
At last long, not one, but two games that finally take advantage of the much-touted programmable shader technology of today’s videocards. Find out what we think.
Power User Confused

Help me out here, folks. I saw this logo in a Wall Street Journal advertisement for an APC Back-UPS. I’m completely in the dark. What do the two asterisks stand for?

—MORTY KURTZ

MANAGING EDITOR KATHERINE STEVENSON REPLIES: Well, Morty, let me give you a hint: One of the letters is an “S,” and the other letter is also an “S.” But I’m leaving it to you to figure out the order in which they appear.

RAID NEEDS REVISITING
I read your “Speed Trials” article in the January 2002 issue, and I must disagree with your results on RAID 0 speeds. You guys must have been doing something wrong, because I get way better results from my two-drive striped array. I use two 20GB IBM 60GXPs with a 16K stripe and cluster size on an ABIT KGF-RAID, and when I run HD Tach, my average read speed is 62MB/sec. I think you should do more testing and append your results.

—SCOTT KLAS

ART DIRECTOR NATALIE JEDAY REPLIES: How nice to have a Renaissance man in our midst, a reader who’s schooled in the finer aspects of lip gloss application and cleavage. We value your insight, so please let us know if you have any strong feelings about our February cover girl’s mascara.

—FRED BOSICK

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: A number of readers called bunk on our RAID benchmarks. For what it’s worth, the stripe size on our Promise FastTrak controller was set at 64K, and the read-speed results we received weren’t inconsistent with what we’ve recorded in the past. Other controllers and different stripe and cluster sizes could yield different results. We intend to revisit the RAID question next month with deeper coverage: different controller cards, different stripe and cluster sizes, and extra benchmarks. Stay tuned.

FASHION SENSE
This might not even be your fault, but the reasonably attractive Santa pixie in the December 2001 issue was given “Clara Bow” lips by the makeup “artist.” The only other magazines I’ve seen take this kind of artistic license are the ones where the words are rather unimportant. While I appreciate this diversion from hardcore hardware, the agency would have done better to send a somewhat more stacked pixie. Not that she’s deficient, it’s just that if they send a regular, next-door type of gal, they should keep the makeup consistent with the overall package! But, then again, it’s California. Maybe all bets are off. If I’m reduced to complaining about the model, that should indicate that I’m pretty happy with the rest of the magazine. Thanks!

—FRED BERNERT

XBOX WITH A VENGEANCE
In response to your January 2002 issue Xbox vs. PC head-to-head: You must be smoking dope. An Xbox costs $299 plus tax, and so does a bargain GeForce3 card that’s almost as good as the Xbox GPU. I see the Xbox as a bridge to my next general-purpose computer. I know you’d like me to do my bit for the economy by buying a $2,500 monster machine, but that will have to wait a couple of years.

EMULATE THIS!
I’m not a PC power user—I mostly just read your magazine for laughs—so this is probably nothing more than a boneheaded question from an ignorant geek wannabe. But after reading this month’s comparison between the Falcon and the Xbox [Head2Head, January 2002], I just thought I’d ask: Are PC software emulators for Xbox or PlayStation 2 games a feasible possibility? Wouldn’t it save game developers time and offer instantly expanded markets, compared with the current practice of porting games?

I assume there are disincentives and legal barriers on the part of the console companies—but how about hardware barriers? I notice you mention that the Xbox plays “proprietary 4.7GB software DVDs.” Just wondering.

—MICHAEL STEELE

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: We received a crush of e-mail criticizing our Xbox coverage. Most letters took us to task for staging an unfair fight, as well as completely ignoring the benefits that consoles offer. So maybe it’s time we clear up three key points:

■ Readers shouldn’t interpret our January Head2Head as a final referendum on the Xbox—it was just a pure part-by-part hardware comparison, not an overall value, price-to-performance, or reliability-and-convenience comparison.
■ We at Maximum PC firmly believe that consoles and PCs can peacefully coexist in every home. They serve different purposes. They’re just different.

TECHNICAL EDITOR WILL SMITH REPLIES: Emulating consoles on the PC is technically viable. Everything from Nintendo 64 and PlayStation 1 to Super Nintendo and original 8-bit Nintendo have all been emulated on the PC. The problem is always on the legal side.
Sony and Nintendo actively fight all efforts to emulate their consoles. Due to an ongoing legal battle, Blockade, the commercial PS1 emulator, has been shut down. Consequently, we do not expect to see anything but underground emulation of the newer consoles anytime soon.

**XBOX CPU RESCUE**

I'm wondering: Is the P-III inside the Xbox soldered onto the motherboard, or can I open the ZIF socket and save the poor thing?

—MATT TAYLOR

**SENIOR EDITOR GORDON MAHUNG REPLIES:**

Save the poor thing from the Xbox or save the Xbox from the poor thing? Regardless, the 733MHz Xbox CPU isn't packaged in the familiar FC-PGA socket interface that's compatible with the average Coppermine P-III motherboard. The Xbox CPU is packaged in a BGA, or ball grid array, that's soldered to the Xbox's main PCB, making it pretty difficult to rescue.

**WIRE WE ARGUING?**

Regarding your LAN party how-to [December 2001]: The color code you used for your Category 5 cable will not work. The proper order (and industry standard) is orange/white, orange, green/white, blue, blue/white, green, brown/white, brown. If the green wires are not split, the cable cannot cancel out any interference received from other devices. This may not be important for some people who are using just a 3-meter cable for two computers, but for an extensive network, it's vital!

—NICHOLAS MOORE

**TECHNICAL EDITOR WILL SMITH REPLIES:**

What you wrote, Nicholas, is exactly what we wrote in December. Of course, you're not alone. Judging by the vast number of e-mails we've received, it appears many Maximum PC readers got really good grades in "Making Network Cables 101," but failed "Intro to Reading Comprehension" miserably.

To reiterate, we originally wrote: "The first pair (usually orange and orange/white) will take the first and second slots from the left side. The second pair (green and green/white) takes the third and sixth slots." And so on.

The fact of the matter is, it doesn't matter which colors you use for which pairs (all of the wires are the same inside), just as long as you're consistent on both ends, and just as long as the second pair fills the third and sixth slots of the jack. If you don't do this, then the cable just plain won't work.

**TREKKERY**

This isn't a big deal, but as a Star Trek fan and a die-hard Star Wars fan, I know that the "pitiful little band" phrase used by your "Tertiary Adjunct" [December 2001, In-Out] is Star Wars dialogue (Emperor Palpatine describing the rebel fleet in ROTJ), and not Star Trek dialogue, as suggested in your comments. Perhaps the Borg have reached Coruscant.

—JOHN FRIEL

**SITH LORD GORDON MAHUNG Responds:**

Rebel scum, that was clearly a trap laid for those who would seek to question our every reference to Star Trek or Star Wars. Do you think we would violate both Paramount Pictures' and 20th Century Fox's trademarks without such a transgression getting past our lawyers? Now that I have exposed your acronym-abusing group (ROTJ Gahl), we shall crush you with our fleet of Vipers.

**BLAST FROM THE PAST—EXPOSED**

I was quite intrigued by your mention of the NV1 in the January issue, because I was pretty sure that at one point, one of my older boxes actually ran that card. Sure enough, after about 20 minutes of digging around the graveyard (aka, my closet), I came upon the Diamond Edge 3D 2000. I figured, What the heck?, and plugged it in.

Zoom! It fired up! I was actually able to get X-Wing vs. TIE Fighter to play in "3D-accelerated" mode. Because we all know that tearing off the shrinkwrap of 5-year-old computer hardware devalues it by approximately 9,000 percent, I'll save you the trouble and heartbreak of doing so just to learn more about the board. On the I/O piece, there are three 1/8-inch jacks labeled "In," "Out," and "Mic." There's also your standard DB-15 video out, and what looks like a CAT5 port (Sega Saturn controller, I presume?). I looked around for the nVidia chip, but all I found was one medium-to-small chip labeled "nVSGR." Other than that, audio is handled by a craptastic Analog Devices chip, and the whopping package is rounded out by a whole 2MB of VRAM.

—TAO TAN

**THE CARD THAT TIME FORGOT**

With respect to your VS 6000 article in the January 2002 issue: The principal engineer [of the card] was Scott Porter and I was the secondary (debug and S.I. design). There were initially 50 cards; then another 200 cards were made. I have five of them. I'm very happy that someone is still interested in these little beasts—they took a lot of work.

—HANK SEMENEC, EX-3DFX

**EDITOR-IN-CHIEF JON PHILLIPS REPLIES:**

We've e-mailed Hank about possibly adopting one of his cards, and he says he's game. Stay tuned—some day we might be able to show readers exactly how the Voodoo 5/6000 stacks up against today's hottest accelerators.

**WELL, IT WAS A NICE CASE**

First, let me say I love your magazine. I've been reading it for years, and it's consistently one of the few magazines published today that I actually learn something from. In your December issue, however, I learned something I could have done without, and that's what Gordon dreams over. In your "Gear of the Year" feature, Gordon writes that he "creams" over the ATC-101 case. A geek ejaculating on a high-end case? Now there's a visual I could have done without.

I assure you, I'm no prude. I enjoy my daily infusion of Internet porn.
What gift would you most like to receive?

- GameCube 5%
- PlayStation2 9%
- Xbox 24%
- $300 in PC Upgrades 62%

(3,682 votes total)

It looks like our online visitors share the sentiments of most Maximum PC editors—$300 in upgrades may not reinvent your PC, but an Xbox could definitely change your living-room lifestyle. That’s right: PCs and consoles can peacefully co-exist.

more than the next guy. For that matter, I enjoy it more than the next guy with two chicks, or just the two chicks, or maybe two chicks with another chick, or the three chicks with their old-maid school teacher, spinning them while her chimp looks on. A chimp in a swimsuit wearing lipstick and pointing a gun at the back of one of the girl’s head, and... um... uh... oh... what does it all mean? Anyway, my point is that Gordo creaming over anything is just plain gross. Tell him to reel it in, wipe off the case, and get back to work.

—JIM DOIRE

MANAGING EDITOR KATHERINE STEVENSON REPLIES: First, let me thank you for providing us with a few special visuals. As for Gordon’s graphic expressions of approval: The “Gear of the Year” feature is very important to Maximum PC and its readers. With all the great stuff we test throughout the year, it’s imperative that we convincingly convey the superiority of the products that make the final cut. To this end, we try not to suppress any editor’s enthusiasm—and, frankly, in Gordon’s case, I’m not sure we could have done so without getting messy.

FAN MAIL
I really enjoy your coverage on case mods. I’ve done a few chop jobs myself, and I also work for a major manufacturer, designing new computer systems. Something caught my eye in the December 2001 Rig of the Month article. The case appears to have plenty of fans, yet his case temperature jumps to 35°C during heavy use. A closer look at your photos reveals the problem. The three side cover fans, the front fan, and the rear fan are all pointed in (with the label side of all fans toward the motherboard)! All that air trying to get into the system has no place to escape. Perhaps you can suggest to Mr. Jugdeo that he reverse the airflow direction of his rear fan.

—DAN SARRATT

SENIOR EDITOR GORDON MAHUNG REPLIES: I agree that 35°C is a little high under heavy use (unless the ambient temperature is close to that normally), and Dev Jugdeo’s Air Machine probably could benefit from a little airflow management. But without having seen the Air Machine in person, it’s hard to pinpoint the issue. I can say that many first-timers do tend to throw fans into their PCs willy-nilly, without paying attention to airflow. Sometimes too many fans just generate noise and don’t aid cooling. Ideally, it’s better to have an equal amount of air being sucked into the case as there is being vented.

THE HIGH PRICE OF PERFECTION
I just can’t understand why you gave the Falcon Northwest a Perfect 10 in your December review. High price should knock it down to at least a 9, and as the review mentions, it didn’t even have front-mounted USB ports. I decided to compare the Falcon Northwest with another brand your magazine featured, and I can’t tell the difference between the two except for the cash value. I went to the respective web sites of Falcon Northwest and ABS Computers and customized an order. I picked the exact same things (give or take brand names), and when all was said and done, I got a price of $1,819 for an ABS system and $3,229 for the Falcon Northwest. Can you please throw me a bone and tell me why I should fork over an extra $1,410 for a Falcon Northwest? I can buy two ABSes for the price of the Falcon! What gives? Is tech support really worth that much extra dough? I don’t believe the inclusion of the Holy Grail of cases makes it worth my unemployment checks.

—BRIAN INGALLS

SENIOR EDITOR GORDON MAHUNG REPLIES: We not only give props to vendors that make hot hardware, we also give props to vendors that get it to us first. Falcon is an old-timer in the gaming PC market, and scored a 10 verdict because it delivered the goods, and delivered them on time. If another vendor could have delivered the first Athlon XP, the first GeForce3 Ti 500, the first P Pentium 4, and the first Sound Blaster Audigy in a system, and that system burned the benchmarks to the ground, it also probably would have received very high marks. The truth is, no one else had the hardware as early as Falcon did. If you’re not interested in getting the fastest hardware first, that’s fine. ABS does indeed offer deadly pricing on its systems (check the feature on page 44 this month, for example), and maybe that’s the way you should go. It’s not called the bleeding-edge for nothing.

DECLARATION OF INDEPENDENCE
In the December 2001 issue, I found something that made me cock an eyebrow. On page 33, there’s a full-page advertisement of an Iomega Peerless portable storage device. Turn a few pages to page 38, and the same product is listed in the “Worst Products of the Year” section. So my question is, Do you let just anyone advertise in the magazine, or do you try to keep a handle on it?

—JESSE HEITSMAN
In the December 2001 issue, I thought it was very funny to see the Iomega Peerless advertisement boasting about the product’s wonderful capabilities on page 33, while you people totally trashed Iomega’s image on page 38, claiming that the Peerless is one of the worst products of the year. Kudos to your merciless evaluation of advertisers (your financial supporters, in a way).

—YOUNG KANG

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Mr. Heitsman might be surprised to learn that Maximum PC’s editorial and advertising teams operate 100 percent independently of each other. In fact, we typically don’t know which companies are advertising in the magazine until after our review verdicts are rendered. While the ad sales team won’t sell ads to tobacco and pornography companies, or companies that have been proven to defraud consumers, it pretty much has an open-door policy for all other potential advertisers, including those hawking crappy gear. No reader should ever interpret the presence of an ad in the magazine as an editorial endorsement! In fact, we encourage readers to take Mr. Kang’s position—that the juxtaposition of page 33 and page 38 in the December issue is testament to our editorial credibility.

As for Iomega: If and when it comes out with a great, innovative storage device, we’ll certainly note the turnaround in a review. It’s always great to see companies make a rebound. It’s good for consumers, and good for the PC industry in general.

SOUNDOFF ABOUT SPEAKERS

As much as I like Maximum PC, I’ve noticed that in every article mentioning speakers, the Klipsch 5.1 set is always chosen as number-one. I have personally tested the Klipsch 5.1 and Midland S4 8200 systems side by side, and in my opinion, the Midland speakers prove to be better. Is Maximum PC so biased as to have found a speaker system that was number-one once, and just assume the manufacturer has continued to produce a number-one speaker system? I would like to think Maximum PC is open to all products, and gives every product a fair trial. The Midland’s specs may not be as impressive as the Klipsch’s, but the overall sound quality and clarity of the Midland speaker system is better. I hope Maximum PC will consider this, and change its way of thinking.

—MATT ROCKER

TECH EDITOR WILL SMITH REPLIES: Testing speakers is by necessity a subjective process. When we test speakers, we put them through a gauntlet of tests, including pink noise at different frequencies, a frequency sweep that starts and ends beyond the range of human hearing (10Hz to 25kHz), and several objective tests as well. In December 2000, we dinged the 8200s because they required elaborate tweaking to achieve acceptable sound, although they did sound great once tweaked. The Klipsch’s, on the other hand, rock out of the box. Case closed.

I PASS ON PRODUCT ACTIVATION

I was on a forum where some guy said he knew how to install Windows XP without having to contact the “ALMIGHTY” Microsoft to get a number. I e-mailed him to see how this is done, and he told me to go to IRC and ask for an ISO that has no activation. He said that after downloading it, all I need to do is replace some files in the ISO, burn it, then install. Is this true?

—ANONYMOUS

TECHNICAL EDITOR WILL SMITH REPLIES: The short answer is yes. Microsoft has indeed distributed versions of Windows XP without Product Activation to extremely large corporations that buy thousands of Windows licenses at a time. Some of these installs have apparently made it onto the net.

The long answer is that installing any software you don’t have a license for is against the law. You can incur fines and penalties if you’re caught. And you need to remember that anytime you download something from anywhere on the net, your IP address can be logged. There’s no such thing as pure online anonymity.

If that’s not enough, we’ve been hearing reports of illegal software containing viruses, Trojans, and other nefarious elements. Tread carefully.

CUT, COPY, PASTE

In the words of one of our very astute readers: “In the most excellent ‘Speed Trials’ feature of your bodacious magazine [January 2002], I think you got your calendar dates hosed, man!!! On page 36, you predicted a release date of early 2000 (1?) for a RDRAM/650 based mobo for the next-gen P4. I know I lose track of time when I’m into my PC gizmo, but, uh... a year and a half!!! I’m pretty sure it was supposed to say 2002.” Well, he’s right.
Quick Start

The beginning of the magazine, where articles are small

Intel Finally Goes DDR

Chipzilla doubles SDRAM memory rates— and puts RDRAM in question

For much of 2000 and 2001, the rumor Intel was that it was delaying DDR SDRAM support in order to bolster support for Rambus RDRAM, a memory type in which the company shares a financial stake. Shoot, Intel even eschewed DDR to support regular-old PC133 SDRAM as recently as September 2001—and everyone knows that tying PC133 to the Pentium 4 is like hitching a tickety-old sidecar to a Suzuki R1.

Well, the wait is over. Intel has finally retooled its primary P4 chipset—the 845—to support DDR, officially known as Double Data Rate SDRAM. The 845-DDR (or at least, that's what we're calling it) will leverage up to 2GB of PC1600 or PC2100 memory. And like its name implies, DDR memory more than doubles the data rate of PC133 from 1GB/sec to 2.1GB/sec, and helps ameliorate the performance embarrassment of the P4/SDRAM union. Otherwise, the new chipset is nearly identical to the PC133 version of 845 and features the same 400MHz data rate connection to the CPU, and 266x8/sec connection hub architecture.

Intel promised performance and the 845-DDR delivers. In last month's "Speed Trials" article, we found Intel's DDR implementation to offer comparable performance to RDRAM, and far exceed that of PC133, when married to the Willamette version of Pentium 4. We also found the Intel 845-DDR chipset to be faster than VIA's DDR chipset, the VIA P4X266.

It must be noted, however, that VIA is preparing a low-end P4/DDR chipset that includes integrated graphics called the P4M266. Bert McComas, an InQuest analyst, says this is bittersweet news for Intel, which desperately needs an integrated graphics chipset to help propel the Pentium 4 into budget boxes. Unfortunately, VIA may not be able to deliver the part because it's involved in a legal tussle with Intel over the right to use the Pentium 4 bus.

Intel intends to position the 845-DDR chipset in the mid-performance range and push its 850-RDRAM chipset as the high-end performer. This should please all the system vendors who've told us that DDR bottlenecked the Pentium 4 as the CPU reaches higher and higher clock speeds. The lowly PC133 chipset will bring up the rear, targeting budget machines.

Rambus: The New Richard Hatch?

Intel plays a game of 'Survivor' with all its memory options

If Intel's memory roadmap were a game show, it would definitely resemble "Survivor." Currently, three different memory types—PC133, DDR, and RDRAM—are vying for Intel's support, if not the ultimate win.

Why, then, has the Rambus corporation done the equivalent of washing its dirty shirt in the community dinner pot? During 2001, Rambus became one of the memory industry's chief antagonists by suing chip manufacturers for patent infringements. But that was last year, and much has changed since then. The courts have largely de-fanged the Rambus suits, and the company now finds itself with few friends. Rumor has it that Intel has renegotiated its contracts with Rambus and now has the freedom to pursue its own memory agenda with no strings attached.

All of this begs the 64MB question: Will RDRAM get voted off Intel's island this year? Surprisingly, industry experts say no, RDRAM will survive. But don't get too cozy with PC133 if you want to build alliances. The memory is weak, slow, and old—way too feeble to remain inside Intel's inner circle. But not RDRAM. It's suddenly a new OEM favorite.

Indeed, both Intel and some large OEMs we've interviewed tell us the faster-clocked "Northwood" version of the P4 offers better performance when paired with high-speed, serialized RDRAM. They say DDR bottlenecks Northwood as CPU speeds increase, whereas RDRAM doesn't. And to help grease the wheels of progress, Intel is expected to push RDRAM from 800MHz to 1066MHz by upping the frontside bus speed of the Pentium 4 later this year.

So, with DDR firmly in the middle and low end, and RDRAM at the high end, it will likely be the kinder and gentler PC133 that gets voted off the motherboard. The tribe has spoken.
‘3D Chips’ Reach Upward
Matrix brings new meaning to the phrase “enhancing your vertical”

In the pursuit of cramming even more transistors onto microchips, Matrix Semiconductor (www.matrixsemi.com) has developed a method of chip fabrication that promises to dramatically increase transistor counts using existing manufacturing techniques.

Conventional microprocessors are built using a single layer of silicon pressed atop a thin layer of insulation. But Matrix’s process, called 3-D semiconductor, uses layers of silicon to create microchips that are built vertically as well as horizontally. This is analogous to building skyscrapers rather than one-story buildings on tracts of land that cost much more than the buildings themselves. 3-D semiconductor allows chip manufacturers to squeeze even more transistors onto a fixed amount of silicon real estate, driving costs down dramatically.

According to Matrix, the first application of this technology will be found in inexpensive, write-once memory that’s compatible with existing flash memory card formats. These cards are already in production by TSMC (Taiwan Semiconductor Manufacturing Corporation) and should see the light of day sometime in 2002. The 3D fab technology won’t be limited to memory, however: It’s already being tested for other applications and may soon find its way into all areas of chip fabrication, including CPU production.

