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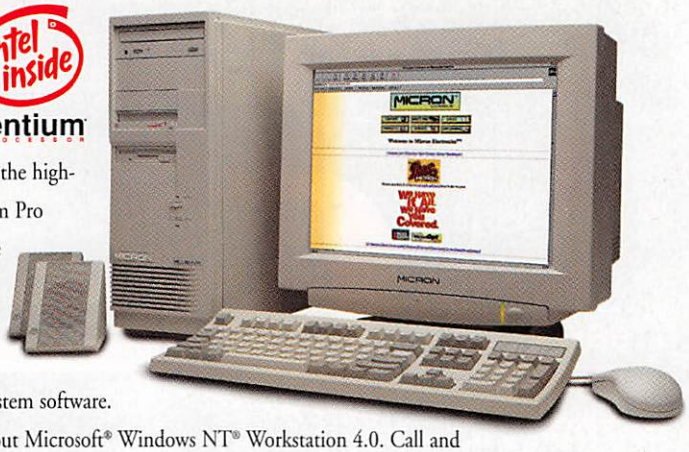

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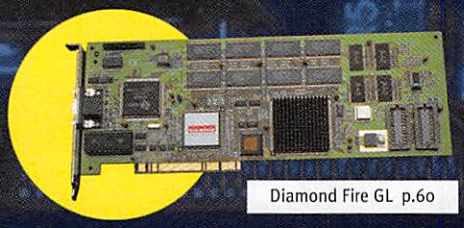

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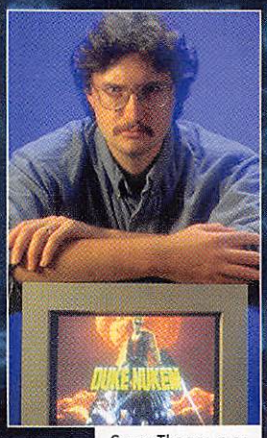

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Readers connect with us via e-mail, fax, and snail mail.

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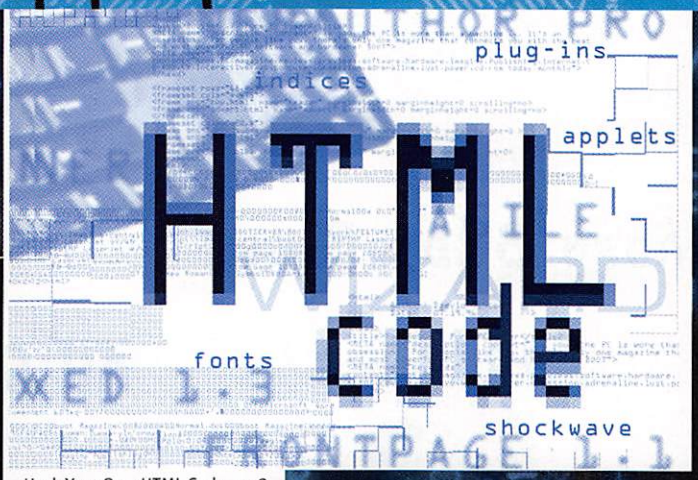
42 DVD: Too Hot to Handle

With a spec sheet that reads like a dream come true, DVD has the potential to revolutionize personal computing.
It's real.
It exists.
And it's ready to ship.
But there's only one small hitch...
You can't actually buy DVD technology any time in the near future. We'll tell you why.



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48 Hack Your Own HTML Code

While it's possible to churn out HTML code with any old text editor, why bother? Today's HTML editors know all the tags, so you can focus on implementing more exotic technology than just bold or italic text. We look at 10 editors and help you pick out the one that fits your style.

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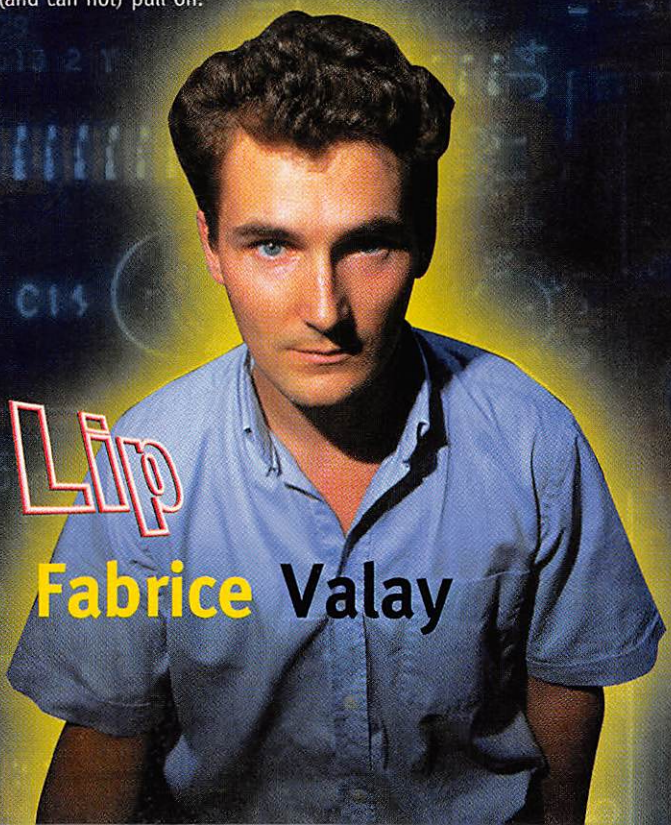
We flew to Paris to hang with the man responsible for creating the first game fueled by Intel's impending MMX instruction set in order to set the record straight about exactly what the new hardware can (and can not) pull off.



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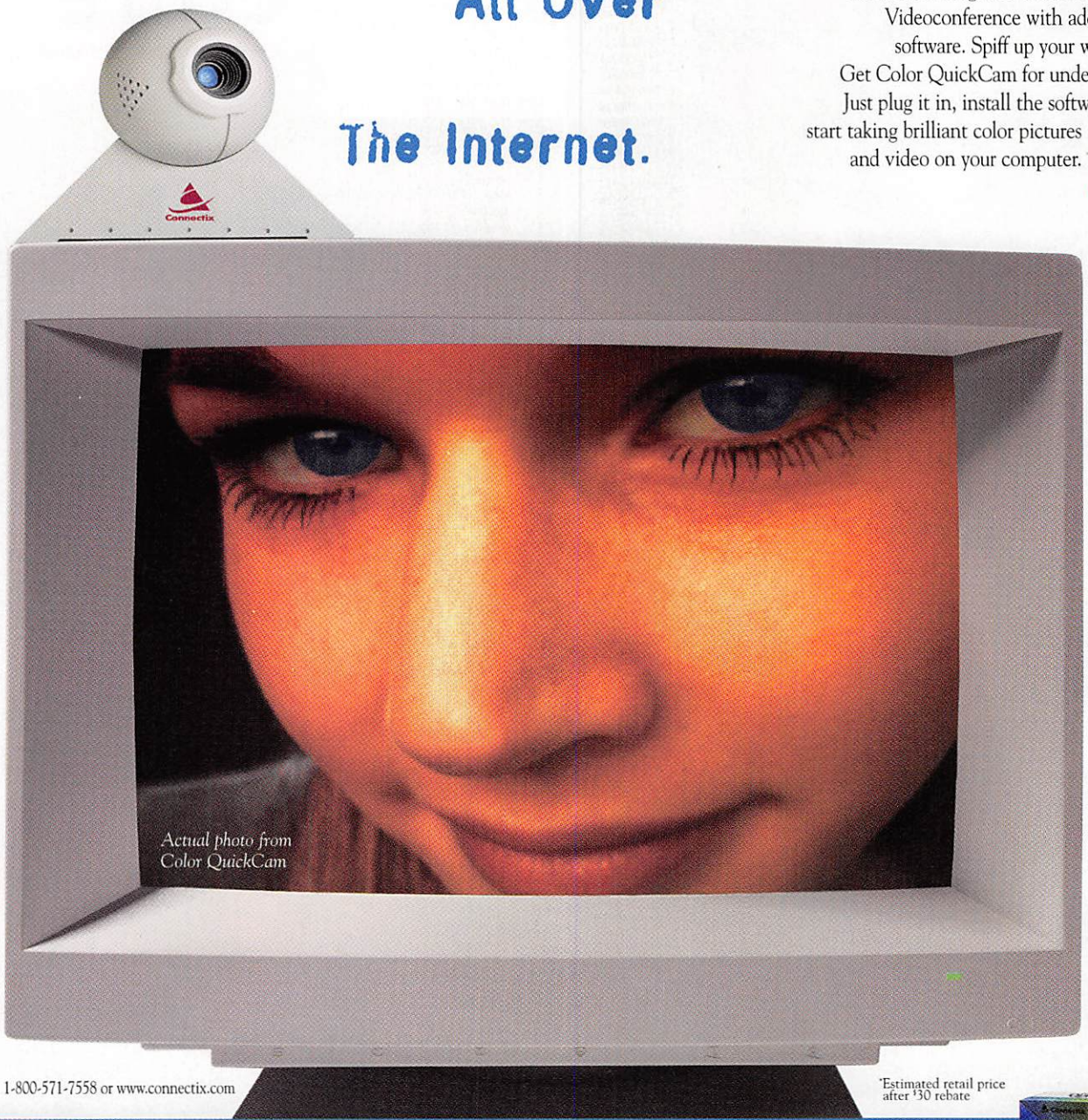