Why CMOS Cameras Will Rule
Memory cards for digital cameras are sometimes called “digital film,” but that’s only half right. In a conventional camera, film is both the light-sensitive recording medium and the image-storage medium—it captures a picture and saves it. In a digicam, those functions are divided. The memory card (CompactFlash, SmartMedia, Memory Stick) is only the storage medium. The image is captured by a light-sensitive microchip.

The type of light-sensitive chip found in most digicams and video camcorders is a charge-coupled device, or CCD. Recently, a rival technology has been displacing CCDs in some digital-imaging products, especially in low-end digicams, webcams, surveillance cameras, fingerprint readers, and the like. The upstart technology is a CMOS image sensor.

You may have heard of CMOS sensors when the first CMOS digicams appeared a few years ago. They immediately earned a bad rap for their inferior image quality. Reviewers have disdained CMOS sensors for their poor resolution, faded colors, and higher signal noise (often visible as flecks of color in dark regions of a picture). But that’s about to change.

CMOS sensors will probably eclipse CCDs in a few years because of their lower power consumption, design advantages, and manufacturing efficiencies. CMOS sensors consume just a fifth of as much power as comparable CCDs—welcome news for anyone who has fed a battery-hungry digicam. CMOS sensors need only one voltage level, so they’re easier to design into a camera than CCDs, which need three different voltages. And although neither type of chip is easy to manufacture, CMOS sensors can be fabricated with essentially the same equipment as microprocessors, which are also based on CMOS technology. CCDs require a more specialized MOS process. Manufacturers can recoup more investment in their costly CMOS fabs by using them to make CMOS sensors when microprocessors have moved on to smaller-scale processes.

Strangely, CMOS sensors came before CCDs. They first appeared in the 1960s and were used by NASA. CCDs grew more popular because they have better image quality. But CMOS sensors are now improving faster than CCDs. In 2000, Canon surprised the photography world by introducing the first digital SLR with a CMOS sensor, the 3.2-megapixel EOS D30. New CMOS sensors coming this year will capture 16.8 megapixels.

CMOS sensors will gain ground slowly, dominating low-end digicams before seizing the high ground from CCDs. If you’ve written off CMOS digicams because of some early bad examples, keep an open mind in the future.

Bendable Displays Inch Closer to Fruition
A bendable, portable display that offers all the viewing majesty of an LCD has been something of a holy grail to display manufacturers for years. But, unfortunately, a key technical limitation has kept engineers from fully realizing a product. What the world needs, it seems, is truly bendable transistor technology.

Well, Philips researchers in the Netherlands have created just that—a polymer-based transistor that functions much like its silicon-based counterparts, but produces lower heat, costs less, and, of course, can be bent without breaking. Philips recently used its polymer-transistors in a 2-inch, 256-shade grayscale display. The “screen” contained 4,000 transistors and displayed a simple image of a wolf.

Now cool your jets if you’re expecting to see rollable, multimedia versions of Maximum PC anytime soon—developers say it will be at least five years before bendable displays of any type reach consumers.

Tom Halfhill was formerly a senior editor for Byte magazine and an analyst for Microprocessor Report. He is now a technical writer/analyst in Silicon Valley.
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TURBO-COOL 450 A4 (Tyan 2462, 2468)
TURBO-COOL 450 XE (SuperMicro P4DC6, DCE)
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PERFORMANCE COMPARISON

<table>
<thead>
<tr>
<th>COMPUTER</th>
<th>SIZE (cu. in.)</th>
<th>PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SleekLine™ 1400</td>
<td>525</td>
<td>115 (w/XP)</td>
</tr>
<tr>
<td>Dell® 8200 (2GHz)</td>
<td>2087</td>
<td>106 (w/XP)</td>
</tr>
</tbody>
</table>

1 As measured by PC WorldBench 4 (higher no. is better).

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By filling out and sending in the questionnaire below, you'll give us a better understanding of what PC technologies capture your interest. Plus, you'll automatically be entered in a random drawing to win a Pentax Optio 330, the smallest 3.3 megapixel digital camera we've ever seen (www.pentaxusa.com).

To be entered in our digital camera drawing you must complete the Personal Information portion of the survey. A completed survey is greatly appreciated but not required. Tear out and send in the entire page to Reader Survey, c/o Maximum PC, 150 North Hill Drive, Brisbane, CA 94005. Photocopies of the survey will not be accepted. Entries must be received no later than Feb 22, 2002. The winner will be chosen on or about March 15, 2002 and will be notified by e-mail (or regular mail).

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Phone number: 
E-mail: 

1) Please rate your level of interest in the following technology areas. Circling "1" tells us you're not at all interested, while circling "5" tells us you're extremely interested:

- **Full desktop systems**
  - 1 2 3 4 5
- **Notebooks**
  - 1 2 3 4 5
- **CPUs**
  - 1 2 3 4 5
- **Motherboards**
  - 1 2 3 4 5
- **CD/DVD recorders**
  - 1 2 3 4 5
- **Videocards**
  - 1 2 3 4 5
- **Soundcards**
  - 1 2 3 4 5
- **Hard drives**
  - 1 2 3 4 5
- **Portable storage**
  - 1 2 3 4 5
- **Cases**
  - 1 2 3 4 5
- **Home server kits**
  - 1 2 3 4 5
- **Digital cameras**
  - 1 2 3 4 5
- **Photo printers**
  - 1 2 3 4 5
- **Monitors**
  - 1 2 3 4 5
- **DV cameras**
  - 1 2 3 4 5
- **Game controllers**
  - 1 2 3 4 5
- **MP3 hardware**
  - 1 2 3 4 5
- **PDAs**
  - 1 2 3 4 5
- **Speakers**
  - 1 2 3 4 5
- **Overclocking/case modding**
  - 1 2 3 4 5
- **Games**
  - 1 2 3 4 5
- **Media editing apps**
  - 1 2 3 4 5
- **Privacy/security utilities**
  - 1 2 3 4 5
- **System upkeep utilities**
  - 1 2 3 4 5

2) What is your favorite part of the magazine?

3) How should Maximum PC change its coverage?

No purchase is necessary to win. The odds of winning depend upon the number of entries received. Imagine cannot be responsible for lost, late, misdirected, or incomplete entries. The prize is nontransferable and no substitutions will be allowed. Winners will be determined by a random drawing of all valid entries and the decision of Imagine shall be final. This contest is open to residents of the United States only. Return of any prize or prize notification as undeliverable will result in disqualification and an alternate winner will be selected. Winners are responsible for paying any income taxes on the value of the prize received. Void in Rhode Island, Puerto Rico, and where prohibited by law.
HELPFUL HINTS

Windows Tips forMorons

We ♥ Dick

You guys probably wouldn't have guessed it, but ol' Dickie has a soft spot in his heart for Valentine's Day. That's right, the first time I ever touched a computer was on Valentine's Day in 1984. I was a sophomore at East Lansing Prep when on that horrible V-Day I didn't get a single card from anyone in my class.

While a lesser man-child would have cried like a little baby, I got productive and started working on our class computer, a TI-99/4. There's nothing like a little Parsec or Pirate Adventure to soothe one's love woes.

What does all this have to do with this month's scintillating tip? Well, I absolutely love many things about Windows XP Pro. For example, the network Quality of Service feature is great at the office. It prohibits any one person (cough) Suzy from Accounts Payable—from wasting all the company's bandwidth by downloading 'N Sync videos. How? By reserving 20 percent of total available bandwidth for real work.

But what do you do if you're a home user who prefers the Pro version? Personally, I want to take full advantage of my 512MB 51DSL line. Well, luckily there's a fix. To unreserve your 20 percent of bandwidth, first log in as the actual Administrator (hold down Ctrl-Alt-Del at the login screen if you're a wanker who uses the Fast User Switching screen). Now go to the Start Menu and select Run. Type geditc.msc and press Enter. Expand "Computer Configuration," then go to "Administrative templates," then "Network," and select the "QoS Packet Scheduler." Double click the "Limit Reservable Bandwidth" key, and check the "Enabled" item on the Settings tab. Change the "Bandwidth limit %" to 0, then click Apply and exit geditc.msc. If you still have QoS enabled on your network, this should free up that 20 percent.

Sigh. I think I'm gonna go watch something from my library of Whitney Houston concerts now.

CONTEST ALERT

Woof! We Need a New Watchdog!

Turk the Bulldog (the angry bloke you see here) has served Maximum PC well as the doggie model for our consumer advocacy column. But the time has come for him to cede his post—so we need a new Watchdog mascot! Do you have a canine friend who might fill Turk's paws? If you do, send us a digital pic. If your dog wins the contest, he or she will be mentioned by name in every Watchdog column, and you and your dog will get a special mention in the magazine's masthead. Heck, we'll even send you a Maximum PC T-shirt for your troubles.

Here's how to enter: Send us one high-resolution, high-quality digital pic of your dog’s most serious, "I mean business" face. (And let's be realistic—toy poodles and little scottie dogs probably won't win.) If necessary, borrow or rent a digital camera or scanner and seek photographic lighting advice from an expert. Also, send us a second shot of you positioned next to your dog—this will serve as proof that the model is in fact your dog and not some clipart you snaked off the web. Include your name, your dog's name, and your address, and send the entire package to input@maximumpc.com, with the subject header "watchdog contest."

The last day to enter is January 31, 2002. Woof!

FIND-SIZE NEWS

RAM Prices Inch Upward?

Memory prices have been low for months, but the honeymoon might soon be over—consolidations in the memory industry and idle production lines could have RAM prices back on the upswing. This winter, NEC shut down a memory plant to stem the flow of cash. Toshiba, meanwhile, gave up entirely on making memory and sold its U.S. plants to Micron; Toshiba will end production of memory in Japan. And RAM maker Hynix has already raised prices of memory twice this winter.

ATI To Build CPU Chipsets Too

ATI will make its own run at the valuable integrated chipset market this year with chipsets for all of Intel's and AMD's CPUs. Stated for a late Q1 launch, the chipsets will support DDR memory and integrated graphics. The company says its aim is to offer system builders the ability to build both low- and high-end systems using as few parts as possible. Company officials dismissed_competitor NVIDIA as a force in the market, and said few have signed up for the much-hyped nForce chipset. Instead, Intel's own integrated graphics chipset will be the primary competitor.

AMD Preps Budget Mobile CPU

AMD will be the first to hit the 1GHz mark in budget notebooks with its 1GHz mobile Duron. The processor features 128KB of L1 cache and 64KB of L2, and runs on a 200MHz front-side bus. The part will cost $160 in bulk quantities. AMD has traditionally suffered slow acceptance of its mobile CPUs, but Compaq has already announced it will use the new Duron part. Meanwhile, projections show that both home users and business people might buy more notebooks in the future.

RSA and Hifn

Wi-Fi networks finally got a dose of security in December when RSA Security and Hifn released a patch for the Wireless Equivalent Privacy protocol, or WEP. WEP is used to encrypt transmissions in popular 802.11b products. Currently, wireless transmissions using WEP can be cracked in a matter of minutes. Using a scheme known as Fast Packet Keying, encryption will become exponentially more difficult to crack. Manufacturers of wireless access points and routers will have to update firmware and software to take advantage of the patch.

Alleged Copyright Viator Set Free

Dmitry Sklyarov, the first person charged with violating the Digital Millennium Copyright Act, will be freed in exchange for testifying against his company. Federal agents arrested the Russian programmer in July after his presentation on how to unlock and copy text from Adobe's protected eBook format at a hacking convention in Las Vegas. Sklyarov agreed to testify against his employer, EcomSoft, which uses the allegedly illegal code in its Advanced eBook Processor. Sklyarov has been the poster child for civil libertarians who say Sklyarov's case is proof that the DMCA law is overly broad and draconian.

Copyrighted material
Is your ISP about to follow Excite@home into the tel-com graveyard?

What do Internet service providers Excite@home, Northpoint, and Rhythms NetConnections all have in common? Answer: Financial failure has turned these information superhighways into highways to hell.

Once rising stars in the ISP market, all three companies have filed for bankruptcy. While news of failing tech companies doesn’t alarm many consumers these days, the fall of consumer-level ISPs such as Excite@home has many people worried about their own Internet connection.

The insecurity is warranted, says Lynda Starr, a telecommunications analyst with Probe Research. Starr says broadband service in general is here to stay, but the weaker ISPs are in danger of being merged or going out of business entirely.

“If you pick a publicly listed company as your ISP, treating it like a stock pick might be prudent.”

Some consumers might have avoided the broadband turkeys in the first place if they had done their homework, says Justin Beach of DSLReports.com, a website that tracks and logs consumer broadband horror stories.

“Many people did predict the demise of Northpoint and Rhythms, as they were clearly overextended,” Beach says. “And @home was also predictable in that regard. Anyone looking at their financials would have seen that they were losing millions a month. If you pick a publicly listed company as your ISP, treating it like a stock pick might be prudent. Would you invest in their stock after reading their last quarterly results? If not, then perhaps it’s best not to be a customer either.”

Beach says if you’re looking to choose a new ISP, you may want to consider smaller operations that are locally run. “If it’s a small shop, then it must be making a living of some kind, and therefore likely to continue,” Beach says.

Surviving the Shutdown

If your broadband ISP goes down, you’ll be stranded without any Internet access. Sound bad? Then protect yourself by following these tips:

- Consider signing on with a metered ISP (such as Bannet.com) that charges only when you dial the service. Use this ISP in the event of a broadband breakdown.
- If your broadband ISP also offers free dial-up access, set up access and test it before the broadband pipes go down.
- Don’t rely solely on your ISP for mail service; consider using web-based e-mail services such as Hotmail and Yahoo mail.
- Determine if your broadband provider will forward your mail to another e-mail address in the event of a service closure.

The hardcore military simulation market hit the dust in spectacular fashion with the flameout of the uniformly brilliant, consistently money-losing Jane’s line. Just because an aircraft, naval, or tank sim that cost millions to make didn’t earn out doesn’t mean all those sweaty hardware geeks (present correspondent included) moved on to Bobble Bobble. When SSI (aka Mindscape, The Learning Company, Broderbund, UbiSoft, and Pat’s King of Steaks) finally pinched out the long-awaited Silent Hunter II after five years of strenuous pushing and one sacked developer, famished sim-hounds went at it like Bill Clinton pouncing on the last Boston Cream in a box of Dunkin’ Donuts. They also quickly came up with a novel complaint in the realm of simulation: The game was unrealistically difficult.

Even though German submariners had the highest fatality rate of any branch of service in both World Wars, Ultimation still felt the need to put its thumb on the proverbial scale in favor of the Allies when creating Silent Hunter II. The developers fitted Destroyer crews with bionic eyes able to pick out a sliver of periscope in a heaving sea at 5,000 meters, equipped them with sonar equipment that could hear a whale fart at a hundred miles, and turned the murky waters of the Atlantic to glass so they could see submerged U-boats. Meanwhile, the submarines were making wider turns and diving slower than their historical counterparts.

Something needed to be done. And fast! Thankfully, the modders were on the case. They swarmed over SH2’s historic anomalies. With an official path still little more than a glib in UbiSoft’s sniveling French ears, you may want to take a break from downloading porn and pick up the 3.4MB SH2 Realism Patch

This patch brings the über-Destroyers closer to their historical level of efficiency by making death charges less lethal, spotting ranges more plausible, and early-model sonar less effective. U-boat diving speed is faster, and their turn radius reduced. The targeting reticle on the 37mm gun is removed, since only wussies and maybe Canadians need targeting reticles. A campaign can now continue even when a primary objective is missed. On the more cosmetic side, the patch adds burning oil slicks, shell splashes, and visible torpedo wakes for steam-powered torpedoes. Beefed-up sounds, including bolts popping out of the hull and shells being ejected, add subtle but welcome touches.

Like any hardcore endeavor, Subsim’s Realism Patch is anal as hell, but it’s also an excellent example of hardcore fans reshaping a game based on their own research.

PC Insanity!

We thought we knew good case modding—but we hadn’t seen the real deal until we began receiving pics from the case-modding contest held at the Cyberathlete Professional League event in Dallas last December.

To the right you’ll find a sneak peak. Marc “Gezer” Weltz’s water-cooled Xbox. Yes, folks, it’s a functional PC. Next month we’ll show you all five winners in larger-than-life splendor.

Thomas McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.
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Klipsh ProMedia 5.1 THX 500-Watt
Speaker & Subwoofer System
16X/40X DVD-ROM Drive
Plexwriter 24X/10X/40X CD-RW IDE
Black Dragon Full-Tower ATX Case 460-Watt PS
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In 1992, id Software unleashed Wolfenstein-3D on an unsuspecting public. Generally acknowledged as the first legitimate first-person shooter, Wolfenstein shocked people with its "extreme violence" and Nazi motifs. Now, almost 10 years later, Return to Castle Wolfenstein borrows the original game's basic DNA, and supercharges it with state-of-the-art graphics and gameplay. But is newer necessarily better? Let's see...

—WILL SMITH

**WOLFSKINSTEIN-3D**

**Texture quality:** Note the lovely repetitive textures that are the same on every single wall as far as the eye can see. These lower-than-low-res textures are around 40 pixels high but still manage to convey an unmistakable sense of Nazi perversion. Winner: RTCW

**Weaponry:** B.J. had all of four weapons at his disposal in Wolf-3D—a knife, a pistol, a machine gun, and a chainsaw. Everything used the same ammo, and each was animated with as many as three animations. Winner: RTCW

**Lighting:** Note how the chandelier bathes the floor below in light. Do you think this effect uses the vertex and pixel shaders in our system's GeForce3 videocard? We hope not—because if this is the best the id team can do with advanced shader effects, then the new Doom III project is in a whole mess of trouble. Winner: RTCW

**German stereotyping:** Wolf-3D is actually light on German stereotyping. You won't find a single pair of lederhosen or even one overweight, beer-swalling drunk. However (and this is a little-known fact), if you had a new "Sound Blaster soundcard," the guards would indeed shout "Achtung!" when they spotted you. Winner: RTCW

**Dimensionality:** As you can see in this screenshot, Wolf-3D is set in a 3D world—it's just a 3D world with only one elevation! No up and no down, thus no ramps or stairs. Oh, and the enemies have just three sides—front, back, and "from the side," depending on how each 2D sprite was animated. Winner: RTCW

**Dogs:** Not only did Wolf-3D allow you to kill jack-booted thugs by the dozen, you could also rid the world of dozens of slobbering, blood-thirsty German shepherds. Apparently, PETA (or its equivalent) didn't have much lobbying power in the early 1990s. Winner: Wolf-3D

**Extras that matter:** When it comes to food, B.J. Blazkowicz is none too picky. Here, we see the Blazy eyeing a tasty bowl of dog kibble. Sources of sustenance also include tasty turkey dinners. Winner: Wolf-3D

**Nazi imagery:** A Nazi-killing craze spread across the land when gamers picked up on Wolf-3D. We were fully immersed in fascist propaganda, from pictures of Hitler to a swastika on every wall. And the best part? Once you killed a Gestapo thug, another one popped up so you could kill again. Winner: RTCW
Texture quality: With super high-res textures and bump maps, RTCW definitely has the visual edge. Pay close attention to the detail of the woodgrain on the table. Now that's a texture! Winner: RTCW

Extras that matter: RTCW retains the turkey dinners, which you can now consume in portions, saving the rest for later. The game offers no dog food, however, for painfully obvious reasons. Winner: Wolf-3D

Weaponry: The 16 weapons in RTCW include everything a small army might need to kill Nazi scum. From the modest pistol to the powerful bazooka and Viper cannon, B.J. has all the tools he'll need. Winner: RTCW

Nazi imagery: This go-round, the Nazis have outdone themselves by decorating their castles, bunkers, and field command with numerous flags and propaganda posters. The painting of der Fuhrer posing with the Renaissance figures is particularly over-the-top. Of course, you can shoot all the propaganda off the walls. Winner: RTCW

Lighting: Dynamic lighting, courtesy of the Quake 3 engine, raises the visual bar in the Wolfenstein legacy to new heights. If you want to see something really impressive, torch a Nazi with a flamethrower, then watch how he lights up the room with his sunny disposition! Winner: RTCW

Dogs: You'll notice that this screenshot doesn't include any dogs. That's because Germans in RTCW don't have dogs. Bob Barker, we know you're responsible for this. Winner: Wolf-3D

Dimensionality: Whaddaya know: A 3D world that actually has ups and downs! That's right, you're not stuck on just one plane anymore, as ramps, stairs, elevators, and the occasional curve let you roam with abandon. Winner: RTCW

German stereotyping: Overweight, busty German women, soldiers that shout "Schnell!" when they spot you, and a liberal dose of phonographs playing Wagner give RTCW the edge in the hotly contested stereotyping category. Winner: RTCW

THE UPSHOT

Despite its age, Wolfenstein-3D holds up well when compared with its modern-day counterpart. Running through German castles and shooting Nazis by the dozens is fun! However, with the exception of a few minor gripes—WE WANT DOGS, DAMMIT!—we are absolutely thrilled with Return to Castle Wolfenstein. By going beyond the castle crawl that was Wolf-3D and adding outdoor areas, multiplayer, and 21st century gaming technology, Nerve and Grey Matter have created a beautiful sequel.

See page 74 for even more Wolfenstein coverage!
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IBM Hard Drive Complaints Spin Up

Since The Dog asked readers for input on IBM's fast but allegedly unreliable 756XP series of hard drives (December 2001), fewer than 100 people have written in about the drives. Considering the number of Maximum PC readers, the number of complaints has been surprisingly small. But many of those who did have problems had more than one problem.

Many stories were like Levi Tiggess', an MCSE. "I've never had a hard drive crash... until I bought a PC with a 45GB IBM Deskstar. I'm now on drive number three. The first one went out after a couple months, and I was unable to recover the data off it. The second drive started developing bad sectors almost immediately, but it held up for the two months it took the online store to send me the second replacement. This time they sent me a 60GB IBM Deskstar and I haven't had any problems since. I'm glad my nightmare seems to be over, but the seek-seek-seek-click seek-seek-click noise still haunts me in my sleep."

Of those people who contacted The Dog, a small percentage said they hadn't had any problems with the drive, such as Mike Rajterowski of the Music and Sound Company.

Guillemot's MAXI Studio ISIS may never completely work with Windows XP.

"Two of the drives have been in use for about 18 months, and the other drive for about nine months. So far no a single glitch or problem."

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

"I have three 756XPs in a machine used for multitrack audio recording and production. The drives are in heavy-duty use 15 hours a week and just running another 15 to 20 hours. When in use, any given drive can run hard for hours at a time. The drives are also defragged at least once a week, sometimes twice. I have no extra cooling on the drives. Two of the drives have been in use for about 18 months, and the other drive for about nine months. So far no a single glitch or problem."

I chose the drives because they came recommended by the makers of the pro-audio card I'm using in the machine. In non-audio apps, I have had two lower-end Western Digital drives fail and one Maxtor drive fail. In an audio application, I have seen one Seagate Cheetah SCSI drive fail in less than two years.

Attorneys for both IBM and the Maximum PC reader who filed the suit are keeping mum about the proceedings. For more information, watch this space or visit www.sheller.com/ibmcliaction.htm to request more information from the firm representing the class-action.

The Operating System Is Broken

DEAR DOG: After reading the letter in your December column titled "The Drivers Are Always Broken," I would like to know the true reason that Guillemot's Maxi Studio ISIS card will not work with Windows 2000 or XP. Sure, people who dished out $300 for the card won't be soothed by the response; however, at least they'll get an idea as to why they cannot use their cards under the Windows 2000/XP operating systems and still retain all the studio functions of the card.

— ATIF BUTT

THE DOG RESPONDS: According to a lengthy Q&A Atif conducted with Guillemot at www.mroundup.com, the driver problem may relate to a design issue with the Maxi Studio ISIS. Says Guillemot: "...the problem with Windows XP or Windows 2000 is that these real-time OSes don't allow any driver or operation to lock the rest of the OS, so the audio buffers cannot go directly through VxD drivers. They must go through intermediary software layers, which the OS can interrupt at any moment, resulting in a regular loss of the audio buffer in transit and a 'click' in the soundtrack. The only way to avoid this data loss when transferring buffers under Windows XP or 2000 would be to have a DMA on each chipset to store the buffers in the memory, but the (main DSP on the ISIS) SAM 9407 has no DMA, and a DMA cannot be generated by software—it requires a hardware access—so ISIS is not/cannot be supported in Windows XP or 2000."
If you're interested in reading the full interview, visit www.varoundup.com/index.php?item=articles/qn_hercules.

**Crazy-High Restocking Fees**

**DEAR DOG:** I'll keep this short and sweet. How can companies get away with charging high restocking and cancellation fees as a percentage of the value? Especially on unopened items? Stores should be able to charge only the cost of putting it back on the shelf, shipping, clearing it out of the computer, and the interest would have made from selling it to someone else for the duration of the time that it was in my possession. I see 25 percent restocking fees nowadays, and 10 percent cancellation fees. A rate of 25 percent is ludicrous. I recently returned a $620 hard drive and the restocking fee amounted to more than $150! I told my bank not to pay it. Clearly, a 2 lb. hard drive should not cost $150 to return.

Returns suck for merchants, I understand. But come on, this is America after all. Can you look into this? Do these companies have a leg to stand on when it comes to exorbitant restocking fees? Many states have interest rate limits for things like auto loans, etc.

— FLETCHER ERICKSON

**THE DOG RESPONDS:** Fletch, The Dog has some bad news for you. After speaking with officials at the Federal Trade Commission as well as two state consumer agencies, it appears that there is no cap on the amount a company may charge when a person returns a product. FTC officials say there doesn't seem to be any laws at the federal level that would prohibit the charges. However, don't feel totally burned. Many states do regulate aspects of restocking fees.

Andrea Sain, director of consumer education in the state of Massachusetts, says it is legal for a company to charge a restocking fee. Stores may also offer you a store credit instead of a cash refund and refuse to accept certain products such as pierced earrings and bathing suits, but only if consumer is made aware of the return policy before the time of purchase. Such a policy must be posted in a conspicuous place. If the notification is made only on the receipt, the state is violating state law, as the consumer is made aware of the return policy only after the purchase has been made. It is illegal for a store to charge you a restocking fee for defective items. If defective, a consumer may ask that the item be repaired or replaced, or that the money be refunded. Sain says many stores may try to steer consumers into having an item repaired by offering that as the only option, but in Massachusetts at least, that is illegal. The consumer has the choice of what they want to do when the product is defective, Sain says. Despite the law, many stores are ignorant of it or blatantly ignore it, she says. Of course, the laws in your state or where you purchase the hardware may be different.

There's an easy lesson here: Read the fine print before you make a purchase. The Dog looked at a dozen online PC hardware stores featured at Pricewatch.com and found that most carried restocking fees of 15-to-25 percent. Many of the stores also had their return policies posted, although most required you to dig around the site to find the policies.

The sticky question is which state's laws apply. If you live in Alaska and purchase a hard drive from a site based in Massachusetts, which state has jurisdiction? The answer has yet to be settled by the courts. Until then, familiarize yourself with the return terms of the online store you're using and consider not always shopping on price. If you get excellent service from a store, consider sticking with it even if it charges more. Good service is sometimes worth paying the extra money for up front. Woof.

Princeton is not dead. However, the monitor and HDTV maker has changed its address and phone system.

**Princeton Dethroned?**

**DEAR DOG:** Woof! I recently bought a Princeton Graphic Systems Synergy 560 flat panel monitor. The monitor works great, but when I went to the Princeton Graphics web site to do my compulsive driver upgrade check, I got nothing. I found a few discussions on Usenet about Princeton's possible demise. What's up with Princeton, Dog?

— FRANK FISHER

**THE DOG RESPONDS:** Princeton is alive and well, according to several employees. The Dog spoke with. Problems in selling the company or visiting its Web site were due to the recent relocation of Princeton's offices.

**Boomsling Booming Again**

In October, The Dog warned you not to purchase any Razer Boomsling mice due to the company's rocky finances. Since then, Razer has apparently come back from the brink, according to reader James Bothe. Indeed, according to the company's Web site, www.razerzone.com, it has secured new backers and is again offering its high-resolution mice made for gamers. The company even says it will soon offer a full set of Windows XP drivers for its mice. At press time, The Dog was unable to reach anyone at the company for comment, but the company's Web site says funding from Synergy of Omaha, Nebraska will allow the company to spin up its support and technical divisions and begin selling its mice again. With that good news, The Dog rescinds the previous warning about Razer.
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HEAL YOUR PC!

18 utilities to help you diagnose and fix your PC's most debilitating ailments.

BY ROBERT LUHN

The PC is like a junkie—always needing another fix. Blame it on the OS, blame it on the BIOS, blame it on Rio, but your typical PC has more breakdowns than Mariah Carey and the Santa Monica freeway combined. Windows takes a left turn into a tree; your modem suddenly starts babbling about checksum errors; you pop a disc into your RW drive and it responds, Say what?

If you often encounter these digital snafus, you may be asking yourself, What's wrong?

What can I fix? What should I shove into the nearest landfill? What's that stain on my pants?

Seek no further, for the answers lie herein. Well, if not the answers, at least the programs that should help you find the answers. We've assembled a medicine chest full of the roughest, toughest, probingest—and sometimes wackiest—diagnostic and repair programs on the planet. We're talking about programs that go where Norton Utilities sometimes fears to tread. One major plus: Almost all of these software tools are available as downloadable shareware or nearly fully functional demos, so you can try before you buy.

Have fun in candyland, and don't forget to turn to page 36 for a peak inside our hardware trauma kit.

Continued on page 28

MPCPA
MAXIMUM PC POWER-USER ASSOCIATION APPROVED

AS WITH ALL POWERFUL MEDICINES, USE ONLY AS DIRECTED. ALWAYS BACK UP ALL IMPORTANT DOCUMENTS BEFORE INSTALLATION.
“If you promise not to cry, I'll give you a sponge bath afterwards.”
Continued from page 26

Beyond Norton

Most of these programs are aimed at unearthing information about your PC and peripherals, testing your hardware, offering advice, and in some cases, actually fixing problems. While we didn’t focus on speed-up, turbocharging, or über-tweaking programs (those were the focus of our October issue cover story), a few are included in this article because they also perform killer diagnostics before they goose your PC.

Now before you put on your scrubs and begin an invasive PC biopsy, please consider:

■ Some of these utilities are hard to configure, hard to run, and lack documentation. In many cases, you’ll be leaving the cozy confines of Windows and entering DOSville, where text is green and “07D8:0028” is just another way of saying “keyboard.” If you speak Hex, you’ll be in your element.

■ Many of these utilities crashed our test PCs more than once. Like benchmark tools, they’re designed to push your PC to the max, and sometimes your PC will falter. Your angst may vary, depending on what Windows version, BIOS, and etceteras you’re stuck with. Always back up your data and Registry before you run any kind of diagnostic or repair tool.

■ Some of these tools are from small-time developers. So follow our advice: When playing with “boutique” software, scan everything you download off the net with an up-to-date antivirus program.

■ Some diagnostic results may be difficult to interpret. Have an engineer pal on call and specialized tech dictionaries bookmarked if you’re afraid of winging it.

■ Expect minimal tech support. With a Symantec-caliber utility, you get comprehensive help, but with many of the utilities in this article, you may get little or no hand-holding.

Second and Third Opinions

Before you ask your PC to turn its head and cough, you might ask, How useful are diagnostic and repair tools anyway? For an answer, we turned to hardware gurus Jim Aspinwall and Stephen Bigelow, who have respectively penned such coffee table favorites as IRQ, DMA & I/O and Troubleshooting, Maintaining, and Repairing PCs. These are guys who have solder burns on their fingers and can field-strip a PC in the dark.

Aspinwall says that before using a diagnostic utility, you should first rely on information provided by the PC itself. “If the PC won’t boot,” he says, “the beep codes will tell you if you have bad RAM, a bad CPU, or a bad system board.”

But if you need more info, both say you should forget about petitioning Windows for help and instead turn to diagnostic tools like the ones described in this article. “Using Windows to troubleshoot hardware is a fool’s errand, because just about everything has to be working for Windows to boot in the first place,” says Bigelow. “You need an OS-independent diagnostic like TuffTest that’s self-booting.”

Bigelow admits that it’s hard to tell if a diagnostic is caging answers from Windows or querying the hardware directly, as it should. To get the real deal, he says, look for diagnostics that are designed to check specific hardware. The best diagnostics will also be self-booting or OS independent. “A real hardcore diag that gets into a drive’s sectors and performs specific functions can be quite efficient,” says Bigelow. “A cosmetic tool that just asks Windows, then pukes out the answer in a pretty dialog is worthless.”

For very specific diggin’ and fixin’, don’t forget the utilities that came with your hardware or are on the hardware vendor’s web site.

Our Three PC Guinea Pigs

We used three PCs to test all the utilities in this article. One was a spanking-new Dell Dimension 8100 with a 1.3GHz P4, a 60GB hard drive, and 128MB of RAM, running WinME. But the real beasts of burden were two Frankenstein PCs that’ve been upgraded as often as Pamela Lee.

The first was a once-hot Gateway box that boasts a 150MHz MMX Pentium. Yowza! This machine runs Win98, 32MB of RAM, and a 2GB hard drive. Hooked to the brute is what’s affectionately called “The SCSI Chain Of Hell”—an external CD-ROM drive, a CD-RW drive, a Fujitsu MO drive, and a scanner, all spanning everything from SCSI I to SCSI Wide/Fat/Mondo III. We figured all of this madness would be enough to turn the toughest diagnostic into a puddle of goo.

The other PC was a 200MHz Pentium Pro/Win98 system with 96MB of RAM and a mix of modern devices (a 60GB Maxtor hard drive) and older ones (a 2MB videocard!). This system has known problems—a flaky floppy drive, RW read problems, and occasionally unexplainable crashes.

No, you may not see these PCs. Their ward has been quarantined.
site. If your hard drive is flipping out, the manufacturer may have a diagnostic/repair tool custom-fit for the job. Just remember: Don't run these tools on other products in the vendor's line or other vendors' products. If you do, you might turn your PC into desk pizza.

Finally, don't forget to download upgrades, patches, service packs, Flash ROM updates, and so on. These often plug massive security holes, fix bugs, and add diagnostic/repair tools to your system.

### PC-Doctor Service Center 2000 2.3

PC Doctor kicks ass when it comes to analysis. It's also smartly programmed. This Windows/DOS duo is logically laid out, runs quickly, comes with competent, hyperlinked PDF documentation, and includes five loopback plugs (special port attachments that let the program compare transmitted and returned signals for errors). Then again, the package also costs (ouch) $500.

The Windows version of the suite sometimes digs deep and other times barely turns the soil. It records only your current video mode, not all the possible ranges of your videocard. The data it provides on your CD-ROM or CD-RW drives is cursory, but the readout on plug-and-play devices, DMA channels, and such is huge. Its hardware testing capabilities are uneven. For example, it beats up your CPU's registers, cache, and such, but elsewhere it simply provides notes like "Video Memory - PASSED." The program also crashed until we disabled its MMX tests, and it was unable to find some of our CD-ROM and RW drives.

Compared to the Windows version, PC-Doctor for DOS is the real deal. Boot off the floppy and you're greeted with a simple text menu. You can run prefab quick and normal tests, grab system info in one shot (and save it to a file), or put your PC through an endless test loop to ferret out problems. And, rest assured, the program ferrets indeed. It was one of the few diagnostics to determine videocard brands and flag specific CD-ROM problems. It also never crashed—a testament to solid programming. Extras you don't get in the Windows version include audio tests, a memory debugger, a CMOS editor, and an app that drains your laptop battery. If you can afford the toll—and if you have a capable repair utility—PC-Doctor is one diagnostic suite to have on hand. Supports: 386 or later CPUs, DOS 3.30 and later, Windows 95, 98, ME, NT, 2000; $500 ($125 for up to three software updates per year); www.pc-doctorstore.com

### TuffTest-Pro v.3.52F

TuffTest is like a pug—tough and simple, with a tendency to chew on things.

A single executable creates a bootable floppy with all the necessary fixins. Reboot and you get a barebones text interface run with F-keys. You can't save test results to a file or view pretty graphics, but TuffTest does examine and torture-test memory, hard and floppy drives, serial and parallel interfaces, your motherboard, keyboard, and a dab of video (up to VGA). That's it—but isn't that enough?

Analysis ranges from modest (you never learn your motherboard BIOS version, for example) to fairly detailed (such as a probe of specific track ranges on disk drives). There's outdated stuff, too, like a destructive media analysis and repair test, which has been passed since SpinRite pioneered nondestructive, low-level testing years ago.

If you want a lean, affordable, OS-free test program, TuffTest is it. But use it in conjunction with a larger suite—something TuffTest's developers likewise suggest. Supports: 8088 through P4 CPUs and compatible processors; $30 (plus $30 for three loopback plugs); www.tufftest.com

### QuickTech Personal

This one could serve as a model for all PC diagnostic tools—fast, small, OS-independent,
Yo, P4. What up? How ya doin'? QuickTech Personal will tease out the details, tap your hardware in every sensitive spot, and report what passes and what fails. Easy to run, and quick to provide detailed and useful output. There's no installation with QuickTech Personal. Just pop in the floppy, boot up, and go to town. QuickTech sports a lean, logical text menu system that's easy to navigate.

All in all, QuickTech is deep, complete, and accurate. It's also one of the few diagnostic tools in this roundup to properly identify Level 1 cache size, the keyboard controller, videocard and motherboard makers, mobo BIOS version, CPU socket type, a ton of details about the CPU (even voltage), what UltraDMA and PIO modes your drives support, and other types of far more specialized information.

System tests—of everything from your CPU to the controller chips—are likewise thorough. For example, the CPU test probes everything from protected mode instructions to AMD 3DNow! support. And unlike some utilities, when it hits a test that's irrelevant, it skips it. What a concept. You can also run all the tests in a batch.

But QuickTech isn't perfect. It froze when it tested a CD-RW drive and can send test results only to a printer. Nor does it test USB, joysticks, FireWire ports, soundcards, or DVD-RAM drives. The manual provides useful, if terse, advice. On the flipside, unlimited tech support via fax, e-mail, and a web interface is free and always available; phone support is a toll call.

If you need stronger medicine for your system, pony up for QuickTech Pro. You get deeper information gathering (especially on PCMCIA, USB, peripherals, video, and Y2K compliance), sound and USB testing, and handy CPU, hard disk, floppy, and video benchmarks. If you're a hardcore user or gamer, go with Pro. If not, QuickTech Personal should do. Supports: 486 through Pentium 4, AMD, and Cyrix processors (no OS needed); $150 (personal version), $400 (pro version); www.uxd.com

SpinRite scrutinizes every square inch of your hard disk, looking for areas that are failing. This report shows which clusters are OK, which are bad (and cordoned off), and where data has been relocated to.

SpinRite 5
SpinRite is the hard disk diagnostic and recovery tool, plain and simple. If this utility can't save your hard disk and files, nothing short of open-platter surgery will raise your dead data. SpinRite goes beyond file repair tools like Norton's Disk Doctor by scrutinizing every square inch of your disk—essentially writing and reading data gazillions of times to uncover areas that are difficult to read and write. Problem areas are cordoned off, and endangered data is moved to safe areas on your drive.

Like all good diagnostics, SpinRite runs off a boot floppy. The program runs a series of intense disk-controller diagnostics, followed by a very in-depth, nondestructive disk scan. (In other words, your data isn't trashed.) The initial scan can take all night; subsequent visits are much shorter. You can also interrupt a SpinRite session and return to your place later. The tool spits out an array of onscreen reports, from a graphical cluster-by-cluster analysis to a readout of current activity. If you want to preserve your data, SpinRite is a must-have.

Supports: IDE, EIDE, SCSI hard drives, Zip and Jaz drives, DOS 2.1 or later, Windows 3.x, 9x/Me 98; www.grc.com

EZ-SMART 5
EZ-SMART is all over your hard disk like Homer on a box of Krispy Kreme. Using the SMART technology built into most hard drives, this utility continually monitors IDE, SCSI, and Ultra ATA drives, and fires off a flare at the first sign of trouble. If the Swiss Army developed a tool for diagnosing and treating common PC maladies, we think it would look a lot like PC Certify. Comprising more than 400 diagnostic tests and utilities, the software fits on a single floppy disk, with room left over for volumes of help files, tutorials, and log files. While you'll still need a decent trauma kit and replacement parts to get a seriously ill PC up and running, PC Certify can shave hours of time that might otherwise be spent tediously examining every component in search of the culprit.

PC Certify operates from any pure DOS environment (such as a Safe Mode command prompt, not that DOS-window jokery), and tests can be executed in a batch run or individually, subsystem by subsystem. Even candystripers will be able to pop in the disk and test hard drives, floppy drives, I/O ports, CPU, and memory for an instantaneous, Star-Trek-like diagnosis—all while receiving a basic education on how PCs work (for example, one help file explains how to interpret hex dumps from crashed programs). Seasoned professionals can trade up to more sophisticated PC Certify versions that perform remote diagnostics, back up the Master Boot Record, and place the system under heavy stress for burn-in testing. One of our favorite features backs up CMOS settings, so a battery swap won't force you to re-tweak your BIOS.

Young'uns may find the DOS-based interface a bit jarring to work with, but hey, it's still easier and less awkward than administering a barrel enema.

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*QuantiSpeed(TM) architecture operates at 1.6GHz. AMD and ATHLON are trademarks of Advanced Micro Devices, Inc. MS and Windows are registered trademarks of Microsoft Corporation.
What CPU goes there? Intel’s CPU-ID frisks your CPU for info on family, speed, and just a bit more.

The great hard disk snoop EZ-SMART constantly watches for failure, and in this screen, can be instructed when and how to warn you.

first sign of trouble. Granted, some PCs will warn you if a SMART drive is failing, but only after its too late. EZ-SMART, meanwhile, can raise a red flag much earlier, based on your settings. Installation tucks an icon into the Windows Systray. Click and you can tell EZ-SMART when to poll your drive and when to rattle your cage (for example, when free space dips below 10 percent). You can even set it to automatically load a repair or cleanup program. Supports: Windows 95, 98, ME, NT4, 2000; $30; www.storagesoft.com

So is Inspector worth the $100? Depends on how much you really need to know about a disc. The program can reveal files and folders normally hidden from Windows view, supply table-of-contents details (type of track, start and end blocks, recording mode), display a readout of your drive hardware (from firmware version to multi-session support), and more. The key diagnostic is the disc error scan—basically a “worst case” scan of potentially unreadable areas of a disc. It flags errors you don’t normally see because the drive is correcting them. This is handy information if you’re archiving vital data or if you’re distributing discs to other people with different kinds of drives (hey, maybe the people who press the Maximum CD should be running this!). All in all, CD-R Inspector earns its keep. Consider it your first line of optical data defense. Supports: Windows 95, 98, NT, 2000; all CD-ROM and CD-RW drives; $100; www.crdrom-prod.com/software.html

CD Data Rescue 1.1

CD-R Inspector covers a lot of bases, but if you need a dedicated CD-ROM, R, or RW resuscitator, CD Data Rescue is your pick. Just be prepared to grapple with a somewhat confusing interface. It’s not clear where to start, and the various options aren’t very obvious. But if you read the lucid, illustrated help file, you’ll figure out the process. Your first step to resuscitation is scanning the disc—always pick the full setting or the program may miss hidden, damaged files. Pick which files/folders to recover, select a destination for the recovered goods, then click the button that matches how badly damaged you think the file is (your choices are Slight, Moderate, Severe, or Extreme). Click Go and the program does its thing—and darn well, too. Supports: Windows 95, 98, ME, NT, 2000; $40; www.naltech.com

Intel Processor Frequency ID Utility 3.9

Ever buy a PC at the local flea market and wonder if a 1.7GHz chip is really under that Malomar-size fan? Wonder no longer. Whip over to the Intel site and download an appallingly simple utility. Fire it up, and you’ll instantly learn how fast that chip and system bus are really cooking, along with such cocktail party chitchat as the size of your L1 Trace Cache in micro-ops. Note: This tool only works on 533MHz and faster Celerons, 450MHz and faster Mobile Celerons, and P-IIs and P-4s. Free; support.intel.com/support-processors/tools/frequencyid/

Super Pi 1.1e

Has your CPU gone transcendental? One way to find out is to download this burn-in program used by overclockers of all ages. Super Pi, as the name implies, puts your CPU, memory, and hard disk through the wringer as it calculates the value of Pi out to 33.5 million digits. (Sorry—the world record is somewhere around 200 billions digits.) If you run the program to the end, it can take up to three days—plenty of time to see if your CPU is working correctly and properly cooled under pressure. Free; www.overclockers.com/tips166/superpi.zip

MEMORY

DocMemory 1.45a/2.0

The makers of this RAM diagnostic tool exhort you to “Download Now!” A $100 value now
Upgrading your memory doesn't have to be complicated.