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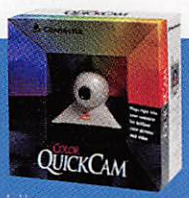

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Product Information Number 111

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november 1996

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Robert J. Abramson and Associates, Inc.
720 Post Road, Scarsdale, NY 10583

VOLUME 01, ISSUE 03
boot (ISSN #1088-5439) is published monthly by Imagine Publishing, Inc., 150 North Hill Drive, Suite 40, Brisbane, CA 94005, USA. Periodical class postage paid in Brisbane, CA and at additional mailing offices. Newsstand distribution is handled by Curtis Circulation Company. Basic subscription rates: one year (12 issues) U.S. **$39.90**, Canada **$53.90**. Canadian price includes postage and GST (GST #128220688). **Postmaster:** Send changes of address to *boot*, P.O.Box 51479, Boulder, CO 80322-1479.

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Standard Mail enclosed in the following editions: A3, B, B1, B2. CPC Int'l Pub Mail # 0781029. Outside the U.S. and Canada, price is $53.95, U.S. pre-paid funds only. For customer service, write *boot*, P.O. Box 51479, Boulder, CO 80322-1479, *boot*, 150 North Hill Drive, Brisbane, CA 94005. Imagine Publishing also publishes *PC Gamer*, *Next Generation*, *Mac Addict*, *Game Players* and *The Net*. Entire contents copyright 1996, Imagine Publishing, Inc. All rights reserved. Reproduction in whole or in part is prohibited. Imagine Publishing, Inc. is not affiliated with the companies or products covered in *boot*.
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EDITOR'S WORDS

Urban Renewal in the Home PC Ghetto

The response to the "How to Build your Dream Machine for $5K" in our premiere issue was nothing short of spectacular. When we decided to go with the story as our cover feature, we felt it epitomized our reader's mindset. As we developed the piece, some people expressed the sentiment, "No one builds their computer from scratch anymore."

But seeing what passes for a "power" system in your typical consumer electronics superstore (133MHz, 8MB RAM, 4X CD-ROM, less than a gig of storage, and a puny 14-inch monitor), we knew many of the people we wanted to read our magazine would be building their own.

The home market has really become something of a ghetto, a place where big companies clear out their stock of outdated processors and components to an unwitting (they believe) public. Corporate buyers and the workstation crowd demand the *real* power, the thinking goes. As a result, the person who has traditionally been at the center of the entire PC evolution, the home power user, is stuck with few recourses and usually resorts to building a machine that suits their specs.

"What would a home user even do with 200MHz?" a spokesperson from a top-five PC vendor asked me the other day. Some people just don't understand.

When Intel first announced their Pentium Pro last year, they made it clear that the 32-bit powerhouse was not intended for the home market. While systems built around the CPU shipped en masse to corporate buyers, early adopters hungry for the opportunity to finally realize Windows NT's speed had to hunt the machines down like rare pheasant. Finally, Intel is releasing the 180MHz Pro chip for consumer systems, such as the Gateway G6-180 reviewed on page 77 of this issue. *boot* readers knew all along that this was inevitable and many probably refrained from buying systems until this chip hit the shelves.

Well, maybe those days are past.

More and more companies are entering the marketplace, from Japanese consumer electronics giants, such as Sony and Toshiba, to hungry young companies looking to make a splash. As the market for PCs matures, the once one-dimensional home PC buyer is finally being recognized as a force to be reckoned with.

Recent offerings from Compaq, NEC, AST, and IBM all recognize this. Consumer machines, available through mainstream channels, packing the punch that was, until recently, reserved for workstations. The fastest CPUs, enough RAM to swim in (and open slots to expand), graphics acceleration to pump up the res and keep it flowing, and storage capacities that recognize the high-bandwidth nature of digital media. While you're looking, be sure to notice that all this is brought to you on a 17-inch monitor with refresh rates and dot pitches solid enough to spare you bifocals in your later years.

Sure, some companies don't quite get it yet. Here in the bootLab, we still see sealed cases, completely filled SIMM slots, laughably bad sound cards, and systems where available ISA slots outnumber PCI slots two-to-one. Hell, we see slots that are completely inaccessible due to protruding heat sinks, dangling cables, and other design snafus. [Note: Don't give me onboard 3D acceleration or telephony, unless there's a way to defeat it when something better inevitably comes along.] But still, these instances are rapidly becoming the exception in this new breed of consumer machines. So every day as I read the e-mails, faxes, and even the snail mail letters from rabid *boot* readers bragging about their own "dream machines" and asking for advice about what sweet new systems and upgrades to buy, it nails home the point: We're here, they know we're here, and nothing's ever going to be the same again.

THE HIDEOUS SM

TO

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LETTERS TO THE EDITOR

Get Out of My Head!!!

I can't believe the exacting nature with which *boot* has realized all my hopes for a PC-based magazine! I'm one of those people who reads and subscribes to everything from *PC Magazine* to *Wired* to whatever else is on the shelf, in search of nuggets of high-power, imagination-inspiring articles that support my obsessive-compulsive relationship with PCs—as opposed to every three-thousandth article about how Bill Gates blew his nose. I play high-end games, I do graphics work, I script, and I defragment my hard drive without *Norton* reminding me. I'm ecstatic someone finally realized there are a lot of people out there who know their stuff and appreciate like-minded people writing for them.

The best example of your success? Just look at what's on your CD-ROM! As opposed to the shovelware that's on most bundled CDs, this one's got *Quake*, ActiveX and video drivers, and even an Anime program! Great job guys, thanks for making my dream PC magazine, and keep up the good work.

Bill Pena
via Internet

Searching for Mother

I was reading the article "$5K Dream Machine" [*boot* 02] and was interested in the motherboard from First International Computers based on the VIA VT82C580VP Apollo VP chipset. The article says that the T2003 From FIC is such a motherboard (with the 2MB L2 cache) but when I spoke with FIC they said that it was just 1MB with a 256K pipeline burst cache and they knew nothing of the one I was speaking of, or any L2 cache that large. Do you know where I can find such a motherboard? Or point me in the right direction?

Thanx,
Manchild
via Internet

Tech Editor Chris Dunphy replies: The new VIA Apollo-VP chipset does indeed support 2MB of L2 cache (it is the first chipset to do so), but right now no motherboards are shipping with that much cache. Look for them to begin appearing later this year.

I'd like to thank you all for coming up with a magazine that really made my head spin. A girlfriend of mine brought it over to me with the disc and she is still calling me trying to get it back. Man, you guys are good! All the other mags get boring by the 10th page, but you guys have had me reading this mag over and over again. All I can do is spread the news.

In your *boot 02* issue, you list several companies in the "One PC Freak's Recipe for the $5,000 Dream Machine" caption. I would like contact info for these companies/vendors so I can start building my system. I also noticed in the "Dream Machines" article that *boot* recommends a First International Computer PT-2003 motherboard (based on the VIA VT82C580VP Apollo-VP chipset), but the sidebar article recommends a Supermicro P55-T2S motherboard w/512K pipeline burst cache. What is the difference—besides the price—of the two?

Thanks again. Yo! The baddest mothers just set a new standard: *boot*!

Orlando Sal Herrera Jr.
CEO
Lizard Central T.A.C.E.
The Afro-Cuban Experience
via fax from Port Morris, New York

Sorry we neglected to provide the contact info for those companies... Here it is:

First International Computer: 510.252.7777; www.fica.com
Matrox: 514.685.2630; www.matrox.com
Adaptec: 408.945.8600 or 800.959.7274; www.adaptec.com
Supermicro: 408.451.1118; www.supermicro.com
Toshiba: 800.879.4963; www.toshiba.com

3D Rage only supports 640x480 in 64k color and 800x600 in 256. What kind of 3D acceleration is that? If I want 3D acceleration, I want it in 1024x768 in at least 64k color.