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Select your system make and model at Crucial.com, and you'll find memory guaranteed to be compatible with your system or your money back. It's that easy! Best of all, you'll get the same top-quality memory the world's leading computer makers install in their systems. Visit Crucial.com and get great memory upgrades at low, factory-direct prices.

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256MB PC2100 DDR

Price reflects an automatic 10% discount for ordering online. Price was taken on 12/6/01 from Crucial's Web site; however, prices can (and do) change daily. Prices may vary according to specific system requirements.
available FREE for only a Limited Time." We're not sure it's worth a C-note, but as free tools go, it's pretty thorough. Boot off a DOS floppy, and DocMemory can run a suite of quick tests, as well as a repeating loop of all the tests, in the memory ranges you pick. The tests are as obscure as you'd expect: Walk 0s, Walk 1s, MATS+, Burst, CheckerBoard, and other patterns designed to see how accurately your RAM stores and reads back information. If bad RAM is found, DocMemory beeps and points out the errant chip's address. Shocking! The manual actually tells you how to interpret results and provides troubleshooting tips. Awesome! We appreciate any information that tells us more about how our PCs work. Supports: Windows 95, 98 (1.45a); ME, NT, 2000, XP (2.0); free; www.simmstester.com

**PowerStrip**

PowerStrip is the über video-tweaking program—but it also reveals a ton about your hardware, such as this readout on a CRT:

```
    1600x1200 75Hz 600 dots per inch
    Maximum refresh rate (scanline): 204.283 ms
    Maximum refresh rate (line): 14.247 ms
    Maximum refresh rate (frame): 60.000 ms
    Minimum refresh rate: 16.667 ms
    Maximum horizontal size (scanline): 1920 points
    Maximum horizontal size (line): 20 pixels
    Maximum vertical size (scanline): 1440 points
    Maximum vertical size (line): 120 pixels
    Maximum horizontal resolution: 1920 pixels
    Maximum vertical resolution: 1440 pixels
    Maximum refresh rate: 60.000 Hz
    Maximum refresh rate (vertical): 60.000 Hz
    Minimum refresh rate: 16.667 Hz
    Maximum horizontal resolution: 1920 pixels
    Maximum vertical resolution: 1440 pixels
    Maximum refresh rate: 60.000 Hz
    Maximum refresh rate (vertical): 60.000 Hz
    Minimum refresh rate: 16.667 Hz
    Maximum horizontal resolution: 1920 pixels
    Maximum vertical resolution: 1440 pixels
    Maximum refresh rate: 60.000 Hz
    Maximum refresh rate (vertical): 60.000 Hz
    Minimum refresh rate: 16.667 Hz
```

PowerStrip is flash-upgradable. One word of caution: RST Pro can't help a system that won't do a power-on self-test (POST). For that, you'll need geeker stuff. Supports: all SIMMs, DIMMs, and RIMMs (SDRAM 64-128, DDR 1800-2100, RDRAM 400-800), SRAM, ECC, Parity and Non Parity; $500; www.usx.com

**DisplayMate**

DisplayMate is the video diagnostic that knows all. Once you pick, say, the video mode to test, DisplayMate will drag you through dozens of interactive screens.

wild. Supports: Windows 95 through XP; $30; www.entechtaipan.com

**DisplayMate Professional for DOS 1.23**

DisplayMate isn't a load-and-walk-away kind of diagnostic. You interact with the program at every step as it tests how well your CRT or LCD tosses stuff onscreen. At Maximum PC, we use its "Obstacle Course" for all monitor reviews.

As you'd expect, this is a DOS kind of program run from text menus and F-keys. But it's logically organized, and DisplayMate takes you through a retina-boggling routine of tests, by category, with the press of a key. Each screen tells you what the test does, what results are acceptable, and how to adjust your monitor if they're not. The 370-page manual is a college course on display technology basics.

So what does DisplayMate test? What doesn't it test? Once you manually adjust brightness, contrast, and color (under the program's direction), it whips you through tests of color palettes, text, reverse video, intensity, color fading, sharpness, centering, flicker, moiré patterns, and more, all in a zillion different resolutions and modes. You naturally get a massive readout on your video hardware's specs. Bottom line: If you're a video jock, DisplayMate Professional for DOS is a must-have. Supports: DOS 2.0 or later; Windows 3.x, 9x, ME, NT, 2000, XP (in DOS emulation mode); $250; www.displaymate.com

**MODEMS**

**Modem Doctor for Windows 2.0.0.21**

Is your dial-up modem dazed and confused? Yanking up stray bytes? Modem Doctor has the cure. The utility probes your modem's setup and tests its reliability (indeed, it found errors with our test unit). To work its magic, the software pummels your modem with AT commands, pokes into your S registers to uncover the modem's settings, checks fax and voice options, and much, much more. It can
even flag a dying serial cable. Wonder what the warning “Modem does not return DCE info” means? Modem Doctor’s detailed help file has the goods. One plus: You can reconfigure your modem without issuing obscure AT commands. You just check boxes in a dialog to reset your modem’s factory settings, tell it to wait for a dial tone, shut off the speaker, set compression, and more. Neat. Neater still: Modem Doctor is way cheap. Supports: dial-up modems (PC, notebook, USB); Windows 95, 98, NT4, 2000; $15; www.modemdoctor.com

**PORTS, SLOTS, AND INTERFACES**

**ID v.1.0**

ID lives up to its humble name. This free app scans your system and reveals basic details about your SCSI and ATAPI devices—ID, manufacturer, device type, and so on. If you lack a diagnostic suite and need this basic info, download this tiny 27K utility and go to town. Supports: Windows 95, 98, NT 3.51/4/5; free; grc.com/freestuff.htm

**QuickTech USB**

USB DOA? Find out why. Boot off the QuickTech floppy and connect a weird little hardware board to the USB port you want to test using the supplied cable. Pick the test options from the text menu and let ’er rip. QuickTech USB will confirm that the port is working up to snuff and test transmission speeds and reliability, voltage (is there enough juice to run peripherals?), power fluctuation and noise (a sign of a faulty connection or USB power problems), and more. You can run tests in a batch in endless loops, pick what’s tested and what errors to ignore, save the results to a file, and at the end, automatically shut down the PC. Very cool. Our only quibble? The manual doesn’t offer much advice if your USB port has a problem. For that, seek out your local repair shop. Supports: USB compliant PCs; USB 1.1 ports; $300; www.uxd.com

Robert Luhn is a freelance technology and science writer based in El Cerrito, California. He never wants to see a loopback plug again.

“There, there, sweetie. I’ll be back at 5 p.m. for a full Registry flush.”

FEBRUARY 2002
EMERGENCY 51!

A peek inside the Maximum PC Mobile Trauma Kit...

In the Lab, we've got all the tools we need to diagnose and fix an ailing PC—but it's been an entirely different story when making house calls. Thus was born the MPC Mobile Trauma Kit, a collection of every tool and spare part a Maximum PC editor might need to triage and revive a PC in crisis. If you ever encounter an infirm rig that requires anything more, pack it off to Rampart—stat!

You can never have enough: You'll want a bounty of coarse-thread #6-32 screws to lock down PCI cards and button down the case; fine-thread M3 and #4-40 screws for the motherboard and hard drive; and a few of the rare 7/16 leg screws for mounting fans. We also pack an assortment of plastic, aluminum, and brass motherboard stand-offs for those times when we have to extricate and raise motherboards.

Let's get small: The oh-so-diminutive PFU Happy Hacking Keyboard Lite 2 (www.pfua.com) will get you out of a jam when your patient's keyboard is DOA.

Drive amnesia: A Mitsumi floppy drive and a 60GB hard drive with copies of PowerQuest Drive Image 5.0 and Partition Magic 7.0 can be lifesavers when you arrive at an accident scene to find a hard drive with bad sectors.

Break the fever: To treat cases of common heat exhaustion, we whip out the AVC Sun Flower (www.avc.com.tw) for Pentium 4s and the company's slotted copper heatsink for Athlon and Pentium III processors.

You never know when you'll need a spare fan belt too: A full assortment of pre-tested cables is crucial. We carry spare power, IDE, floppy, Ultra 160 SCSI, legacy SCSI, audio and USB cables, power Y-splitters, and a nifty compact crossover Ethernet cable from Everglide.
**Software essentials:** It's always wise to carry a stack of OSes for times when you need to load a CAB file to complete a hardware installation. Also handy are a Windows 98 boot disk, a disk full of usual-suspect device drivers, and Ultra-X's RAM stress tester (RST) for testing system memory.

**Getting wired:** Sooner or later, you'll be glad you have on hand a Leatherman Wave, a good Ethernet crimper, a wire stripper, and a couple of small pliers and wire cutters.

**Point and shoot:** Raytek's ultracool MT4 infrared, non-contact thermometer (www.reytex.com) will immediately tell you if a CPU is running a fever.

**Screw in, screw out:** A SnapOn screwdriver, a couple of Torx-head drivers, and a few small screwdrivers (not shown) are more than sufficient for disassembling any PC.

**Plastic fantastic companion:** Plano's classic 147M trauma box features three sliding trays that let you access small items without opening the entire box. It also boasts a safety lock that keeps you from accidentally spilling the entire contents onto the floor. We bought ours from an EMS supply shop (www.buyemp.com).

**Suture, please:** Don't leave your patient with its wires hanging out! Wire ties and anchors with double-stick tape on one side separate the surgical pros from the quacks.

**Surgical dressing:** We keep a healthy selection of front bay covers, expansion slot shields, and even those freakish old-style P4 brackets handy for emergencies.

**The Case Continues**
An Open and Shut Case

**Painful discharge**

Ideal's Stat-Gard (www.idealindustries.com) plugs directly into three-prong outlets to ensure you're getting a proper ground and even checks the circuit to see if it's properly grounded.

**Pacemakers**

These 3-volt batteries keep power going to the computer's CMOS when the system is unplugged. Unless you're trying to resuscitate a true dinosaur, the CR2032 button cell is about the only PC battery you need these days.

**Rubber baby buggy jumpers**

You'll want to keep a handful of 2.54mm motherboard and optical-drive jumpers, as well as the hard-to-find 2mm jumpers used in some hard drives to set their master/slave assignments.

**Organ donor**

We lifted a power switch, speaker, and power LED from an old PC. You'll need these small parts when you have to test a problematic motherboard that's no longer attached to its host case.

**Burn ointment**

Arctic Silver II thermal compound (www.arcticsilver.com) is considered one of the best substances for keeping a CPU in contact with a heatsink. A slightly less efficient but non-conductive version called Arctic Alumina is also available.

**Mouse in the house**

Logitech's tiny Mouselman Traveler (www.logitech.com) lets us access a PC's PS/2 or USB ports when we need cursor control, and the Traveler's optical sensor doesn't require cleaning.

**Tricky NIC**

Besides the ubiquitous 3Com 3C905 PCI NIC, we also pack an older D-Link DSB-650 USB Ethernet adapter (with drivers on diskette and CD-ROM) for quick connection to the Internet to download essential software we'd otherwise be without.

**Power struggle**

PC Power and Cooling's ATX power tester (www.pcpowerandsupply.com) places a load on a power supply to test if it's the cause of a cornflakes PC. Simply unplug your power supply from the motherboard and into the tester. ■
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Learn more about Audigy™ ADVANCED HD™ and SB1394™ at www.soundblaster.com.
It's been 10 long months since we first celebrated the awesome promise of pixel and vertex shaders—and 10 long months without a single PC game that takes advantage of the new 3D acceleration technology. But this month, the wait is over! We give you Aquanox and Ballistics, the first two PC games to unlock the power of programmable shaders.

BY BILL MCCLENDON
AQUANOX

THIS UNDERWATER DIORAMA SHOWS OFF MUCH OF AQUANOX’S SHADER BRILLIANCE IN ONE FELL SWOOP.

1: Surface reflections on these “pills” are done using pixel shaders. Environment mapping (that is, mirror-like reflections of a surrounding environment) are also introduced in the game, where applicable.

2: Level-of-detail calculations, in conjunction with pixel shaders, reduce the detail of distant objects without compromising visual quality.

3: Bump-mapping—such as that used on the surface of this vehicle—isn’t a chipset-based feature any longer. Pixel and vertex shaders can now be programmed to display this effect. It’s important to note that bump-mapping looks best when you’re actually playing a game and objects are in motion. Light reflecting off the bumps changes accordingly as an object shifts position.

CONTINUED ON NEXT PAGE >>
he advent of DirectX 8, nVidia’s GeForce3, and ATI’s Radeon 8500 changed forever the rules of 3D acceleration. The traditional 3D rendering pipeline is now obsolete—game developers are no longer limited to the cookie-cutter effects that are hard-coded directly into a videocard’s circuitry. No, in the new world order, developers can program their own effects, for a near-infinite variety of dazzling looks and feels. It’s a “simple” matter of programming pixel and vertex shaders. You can learn all about these shaders by referring to our April 2001 cover story, but for now we invite you to check out our reviews of the first two PC games to leverage shader power. Unfortunately, the story you’re about to read is all too typical: Even awesome graphics can’t compensate for limited or flawed gameplay.

AQUANOX

Aquanox is the sequel in name and theme to 1997’s Archimedeian Dynasty. The bad old Bions from the previous title have long since been vanquished, but now there’s a new threat in the deep blue sea. Playing as freelance mercenary hired-guns loose-cannon Emerald Flint, your ship is stolen before the game even starts, requiring you to go into hock just to buy a beater. At least this explains why a successful mercenary has to drive such a junky underwater hoopie at the get-go.

For lack of a better phrase, we’ll call the game a “first-person swimmer”: You navigate plankton-rich waters, attack, and evade. The game is unbearably story-driven, with incredibly lengthy between-segment videos, tedious expository text and voiceovers between missions, and huge chunks of in-engine mini-cutscenes during missions. The execution of the story itself is pretty much gravy, though: You can nonchalantly key your way through the Talk options between missions (you need to talk to certain people in order to get paid), and it doesn’t affect gameplay at all. In fact, the forced, wooden voiceovers are so painfully bad, you’ll want to get back to the action as soon as possible.

Aquanox follows the typical “kill enemies to earn money in order to get better stuff” formula, and does so exceedingly well. You’ll always want to check the upgrade shop between missions to make sure nothing new or better has popped up for sale. One nice aspect of shopping is that you can sell your gear back to the shop for the exact price you bought it for, which means you can retrofit your existing ship without losing anything on the deal. You have torpedoes, direct-fire machine guns and lasers, and heavy-duty missiles to choose from, along with a decent variety of ships. There are clear winners in each of the shopping categories, so once you land one of the good weapons, you’ll rarely need to switch. While this makes for quicker kills, it doesn’t promote variety in your arsenal.

Gameplay is about as straightforward as it gets: You swim to various navigation points and blow up stuff. Sometimes you have to escort ships (which involves blowing up enemies), and sometimes you have to defend certain buildings (which means blowing up attackers). Other times you get to battle bizarre sea-beasts, which are so huge you have to pick off their component parts console-style. The physics in the game are extremely action- and first-person oriented. In fact, first-person is the best way to play this game. Use your mouse and keyboard and circle-strafe around enemies. While your ship is afforded six degrees of freedom, you don’t even need it—you can play the entire game by moving in the four traditional directions.

Of course, the big selling point of Aquanox is its graphics, and we’re not going out on a limb in saying this is easily one of the prettiest damned games we’ve ever played. Aimed squarely at next-gen videocards, Aquanox is a joy to behold. The lighting effects in particular are extremely well done, and you get bump-mapping, high-resolution textures, and models with staggering polygon counts tooling around in the briny blue. It’s too bad this comes at a price, and that price is stability—our review version of Aquanox sure did like to crash to the desktop.

If you want an underwater sim with a deep, compelling story of love and discovery, Aquanox ain’t it. But if you want to swim in some of the most beautiful and lush environments ever seen on the PC and blow up everything in sight, this baby’s for you.

BALLISTICS

When you play Ballistics, you can almost hear the development team voicing its overriding goal throughout the entire design process: “Yes, that’s fine—but how do we make it go faster?” Games like Wipeout XL, Forsaken, and (for you old-schoolers) S.T.U.N. Runner used the same basic principle: Strap the player into a futuristic vehicle to race as fast as reflexes will allow. Speed is king, and the faster the better. At its heart, Ballistics is a straight-up racing game with...
the obligatory tacked-on story. It's set in the future, and sports fans are looking for blah blah blah... whatever. You jump into the game and check out your ride—in this case, a sleek, jet-powered suicycle that has a surprising number of variable characteristics such as mass, boost, cooling, and acceleration. The standard formula applies: Win races to get money, and use that money in the shop to upgrade parts. Your new upgraded bike helps you win more races, which... well, you get the picture. In a game as visually rich as **Ballistics**, it's no surprise that each modification to the bike—even the aerodynamics of the seat—markedly changes the bike's appearance. Too bad this change is only really visible in the shop.

The game provides a total of seven tracks (some of which must be unlocked by, you guessed it, winning races), but they're hardly typical. In the world of **Ballistics**, racing takes place not on flat or banked tracks, but in tubes. The bikes are magnetically attached to the sides so they can rotate a full 360 degrees and attain the highest speeds possible. In the easiest mode, the game automatically reattaches you to the tube should you become disengaged. But in the higher difficulty levels, you'll have to do that by holding a button. Use a gamepad for this one, folks.

Acceleration is key, and yellow "booster pads" give you a temporary charge, while a "super booster" is intended for more serious situations. Yeah, right. In actual practice, you go from one booster pad to the next, holding the super booster button down the entire time, trying not to run into things that'll explode on impact. One thing **Ballistics** does—and does extremely well—is simulate the sensation of speed. Most games let you go 200, 300, maybe 400 miles an hour. **Ballistics** starts in this neighborhood, and if you can get the track rhythm down, Mach 2—complete with the sonic boom and visual effects—is more than attainable. After 15 minutes or so at Warp Factor Five, you'll be giggling like a schoolgirl—and trying to top your best speed on the next run.

With such simplistic gameplay, a game must by necessity have something special going for it. In **Ballistics**, that thing is graphical splendor: lots of it, all the time, and always on. If you have a DirectX 8 videocard (you do, don't you?), crank up that bad boy to the Extreme setting and let it rip. Amazing reflective surfaces, transparencies, lighting effects—**Ballistics** is like a checklist of Eye Candy Approved features. It's almost a shame you're always blasting along at more than 1400mph; when you smack into a wall, remember to steal a moment to take in all the beauty.

**BEST OF SHOW:** Stunning graphics, and sheer, unadulterated, giddy speed. It's also easy to simply load and play without hassling with any learning curve.

**WORST OF SHOW:** Not a whole lot of "there" there. Repetitive. Not a lot of fun on the higher difficulty settings.

**MAXIMUM PC VERDICT:** 7

$30, GRIN/Xicat Interactive, www.xicat.com, 954.522.3900

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Pixel and vertex shaders allow **Ballistics** to display special effects like reflections, refractions, motion blurs, and heat waves without compromising CPU resources. Here's an explanation in the developer's own words: "In this shot, you can see a typical outside scene where more than 200 vehicles move around the skyscrapers. The pixel and vertex shaders are used for the rendering output as well as for the reflection and environmental mapping of the skyscrapers, the 200 cars, and the Speeder you control—this becomes more obvious when you move through the scene, of course. In the bottom-left corner is a small shot of the classic **Ballistics** checkpoint effect. This effect distorts a passing object, its particle streams, and the background, and also takes a small reflection from the area in front of the checkpoint and displays it in a realtime generated energy field. When in motion, it provides a dizzying effect, to say the least."
MINOR LEAGUE

MAJOR PERFORMANCE

BY LOGAN DECKER, GORDON UNG, AND WILL SMITH
Can mom 'n' pop system vendors build better PCs than the big boys? That's exactly what we wanted to find out. Submitted for your approval, reviews of nine systems that are poised to topple the PC establishment.

We all know what we can get from the monolithic PC giants—the Dells, the Gateways, and the Compaqs of the world. But more likely than not, there's a smaller PC vendor just a phone call away who can provide that extra bit of TLC that turns a mere fast machine into an overclocked screamer. So we asked a handful of these "independents" to let us review the finest systems they could offer Maximum PC readers. Our ground rules were simple:

1. The vendors had to send us the exact same systems they would sell to the general public. For example, the mom 'n' pops weren't allowed to overclock their CPUs or videocards if they wouldn't do so as a matter of standard sales policy. Same goes for BIOS tweaks and cases detailed with nail polish.

2. The vendors weren't allowed to send us monitors and speakers. Why? Because we didn't want them sending us dime-store displays and sound systems in order to lower their overall system prices (so please note that all prices you see in this article are for the main boxes only).

3. The vendors were asked if they could handle the production of 80 additional machines within a month of this article's publication. If they couldn't, we would still review their machines and their final verdicts wouldn't be adversely affected, but we would warn the public about the production limits. As it turns out, all vendors stated they could handle 80 additional machines per month.

Once we got all the rigs in house, we began to notice patterns: All but one vendor used AMD's Athlon XP CPU, taking advantage of its competitive speed and far lower price than Intel's Pentium 4. And all but one vendor included two hard drives in a RAID 0 array (but just wait until you read what the non-RAID system pulled off). Most of the shops went with GeForce3 Ti 500 videocards, and all but two vendors knew that savvy buyers want to see the name "Plexor" in their optical drive bay.

Clearly, the small mom 'n' pop shops know what power users and gamers want, and are willing to go the extra mile to deliver specialized components and tweaking techniques that the big boys can't be bothered with. And, luckily, the scrappy vendors also back up their overclocking sleight-of-hand with strong warranties.

Now, let's step into the Lab to see how these renegade rigs performed...

NextGen's AMD XP

Ready for overclocking—and brother, it needs it

NextGen took pains to prepare its AMD XP Performance System for overclocking—the rig came equipped with a blue chipset heatsink and fan, and the monstrous Swiftech MC242-A CPU cooler. So it's a little strange that the company didn't overclock. And a shame, because the AMD XP Performance System could have used it.

Like most of the systems in this showdown, the AMD XP includes all the right gear: the fastest shipping Athlon, 512MB of RAM, a 24x Plexor burner, a 16x Pioneer DVD-ROM, an ASUS mobo using the KT266A chipset, an Audigy Platinum EX, a Leadtek GeForce3 Ti 500 videocard, and a pair of 60GB 7200XP IBM hard drives. The configuration of the IDE RAID had us baffled, however. Instead of running the two IBM drives on separate IDE channels, NextGen has the drives sharing the bandwidth of a single IDE channel, which can seriously degrade performance. The company did the same with the optical drives and combined the Plexor and Pioneer on one channel as well. This can drastically impact high-speed disc-to-disc dupes.

It's possible that the shared drive configuration hurt the performance of the system in the disk-intensive SYSmark2001 benchmark—NextGen's score trailed that of the Overdrive PC (page 48), even though the Overdrive has a slower CPU. But the NextGen did come back into favor in our 3DMark2001 test, where it finished just behind the Patriot (page 48) along with two other systems. NextGen has fine components and the right features for people who want to overclock, but its price-to-performance ratio and oddly configured RAID controller dragged it down—way down—in this roundup.

**Maximum PC Verdict:** 5

Element PC Patriot 1900

Overclocked and over the top

The Patriot 1900+ arrived in a box so big we could bury someone in it—like, say, the competition, which got stomped in the benchmarks by the Patriot's heavily overclocked processor and videocard.

The Athlon XP 1900+ overclocked to 1.67GHz was a predictable plus, but the real jewel of this system is MSI's KT7266 Pro2 mobo, featuring an onboard Promise RAID controller (leveraged by two 80GB Maxtor D740X drives in a RAID 0 configuration) and built-in USB 2.0 (the Patriot was one of just three systems to include the new USB standard). The interior wiring was tidy, with nothing dangling. The only disappointment was the Hercules Game Theater XP, which is passe soundcard technology compared to the exquisite fidelity of the Sound Blaster Audigy's digital-to-analog converters.

The Patriot's overclocking paid off in spades, delivering an unprecedented 193 in our SYSmark2001 benchmark. We were concerned about the stability of the system, but the Patriot never faltered under hours of looped 3DMark2001 stress testing, and Element PC backs up its bravado with a full-year warranty that covers all components (parts and labor).

Though the Patriot is obviously configured for PC fanatics, its thorough documentation leaves nothing to chance, providing lucid instructions on everything from positioning the system for optimal ventilation to flashing your BIOS. We even received a boxed copy of Windows XP Professional!

How's that for PC populism? Indeed, the Patriot is a first-rate system priced for average Joe.

MAXIMUM PC VERDICT: 9
$2,600, 888.323.2661, www.elementpc.com

GMachines Omega AMD

Overclocked speeds without overclocking

GMachines' Omega AMD has a lot going for it right out of the gate. In SYSmark2001, the Omega's non-overclocked 1.6GHz Athlon XP 1900+ ran neck-and-neck with XDream's 26GHz P4 and not far behind the blistering speed of Element PC's slightly OC'd Patriot. And while Maximum PC is always down for a little fun, we think Element overstepped the fine line of appropriate flag display with its decals, and most of the staff would rather have the sleek and polished Cooler Master case that GMachines uses.

Internally, the AMD Omega is pimped out with an ASUS A7V266-E motherboard (featuring VIA's desirable KT266A chipset), a Sound Blaster Audigy Platinum EX, a Visiontek Xtasy 6964 GeForce2 Ti 500 (overclocked to 260MHz on the core and 287MHz on the DDR memory), a Plextor 24x burner, and IDE RAID. Oddly, GMachines' choice of hard drives leans toward the diminutive with just two 40GB Seagate Barracuda IV drives. Internal case wiring was pleasant, but not exactly Voodoo-level, and even though the Cooler Master case is well-ventilated with four 8cm fans (two in the front bezel, one behind the CPU, one up top), the aluminum-only, low-velocity heatsink attached to the CPU doesn't lend itself to overclocking. On the flipside, the Omega AMD is quieter than most of the rigs in this roundup and less likely to rattle your nerves.

The Omega AMD is a solid performer with top-of-the-line components, and we suspect it fell slightly behind in performance benchmarks only because GMachines chose not to overclock it. Of course, considering its CPU cooling apparatus, overclocking probably would have been ill-advised.

MAXIMUM PC VERDICT: 9
$2,570, 877.677.7383, www.gmachines.com
THE DEFINITION OF "AIR SUPERIORITY"

"If you thought the end of the Cold War meant a halt to weapons R&D, think again. Falcon Northwest's new MACH V proves that plenty of cash continues to flow into the campaign against the tyranny of slow 3D Gaming. Like a freshly declassified fighter-bomber, the system swooped in and precision-bombed nearly every benchmark record in existence."

VERDICT: 10/10, Kickass Product Award, Gear of the Year (Best Desktop System)
-Maximum PC

"In total, we evaluated 7 power and 11 value systems... Falcon Northwest's MACH V game machine is the unrivaled speed champ in this lineup... the Athlon XP 1800+ MACH V we tested scored a 121 on PC Worldbench 4, setting a record for performance and beating the fastest Pentium 4 system we tested by 14 points. This system is fast and fun." TALON 3.1: "...this Talon posted a stunning PC worldbench 4 score of 116, second only to another Falcon - our power list's (MACH V)"
- PC World

"FALCON SETS A NEW HIGH-WATER MARK WITH ITS BEST-EVER PC. The Falcon team have always been excellent system builders, but this new computer is the cleanest, best-cabled model we've ever seen from them. It's Falcon's best MACH V to date. We're smitten." Score: 95%, Editor's Choice Award
- PC Gamer

1-888-FALCON-1
WWW.FALCON-NW.COM
XDream Nightmare
You will learn to fear the power of the cube

The XDream box was the only system in this round up to ship with a Pentium 4, as well as the only system to include RDRAM instead of DDR SDRAM. But the most noteworthy aspect of this rig is its measurements. The folks at XDream managed to cram a lot of goodness into this 13x18x14-inch shiny black cube.

It’s truly a thing of beauty. Boasting an airflow design that cools the memory, CPU, videocard, and hard drives, as well as 10 3.5-inch drive bays and more than enough space for all but the largest ATX mobos, the XDream’s case is our fave in this showdown. Although the funky interior design doesn’t lend itself to a fancy wiring job, the cables were all arranged so as not to interrupt airflow.

Sporting a 2GHz Pentium 4 on the ASUS P4T mobo and 256MB of PC800 RDRAM, the XDream turned in respectable three-place performances in our MusicMatch, Quake III, and 3DMark2001 benchmarks, but fell behind to fourth in SYSmark2001. The super-special Plextor Plexwriter 24/10/40, which ships with a black faceplate and tray door, chalked up the second fastest score in our audio extraction test.

Our biggest gripe with the XDream—and it’s a big one—is its high price. We understand that P4 systems cost a little more, but maybe that’s why all the other vendors went with AMD (and many of these Athlon rigs turned in better benchmarks). The XDream costs damn near $3,200, and that’s just too much for a box with no monitor or speakers.

MAXIMUM PC VERDICT: 8
$3,175, 877.622.4469, www.xdreammachines.com

Overdrive PC OPC-XA7
Middle-of-the-road performance in a generic case

Even though the OPC-XA7 uses one of the slowest processors in this round up, Overdrive PC managed to squeeze out an impressive amount of performance from the Athlon XP 1800+. Sadly, no amount of squeezing could elevate the OPC-XA7 above the competition.

Featuring an Abit KG7-RAID motherboard (which features the AMD 761 chipset) and a two-disk RAID array, the OPC-XA7 landed squarely in the middle of the pack with a SYSmark2001 score of 187. And with its VisionsTek GeForce3 Ti 500 board overclocked to 275.5MHz, the OPC-XA7 again managed to land exactly in the middle with a score of 30ips in 3DMark2001. Haunting, isn’t it? We were unable to complete our Audigrafter test, as the Plextor 24x repeatedly returned mysterious ASPI errors.

Inside the bland Antec case, we found a few unexpected surprises. First, every cable inside the box was fastened with Velcro ties, which keep the cables nicely bundled and manageable. Second, the blowhole fan on the case door drew power through a headphone-style jack, which makes removing the case door much easier than if the fan drew power using a standard power mount. The Overdrive is also one of the few systems to include USB 2.0 ports, so you’ll be able to take advantage of imminent USB 2.0 devices without opening your case.

Although Overdrive did a competent job of putting its hardware to good use, in the end, the OPC-XA7 (wasn’t that the name of the Star Wars robot?) couldn’t compete with brainer—though similarly priced—contestants.

MAXIMUM PC VERDICT: 6
$2,595, 770.734.3220, www.overdrivepc.com
Computer HQ PowerPlay
Pretty on the outside, ugly on the inside

When we unpacked the PowerPlay XP1900, the first thing we noticed was its awesome Cooler Master ATC 210 case, with its swank clear acrylic door on the front bezel. We were far less impressed with what we found behind the door. With middling benchmark numbers and a downright crapastic wiring job, the PowerPlay's pretty case is about all it has going on.

The PowerPlay includes all the right parts—they're just slow. An Athlon XP 1900+ and 256MB of PC2100 DDR memory are paired with an ASUS A7V266E mobo. The system even boasts an IDE RAID array using the motherboard's onboard Promise controller and a pair of 60GB IBM 60GXP, but it still comes up short in the benchmark battle. Scores of 184 in SYSmark2001 and 209 seconds in Audigrabber would have been great about six months ago, but now they're yesterday's news.

The wiring job in this system is the worst of the roundup. A bunch of color-coded and rounded cables do not a wiring scheme make. None of the cables are secured to anything, so power cables, rounded IDE cables, and the soundcard's internal ribbon cables all float freely around the case. Needless to say, this doesn't encourage good airflow.

So what's to recommend? Well, we were thrilled to find USB 2.0 ports, and we're dig the Audigy Platinum EX. We were also impressed at how quiet the PowerPlay ran, even in the traditionally loud aluminum Cooler Master case. Still, mediocre performance and a high price make the PowerPlay a sketchy choice.

MaximumPC Verdict: 6
$2,995, 888.455.7978, www.computerhq.com

ABS Tiger
Athlon XP 2000+ for $1,600? Holy Frijole!

Yes, we did a double-take when we saw the price too. Hell, we even did a triple-take. AMD's Athlon XP 2000+ running at 1.66GHz, Leadtek's WinFast GeForce3 Ti 500, 512MB RAM and a Pexwriter 24x—all for $1,600. So what's the catch? If there is one, we couldn't find it. The Tiger wasn't the fastest rig in the roundup, but it's far and away the best bargain.

Our initial out-of-the-box inspection of the system wasn't particularly inspiring—the wiring was more or less tidy, but dangling IDE cables still inhibited airflow from the forward vent, and the Tiger was the only system that wasn't configured with a RAID array. But SYMark2001 didn't seem to mind. The Tiger returned the second-highest score in our roundup, which we suspect is a result of the massive 8MB cache on the 100GB Western Digital "Special Edition" WD1008BB. We should mention, however, that we tried to run SYMark2001 on the Tiger's original configuration no fewer than 15 times! It never completed successfully, so we were forced to do a clean install of Windows XP. Luckily for ABS, the final SYMark2001 result, combined with a second-place tie in our Premiere script, demonstrates that the Tiger excels at bread 'n butter office apps.

The rig's gaming benchmarks, on the other hand, were abysmal, coming in next to last in both Quake III and 3DMark2001. But if getting the best frame rates in the universe isn't your number-one goal, and you like the idea of a heartwarming warranty of three years on parts and lifetime labor, you'd be hard-pressed to find a better deal on the best components.

MaximumPC Verdict: 8
$1,500, 860.676.8398, www.abspec.com
Velocity Micro
Velocity AX1900+XP
This hot rod could use a tune-up

At first glance, the Velocity AX seems like a poster child for the mom 'n pop shops: familiar case, familiar components, familiar configuration, all put together with the kind of care and craftsmanship that the behemoth manufacturer's can't offer. Unfortunately, the rig stumbled badly during a couple of important benchmarks, leading us to think the configuration could have used a little more of the refinement bestowed on the case and interior.

The rig arrived in a handsome slate-gray case with a hinged door, and the WinXP activation code and product stickers were placed on the inside of the door—nice touch. The interior wiring was superb, with neatly bundled power supply cords and IDE cables folded out of the way behind the drive bays. There was also a dual-fan PCI card directly under the GeForce3 to cool the chip.

Despite an Athlon XP 1900+ (slightly overclocked to 1.612GHz), 512MB of PC2100 RAM, and a GeForce3 Ti 500 GPU bumped up to 270Mhz, the Velocity AX hovered dangerously near the bottom of the pack in our SYSmark2001 test and delivered just a modest 833fps in Quake III.

Luckily, the rig coughed up a more satisfying 30.2fps in our 3DMark2001 benchmark, and we're confident that with some tweaking, the Velocity AX could deliver a lot more than it did in all of the benchmarks. It's a decent performer in most respects, and comes at a fair price, but its poor SYSmark2001 showing drops it from a champion to an "also ran."

MAXIMUM PC VERDICT: 7
$2,860, 800.300.7888, www.velocitymicro.com

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ePCdirect Kommander XP
More power than we expected for the price

We're not sure what the “e” means in ePCdirect, but we suspect it stands for "economy." At about $1,400, the Kommander XP is about $1,000 less than all the other PCs in this showdown.

Unfortunately, the Kommander XP also trailed in performance. That's not surprising, considering the box includes an original GeForce3 card (instead of a GeForce3 Ti 500) and an Athlon XP clocked at "just" 1.53GHz. And, of course, even though it trailed the competition, the Kommander isn't that slow; it's just a Maserati in a Ferrari jungle. We also bet that a lot of people would gladly eschew a few faster core components in order to knock a cool grand off the price of admission. On the plus side, the rig does include USB 2.0 support, a rare amenity in this showdown. The USB 2.0 comes onboard the rig's MSI K7T Pro 2 RU motherboard, which is based on the much-favored VIA KT266A chipset. Unfortunately, our system didn't have the correct USB 2.0 drivers loaded, and Windows XP doesn't support USB 2.0 natively. D'oh!

We also grimaced when we saw the two smallish 40GB hard drives sandwiched against each other without any active cooling on them—that's just asking for a case of cooked platters. The final turn-off was the Acer 20x burner, which couldn't compete against the sexy Plexies installed in most of the other systems.

The Kommander 1900+ would be a Kick Ass PC if this were September 2001, but it's not, and the box reads like last year's specs. Still, the price is right for many budding enthusiasts and honestly the performance isn't all that bad.

MAXIMUM PC VERDICT: 6
$1,390, 977.372.8833, www.epcdirect.com
The fastest game on earth is coming to your PC this fall. Ballistics is a heart-pounding, non-stop adrenaline ride through a futuristic world of Formula-One racers gone bad. Race against up to 8 opponents in GeForce3™ enhanced levels that will blow you away. Achieve insane G-Forces traveling at twice the speed of sound. With full vertex shading and bump mapping, Ballistics brings some of the most impressive visuals seen on a PC to date. Get into the race, go Ballistic.
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<tr>
<th>Company</th>
<th>CPU/RAM/Mobo</th>
<th>Videocard</th>
<th>Storage</th>
<th>Optical</th>
<th>LAN/USB/Firewire</th>
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<td>NICKERI</td>
<td>Athlon XP 1.6GHz, 512MB RAM, Asus A7V266E mobo</td>
<td>Leadtek GeForce3 Ti 500, 240/250MHz</td>
<td>Two IBM 60GB 60GXP (2MB cache) in a RAID 0 config</td>
<td>Pioneer 16x DVD-ROM, Plesix 24x/10x/40x CD-RW</td>
<td>3Com 10/100, four USB 2.0, two IEEE-1394</td>
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<td>ELEMENT PC</td>
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<td>Soundcard</td>
<td>Software Highlights</td>
<td>Warranty/Support</td>
<td>Benchmarks*</td>
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<td>Audigy Platinum eX</td>
<td>Windows XP Professional, Easy CD Creator 5, Power DVD</td>
<td>One year parts/labor; 9am-6pm, Mon-Fri</td>
<td>SYSMark 183; Premiere 6 176;</td>
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<td>Quake III 94.6; 3DMark 30.9</td>
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<td>Hercules Game Theatre XP</td>
<td>Windows XP Professional, Easy CD Creator 5, Power DVD</td>
<td>One year parts/labor; 9am-6pm, Mon-Fri; 10am-6pm, Sat; plus 24/7 &quot;Ask Dr. Tech&quot; Home Plan</td>
<td>SYSMark 193; Premiere 6 163; Audigraffer 181; MusicMatch 207; Quake III 52.2; 3DMark 33</td>
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<td>One year parts/labor; 9am-6pm, Mon-Fri</td>
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<td>One year parts/labor; 9am-6pm, Mon-Fri</td>
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<td>Quake III 86.7; 3DMark 28.2</td>
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<td>Soundblaster</td>
<td>Windows XP Professional, WinDVD, Easy CD Creator Basic 5.0</td>
<td>One year parts/labor; 24/7</td>
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<td>Audigy Platinum eX</td>
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<td>Three years parts/labor; 9am-5pm, Mon-Fri</td>
<td>Premiere 6 172; Audigraffer 209; MusicMatch 214; Quake III 86.2; 3DMark 26.5</td>
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<td>SYSMark 191; Premiere 6 172; Audigraffer 197; MusicMatch 216; Quake III 79.4; 3DMark 26.5</td>
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<td>Windows XP Professional, Easy CD Creator 5, Asus DVD Player, Norton Antivirus 2002</td>
<td>Three years parts/labor; 9am-5pm, Mon-Fri</td>
<td>SYSMark 179; Premiere 6 183;</td>
<td>$2,600</td>
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<td>Premiere 6 182; Audigraffer 184; MusicMatch 223; Quake III 83.3; 3DMark 30.2</td>
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<td>Hercules Game Theatre XP</td>
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<td>($1,590 with Orion 19-inch monitor and Logitech Z340 speakers)</td>
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* Scores in red indicate best score of all nine machines tested
** Would not run
Ask the Doctor

Have a burning PC problem? How about a burning PC sensation? We’re more than happy to help you with your PC problems, but you might want to get that sensation thing checked out by a qualified sensation checker-outer. If you have PC questions, send them to doctor@maximumpc.com. Just remember: We can’t answer every e-mail. Oh, no—not by a long shot.

ACR Ain’t All That
I ran into a hardware problem that lead me to purchase a new mobo. I chose a dual-proc board with RAID so I could double my existing CPU and hard drive power. The new board has five PCI slots and one ACR slot. Funny thing is, there are no ACR cards that can plug into this slot. In fact, everyone I asked said either they never heard about it or that it must be thinking of an AMR slot. One guy even tried to convince me I was mispronouncing AGP slot! Daal! I’ve heard

"Even if you do find that the machine uses both processors, the Doctor doesn’t recommend that you go for the slower-paced Pentium III Xeons.”

there are supposed to be wonderful boards available that use the ACR slot. Boards that combine audio, Ethernet, and USB all in one. Is there really such a thing as this mystery ACR beast? Please advise.

—JIM DEPASQUALE

An ACR card is a little riser card that features modem, audio, networking, and USB interfaces. Hook an ACR card into your mobo and you suddenly gain access to all the integrated poop that’s been soldered onto your board. ACR is simply the non-Intel version of CNR. Unfortunately, Jim, going out and buying an ACR or CNR to augment your motherboard isn’t a likelihood yet. Because different motherboard makers can hook whatever feature they want into the ACR or CNR slot, it’s not guaranteed that an ACR card specifically for, say, Ethernet, will work in the board you have. For this reason, it’s difficult to obtain an ACR/CNR card that isn’t bundled with the motherboard. Currently, ACR and CNR are really designed for full-system vendors who want to add networking, audio, or modern capabilities to a PC. If it didn’t come with your motherboard, it probably isn’t worth seeking out.

Broadband Overload
I’m lucky enough to have both a cable modem and DSL in my home, and I want to find a way to combine them to increase my upload/download speeds. Do you have any suggestions?

—GERRY ROBINSON

The only place to get an ACR board, or audio and communications riser, is from your mobo manufacturer; otherwise you risk compatibility problems.

The Doctor loves the convenience of a wireless keyboard and mouse setup, but being a discerning gamer, he demands great things from his mouse. He frankly prefers a higher refresh rate from his mouse than a wireless device can provide. For example, standard PS/2 mice update their position to the PC 40 times per second. USB mice update 125 times per second, resulting in more precise movement. By contrast, a wireless mouse updates 50 times a second, which can result in jerky, choppy mouse movements.

What’s the upshot? If you’re serious about games, forgo a wireless mouse in favor of a wired rodent.

 Outlook Attachments Make ME ANGRY!
I know that Microsoft is trying to do its part in protecting computer users from viruses, but it seems to be at the cost of our e-mailing freedom. I have Office XP, and it seems as though Outlook is calling the shots now on what can and cannot be received. Any type of .bat, .exe, .vbs, or .js attachment is blocked, and although it’s evident an attachment was sent, Microsoft gets the last laugh by informing you that you will not be able to access it. More than 50 percent of the computer-using public might be idiots and inclined to open every attachment they get over e-mail, but the rest of us are a bit more discriminating. Furthermore, viruses can come in many shapes and sizes and could just as easily exist in a Word doc-
I want my freedom back.
—MICHAEL HAGERMAN

Blocking executable attachments wholesale is a pretty heavy-handed response to the proliferation of worms, Trojans, and viruses, but it's better than some of the other solutions we hear Microsoft considering, like shutting down the whole Internet thing all together ("...if you can't use it nicely,..."). And as far as we know, there isn't an easy way to lift the embargo in Outlook 2002. But there are a few work-arounds.

You could ask your correspondent to change the extension of the file he or she sends you and inform you of the correct extension in the text of the e-mail. Not fun. A more efficient approach would be to compress the file and send it as a .zip archive instead.