Currently, the hottest motherboard is the First International Computer PA-2005, which uses the VIA chipset and provides support for burst EDO RAM and USB serial ports. It has edged out Intel's 430HX Triton equipped motherboards in the latest trials. But FIC doesn't sell individual motherboards directly, so check their Web site for a list of resellers.

2001: A 3D Odyssey

I bought your premiere issue because of the article about building a "perfect" $5K PC. However, when I read the preview of NEC's PowerPlayer 200!—Wow! Two different 3D chipsets. Prior to this, I thought I was going to have to choose between 3Dfx's Voodoo chipset and ATI's 3D Rage chipset. Now I find that I can have both in one package. Yes, I know it doesn't have the SCSI Ultrawide hard drive or a very good sound card. If I can get one of NEC's new monitors to go with it, I'm sold. Got any ideas of when this system will actually be available?

Peter D. Meredith
via Internet

Reviews Editor Michael Brown replies: After we went to press with our hands-on preview, NEC changed the name of their PC to the PowerPlayer 2010, and delayed the ship date. The last we heard from NEC was that the 2010 would ship in October. Rest assured, we'll publish a rigorous hands-on review in an upcoming issue.

What's so Great About Rage?

I've read your review of the three systems with 3D Accelerators ["200MHz Monsters in 3D," *boot* 02]. What I don't understand is what makes 3D Rage a better accelerator than S3's ViRGE? or PowerVR, for that matter. As far as I can tell, the ViRGE is a better accelerator in every respect. It's faster than 3D Rage in 2D acceleration, and 3D Rage only supports 640x480 in 64k color and 800x600 in 256. What kind of 3D acceleration is that? If I want 3D acceleration, I want it in 1024x768 in at least 64k color.

Thanks
George Petrov
via Internet

Tech Editor Chris Dunphy replies: The PowerVR does indeed pack more 3D horsepower than the Rage, but industry support for the PowerVR seems to be waning fast. As for Rage vs. Virge, in our head-to-head review of the Virge-based Number Nine 9FX Reality 332 and Orchid Fahrenheit Video 3D versus the Rage-powered ATI 3D Xpression and the Matrox Mystique—the Rage came out on top. But the next wave of 3D accelerators is already here, and the Rage is yesterday's news. Check out our preview of the twice-as-fast Rage 2-powered 3D Xpression PC 2 TV on page 78 of this issue, and our hands-on reviews on page 95 of two new 3Dfx Voodoo-powered cards from Orchid and Diamond—the new kings of the 3D hill. But even the new 3Dfx doesn't support much more than 800x600. 3D requires moving more memory a lot faster than the old 2D world. The current generation of chips just isn't ready for 1024x768 in 16bpp with two front buffers and a Z-buffer. But have no fear, most games will be in 640x480 with 16bpp, so motion will be so fast and smooth that you'll hardly notice the resolution.

Hitting the Sweet Spot

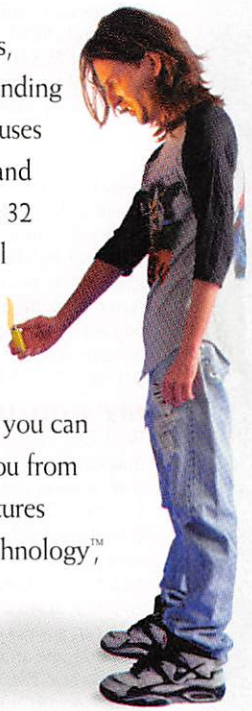
You always hear people say you should decrease the number of fonts installed on your system to increase Windows performance. Is there a sweet spot for fonts? Obviously it's preferable to have fonts available without loading and reloading, so there must be a number that you could have installed without giving up a performance hit. Thanks for the help here...

BTW—*my* "dream machine" [*boot* 02] is a 200MHz Pentium, Intel

▶ 10

A breakthrough in sound so real, your PC will have its own groupies.

Systems, the professional audio experts, inside your PC. It delivers the mind-bending realism of wave-table synthesis–which uses actual recordings of real sound effects and musical instruments. And it plays up to 32 notes simultaneously, adding new detail and richness to your favorite games and software.



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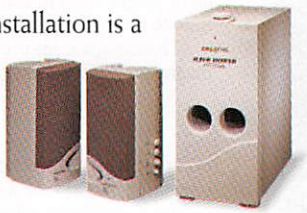
Our downloadable SoundFont® technology lets you add new sounds and instruments to your card. Add up to 28 MB of memory to create your own audio library. We even included a microphone and software for recording music and sound effects. And, of course, the AWE 32 is fully Plug and Play and works with Windows® 95, Windows 3.1 and DOS. So installation is a no brainer.



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Want to complete your multimedia dream system? Pick up the new Blaster CD™ 8x CD-ROM and Sound Blaster Speakers too, at your nearest Creative Labs dealer. But take along your bodyguard, in case the groupies get carried away.

The crowd keeps growing until they have your house surrounded.

Then the chanting begins. "A-W-E...A-W-E...A-W-E."

It seems that Sound Blaster® AWE 32™ PnP is the first sound card to develop its own cult following. That's because it makes every other sound card seem like a blast from the past.

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commport

PCI motherboard, 128MB RAM, 2.1GB Barracuda SCSI HD attached to an Adaptec 2940 U/W, with a 2MB Matrox Millenium. It was all home built by me and I am very proud of my baby. Thanks for the great article.

Jeff Sopha
via Internet

Tech Editor Bryan Del Rizzo replies: Good question Jeff, but even Microsoft concedes there's no "sweet spot." The number of fonts you have installed is really dependent on the applications you're running. Generally, the fewer fonts the better your performance; but if you really need to use more, check out a font management utility such as Ares FontMinder 3.0 *(800.783.2737).*

MY GOD!!!

Well, I just bought my first copy of *boot* magazine and I can tell you, you guys rule. Now what makes me say that??? CONTENT. You have CONTENT. Man, now if only some other mags could have content as well. I'm sick of picking up a mag and having trouble locating an article from an advertisement. All I can say is keep on doing issues like this first one and, man-o-man, you guys are gonna rock. I've already told a few hundred people on IRC undernet about the magazine and to check it out 'cause it's very cool, and you generally find the hard-core comp users on IRC.

If you guys ever want to stop by and say hello, most of the gamers hang out on us.undernet.org port 6667 in the channels #unreal or #quake. My nick on IRC is _psychic_. Most of us on IRC get great information too: George Brousard of 3Drealms comes on; there's some people from Epic working on *Unreal* who come there; and a lot of people from id software show up from time to time giving us info.

Thanks again for producing the BEST magazine I've seen in ages...

Iata...
Aaron Hazen
via Internet

And the Verdict Is...

I recently bought your awesome magazine, and I was really amazed by the detail and work that went into creating a magazine that offers a lot to lots of people, not just gamers.

I have a suggestion: While reading the reviews, it was hard to notice the verdict for the game/application. I usually pay attention to what computer magazines rate the product, and I agree with most of yours; just that it is hard to find/see the Verdict. It's too small and stuck in the corner. So if you could maybe make the *bootVerdict* bigger, it would look a lot better.

Tyler Woodworth
via Internet

Art Director Laura Morris replies: We agree, Tyler. Check out the reviews this month and see our big, bold new bootVerdicts*!*

Free Tibet, Free Lunch, Free *boot*

I recently subscribed to your magazine because I was very impressed with the premiere issue of *boot*, which was informative and fun to read. However, I am now starting to have some concerns because I have noticed that most, if not all, of your articles are presented fully on your Web site—for free!

My question is: Why should I pay money to subscribe to a magazine that puts most of its content on its Web site?

I know that you get a free CD with every issue, but still, I'm starting to get a little discouraged.

Could you please tell me what your future plans are for the *boot* Web site? Will you continue to post your entire magazine on the site and leave little incentive for customers to subscribe to the magazine, or will you decide to change it around a bit when *boot* becomes more familiar to computer enthusiasts?

My question is: Why should I pay money to subscribe to a magazine that puts most of its content on its Web site?

Cordially,
Rickey Singh
via Internet

Web Editor Daevid Vincent replies: You bring up a valid point. Because this is a launch, we wanted our Web site as full of info as possible, so potential readers could check out what we're like. A taste of the magazine, if you will. Not everything is online and not everything is in the mag or on the bootDisc*. All three complement and work off each other in an integrated fashion. For example, the* bootWire *online news is updated almost daily. There are patches and demos online that we couldn't get onto the disc. There are huge files that no mortal would dare download on the disc. And there are articles and pictures in the magazine, (the Lip interview, for example).*

The "Other" OS

With the advent of IBM's last OS release, OS/2 Merlin is not only competitive, but also fun! It has built-in Java support (as if we care), an FTP folder (cool), and voice command as part of the OS (coolest).