But if you want to really throw open the gates (no pun intended), go to http://support .microsoft.com and look up the Knowledge Base article Q289457. You'll find not only a list of over 40 verboten attachments, but also a 12-step (!) method for removing the ban on certain attachments by editing the Registry.

And remember, you always have the "freedom" to choose a different e-mail client!

User Serviceable? Yes/No
Can I upgrade my laptop? If so, what components can I switch safely?
—NORAH TEPPER

The easiest components to upgrade are the memory and hard drive. With a desktop replacement notebook, you can usually upgrade by adding peripherals to the miniPCI slot, as well. Keep in mind that it will depend on what your manufacturer supported in its miniPCI implementation. If, for instance, the notebook maker didn't wire the notebook to support a miniPCI 300.11b card, then the card won't work.

In general, it's actually very difficult to perform major alterations on notebooks, and the difficulty usually increases as the notebook gets smaller. Larger notebooks, again, have some modularity, and the Doctor has witnessed minor overclocking jobs and surgery to swap even video subsystems in some of the more substantial models. However, even if you had the skills to do this to your notebook, you probably couldn't procure the necessary parts. As a general rule, stick to the obvious upgrades (hard drive and memory) for your notebook.

Chipset Conundrum
I'm considering upgrading my year-old AMD 1GHz and ASUS A7V MB, and, after reading the last issue of Maximum PC ["Gear of the Year," December 2001], I'm considering an upgrade to an Athlon XP. There are a number of motherboard options, but I'm not sure I'm experienced enough to make an informed decision, so I'd like to hear your opinion. I've heard enough about ASUS to respect its reputation and would rather stay with the security of their brand recognition.

My problem arises because ASUS seems to offer two motherboards for the Athlon XP: the ASUS A7V266 with a VIA KT-266 chipset and the ASUS A7M266 with an AMD 760 chipset. The A7V266 seems to have more features and contains a VIA chipset, which I recognize as a reputable industry name, but the A7M266 has an

The bad news is you've got a problem. Windows XP either doesn't like a piece of hardware or it doesn't like your Win98 install. The best thing you can do is to back up your system, then try a clean install of WinXP. The best way to do this is to boot off the WinXP CD, instead of trying to run the installer from within Windows.

If you do have to do a clean install, give the Migration Wizard a try. It will grab all the files and even some apps and copy them to the new Windows XP install. It helps to have a spare hard drive around, but if you don't, you can copy your data to another partition. The Migration Wizard can be found in the Windows XP install menu, under "Perform Additional Tasks" then "Transfer Files and Settings."

MSN Messenger Be Gone!
I upgraded to Windows XP Home and now I see all kinds of promo's, ads, etc., for Microsoft products. This is bad enough, but I also find that Microsoft Messenger always loads when I run Outlook Express. I neither need nor desire this program.

Can you recommend a way to get rid of this, and all other MS-BS? I'm trying to save memory space.
—GARY BONHARD

Preventing Messenger from loading with Outlook Express is as easy as pie. You don't need to do any kooky Registry editing or anything like that. All you need to do is start Outlook Express, go to Tools > Options and uncheck "Automatically log onto Windows Messenger." It's as easy as that.

We're not exactly sure what you're talking about when you say, "promo's ads, etc., for Microsoft products," since we've never really noticed any.
AMD chipset, which I believe would be more reliable.

As if that's not enough, the ASUS web site mentions an upcoming motherboard called the A7V266-E containing a new chipset (VIA KT-266A), which will support the Athlon XP. What are the pros and cons of the two chipsets and/or should I just wait for the A7V266-E?

—JAMES HAWKINS

After reading "Speed Trials" in the January issue of Maximum PC, the Doctor suggests you check out the ASUS A7V266-E. The KT-266A chipset is the Athlon XP chipset to beat today. Although nVidia's nForce is faster in some respects, the chipset is definitely experiencing some teething pains, such as some memory bandwidth issues with double-sided DIMMs. AMD's 760, once king, is now second choice for most AMD fans.

Pencil + CPU = Slow Painful Death

About a month ago, I took a lead pencil to the L1 bridges on my AMD Thunderbird 200FSB 900MHz chip. It was all fun and games until I tried to boot. What I got was either a series of four consecutive tones or a single long beep. I couldn't tell.

At the time, I thought I had fried my chip, so I bought another one (an AMD T-bird 266FSB 1.2GHz). Same problem.

By digging around online, I found a trick that lets me boot the PC. Hitting the "insert" key while starting up my system makes everything work fine. I'm able to get into both my Win98SE and my Win2000 OSes. But I have to do this every time, which is a major pain.

Of course, I set the chip speed and went through all the BIOS settings... and even tried setting them to the "failsafe defaults." Still, no luck. The only way I can boot into a functional OS is by hitting the insert key.

—JOHN MCEWEN

Generally, if your motherboard can boot with the insert-key routine, then it should respond to resetting the CMOS by using the jumpers. When resetting the CMOS, you may have neglected to unplugging your system. If you try to reset the CMOS by jumping the board with the power cable still plugged in, it won't actually reset. Disconnect the cable leading to the PC's power supply, wait five seconds, then jumper the CMOS reset jumpers. Of course, make sure you are actually jumping the correct jumpers (double-check your motherboard manual if necessary).

Make sure you set the correct speeds in the BIOS for your new 1.2GHz/266FSB (it should be set to 2x133), then fire away. Abit's own FAQ (www.abit-usa.com) has a recommendation for people who have "penciled the L1 bridge on the CPU surface. Unseat the CPU and clean the surface by a rubber carefully. Clear CMOS via jumper..." You get the gist.

—MATT HALLMAN

Four P-III or Two Athlon MPs?

I'm a videographer and I use a computer for my video editing. I currently have a dual 550MHz P-III rig with 512MB of RAM. This system takes up to 10 hours to render a 2 minute, 30 second 3D animation.

I saw a system on eBay with four P-III 550MHz Xeon processors and 2GB of RAM for $2,500, or I could buy a dual Athlon XP 1900+ with 1GB of RAM for about the same price.

Which one of these would be better in Adobe Premiere renders? I'd also like to know if the Intel 450NX chipset in the Xeon system supports AGP videocards. I really don't want old technology, but my dream system has quad processors.

—PHAT NGUYEN

Adobe Premiere 6.0 does take advantage of multiprocessor support but only under certain circumstances. You should fire up Premiere (ideally version 6.0), open your project, then Ctrl-Alt-Del to pull up the Task Manager to monitor the impact on both processors under Windows 2000. As you render your project, watch the CPU graphs to see how much each CPU is used. If you find that both CPUs rarely hit 100 percent, then getting a single, faster CPU will benefit you more than two or four slower CPUs.

Even if you do find that the machine uses both processors, the Doctor doesn't recommend that you go for the slower-clocked Pentium III Xeons. As its name implies, the 450NX chipset does not support AGP. The chipset also does not support higher front-side bus speeds, DDR memory, 64-bit PCI, or any of the advanced features we've seen on mobos in the past two years. Furthermore, Intel no longer sells the 450NX, so you'll probably never be able to upgrade the CPUs. The Doctor recommends that you invest in a pair of high-speed Athlon MP CPUs and a 760MP motherboard such as the Tyan Thunder K7. You'll have access to higher-clocked CPUs when they come out, and driver support for new OSes, such as Windows XP Pro, is already available.

Do MP Mobos Support XP Processors?

I went to Tyan's Web site to look at its new dual processor mobo. It says that it supports the Athlon MP processor, but will it support the new Athlon XP processors? I would rather use the Athlon XP than the MP.

If you're hoping to drop a pair of Athlon XP CPUs into a dual rig, the short answer is that it may or may not work. AMD's Athlon XP and Athlon MP CPUs are virtually identical (the newer MP chips even use the same organic packaging instead of the ceramic packaging of the 1.2GHz and 1GHz MPs). The main difference between the CPUs is in the testing AMD does. Athlon MPs are thoroughly tested and guaranteed to work in multiprocessor configurations. Athlon XPs, on the other hand, are not tested for multiproc purposes.

For most people, however, the lack of dual-proc (DP) certification will not be a deterrent, and the dual XPs will probably work just fine—there's simply no intrinsic reason why XP pros wouldn't work in tandem. In fact, if you want a cheap, dual Durons should work well too. Something you should keep in mind anytime you're dealing with a non-DP-certified CPU is that the multiproc configuration may work fine for some things but not for everything. If you're building a rig for home use and don't mind occasional weirdness, go for it. If you're building a server to run your business on, risking stability to save $100 is just stupid.
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How To... A step-by-step guide to tweaking your PC Experience

HACK YOUR TiVO

Turning your 30GB video recorder into a 138GB monster is simple—but you’ll need a PC to do it!

You already own a TiVo personal video recorder—a next-gen recording device that eschews traditional analog tape and actually records TV shows to a hard drive in the MPEG-2 format. The only problem is that your TiVo just doesn’t hold enough TV. Well, here’s the how-to you’ve been waiting for. We’re going to show you how to open your TiVo and add a new hard drive to complement the one that’s already inside. WARNING: This operation, however safe and effective, will void your warranty! Regardless, we still think having a TiVo with more than 100 hours of recording time is more than worth a little warranty violation.

Before you start working on this, read all of the instructions to their completion. If you don’t follow the instructions precisely, you might seriously damage your TiVo. We’ll assume you have a basic knowledge of upgrading PCs before you begin—Maximum PC will NOT provide any follow-up tech support for this how-to and is not responsible if something goes wrong with your TiVo upgrade. However, we invite you to check out www.tivofaq.com/hack for instruction in even greater detail.

Gather Your Parts

Before you get started, you’ll need a few supplies. Here’s the short, short list.

A. TiVo unit with a single drive. The low-end 14-, 20-, and 30-hour units all use single drives. Go here for a definitive list: www.9thtee.com/tivoupgrades.htm.

B. The biggest hard drive you can get your hands on, preferably 5400rpm (because slower spinning drives consume less power and generate less heat). We used a Maxtor 80GB 540DX.

C. The Kazymyr Boot CD, created from an ISO image available at www.9thtee.com/tbv2_6i.iso. You can use Easy CD Creator, Nero, or most any other CD burning app to burn the ISO to a CD.


E. T-10 Torx screwdriver (to open case and add/remove HDs).

F. Regular screwdriver (to pry open stubborn TiVo case).
1 **Bust Open the Case**

In order to get into your TiVo, you’ll need to unscrew the three screws circled in red above. Use your T10Torx bit to loosen these screws. Then you’ll need to gently slide the top of the case off the back of the unit.

You might need to use a flat screwdriver or a butter knife to gently pry along the back edges of the case to get the top moving. The red circles show the best places to pry.

If you get to this point and there are already two hard drives in your TiVo, you’ll need to check the TiVo hacking FAQ [www.tivofaq.com/hack](http://www.tivofaq.com/hack) for instructions on how to replace your second drive.

2 **Look Around the Innards**

Welcome to the guts of your TiVo. Before you get started, take a look around. The main things you need to be concerned with are the power supply (outlined in red) and the hard drive bays (outlined in blue).

**WARNING:** Stay away from the power supply since it’s unshielded and can shock the hell out of you even when the TiVo is powered down!

![Diagram with labels A and B]

- **A** Hard drive area
- **B** Power supply

3 **Let Your PC Do the Talking**

In order for your TiVo to recognize its new hard drive, you’ll need to set up the new hard drive so that it can properly communicate with the machine’s original hard drive once both are installed in the same box together. To do this, connect the drive you want to add to your TiVo to the primary IDE channel of your PC as the slave. You probably won’t need to disconnect your PC’s current hard drive to do this, but you may need to temporarily unhook your CD-RW or Zip drive. And you’ll definitely need some type of operational optical drive remaining in your PC.

Make absolutely certain the drive you’re adding to your TiVo is set to be the slave. Once the drive is installed, you’ll need to boot your PC directly from the Kazymyr TiVo utilities CD-ROM. Obviously, your PC will need to be bootable from its optical drive, so you might need to make some changes in the BIOS; consult your motherboard manual if necessary.
**Bless Your PC**

No, this step doesn't involve the Pope. **After you boot off the CD, you'll see a screen with a lot of text containing lots of information about DMA modes and byte swapping. If you don't know what to do here, or you just don't understand what's going on, it's safe to simply press Enter and continue booting.**

After your hardware is initialized, you'll be presented with a Linux login prompt. To log in, type `root` and press enter. There is no password. Now it's time to run BlessTiVo, the application that will prime the add-in hard drive for your TiVo. If you connected the hard drive to your Primary IDE channel as the slave, then you'll type `BlessTiVo /dev/hdb` and press `Y` when prompted. The BlessTiVo app will then prep your drive for the TiVo. This should take just a couple seconds. **WARNING: Make absolutely certain your drive is, in fact, connected to the Primary Slave channel, or this command will wipe the drive on the Primary Slave channel.**

![Screeshot of BlessTiVo](image1.png)

**NOTE:** This is a re-creation of an actual screen.

---

**Get Up and Running**

Now that your add-in hard drive is blessed, it's time to install it beside your TiVo's original drive.

First, you'll want to mount the add-in drive to the mounting bracket from www.3thtee.com ([Image A](image2.png)). Use the four screws and blue washers as shown in the picture. Make sure you attach the drive facing the right way. The IDE and power connector should be on the same side as the lip that holds the bracket in place. After you've properly placed the drive on the bracket, you can fasten it to the TiVo chassis ([Image B](image3.png)). Make sure you've got the new drive's jumper set for the slave position!

Once both drives are mounted, connect the IDE cables to them. The original drive should be connected to the end of your IDE ribbon cable; the new drive should be connected to the middle interface. Attach power headers to each drive, put the lid back on, and your new TiVo should be ready to go!

Once you connect the new drive, and power up the TiVo, the two drives will become “married.” This means they can't be separated without the aid of some type of software, if at all. If you separate married drives in a TiVo, the TiVo unit will stop working entirely, so don't try this unless you're sure you have a plan of action. You have been warned.
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Meet the New Pentium 4

Intel's latest flagship CPU is smaller, faster, and just plain meaner.

If you thought Intel was playing clock-speed games in 2001, prepare to hang onto your keyboard. With the introduction of the new "A" version of the Pentium 4, Intel is expected to throttle frequencies to—are you ready for this?—3GHz by the end of the year.

Code-named "Northwood," the P4-As will feature the 0.13-micron process that Intel introduced with the P-III Tualatin last year. The more efficient process technology shrinks the size of the CPU die, lets Intel grow more CPUs per wafer, and helps the CPU hit higher speeds, thanks in large part to the use of copper interconnects, which replace the aluminum interconnects of yore.

Externally, the P4-A looks the same because it uses the same integrated heat spreader that Intel uses for its other Socket 478 CPUs (you won't be able to buy a P4-A with a Socket 423 Interface). Inside the core, the most noticeable change is in L2 cache: Intel was able to double the amount of L2 cache from 256KB (found in the original 0.18-micron Willamette Pentium 4) to 512KB. But even with the larger L2, the P4-A is still some 72 square millimeters smaller than earlier P4s.

Intel says there are no other significant changes to the P4 engine itself—no extra floating point units, no pipeline or logic changes, no superchargers or high-flow air miers, nothing. That's because Intel normally lets the "process elves" first shrink the chip, after which the "architecture elves" get down to business. To this end, we expect the Pentium 4 to undergo yet another change by the end of this year, but this is just pure conjecture.

We test-drove a 2.2GHz Pentium 4-A and found the new chip to be a serious screamer compared with the 2GHz Pentium 4. Because our P4-A was locked, we couldn't underclock it for an apples-to-apples comparison between Northwood and Willamette. If you're considering the purchase of a Pentium 4 box, you should definitely wait for the Northwood version. During performance testing, we saw an across-the-board increase in speed. Sure, some of the performance is directly attributable to the 10 percent clock speed increase, but the larger L2 cache also appears to give the new P4 a boost beyond what one would expect from a mere 200MHz. The boost was most evident in SYSmark2001, which gauges the time it takes for a PC to complete multitasked action scripts in 14 popular Windows apps. In this test suite, the 2.2GHz Northwood coughed up a 19 percent increase over the 2GHz Willamette. The extra L2 also paid dividends in low-resolution Quake III, where we recorded a 17 percent frame rate increase with the Northwood.

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GORDON MAHUNG

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DARE TO COMPARE

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>2.0GHz P4</th>
<th>2.2GHz P4-A</th>
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<tr>
<td>SYSmark2001 Overall</td>
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NOTE: Both CPUs were run on the exact same test configuration: Intel 845GMD motherboard (production 5.8B); two 128MB PC2700 Kingston ValueRAM RAMs; 80GB IDE 7200SP; Windows XP Professional, AVG Sunflower heuristic/anti-virus; GeForce 2/64 MB. Donor system was a 4-driver, Intel Application Accelerator.
The NickLock

"Turn your key, Maura. Turn your key!"

While the NickLock's promise of letting you swap hard drives with the flick of a switch sounds alluring, the scheme is actually unreliable and somewhat scary. A simple keyed switch runs to two wires that replace the master/slave jumpers on your hard drives. By turning the key, NickLock supposedly swaps the master/slave relationship on your drives and should let you boot from either drive.

Unfortunately, NickLock doesn't work well with all hard drives, particularly those that don't default to slave when the master jumper is removed. There's also no electronic safety lock that would prevent damage to a drive if the key were turned with the PC on. If you're looking for easier drive separation, check out Romtec's Trios instead (www.romtecusa.com). Nicklock costs $29; go to www.nicklock.com.

First Look

Medal of Honor: Allied Assault

Or... 'Saving Private Ryan: The Videogame'

In case you haven't gotten it yet, blowing up Nazis is fun for the whole family. And unlike some other, um, slightly unrealistic W2W2 games fraught with zombies, Medal of Honor: Allied Assault depicts the events leading up to, and following, the Allied invasion of Normandy. You play as Powell, a U.S. Ranger who's assigned to the North African and European theaters. Missions include everything from destroying a Nazi mustard gas production facility to surviving the D-Day invasion of Omaha Beach. We played a pre-release version of MOH:AA, and it looks great! Excellent AI (for squadmates and enemies alike), a plethora of realistic weapons, and some of the most delicious sniping we've experienced in any game, anywhere. The most surprising thing is that even stealth-oriented levels are fun. Medal of Honor: Allied Assault is expected to ship in January.

Weird Science

The best thing about having a lab all decked out with cool technology isn't that we're able to thoroughly challenge the claims of hardware and software vendors, it's that every so often, when we find ourselves with some downtime, we get to conduct our own experiments. Like that Monday afternoon a couple months ago....

Our objective? To create a being in our own likeness.

It stood to reason that a little salt on a motherboard would sire our computer geek prototype.

Here's your chance to contribute to...

Reader Reviews

In the months ahead, the magazine will feature a new section called "Owner Opinions"—this is your chance to report on the pluses and minuses we missed in our own published reviews. Currently, we're looking for reader reviews of the following products:

- Creative Labs Sound Blaster Audigy
- IBM G65XP hard drive
- PlexWriter 24/10/40
- Falcon Mach V desktop PC
- Celestix Aries Home Server
- ATI Radeon 9500

If you own one of these products and would like to contribute, send an e-mail to owneropinions@maximumpc.com. Name the precise name/model number of your gear and include a descriptive, detailed, 300-word review of your most significant likes and dislikes. Include your real name, because Maximum PC reviewers don't use pseudonyms!
Dell Inspiron 8100
Fastest game in town

One year ago, if you showed up at a LAN party toting just a notebook PC, you would have been laughed off the premises. But that ain't the story anymore. Dell's new Inspiron 8100 takes notebook gaming to a dangerously attractive higher level. Featuring the fastest Intel mobile CPU to date, as well as the fastest mobile graphics chipset available, the latest Inspiron is the speediest gaming notebook we've ever seen. And don't think for a second that the 8100 is some kind of clunky, titanium-shell butterfly you use at the cafe while sipping a no-frill, double-decaf latte with steamed skim milk. No, partner, the 8100 is designed to annoy the person next to you on the plane when you're playing Return to Castle Wolfenstein with the sound turned up.

If you saw Dell's 1GHz Inspiron 8000, you'll recognize the 8100's body, but with two new core subsystems. Way back in mid-2000, the 8000 was a hot job with its 1GHz Coppermine Pentium III and 32MB GeForce2 Go 3D chipset from nVidia. The 8100, however, trumps its predecessor with a 1.2GHz Tualatin Pentium III-M. This particular P-III doubles the previous CPU's L2 cache to 512KB, adds a data prefetch logic unit, and employs a 0.13-micron process instead of the less efficient 0.18-micron process.

But the eyebrow-lifting feature of the Inspiron 8100 isn't its 1.2GHz CPU, but rather ATI's new Mobility Radeon 7500 with 64MB of DDR RAM. Issues of "cooked drivers" aside (see our January issue for the skinny on ATI's driver shenanigans), the Mobility Radeon 7500 stands as the fastest graphics chip available at press time— at least until nVidia answers with its upcoming NV17M chipset.

In Quake III, the 1.2GHz P-III-M /Mobility Radeon 7500 combo was nearly twice as fast as the previous-generation 1.13GHz P-III-M/Mobility Radeon that powered the HP 6100 we reviewed in October 2001. And compared with the Inspiron 8000 we reviewed in June, the Mobility Radeon 7500 is about one-third faster in Quake III.

Dell didn't just stop at upgraded graphics and CPU power, however. Our 8100 came with a combo drive that burns at 8x, and just as we went to press, Dell made a 16x burner available! Dell also ups the hard drive to 60GB, although our unit came with a 48GB drive. (Dell is dropping the 48GB for a 40GB option.) By using a combo drive, Dell was able to configure our unit with two batteries. With two cells, the 8100 actually let us watch all of Oliver Stone's JFK with 6 percent of the battery charge left over. That's something no other notebook has ever done before!

But not all was perfect. We did have a small problem with the charging system, which forced us to use another notebook to charge the cells for our DVD test. Dell says the problem was unique to our test unit, but rest assured, we'll be monitoring the situation carefully (please let us know if you experience similar problems). We also would have liked it if Dell enabled the built-in WiFi capabilities of the notebook.

We give Dell big props for even considering—let alone making—such a beast of a notebook. With the fastest CPU and graphics available, a fat hard drive, built-in Firewire, great audio, an 8x combo drive, and a 160x1200 screen, the 8100 is overwhelming. Say what you will about the largest PC maker on the planet, but its notebook team is committed to pure PC power.

—GORDON MAHUNG

MAXIMUMPC VERDICT

Dell Inspiron 8100

+ SEE'S KNEES
A 1.2GHz P-III and Mobility Radeon 7500 make this notebook the fastest game in town.

+ ITchy Like Fleas
With its weight and bulk, this Dell would get the nickname "Tiny."

Dell Inspiron 8100

$2,925 (w/ 40GB hard drive)
Devastator 9908 Arcade Controller

MAME lovers, your time has come!

ever miss the carefree days you spent as a youth, holed up in dark and smoky arcades, playing classics like Pac-Man, DigDug, and 1942? Allow us to introduce you to the Multiple Arcade Machine Emulator (MAME). The mission of MAME developers is simple—to propagate a single hardware emulator that works with every arcade game ever made.

Here's how MAME works:
You install the MAME software on your PC, then load the “ROM” of whichever arcade classic you’re itching to play (the ROM is the game’s raw programming code pulled directly from the arcade machine’s circuit board). MAME then uses your PC’s hardware to literally emulate the hardware characteristics of the arcade machine, then runs the ROM on that virtual platform. The result is old-school gaming in the privacy of your home. Of course, it’s legal to play these games only if you also own the physical arcade machines or have purchased the ROM from a legal source (uh, like we did), but the MAME software itself is 100 percent legal.

All of this leads us to the Devastator, a custom-built arcade controller designed specifically for MAME addicts who are sick of struggling with mere PC keyboards. The Devastator includes two arcade-quality four-way joystick, with authentic four-button arcade controls on either side of each stick. But the fun doesn’t end there. Smack dab in the middle, you’ll find a trackball and spinner, which are exactly what you’ll need to get the most out of your Tempest and Centipede ROMs. The complement of controls is rounded out by a one-player button, a two-player button, and two coin buttons.

We’re happy to report that the various sticks and buttons have withstood countless hours of “testing”—along with the staffs of NextGen and PC Gamer, we’ve abused the Devastator to high hell, banging the thing as if it were owned by a callous exploiter of youth and not a product on loan from a humble entrepreneur named Jim Krysch. With a little tweaking, the trackball works great in Centipede, Millipede, and Missile Command. Our only real gripe is with the spinner, which gets the job done, sure, but just doesn’t have that authentic arcade feel. It’s simply too grippy—too heavy for the wild, fast spinning we expect to find while playing Tempest or Arkanoid. We think the spinner should be a little less resistant around the axis and a little heavier around the edges to allow it to spin for two or three rotations on one twist. Nonetheless, the spinner is certainly functional, especially after tweaking MAME settings for speed and sensitivity in each game.

The real problem with our Devastator review unit is its odd button layout. While we appreciate the ambidextrous setup, we’d much rather see a single six-button layout next to each stick so we could play Mortal Kombat and Street Fighter II: Championship Edition as they were intended to be played. In the configuration we received, the Devastator is useful only for games that require four buttons or fewer. Luckily, if you don’t mind spending a few more bucks, the folks at Tomycon will be more than happy to substitute different joysticks, or even button layouts.

If you’re a full-time arcade gaming freak, the Devastator will change your life. Thanks to MAME and the Devastator, your favorite games from the early years of videogaming can be played again—almost exactly as you remember them.

—WILL SMITH

Devastator 9908
TREYONICS

**VERDICT**

The Devastator we reviewed is perfect for almost any arcade game made before 1990.

**TURN-ONS**
The Devastator does a great job of emulating most arcade games. It is also very well made and durable.

**TURN-OFFS**
The Devastator is not as good as the original arcade version of the game.

**www.tomtum.com**

$450
HP dvd100i CD/DVD Burner

When Pioneer introduced its DVR-A03 DVD burner (reviewed in July 2001) under the DVD-RW standard, manufacturers behind the competing DVD+RW standard began to turn up the volume on their own format. "It's all about compatibility," they said, suggesting that their "any day now" +RW drives were going to deliver better compatibility with DVD-ROM drives and set-top players. We were certain the +RW folks were gearing up to crush the competition with faster speeds, better software, and greater compatibility. But now that we've received our first +RW drive—HP's dvd100i CD/DVD burner—we're beginning to wonder if the +RW developers were simply delaying their roll-out in order to deliver a product that worked at all.

Now, HP did indeed deliver on one of the big promises of +RW—sheer speed. The dvd100i beat -RW drives with consistently faster rewriting speeds and transfer rates across all CD and DVD burning times. Specifically, the HP drive, rated at 2.4x for rewritable DVDs, wrote 4.25GB of data to its disc in 31 minutes. This is almost exactly twice as fast as the 1X Pioneer DVR-A03, which took 57:26 minutes to write the same data to its rewritable media. Still, in write-once/DVD-R mode, the Pioneer -RW drive can write the same amount of data in 29 minutes and with much greater compatibility than even -RW or +RW. (The higher reflectivity of rewritable media causes many DVD-ROM drives and set-top players to think the disc is dual-layer—which it is not—resulting in less compatibility.) The DVD+RW camp is proposing a write-once "DVD+R" format, but no promises have been made, and even if there were, we wouldn't bet our Lab on it.

All of the HP drive's bundled applications installed with minimal intervention, and a booklet included with the drive explains simple recording procedures. The bundled MyDVD 3.0 authoring software is a vast improvement over the 2.3 version. In fact, its streamlined interface makes it seem like a different program. But for some reason, the developers took away the freedom to place buttons wherever you want them, as you could in 2.3. So all your DVDs come out looking factory-issued.

The dvd100i is a competent drive, and six months ago we would have been all over it. There's no question that it's faster than Pioneer's A03, and its CAV reading (but not writing) of random access for data discs is much more efficient than the A03's CLV method. But is anyone really buying DVD+RW just for data backup purposes? It would be cheaper to buy another hard drive or two, or hire an assistant.

The problem is, we can't think of any reason to stick with this standard, which provides too little, too late. DVD authoring and sharing is the reason you'll shell out $600 for a DVD burner, and if you want to share your discs, we can't recommend the dvd100i when there's a superior drive already available for the same price. Even Sony—one of DVD+RW's founding members—chose to put Pioneer's DVD+RW in its own line of VAIO computers! But hey, as we were once told by a few wise people, "It's all about compatibility."

For more information on competing formats for recordable DVDs, see Beyond the X-Rating in our September 2001 issue.

LOGAN DECKER

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DARE TO COMPARE

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<th>dvd100i (+RW)</th>
<th>Pioneer A03 (-RW)</th>
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<tr>
<td>Toshiba MD-1582 (-DVD-ROM)</td>
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<td>NEC DV5000A (-DVD-ROM)</td>
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<td>RCA Rev X502 (-set-top)</td>
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<td>Sony RMSS300 (-set-top)</td>
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DVD+RW promised higher compatibility with set-top players, but the chart above seems to suggest this was a big fat lie.

THE BENCHMARKS

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<td>Average data transfer</td>
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<td>3.63MB/sec</td>
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<td>Random/10k-seek time (ms)</td>
<td>152/256</td>
<td>109/291</td>
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<td>Audio extraction (min/sec)</td>
<td>6:31</td>
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<td>Data burn (min/sec)</td>
<td>3:18</td>
<td>7:52</td>
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<tr>
<td>CPU utilization</td>
<td>20% (2x)</td>
<td>51% (8x)</td>
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NOTE: The data CD burn benchmark uses the bundled applications to create a 64MB CD. The data DVD burn benchmark uses the bundled applications to create a 4.25GB DVD. For more information on how we benchmark optical drives, go to the MagReprints section of MaximumPC.com.
Bantam BA350 MP3 Player
Wee player, monster bargain

If you were to step on one of those bite-size candy bars popular during Halloween, you'd end up with something about the size and shape of Bantam's BA350 MP3 player. Weighing in at a mere 2.25 ounces, the BA350 packs in more features than most larger and more expensive players, beginning with a generous 128MB of internal memory (and an MMC card slot for expansion), as well as a built-in lithium-ion battery that recharges whenever the unit is connected to your USB port—even when you're downloading songs.

The controls are so simple and accessible that even a drunk could manage them. Two buttons at the top control the play/pause functions and activate the menu options, and the slightly elevated directional pad at the bottom of the player lets you navigate the menus, switch tracks, scan, and adjust the volume. Although the accompanying software looks like it was built with a Windows 3.1 development kit, using it is still a snap. Drag and drop tracks onto the right-hand pane and they are automatically queued for upload.

We didn't have any qualms with the BA350's sound quality, but there were annoying pops and clicks between tracks, and the maximum volume could stand a little more headroom. There are just five preset EQ settings with no option for customization, and most of the presets are too heavy-handed to be useful. There's also no protective cover for the MMC slot—not good.

Despite a few first-generation nicks, the BA350 is an awesome combination of great design, large capacity, and reasonable price.

SUNNY SIDE UP: It's tiny, sounds great, and is easily controlled even when it's in our pockets.

BURNED TOAST: The BA350 comes with a generous set of accessories, but we wouldn't have received the (optional) AC adapter to charge the unit with—

MAXIMUM PC VERDICT: 9

$230, Bantam Interactive, www.bantamusa.com, 314.802.0132

Be careful with Bantam's BA350—this miniscule MP3 player is easily swallowed.

out connecting to a USB port.

—LOGAN DECKER

OCZ Titan Series
Titan 3 GeForce 3
OCZ Octane Series
Octane 600Ti
Octane 240Ti

www.ocztech.com
Pen Scanner Scuttlebutt
When is a cigar really not a cigar?

Despite their decidedly phallic shape, there's no reason why anyone should be embarrassed to use one of these electronic gizmos in public. Pen scanners are indeed clever little gadgets designed to capture text and transmit it to your computer. In theory, you should be able to take them anywhere to grab text on the fly.

WIZCOM QUICKLINK PEN
The QuickLink's performance was less than sublime: It scanned a National Enquirer at no better than 50 percent accuracy (think mangled letters and words), and it failed entirely to scan a transparency. The good news is that the pen offers all sorts of extras, such as the ability to collect Internet addresses and download them to the appropriate software. Sure enough, it lifted a URL off a business card and popped it into our browser as easily as popping a Counter-Strike camper with a Glock. It also scanned our copy of PC Gamer beautifully, capturing every irreverent word.

The QuickLink is rated to hold 1,000 pages of text, ships with a carrying case and serial cable, and has an LCD that can display three lines of text at roughly six words per line. It also has a built-in address book and can provide literal translations for eight languages. The unit can scan six- to 22-point text in a variety of fonts and color combinations, as long as none of them are red/white or blue/black (red interferes with all pen scanners' red scanning light, and this unit needs high contrast to distinguish characters). Some will argue that mangling the Enquirer's text is an improvement, but we require better than 50 percent accuracy from any scanning project.

C TECHNOLOGIES C-PEN 800C
Not only can the 800C display up to seven lines of text, it also has the ability to beam scanned information to a PC and the option to use the pen as a writing implement—just write letters on any surface and they appear in the pen's screen! To test this baby, we dragged out a Victoria's Secret catalogue. Scanning the text was faultless. Scanning the visuals was fruitless. Beaming the text was flawless. And the note we wrote to ourselves regarding Jon's lingerie preferences worked just fine.

Transparency scanning was nearly perfect, but while the movie review section of our local newspaper scanned reasonably well, the pen was incapable of correcting cruel blasphemy about our hero, Jar Jar Binks. Extra features include a dictionary (to immediately learn the meanings of scanned words), translation functionality, and the ability to beam scanned business card information. Although the C-Pen can scan up to 22-point text in a variety of fonts and colors, it taw was baffled by red/white and blue/black combinations.

IRIS IRISPen II EXECUTIVE
There's a scanner, but no case. There's Windows and MacOS software, but no batteries. There's a well-written manual, but it includes crappily black-and-white pictures. What gives?

The really bad news is that because this scanner must be connected to a USB port to work, it's not even portable. The really good news is that because your computer is doing all the OCR processing, the IRISPen II is significantly faster and more accurate than the other scanners in this roundup. Excited by its single, programmable button and features ranging from text-to-speech functionality to the ability to scan small pictures, we eagerly reached for reading material—only to discover we had exhausted our meager supply with the other pens. Never fear. We bravely visited a neighbor, borrowed Maxim, the Toronto Sun, and even a transparency, learned that 3:00 a.m. is not an ideal time for a visit, and scanned all three—as well as the logo off a business card—perfectly.

ERIK SEBELLIN & S.J. ROSS

MAXIMUMPC VERDICT
QUICKLINK WIZCOM

+ QUICKLINK WIZCOM
- Tons of extras.
- BUNK
- Worst scanning accuracy of the bunch.
- 988.777.0552
- www.wizcomtech.com

$170

MAXIMUMPC VERDICT
C-Pen 800C

+ BUENO
- Can be used as an actual writing implement.
- Scanning quality was excellent.
- 770.680.2570
- www.cpen.com

$180

MAXIMUMPC VERDICT
IRISPen II Executive

+ LIKEY-LIKELY
- Superfast and wonderfully adopt.
- 800-900
- Not portable—requires a constant PC connection.
- 561.395.7831
- www.irispen.com

$130

68 MAXIMUMPC FEBRUARY 2002
CD Labeler Looksee
Not all CD label applications are created equal

Most power users rely on Nero 5 for CD burning duties, then print out a label created in the program, and probably never even consider that their experience could be improved. Well, answer this: Are you totally satisfied with your CD labels’ appearance? After all, Nero offers just a rudimentary array of design options, and lacks CD labeling apparatus. That’s right, there are instruments expressly made for the easy, smooth application of CD labels. We review two of them here.

SURETHING CD LABELER, DELUXE
Both of the labelers we tested come with a supply of labels and label-designing software that includes templates, clipart, and the ability to import graphics in a variety of formats. Of the two, the SureThing package is more versatile. A comprehensive user’s guide and intuitive button layout make it easy to navigate the app’s many features. The SureThing program includes more than a 1,000 different backgrounds, 16 different design templates, and seven font options within each template. Handy preview and browse capabilities make the vast number of options manageable.

The kit includes 22 standard and full-faced CD labels, four jewel case inserts, four mini-CD labels, and 26 CD hub labels (for the hub-labeling inclined).

The applicator is simple enough. In fact, “applicator” seems almost too technical a word for the flat, oval-shaped, plastic doodad that serves as such. Peel your fingers to press your CD onto the label. While it’s a more precise method than applying a label freehand, not all our applications were flawless. Depending on how flat the label lies, and how evenly you apply pressure with your fingers, you may still end up with wrinkles.

AVERY AFTERBURNER
The Afterburner software offers 10 templated designs, and for each template, you have the choice of two Layout Font options. Put another way, AB loads approximately 28MB of clipart, backgrounds, and templates onto your PC compared with the 540MB that come with SureThing.

There’s scant documentation to help you get started. A bundled tri-fold brochure serves as a compendium of the software’s features and installation process. There’s also online help available. That’s important to remember, as little of the program is intuitive.

The Afterburner labeling system includes six jewel case inserts and 20 white matte Avery CD/DVD labels, all of which are full-faced (that is, they cover all of a CD’s surface except the hole). The Avery matte labels were capable of better inking than the matte labels that come with the SureThing. A good thing, because with the Afterburner applicator, you’re confined to using Avery brand labels, which bear uniquely perforated tabs. The tabs prove handy because you never need touch the labels’ sticky side during application. Don’t even think about trying non-tabbed labels with the AB, because the small protruding posts on the applicator that hold the tabs in place are the only things preventing the label from curling up and becoming unmanageable.

The Afterburner applicator looks more serious than the SureThing. Your newly printed label is placed sticky-side-up on a foam disc at the center of the applicator. With the CD on top of the label, you simply push the arched contraction flat using a knob that sticks up through the disc’s center; this evenly affixes the label to the CD. Pop off the disc, tear away the perforated tabs, and admire a perfectly smooth and centered label. Every time.

Besides the disparity in their templated designs, the programs that come with both of these applicators are comparable, and both unfortunately lack Nero’s useful ability to create a track list from the file names on your disc. But when it comes to the labeling apparatus, there’s one obvious winner—the Afterburner. And truth be told, you can use Nero and the Afterburner applicator together simply by selecting an Avery brand label from the Nero Paper Stocks option.

—KATHERINE STEVENSON

If you’re not satisfied with the SureThing as an applicator, try using it as a durable, if small, serving tray.
Intruder Alert!

Two devices that use your body to lock down your PC

If you're unwilling to wipe those illegal warez off your hard drive, you may as well protect your PC from the prying eyes of your spouse, children, or parents. We review two “biometric” security devices that promise to secure your illicit rig.

U.ARE.U PERSONAL

There's a reason why no one uses passwords to secure his or her PC—they're a pain to remember and accurately type in. Enter the U.are.U Personal fingerprint recognition system, which takes all the hassle out of PC security. Via a simple USB connection, the U.are.U Personal associates your unique epidermal ridges with a user account.

This Windows XP-only device lets you quickly switch access among users by simply pressing a finger to the scanner. In our testing, the recognition was downright amazing, even when our fingers weren't hitting the sensor straight on. The Windows XP software bundle lets you associate your fingerprint with specific applications so that only you can access them. You can also associate your fingerprint with web accounts, so instead of typing a password to access, say, your Yahoo mail account, you can just scan your finger and the U.are.U application will enter your password for you. The software will also let you encrypt files.

The U.are.U Personal is amazingly accurate and offers reliable security, but only with Windows XP.

Face Lock's Achilles' heel is Windows 98's inherent inability to keep its files secure.

If your computer's data were really valuable and unavailable any other way, a criminal might be compelled to cut off your fingers or force you to unlock your PC at gunpoint in order to gain access. The company says future versions of the scanner may check to see if the finger is attached to a living person before unlocking the PC. Seriously.

In a day and age when most PC biometrics are just fluff and gimmicks, the U.are.U Personal delivers the goods—and it delivers it all for a damn good price.

FACE LOCK

Pick up the box for Data Becker's Face Lock and you'll think it's just another cheesy program that should be sold by spam mail with the header "Incredible deal!!" However, Face Lock is a surprisingly powerful program for just $29. The name says it all: Associate your face and voice with your specific user account, and the software will prohibit all other beings from using your PC. (Please note that you have to provide the webcam and microphone necessary for the face and voice recognition).

During testing, Face Lock managed to keep all unauthorized editors from logging into a Windows ME machine. We even tried to fake out Face Lock by changing the sound of our voices and by using one editor's image and another's voice to spoof it, but Face Lock performed its sentry duties properly every time; it could even tell when we took off our glasses. Unfortunately, the entire program is about as secure as a lock on a glass door. Why? Because Face Lock works only under the Windows 9X core, which has virtually no security (you can circumvent its security with a simple boot disk). The lack of Windows 2000 and XP support makes Face Lock worthless for securing a PC from all but 5-year-olds and senior citizens.

—GORDON MAH UNG

MAXIMUMPC VERDICT

U.ARE.U

DIGITAL PERSONA

AWESOME

It works exactly as promised—and what's promised is cool, inexpensive, and necessary.

AWFUL

Shouldn't this thing wipe out typed passwords entirely?

877.378.2738 www.digitalpersona.com

$69

FACE LOCK

DATA BECKER

LAUDABLE

The utility has an uncanny ability to properly recognize faces and voices and keep intruders at bay.

LAUDABLE

Ugh, the Win95/98 SEs are intrinsically insecure—and Face Lock doesn't offer Win2000/XP support.

781.453.2348 www.databecker.com

$29
Derive 5
For people who think vector calculus is a self-indulgent, lazy-day diversion.

There's nothing really "freaky" about Derive 5. Oh no, it's a perfectly sensible program—if you're one of those wacky savants who abhors long division and therefore resorts to converting all difficult math problems into logarithms inside your head, instead. If you're that kind of proto-geek, then you'll find Derive 5 to be an excellent ally in advanced computations. Consider it a calculator cubed. Or as the Texas Instruments web site succinctly puts it, "It does for algebra, equations, trigonometry, vectors, matrices and calculus what the scientific calculator does for numbers."

The software provides the results of numeric operations to thousands of digits of precision—or rounded-off, if that's your preference. And not only does it apply the rules of advanced mathematics to problem-solving, it also furnishes a large library of utility files for abstruse mathematical tasks (such as computing elliptical integrals and solving first and second order ordinary differential equations). Simply click on an equation to highlight it, then copy and paste it in Derive's entry line, in a dialog box, or in the 2D or 3D plot windows.

Speaking of 3D plot windows, we were impressed by Derive 5's ability to create, store, rotate, and zoom a variety of shaded and patterned 3D surfaces in realtime, using either parametrically defined functions or sets of data points. It was easy to find point coordinates with movable cross lines, and by using the Insert tool, we were able to quickly annotate surfaces with descriptive text and OLE objects.

Images, text, and entire files can be exported in a variety of formats for use with other documents. In fact, the ability to create and save Derive 5 worksheets makes the application a strong asset in tracking computations. We found it quite rewarding to build computations within the program, then paste them as needed into other, non-mathematical documenting tools such as Word and Excel—mainly because Derive provides a host of math symbols and Greek letters on a pair of dockable toolbars. In Word, you have to go through a tedious series of submenus to find the symbols you need, and even then, equations are difficult to properly format as part of continuous text. But importing the equations as graphical files into Word was a snap.

The Derive interface is simple to work with. Moving the mouse over a button on the button bar brings up a brief sentence describing the button function. There's extensive help available by pressing F1, with plenty of hotlinked entries, including explanations for the hundreds of functions, as well as examples within the utility files. Unfortunately, there's no context-sensitive help, which means if you have a question relating to, say, Padé rational approximations (and, really, who doesn't?), you can't just click on a portion of the appropriate utility file, hit F1, and expect to see your answer.

Very occasionally, the otherwise excellent manual doesn't reflect the content of the software in its current state. For instance, page 55 of the tutorial introductory chapter refers to using the File-Open command and accessing chapter02.dtw. This file is not included with Derive, nor is it up at Texas Instruments' Derive web site. While this is a minor blot on a document of 260-plus pages, and doesn't justify a new printing, a simple errata sheet to clarify the text could have been enclosed with our boxed copy (and wouldn't you expect as much fastidiousness from a math software developer?). Regardless, Derive 5 is an extremely powerful, easy-to-use tool for professionals, educators, and students in math-related fields. It's well-supported both by Texas Instruments and through third-party supplemental books. A complete list is available at http://education.ti.com/global/otherHow.html/F14.