OS/2 is arguably a superior OS. Its smaller market share is due to just two things: Microsoft's ad campaigns and the deterioration of the median PC consumer.

For those who chose not the lemming way, but are capable of walking the high road, it would be nice to have some OS/2 coverage.

Win95 may be adequate for those PC users who would rather not trouble themselves with inconsequential data such as grasping directory trees, but for those of us who wonder if we can change the PCI bus IRQs, more is better.

TTYL,
Jonathon Woolridge,
Pensacola, FL

It's About Time

It's about time a PC mag with no Mac-soup came forth.

It's about time a PC mag without business and financial stuff came out.

It's about time a PC mag without cheesy <BOOM> <BAM> graphics showed up.

It's about time a PC mag with a good mix of entertainment and tech appeared.

It's about FRIGGIN' time a PC mag with a mature but fun nature existed.

It's weird how the name BOOT, so simple and perfect, was never taken.

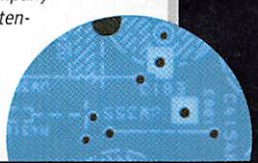
Dennis J.
via Internet

Cut, Copy, Paste

In the "Rendering on the Fly" feature in our premiere issue, we did not caption the screen shots at the start of the article. Mission Studios e-mailed us that the center screen actually belonged to their soon-to-be-released JetFighter III *title. Look forward to a review of that great-looking sim soon in the pages of* boot.

In our review of Compaq's Presario 8710, we reported that the computer's STB sound card encountered major problems running Quake *and several other games. Compaq has since discovered that these problems were due to a configuration error in the system that was sent to* boot *for review, and that the problem does not exist in units the company has shipped to retail.*

Compaq confirmed that the STB sound card is not hardware compatible with Creative Labs' Sound Blaster, but the company reports that it has performed extensive compatibility testing and claims that the card will run 98 percent of all games on the market.



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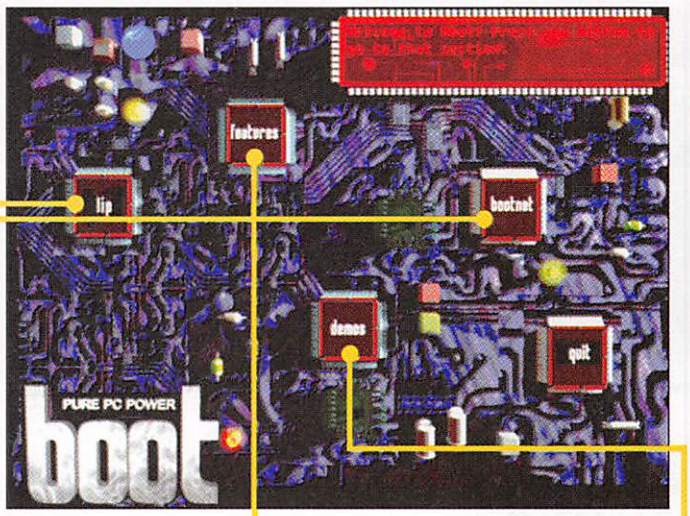
Product Information Number 130

boot CD-ROM DISC

welcome
to the Third Edition of the mighty, mighty bootDisc!

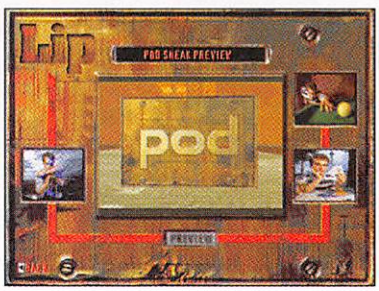
Every month, *boot* magazine comes bundled with 550+MB of exclusive demos and the hottest software around. So slam this issue of the *bootDisc* into your CD-ROM drive and give yourself an injection of Pure PC Power.

The *bootDisc* is compatible with both Windows 95 and 3.x. (Simply launch bootCD16.exe to run under 3.x.) Some of the applications included on the disc may require Win95 to run. *boot* also recommends a Pentium 90 or better with 16MB RAM for best performance and access to all the software included. While the interface will run under 256 colors, it runs best under true color (16-bit or 24-bit mode).



Navigation

Rolling the cursor over any active button will bring up Help in the display box at top right—if you're unsure what a particular button does, just move the mouse over it. Background sound can be controlled with the blue slider at top left.



Lip:

boot interviews Fabrice Valay, the man in charge of making the first MMX game, *POD*.

An **exclusive** AVI of this high-adrenaline, futuristic, racing game is featured with the interview on the disc; simply select the preview button to show the *POD* movie.

Features:
Hack Your Own HTML Code

Try out many of the powerful HTML editors featured in this story. Create Web magic and we'll consider posting it at our *bootNet* Web site. The details are on the disc.

Demos

Clicking an application brings up information, a screen shot, and allows you to load it. Pressing the *boot* logo launches the application (or in a few cases, brings up a window to allow you to launch the program). Check for special instructions to find any limitations a demo may have. Clicking on the globe fires up your resident browser and takes you to the Web for more information about the product. The Video button turns green when a video about the software is available; press it once to start the movie, and press it again or select a different application to stop it.

bootNet

The *bootDisc* integrates Internet connectivity; allowing you, at the press of a button, to contact *boot* magazine, subscribe electronically to the magazine, or jump to our *bootNet* Web site. Don't worry about browser compatibility—we let you select your preferred browser.

features

Our feature this month is about the wide, **wide** world of **HTML editors**, and we're giving you **full-functioning** demos of the **hottest** ones available.

HotDog

One of the best code-based editors around, offering quick entry of up-to-date HTML tags for graphics, links, lists, tables, and scrolling marquees. *HotDog* features multiple search and replace, floating customizable toolbars, event sounds, and an FTP client. Includes a spell checker and a real-time viewer so you can see your page in a WYSIWYG format.

Front Page

Front Page provides a complete authoring environment for creating, deploying, and managing sophisticated Web sites. Templates, wizards, and advanced Web bots enable straightforward creation of interactive content.

Home Page

Home Page offers ease of use by hiding the complexity of code generation, yet still leaves the power to access raw HTML code for advanced editing and customization. Its features include a table editor, frames support, and libraries for storing frequently used items—even entire Web page templates.

Web.Designer

Excellent choice for simple Web page creation featuring a word processor-like interface that makes creation and editing almost intuitive, and a WYSIWYG display that lets you instantly preview your page. It includes a handy file conversion tool and an extensive clip art collection.

Plus many more shareware and commercial demos of the best HTML editors out there.

Also on this edition of the bootDisc*:*

Painter 4.0

Painter's astounding Natural Media features simulate the tools and textures of traditional artist's materials: from crayons to calligraphy, oils to airbrushes, pencils to watercolor.

Cakewalk ProAudio 5.0

A music workstation for professional musicians, producers, and multimedia developers; *ProAudio* gives you perfectly synchronized MIDI and digital audio in one package.

SmartSound

Start creating your own custom soundtracks immediately. Using no musical notation and requiring no musical or technical background, virtually anyone can open the program and begin creating customized soundtracks to their exact specifications.

Egor Animator 3.0

Create your own Java applets! Use JPEGs or GIFs to create incredible Java animations complete with sound.

demos

This month the **bootDisc** brings you a combination of **sports** and **warfare** for a satisfying mixture of competitive **blood loss**!

Triple Play Baseball

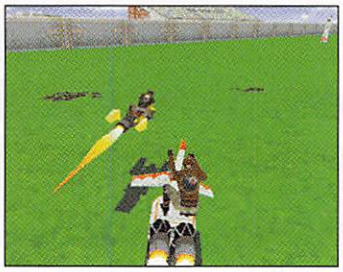
Electronic Arts keeps pumping out great sports games and this latest offering of the great American pastime is no exception. The game features advanced opponent AI, as well as solid play-by-play announcing, intuitive pitching controls, and three different batting stances that give impact to your hits.

HyperBlade

In the future there is no war... only *HyperBlade*. Perform 360° flips, 180° twists, rail slides; and in-your-face tripping, slashing, kicking, and body-checking. *HyperBlade* fuses high-speed hockey and extreme skating with front-line warfare.

ToonStruck

More than two years and six million dollars in the making, this unique, animated adventure game from Virgin stars Christopher Lloyd (*Goin' South, Clue, Star Trek II*) as a cartoon artist trapped in his own imaginary world.



Rocket Jockey

Saddle up on your crotch rocket and hurl yourself full throttle at your opponents in Rocket Science's latest release. You fly mere feet above the ground and whip around by grappling pylons with your steel turning cables. Use these same high-tensile cables to drag your opponents through the dirt and slam them into concrete walls. Fun.

Z

This game from Virgin—winner of a *boot* Kick-Ass! Award—combines advanced AI, awesome cut scenes, challenging gameplay, and verbal abuse in a balls-out game of capture the flag.

Diablo

The catacombs beneath the town are said to house long-dead warriors from a forgotten age. Some say they lead to the gates of hell itself. For some reason, you want to go down there. Random dungeon generation makes this game from Blizzard different every time.

Plug-ins

We've gathered more Inline Plug-ins and ActiveX Controls than you can shake a shtick at, so open up your browser and say ahhh.

- QuickSilver
- Action
- ActiveX
- Enliven
- Keyview
- Crescendo
- QuickView Plus
- Shockwave
- Excel Viewer
- Live 3D
- VRML ActiveX
- HindSite

the web

Imagine Publishing
is pleased to announce the launch of the *boot* magazine **World Wide Web** site at:
http://www.bootnet.com

bootNet sports many of the exciting features that make *boot* magazine so valuable to the hard-core home PC enthusiast. There are reviews and previews, bootWorthy products, and an expanding archive of *boot* articles online. *boot* magazine, the *bootNet* Web site, and the *bootDisc* CD-ROM work together to create a truly integrated multimedia experience. Search the site for keywords, chat in real-time with other readers and the *boot* editors, post messages in our forums, and see the *boot* team at work. This site is live and will be updated daily with the freshest news bytes available. We also feature a download section for the latest drivers and patches. Want to write a letter to the editor? No problem. Want a second opinion on that new PDA before you plunk down $500? No problem. Just want to drool over stuff that no mere mortal could afford? We have that too! Of course all this cutting-edge technology comes with some strings attached: You'll need a javaScript & frames-capable browser (we recommend *Netscape v3.0*). A minimum screen res of 800x600 and at least 16-bit color is also highly recommended for optimal viewing. In the near future, VRML and ShockWave plug-ins will be required as well, but for now they're not.

If you're always climbing to the pinnacle of the fast-paced tech world, you probably already have these basics; if you're standing still, get your boots on!

NEWS:

bootWire features the latest news, updated daily; bootDeep gives you in-depth analysis of the key stories that have broken on the bootWire; and bootRadar picks up the latest cool PC products appearing on the horizon.

P/REVIEWS:

bootWorthy highlights a particular category of products and examines the best of the best. You'll also find no-bunk reviews and advanced previews of all the PC hardware and software you care about.

VOICES:

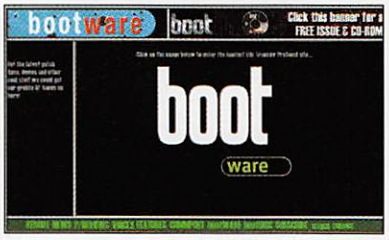
Columns by *boot*'s talented writers, a few words from our editor, and some special guest contributions.

FEATURES:

Showcasing the feature articles that appear in *boot* magazine each month, this is where you'll find a variety of in-depth stories as well as a peek into next month's issue.

COMMPORT:

Want to contact us? We want to hear from you. This section is the most interactive part of *boot*'s Web site. It has letters to the editor, bootForums, and bootRap where you can discuss your passion for the cutting edge with other like-minded individuals. There will be a live camera feed, and a profiles section introducing our staff. Plus a list of advertisers' links so you can find out more about their products.

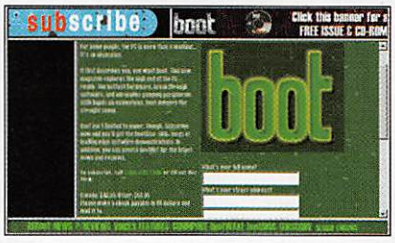


bootWARE:

Get your grubby lil' hands on the latest downloadable drivers, patches, and coolest demos around.

bootDISC:

This area will help integrate the *bootDisc* bundled with *boot* magazine, with current information available via the Internet for a seamless transition from print to disc to Web and beyond.



SUBSCRIBE:

You came, you saw, you lusted for! Fill out this subscription form and enjoy the printed parent of *bootNet* with extra pictures and more articles to peruse at your leisure.

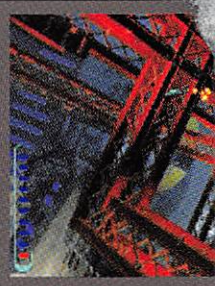
Microsoft

Where do you want to go today?™

London, A.D. 2500.

New A.D.

Earth covered in plankton is only the start. The single potent thought floating around the alien invasion force 30,000 ft below the oceans is to submerge Earth. And the only lifeguard on hand to prevent total mayhem is you. Earth's last chance to keep 6 billion heads above water in DEADLY TIDE.™



www.microsoft.com/games/deadlytide/

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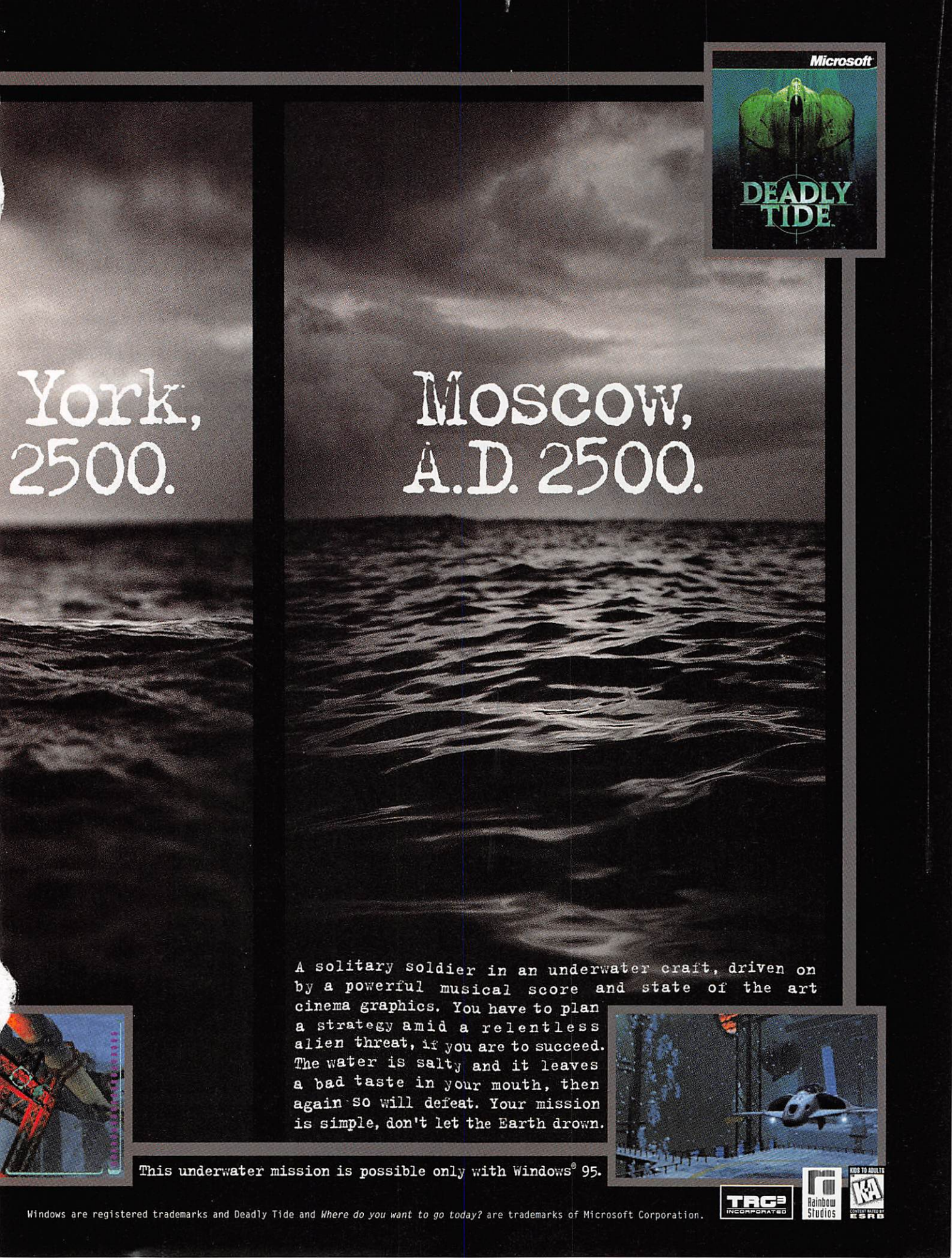
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Moscow, A.D. 2500.
A solitary soldier in an underwater craft, driven on by a powerful musical score and state of the art cinema graphics. You have to plan a strategy amid a relentless alien threat, if you are to succeed. The water is salty and it leaves a bad taste in your mouth, then again so will defeat. Your mission is simple, don't let the Earth drown.
This underwater mission is possible only with Windows® 95.
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Windows are registered trademarks and Deadly Tide and *Where do you want to go today?* are trademarks of Microsoft Corporation.