—BARRY BRENSER

MAXIMUMPC VERDICT

Derive
TEXAS INSTRUMENTS

GOOD DAY SUNSHINE
Extremely powerful and easy to use—assuming you understand "math" in the first place.

MEAN MISTER MUSTARD
No context-sensitive help, plus the manual's a bit inconsistent with the software.

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FEBRUARY 2002
MATERIAL
Illustrator 10

Adobe obviously knows how to make a great graphics app—but is it out of new ideas?

If you’re a professional artist who uses a computer for your work, you absolutely must have some version of Illustrator. The real question at this point is, is version 10 worth the upgrade? The answer depends on what you do with the program.

If you’re a commercial artist who needs to create and update multiple versions of the same graphic, Illustrator 10 is a godsend. The new Data-Driven Graphics feature allows designers to designate variable fields that can later draw from a shared database. This allows a group of designers to generate regional variations of a single ad layout, or product-specific versions of a promo, or really any kind of design document that demands small variations or continual content updates to a common layout. Variables can include either text strings or images, and a Visibility option even allows you to hide certain elements in specific designs.

Adobe obviously tried hard to make the Data-Driven Graphics process as painless as possible, but complete control can be a chore. While objects can be added to the database via drag-and-drop, that method isn’t always efficient, especially when you’re dealing with larger databases. The other option is to create the database in XML (its native format), but this will likely require a programmer for larger projects. The scant six pages dedicated to the topic in the 400-plus page manual provides nowhere near enough info to truly tap the power of this promising new feature.

Adobe says its latest additions make Illustrator 10 the quintessential tool for web designers—but don’t delete Macromedia Fireworks just yet. The latest version of Illustrator adds sophisticated new slicing options for dealing with large web graphics. Slices are even recalculated after you make changes to your work. Nice. The Symbols palette, meanwhile, is supposed to help keep file sizes under control by scaling recurring elements instead of recreating them in each instance. Both of these features work conceptually, but there’s an underlying problem in the essential fact that Illustrator is a vector-based app trying to make do on a raster-based web. Before your art can be added to the standard web page, you still need to rasterize it into an HTML-kosher format such as JPEG or GIF. On the plus side, Adobe has extended Illustrator 10 to allow the export of SWF Flash animations from directly within the program. And perhaps Illustrator 10’s most useful new feature is its least heralded: The ability to selectively set anti-aliasing for type. Once you see how clear smaller point sizes reproduce when rasterized without anti-aliasing, you’ll wonder why all applications don’t offer this option.

Rounding out the changes is a handful of new tools for distorting simple elements. Enveloping, Warping, and Liquifying allow you to bend your images, but, as you’ll find with all canned effects, the threat of “cliché abuse” is high. Another quiet change that’s actually very useful is the refined Pathfinder palette, which makes combining elements much easier. It’s an excellent feature that just got better.

Unless you’re the rare designer who honestly needs one of the specific tools mentioned above, you’re better off spending the $150 upgrade fee on plug-ins such as Elysium’s 3D Tiger or any of Virtual Mirror’s offerings. So, if we were simply grading this version as a pure upgrade product, we’d give it a 6 verdict. But if you don’t already own Illustrator—or haven’t upgraded since revolutionary features like Brushes and Mesh fills were added—you should take the plunge. As a stand-alone-alone product, version 10 deserves a Perfect 10 verdict.

Whaddya say we compromise, give the application the benefit of the doubt, and award this update a very solid 9?

—BRAD DOSLAND

Vector vs. Raster

Even some experienced computer artists still don’t get the distinction between vector-based apps such as Illustrator and raster-based apps such as Adobe’s other stalwart, Photoshop. Here’s the deal:

A vector-based graphic is made up of mathematically defined curves and designated fills. The shape, fill, stroke, and other properties of the graphic can be manually edited at any point. The fundamental component in any vector-based graphic is the Bezier curve, a line segment defined by handles extruded from the segment’s two defining points. Because the graphic is strictly preserved as an aggregate of numerical formulas, the graphic (or any of its individual elements) can be scaled up or down with no loss in image accuracy.

A rasterized image is vastly different. This variety of graphic is made up of a fixed grid of colored squares (that is, pixels). The higher the image resolution, the more pixels that constitute the picture. A raster image can contain more subtle gradients and textures, such as those found in a photographic image, and the tools for editing a raster image tend to be much more intuitive than the tools used to tweak the handles of an elastic line segment. But a raster image can sometimes be more difficult to manage because individual elements aren’t preserved (unless saved with layering data) and scaling degrades image quality.
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Return to Castle Wolfenstein
Mix one part Nazi, one part stealth, one part mayhem. Stir and enjoy!

You'd be hard-pressed to find a more satisfying moment in single-player gaming: You've already taken out a rat's nest of Nazi goons, but now you have to make it across a few hundred yards of Jerry-infested wilderness—in broad daylight, without being detected. Killing the bastard in the watchtower is your most logical objective; if you can get him, the rest of your mission should be cake. So you flank him on the right, and keep to the trees. Finally, you reach the watchtower. Undetected but smack dab in the middle of a matrix of German guards, you begin climbing up the ladder, quiet as a church mouse. You reach the top. You aim your silenced gun. You hold your breath. You pull. Ffft-fft-fft.

And he's dead! Victory! Well, at least for now. None of the sauerbraten saw your brazen assassination, but you still have to find the experimental sniper rifle with the aluminum bullets and steal your way to the next checkpoint.

Rejoice, fans of first-person adventuring, for RTCW is a deep, rich, and intensely satisfying romp through the banality of evil. Gameplay is standard single-player fare: You're a covert operative—B.J. Blazkowicz, Nazi party hater extraordinaire—and you earn your keep by assassinating bad guys, stealing bad guys' code books, and blowing up bad guys' toys in a preposterous mixture of wartime, supernatural, and quasi-sci-fi levels.

While the general gameplay language of RTCW is nothing revolutionary, the game's overall level design, weapons assortment, AI, modeling, animation, and texturing are nearly beyond reproach. Beautifully detailed outdoor levels—replete with plenty of sniping perches and curious buildings to explore—do a remarkable job of communicating scale. Indeed, when you hit the Bramburg Dam, you feel like you're about to single-handedly wrestle control of a major municipal utility. To accomplish such a feat, you're armed with what must be about 400 pounds of weapons and ordnance. We particularly liked the German paratrooper rifle, which can be picked up from fallen Jerrys. With both semi-automatic action and a sniping scope, it's the perfect companion for cleaning out interior levels where different types of enemies attack you from both near and afar.

One of your most formidable foes is the cat-suited-clad Elite Guard—a red-hot Gestapoatrix who likes to teach little American boys a lesson with the barrel of her silenced Sten machine gun. The Elite Guard's supermodel looks are eclipsed only by her frustrating ability to dodge your fire with cartwheels and similarly flamboyant acrobatics. Like all the characters in RTCW, the Elite Guard are brought to life with state-of-the-art skeletal animation and AI. Enemies can run for cover, change their strategy based on what weapon you're carrying, and sound alarms when they notice dead bodies. But nothing's more annoying than tossing a potato masher at a Jerry, then getting blown to bits when he tosses it back at you.

While your missions are almost entirely linear, they're certainly varied in structure—RTCW offers far more opportunities for stealth wet work than the typical first-person shooter. And when you're not in a level where secrecy is key, you can still make your own decisions about how to, say, take out a 10-man hit squad. Mow them down with a 500-round clip of your Venom gun, or pick them off one by one with your scoped Mauser rifle. It's really your decision.

RTCW is certainly no Half-Life in the purity-of-vision department (c'mon—since when did the Nazis invest in supernatural and cyborg research?), and its zombie levels are just plain un-fun (when these goths fire their "phantom skulls" at you, your entire vision goes black, and you can't fire back—sort of like the old street-fighting trick where your opponent pulls your jacket over your head, then beats the crap out of you). But with hours of diverse single-player action, and bullet-proof team-oriented multiplayer, it's extremely satisfying experience overall.

—Jon Phillips
Let the Games Begin!

Action by air, by sea, by horseback, or by the numbers

Comanche 4

The latest Comanche romp is far more arcade-like than all previous versions of the attack helicopter fest. You get six single-player campaigns, good for 30 individual missions. They’re mostly of the “bad guys have taken over X, and you have to kill them” variety, and your fully loaded chopper is more than up to the task. Your arsenal includes a nose-mounted cannon, direct-fire, unguided Hydra rockets, air-to-air Stingers, and air-to-ground Hellfire missiles. The bad guys come on foot, on snowmobiles, in armed ground vehicles, and in enemy choppers, and all seem eager to get in front of your guns. The flight model is loose and easy to pick up, and there are three views to choose from, along with a “freetrack” mode. The enemy AI is primitive and tends to rely on the force of numbers rather than cleverness. The game did have issues with Win2000—taking a frame rate hit in places—but you’re warned of this during install.

OH, HELL YES! Explosion graphics and sounds are well done.

HEAVY SIGH: Playing under Win2000 puts the “chop” in chopper. Trees don’t explode when hit. The copter’s size is indiscernible in first-person mode.

—BILL MCCLENDON

MAXIMUM PC VERDICT: 7 $40, Novelogic, www.novalogic.com, 877.405.9647

Dark Age of Camelot

The latest entrant to the “massively multiplayer online role-playing game” scene is Dark Age of Camelot. Like other MMORPGs, DAOC is a persistent world, filled with thousands of other players. But what sets DAOC apart is a very advanced player-vs.-player (PVP) combat system—DAOC lets you fight other players for control of the realm instead of banning PVP combat entirely or allowing players to fight willy-nilly. The DAOC universe is divided into three different realms and each is populated with different classes of players. As with most MMORPGs, the fun starts once your character matures, and the high-end game consists mostly of inter-realm PVP battles for realm artifacts. These artifacts give stat bonuses to everyone within a realm and must be defended from attacks by the other realms. There are still some niggling balance issues with realm-vs.-realm combat, and we find the basic user interface a bit confusing.

BOO-YAA: Finally—compelling reasons to kill your fellow gamers.

BLAH: The DAOC launch didn’t suffer the traditional MMORPG “server issues,” but we think realm balance and UI should have been refined first.

—WILL SMITH

MAXIMUM PC VERDICT: 8 $40, www.darkageofcamelot.com, 703.934.0189

Silent Hunter II

In Silent Hunter II, you control a German U-boat in many different mission types, ranging from the relatively easy search and destruction of an Allied convoy to damn-near-impossible carrier attack missions, complete with Allied tin cans that ruthlessly seek you out. The level of realism is fully adjustable, from an almost arcade-like simple mode to a mode that lets you control every aspect of your sub’s activity. We were especially impressed with the level of detail found in the torpedo control—everything is configurable, including running speed, distance to arm, and the direction of the torp’s turn. Via a future patch, you’ll be able to go head-to-head against a friend who’s playing Destroyer Command, an Allied destroyer sim. SHII’s weakness is wimpy graphics. Even at the full detail setting, you won’t be able to stress your GeForce3 card.

GUT: Terrorize the civilian shipping lanes of the Atlantic, with as much or as little detail as you like.

BEDEAUERLICH: Weak graphics, and no multiplayer out of the box.

—WILL SMITH

MAXIMUM PC VERDICT: 8 $40, Ubisoft, www.silenthunterii.com, 415.547.4000

Codename: Outbreak

The plot from the new futuristic shooter Codename: Outbreak is a rip-off of every bad sci-fi movie ever made. This could be forgiven if the game wasn’t such a pale wannabe of a tactical FPS. You’re given freedom to vary gameplay—such as control over teammates and weapons and whether you want to enact a day or night strike—but none of this works very well. Your teammates’ AI is so bad, the poor bastards usually can’t even negotiate turns. The game’s weapons are indistinguishable at times, which makes some sense considering there’s a single polygonal model shared by all the weapons! Although some aspects of the graphics are well-implemented—we like all the models that describe the environments—character models are excessively blocky, and the game suffers serious clipping issues. Some elements of Codename: Outbreak show promise, but the game simply doesn’t offer rewarding gameplay.

BRAVO: General level design is creative, and the game costs just $20.

BLECH: The AI sucks, the story is cliché, the graphics are uneven, and the gameplay is filled with boring puzzles and unsatisfying missions.

—JOHN TUMMINARO

MAXIMUM PC VERDICT: 4 $20, www.venom3d.com
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<th>Type</th>
<th>Model</th>
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<tbody>
<tr>
<td>128MB 800Mhz</td>
<td>$47.00</td>
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<td>256MB 800Mhz</td>
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### DDR

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<tr>
<td>128MB PC 2100</td>
<td>$31.00</td>
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<td>256MB PC 2100</td>
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<tr>
<td>512MB PC 2100</td>
<td>$134.00</td>
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### VIDEO CARDS

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<tr>
<th>Type</th>
<th>Model</th>
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<tbody>
<tr>
<td>EVGA</td>
<td>E-VANTA 8MB AGP</td>
<td>$26.00</td>
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<td></td>
<td>TNT M64 32MB AGP</td>
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### HARD DRIVES

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<tbody>
<tr>
<td>MAXTOR</td>
<td>20GB 8/6540002mb</td>
<td>$76.00</td>
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<td></td>
<td>20GB 100/720002mb</td>
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<td>30GB 100/720002mb</td>
<td>$94.00</td>
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<td></td>
<td>40GB 100/720002mb</td>
<td>$98.00</td>
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### MOTHERBOARDS

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<thead>
<tr>
<th>Type</th>
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<tbody>
<tr>
<td>SOYO</td>
<td>K7V DRAGON+</td>
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<td></td>
<td>K7ADA</td>
<td>$92.00</td>
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<td></td>
<td>TVBA 133U</td>
<td>$76.00</td>
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### INTEL

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Price</th>
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<tr>
<td>PENTIUM 4</td>
<td>2.0GHz Retail Box</td>
<td>$479.00</td>
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<td></td>
<td>1.6GHz Retail Box</td>
<td>$239.00</td>
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<td></td>
<td>1.7GHz Retail Box</td>
<td>$189.00</td>
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<tr>
<td>PENTIUM III FLIP CHIP</td>
<td>1.1GHz</td>
<td>$167.00</td>
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<tr>
<td></td>
<td>1.3GHz</td>
<td>$134.00</td>
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<tr>
<td></td>
<td>1.5GHz</td>
<td>$134.00</td>
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<tr>
<td></td>
<td>2.2GHz</td>
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### CD ROMS

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<thead>
<tr>
<th>Type</th>
<th>Model</th>
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<tr>
<td>48X Mitsubishi IDE</td>
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<td>52X IDE</td>
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<td>56X IDE</td>
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<tr>
<td>52X CREATIVE</td>
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### SOUND CARDS

<table>
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<tr>
<th>Type</th>
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<tr>
<td>CREATIVE LABS</td>
<td>PCI 16bit</td>
<td>$19.00</td>
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<td></td>
<td>PCI 128</td>
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<td></td>
<td>Live Value</td>
<td>$32.00</td>
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<td></td>
<td>Audigy MP3 5.1</td>
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</tr>
<tr>
<td></td>
<td>Audigy X-Gamer 5.1</td>
<td>$89.00</td>
</tr>
<tr>
<td></td>
<td>Audigy Live Platinum</td>
<td>$189.00</td>
</tr>
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</table>

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<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16/10/32 TEAC</td>
<td>$114.00</td>
</tr>
<tr>
<td></td>
<td>16/10/40 Yamaha</td>
<td>$149.00</td>
</tr>
<tr>
<td></td>
<td>20/10/40 Yamaha</td>
<td>$199.00</td>
</tr>
<tr>
<td></td>
<td>20/10/40 Acer</td>
<td>$99.00</td>
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### DVD ROMS

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrey DVD 12X IDE</td>
<td>$49.00</td>
<td></td>
</tr>
<tr>
<td>Samsung DVD 16X</td>
<td>$62.00</td>
<td></td>
</tr>
<tr>
<td>Toshiba DVD 16X</td>
<td>$73.00</td>
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- **CoolerMaster DP5-611A** **$7**

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- **100GB 7200RPM ATA 133 HD from:** **$215**

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- **DDR 2400 Corsair 256** **$69**
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- **AMD Athlon™ XP 1700+** **$126**
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**Monarch XP 1600+ DVD**

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
</table>
| 090065 | Mid-Tower with 300Watt ATX Power Supply | **$799.00**
| DFI AX76-5N AMD761/VA-686B 266FSB DDR Motherboard | **$294.00**
| AMD Athlon™ XP 1600+ Processor | **$294.00**
| Ball Bearing Heatink Fan | **$294.00**
| DDR 256 MB 2100 (266FSB) Memory | **$294.00**
| Western Digital 40GB 5400 RPM Hard Drive | **$294.00**
| Sony DVD 16X 46 CDROM DDU1651 | **$294.00**
| 1.44 MB 3.5 inch Floppy Drive | **$294.00**
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| nVidia GeForce2 64MB AGP Video Card | **$294.00**
| Lucent 56K v.90 Modem | **$294.00**
| Microsoft Windows XP Home Edition | **$294.00**
| Limited 1 Year Warranty | **$294.00**

**Monarch Athlon 1800 GTO DVD**

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
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</table>
| 090961 | Monarch Mid Tower Case | **$998.00**
| Athlon SPI 350 Watt Power Supply | **$998.00**
| DFI AMD 761 DDR 266FSB | **$998.00**
| AMD Athlon™ XP 1800+ Processor | **$998.00**
| w/Quinterpod™ architecture* | **$998.00**
| CoolerMaster Heatink Fan | **$998.00**
| DDR 256 MB 2100 Corsair | **$998.00**
| IBM 40 gb 7200 RPM ATA/100 HDD | **$998.00**
| 16X DVD 40X CD-Rom | **$998.00**
| 16X16X40 CDRW Burnproof Tech. | **$998.00**
| 1.44 MB 3.5 inch Floppy Drive | **$998.00**
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| nVidia 3D GeForce 2 MX 400 64 MB AGP | **$998.00**
| Lucent 56k v.90 Modem | **$998.00**
| 2 USB Ports, 2 Serial, 1 Parallel | **$998.00**
| Microsoft Windows XP Home Edition | **$998.00**

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<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
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</table>
| 090115 | Lian-Li PC-70 Aluminum Case | **$3,050.00**
| 465 Watt Dual AMD Power Supply | **$3,050.00**
| 2 - AMD Athlon™ 1800+ MP 266 FSB | **$3,050.00**
| Socket A Processors | **$3,050.00**
| 2 - ThermalTake Volcano II CPU Coolers | **$3,050.00**
| 1GB PC133 EEC DDR Corsair Memory | **$3,050.00**
| Tyan K7 Dual AMD Motherboard AMD760 Chipset | **$3,050.00**
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| 2 - Seagate 10 GB Cheetah 10000 RPM Ultra160 HDS | **$3,050.00**
| Sony 16X DVD40X CD-ROM | **$3,050.00**
| SoundBlaster Live! 5.1 PCI Value Sound Card | **$3,050.00**
| Matrix16BM G450 DDR Dual Head Video Card | **$3,050.00**
| Lucent 56K v.90 Modem | **$3,050.00**

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- Lucent PCI 56K Voice Modem and 10/100 NIC
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- Nvidia GEFORCE 3 Ti 200 3D DVD 64MB DDR
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How would you like to be seated next to this foreboding-looking monster at a LAN party? The chilly breath of imminent doom—that's what awaits hot temperatures that would dare wreak havoc on Salar Madadi's overclocked Duron processor. We had a brief chat with Madadi, an Ontario computer information systems student, to ask him what in God's name he was thinking.

MPC: What's the deal with the crazy skull? I'm not really sure. It looks like it's from one of those models from science class. It didn't have any company markings or anything on it. I got it at a garage sale, and it cost me only a quarter. After I got it, my girlfriend and I put on some music and made the jaw sing the lyrics (laughs).

MPC: Are those real human teeth? They're my baby teeth! No, they're actually plastic, and they came with the skull.

MPC: It looks like you pounded aluminum around the skull. Yes? No? Nope, it's bondo, which is a paste-like material that's used to fix car bodies. It took me forever to mold it onto the skull, and I had to apply at least 20 layers. Then I used my Dremel to carve away the grooves, then sanded it smooth.

MPC: You're not into witchcraft or the occult, are you? Me? Not really. The inspiration came from one of my favorite artists, H.R. Giger. If you haven't seen his art, he was the guy who did the art for the movie *Aliens*.

MPC: What's up with your lights and windows? The lights are blue cold cathodes from BGmicro.com. I was thinking of getting regular auto neon, but these cathodes are brighter and cheaper. The windows are cut from a Lucite sheet I got at a hardware store. I did the window cutouts myself with a Dremel and trimmed them using chrome auto door trim. I chose the triple window shape because it looked good and was unique. I didn't want to have the standard rectangular case window on my case.

MPC: What do you think your next case will look like? Hmmmm, how can I put it? It'll look like a techno-organic nightmare. If you've ever seen *Akira*, think about what happened to Tetsuo's arm after he lost it. The new rig will be water-cooled, and I have crazy ideas about how to integrate the water-cooling with the visual aesthetic of the case. It's all in my head now.

MPC: Hey, two heads are better than one! Stupid joke, sorry.

With help from Virtual-Hideout.net and FanBus.com, Madadi made a 12v/no/7/off box so he can quiet or turn off his fans at will. The first six switches control the fans, while the last two control the interior lights. The CompuNurse LCD shows ambient case temperature. Key hardware includes an Abit KT7A-Raid mobo, a 700MHz Duron O/C'd to 1GHz, 512MB of PC133, and a Powercolor GF2MX 32MB videocard.

Here are two shots of Madadi's "chilling" figure—head—the first under normal lighting, the second with room lighting turned down, and his blue cathode interior lights turned up. Would any renegade dust dare enter? The big red button handles power on/off, while the small button handles reset. Both were bought at a local electronics store to replace the originals. Madadi's case is an InWin Q500.
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