NUGGETS

Top 5 Games To Play On a Laptop

Gaming on a laptop can either be a total blast or utter frustration. Controls and graphics take on new meaning when played on a laptop and it's hard to tell what will work until after you've loaded the game.

We've compiled the following list of five winners (and losers) to help:

1) *Duke Nukem 3D* is better than *Quake*

While *Quake* is a monster game on the desktop, it's too dark on a laptop's dim display. *Duke*'s bright environment comes across better.

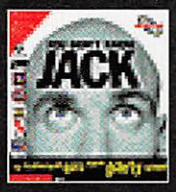
2) *Command & Conquer* is better than *Close Combat*

Command & Conquer is one of the best games ever on any machine. And when it comes to playing on the road, its large troops beat the microscopic soldiers in Microsoft's *Close Combat* to a pulp.

3) Any *golf game* is better than any other sports game

Sports sims' controls are usually too complex for a laptop. But golf has simple controls: point and swing. And a peaceful 18 is the ideal way to kill time on those agonizing cross-country flights.

4) *You Don't Know Jack* is better than *The Love & Relationship Test*



You Don't Know Jack is king, especially on a laptop. It's a natural at parties. Besides, what would you rather click around with: *You Don't Know Jack* or Virtual Entertainment's lame *Love & Relationship Test*?

5) *Joust* is better than *Defender*

The oldies' primitive displays are a natural on the laptop's LCD, but control is the determining factor. *Defender* is flight sim-esque and on this list, it loses out to *Joust* for the same reason flight sims are not included: The controls are stifled by a laptop's tiny keys and usual lack of a game port.

The Electronic Fairway

Etiquette lessons for digital duffers

A survey of 1,000 golf pros revealed that most course administrators "frown on the lack of etiquette" shown by the players who frequent their courses.

To combat slow play and the players' inability to "clean up after themselves," course owners can now place a multimedia kiosk in their clubhouses that details proper golf etiquette, such as repairing ball marks on greens and raking sand traps.

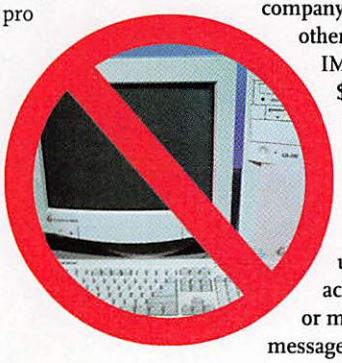
In addition to the clubhouse kiosks, at least 11 other companies are also producing electronic aides for golfers. At the low end are hand-held lasers that point at reflective targets and display the distance to the pin on a small screen. The higher-priced systems give golfers hole diagrams and two-way communication systems with the pro shop. The majority use GPS (Global Positioning Satellite) technology—the same technology that guided cruise smart bombs at targets during Desert Storm—with a transmitter located in the golf ball. So if you covertly plant your ball on a particularly attractive duffer, you can track their every move from your golf cart.

Build Your Own Web site, *"No computer required"*

With IMVInternet's Easy Site kit and service anyone can run their own Web site, and they don't even need a computer.

The kit, which retails for $39.95, comes with a pad of Web site worksheets that any gumba can fill out with pen, magic maker, or crayon. An instruction booklet also comes with the kit and will help you select a background color, templated-page design (from a selection of 10), and a glossary of Web terms.

Once completed, just mail or fax the worksheet—along with company logo and any other graphics—to IMVInternet. For $19.95 a month, they'll post the info on a site as large as three pages. They'll also set up an e-mail account and fax or mail you the messages.



Rappers Down With id

Los Angeles-based label Damian Music has just released an enhanced CD titled *Da Black Side Brown* featuring songs from Los Angeles rap and Latino artists on the audio portion, and full versions of id Software's *Doom*, *Hexen*, and *Heretic* on the multimedia portion.

Even if you're not down with the music, you might want to pick up da disc for da games. After all, you'd be hard pressed to find all three of these games on one disc for less than the enhanced CD's $15.98 suggested retail price.

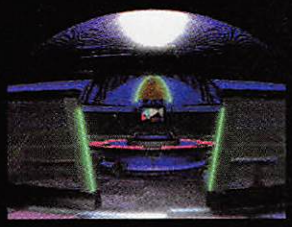
SPA to Honor Nicest Software Boxes

While many bemoan software's wasteful packaging as environmentally unsound and depriving smaller developers of scarce shelf space, the Software Publishers Association is presenting the first ever Software Packaging Awards, as part of their 12th Annual Conference in Atlanta.

Each entertainment, reference, edutainment, and productivity title will be judged in two categories: "Creative/Design" and "Most Consumer Friendly." "Packaging," says Mandy Braun Strum of the SPA, "is often the only thing the consumer uses when making a purchase decision."

The finalists for creative design in the entertainment category range from LucasArts for *The Dig* to Randomsoft for *Smart Games Challenge*.

SURF AND DESTROY™



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vertigo! negotiate real-time 3-D interactive mazes featuring multi-threat traps, dizzying pratfalls, and puzzling enemies by mastering a progressive set of gravity-defying skills.

where?
cyberspace! surf to 18 virus-mutated maze-like worlds, free-floating through a bizarre interpretation of the Internet.

when?
october! at your local software retailer.

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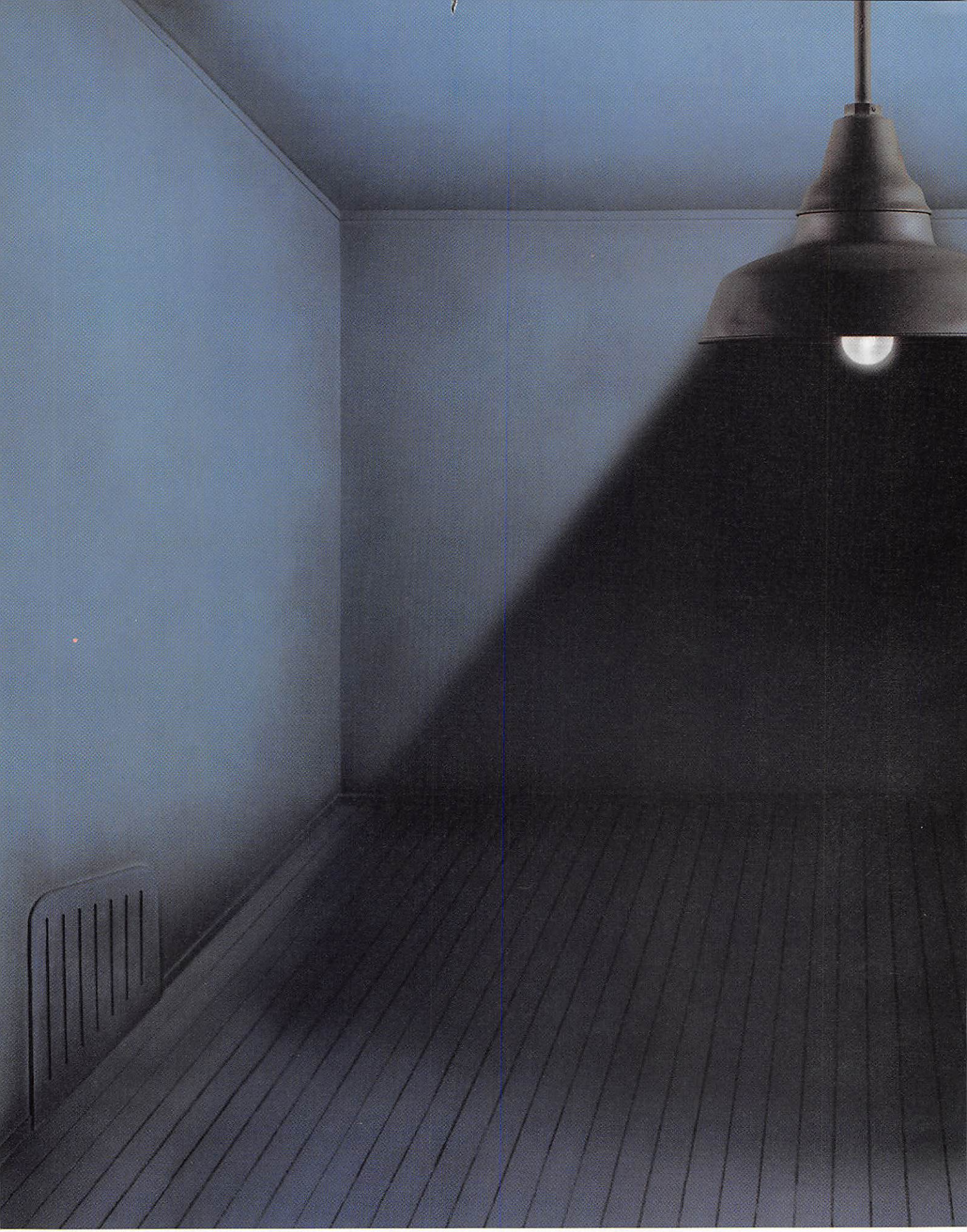

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Mac OS

Designed for Microsoft Windows 95

Product Information Number 290

Software Developers Become Free Agents

The big names are taking big bucks and big chances

As the software industry becomes more viable, the stakes become higher. As the battle for retail shelf space rages, in-house production budgets go through the roof, bidding wars break out to distribute buzz titles, and the technology marches forward; developers who crank out successful games at the cash register are managing their careers the same way professional athletes approach a new season: by signing big money contracts.

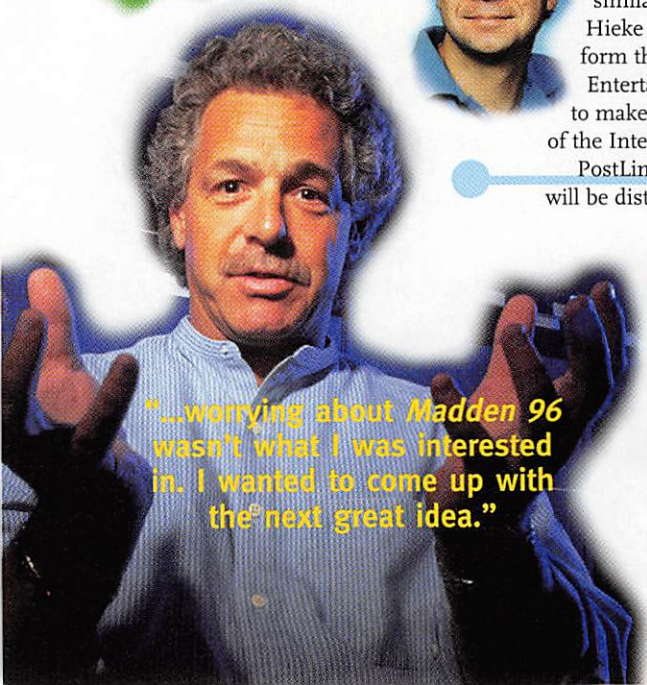
1995's sales figures for computer games were up 41.7 percent over 1994's numbers, according to PC Data. And those numbers are expected to balloon even higher in 1996. Not only have revenues increased, but the sheer number of titles released into the retail channel has risen consistently during the past three years. Game publishers need every possible advantage to make it in today's fierce market, and wooing the competition's best people away has become the latest weapon in the struggle to survive.

Highlights of developer free agency include Sid Meier's leaving MicroProse and signing with Electronic Arts, and John Romero's post-*Quake* departure from id Software to start his own company, Dream Design. Romero then recruited Tom Hall from 3D Realms. Hall was the producer for 3D Realms' highly anticipated shoot-'em-up, *Prey*. Romero and Hall had worked together on the production of *Wolfenstein 3D* and *Doom*.

Meier's agreement with Electronic Arts established EA as the exclusive publisher for games from his recently formed company, Firaxis Software. "We wanted a relationship with a publisher that would allow creativity," said Meier, who created such classic games as *Railroad Tycoon*, *Silent Service*, *Pirates!* and *F15 Strike Eagle*. Once Meier completes *Magic: The Gathering*, his long-term relationship with Microprose will be over.

Like many sought-after developers, Meier formed his own company to develop titles, and signed distribution deals with existing companies with hopes of more creative freedom. In a similar move, Ron Martinez and Andy Hieke split from Spectrum HoloByte to form their own company, PostLinear Entertainment. Martinez says they left to make new games that take advantage of the Internet and other new technologies.

PostLinear's first game, *Flying Saucer*, will be distributed by another company that was created this year by a former exec at a big name publisher, Stuart Bonn's AnyRiver Entertainment. Bonn, who was a founding member of EA, left after 12 years of producing such classics as *Chuck Yeagar's Advanced Flight Trainer* and *Shockwave Assault*. "I was concerned that as a company EA needed to move in a particular direction and not everybody felt the same way," says Bonn. "AnyRiver Entertainment was started in a risky environment and we were constantly doing things that took nerve."



The list of developers who have made the jump from one big company to another, or staked out on their own, is long and growing on a weekly basis. To the buying public, free agency may not seem like a big deal on the surface. But consider that all these big names left to make more creative games that utilize the latest technologies. They were not interested in producing sequels or formulaic hits. As Bonn says, "It's mind boggling that EA could come out with *Madden 91, 92, 93, 94, 95* and continue to dominate the charts. But worrying about *Madden 96* wasn't what I was interested in. I wanted to come up with the next great idea."

— Doug Lombardi

Free Agent Score Card

- **Sid Meier** abandons a long-term relationship with MicroProse and signs a distribution deal with Electronic Arts for his new company, Firaxis.
- **John Romero** departs from id Software immediately after the release of *Quake* to form Dream Design.
- In the midst of developing the highly anticipated *Prey*, **Tom Hall** bails from 3D Realms and joins Romero's Dream Design venture.
- **Peter Molyneux** has been complaining about the company's increased bureaucracy and is threatening to leave EA-owned Bullfrog.
- **Johnathon Ellis**, founder of Psygnosis, has stepped down to spend more time with his family.
- **Don Thomas** left the nearly extinct Atari to become a Sony man.
- EA co-founder, **Stuart Bonn**, departed to form AnyRiver Entertainment.
- **Ron Martinez** and **Andy Hieke** split from Spectrum HoloByte to form PostLinear Entertainment.
- **Frank Evers** left Spectrum—after producing *Earth Siege 2*—to join Activision.

MMX and USB delayed

Compatibility and supply issues cause holdups

Intel has confirmed that the production of USB peripheral controllers has been delayed, and Pentium processors with the MMX instruction set will not be shipping to system manufacturers until the first quarter of 1997.

Intel promised both technologies in time for this holiday season. However, an inside source at the major PC manufacturer that expected to ship the first MMX-based systems told *boot* that their MMX machines would not be available this year, after Intel "decommitted" from shipping MMX chips for 1996. The source's company had intended to stock their fall retail refresh with MMX-based systems, but will instead settle for existing technologies.

Kim Gibbons, a spokesperson for Intel, confirmed the delay of MMX. "We have pushed the shipping date from Q4 to Q1," says Gibbons. "We made the change for a couple of reasons. Our OEMs requested that we provide the highest level processor we could. They want the 200MHz and we can't make enough to meet the demand they are projecting." Gibbons also said that Intel expects the slippage will give developers an opportunity to make more applications MMX savvy by 1997, and introducing the new instruction set in Q1 works better with the OEM spring refresh. "Trying to introduce in Q4 really disrupts the Christmas buying season," says Gibbons.

"I think there was a lot of skepticism about them meeting that date [Q4 1996], says Ted Pine, an industry analyst at InfoTech. "The time to get it out would have been midcycle. The ideal times for new technology are the first of the year or midsummer. If it was released this year, it would have been incorporated on some of the high-end machines. So they miss Christmas and nobody likes to do that," Meanwhile the release of USB peripheral controllers has also been delayed by six weeks. A spokesperson for Intel said the delay was realized as the product was tweaked to meet the Plug-and-Play spec. USB hub devices, such as monitors, provide additional USB connectors for daisy chaining. USB peripheral devices, such as mice and keyboards, take up a single port and do not supply additional connectors. The spokesperson said both hub and peripheral USB products are, however, still expected to be introduced in time for the holiday season.

— *D.L.*

Sierra On-Line to Offer Video Card

Company claims it's not moving into the hardware market

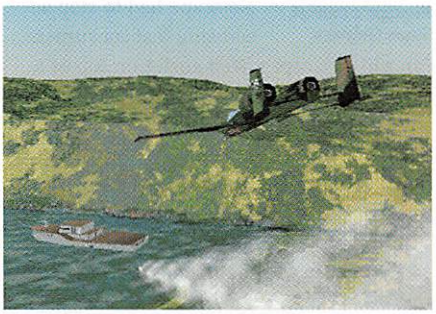
In a move that calls the viability of Microsoft's Direct3D API into question, Sierra On-Line will offer a 3D graphics accelerator card based on Rendition's Vérité chip this holiday shopping season. Although the move clearly puts Sierra into direct competition with major peripheral manufacturers such as Diamond Multimedia, Orchid Technology, and Creative Labs, Sierra claims it has no intention of becoming a hardware company.

"We're not trying to get into the hardware business," says Sierra product manager Scott Fasser, "we're trying to establish a standard." Fasser went on to criticize Direct3D, saying "there is no comparison between games written to Direct3D and games tuned to a specific chip, such as the Vérité."

Based on the prototype Vérité-based cards that have come through the bootLab, it looks like the only difference between any manufacturer's card will be the software bundled with it. Sierra's card, tentatively named Screamin' 3D, will be bundled with Sierra's *Indy Car II*, *Silent Thunder II*, and possibly one or more additional games to be announced later. The card will feature 4MB of EDO DRAM and is expected to carry a street price of $199. The Screamin' 3D is being built for Sierra by the Japanese manufacturer Canopus and should be available in early November.

Sierra will hedge its bets by also supporting Direct3D, but Fasser said the company is still evaluating whether or not to directly support other chipsets, such as the 3Dfx Voodoo Graphics. "We'll decide that based on how well the Screamin' 3D sells; how well the Vérité sells; and whether it seems cost effective to support the Voodoo," says Fasser. "But a lot of the games we're working on, including *NASCAR II*, *Red Baron II*, and *Cybergladiators* will be Rendition-ready when they ship."

Fasser says end-user cost was a major factor in Sierra's decision to support the Vérité. "3D is going to make the PC the ultimate gaming platform," says Fasser. "We're trying to make that experience affordable. The Vérité is a single-board solution, and it's less expensive."



***Silent Thunder II* is one of two titles Sierra will bundle with it's Screamin' 3D card.**

Fasser claims the initial reaction has been positive—even though Sierra hasn't signed contracts with any retailers yet. "They're interested in what we're doing," says Fasser. "The 3D accelerators on the market now have sold OK, but not great. Our challenge now is to convince retailers that these cards make games better. And we have to convince gamers that these cards make a difference in performance—that they make gaming better without having to buy a whole new PC."

— *Michael Brown*

Battle in the Courtroom

NETSCAPE VS. Microsoft

Netscape's attorney discusses the case against Microsoft

One of the fronts in the browser war between Microsoft and Netscape is a battle being fought in the courts. It began with a cease and desist letter from Microsoft. Netscape countered with a charge of antitrust violation. We recently spoke with Netscape's attorney in the case, Susan Creighton, to find out more. Creighton is a partner at the San Francisco-based law firm of Wilson Sonsini Goodrich and Rosati. She specializes in antitrust and intellectual property matters, and was one of the lead attorneys in preparing the white paper viewed as pivotal in the Justice Department's decision to file suit to block the Microsoft-Intuit merger.

Netscape's counsel, Susan Creighton

boot: Why have you been retained by Netscape and how does it involve Microsoft?

Creighton: Microsoft sent Netscape a cease and desist letter, which meant Netscape had to stop advertising that consumers can run Netscape's Web surfer on top of a Windows NT workstation, because it was suggesting that people could use it as a full platform for Web servers. And this wasn't just Netscape, this was anybody else.

boot: In other words, if you made *any* Internet product that competed against Microsoft, they thought you were breaking the law?

Creighton: You can only use NT workstations under license; which are 10 TCP/IP connections; which is any kind of meaningful use of the product. What they are trying to do is to force everybody, instead of paying $319.00, to buy the more expensive product [NT server], which is about $350 more. We thought this action was a violation of the antitrust laws.

boot: Can you give us an example of what you consider anti-competitive behavior?

Creighton: The [cease and desist] letter is a good example; when Microsoft tries to keep consumers from having an equal choice.

boot: What are you hoping will be the resolution of your actions?

Creighton: Well, to begin with, we would like to see the government start an investigation. One of the things Microsoft does is that it has these non-disclosure agreements which make it impossible for a company like Netscape to find out what Microsoft is up to.

boot: The big three CEOs of online services (Steve Case, Robert Massey, and Edward Bennett) all said they wanted the Justice Department to look into what was happening with Windows 95. Now we see separate deals between online services and Microsoft. Have the issues changed or has Microsoft turned the tables?

Creighton: I think those online services felt the only way they could match Microsoft was to be on the desktop, and they were willing to strike any kind of deal they could to get that.

boot: If Netscape already has 85 percent of the market share of Web browsers, is it just sour grapes that Netscape wants Microsoft to compete and play by the same rules?

Creighton: First off, we didn't pick this fight. Microsoft sent us the cease and desist letter. But this goes way beyond a Microsoft/Netscape thing. As far as Web servers go, neither Microsoft nor Netscape has any significant market share there. And what Microsoft is trying to do is monopolize all the Web servers, Web browsers, Web tool makers—all those things.

boot: What can we expect from Netscape in the near future regarding this issue?

Creighton: For the next couple of weeks we will be looking at a lot of issues. We'll be looking at APIs. Microsoft can give its browser a big advantage if it knows how to hook into the operating system, and other companies don't.

boot: Doesn't Microsoft give these tools internally to its own developers and then release to the public six months later down the road?

Creighton: Yes. And that is exactly what we are looking into.

— *Tom King*

***Tom King** is the host of Computalk Radio in Houston, TX and regular contributor to* boot.

Toshiba Introduces Desktop Systems

More Japanese manufacturers to follow

Following in Sony's footsteps, Toshiba has become the latest major Japanese consumer electronics manufacturer to introduce a line of desktop PCs this year, with their Infinia line.

Toshiba's first systems will feature 166MHz and 200MHz Pentium processors. Prices for the Infinia systems will be competitive, ranging from $1,699 to $2,799. Since Toshiba is one of the major players behind the introduction of the DVD format, the spring refresh of the Infinia line is expected to include DVD-ROM drives and MMX processors.

In the past, PC sales in the United States were dominated by domestic manufacturers such as Compaq and Hewlett-Packard. Toshiba's entry, along with Sony's entry, and the purchase of Packard Bell by Japanese-owned NEC, adds to what has been termed "the Japanese invasion" of the desktop market by giant consumer electronics firms. Fujitsu, fresh from their entry into the portable market, is also expected to introduce a line of desktop systems this winter.

"Currently with our portable offering, we're the country's eighth largest computer company," says Tom Scott, general manager at Toshiba. "By adding desktop computers to our mix, we have our sights set on the number five spot, and we'll be there by the end of 1997." The number five position is presently held by South Dakota-based Gateway 2000.

— *D.L.*

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pure lust

HIGH-TECH **TOYS** AND **TOOLS** WITH THE RIGHT STUFF

Don't get up

Kenwood boasts that its new KC-Z1 Stage 3 Home Theater Controller contains "all of the advanced technology we could find." Ranging from $2,800 to $3,500 (street), and offering every feature imaginable in a stereo tuner/pre-amp (including Dolby Pro Logic and Dolby AC-3 surround sound, Home THX circuitry, and TOS-Link optical digital-audio inputs and outputs), the Stage 3 is a veritable wet dream for home-theater buffs.

The cordless touch panel does much more than tweak volume. Communicating at 900MHz RF, the unit controls every aspect of all your A/V components, plus six accessories, including lights, curtains, and your blender—provided they're properly equipped. The touch panel supports two-way communication, so base unit settings are displayed on the remote control.

Kenwood: 800.536.9663; www.kenwoodcorp.com/

Baywatch never looked so good

The sheer size of Sony's new KP-61XBR48 rear-projection television set is impressive (61 inches, measured diagonally), but it's the host of extras that make this boob tube shine.

What's better than picture-in-picture? Picture-and-picture: This XBR model can display two separate television programs side-by-side in full-size windows. Sony claims its 3D digital comb filter practically eliminates dot crawl and cross-color distortion while delivering uniform brightness from the center of the screen to all four corners. The XBR48 retails for $5,499 and unlike most projection televisions, which have a small visual sweet spot, this model has an impressive 150-degree viewing angle.

Sony hasn't neglected audio, either: They've built an 80-watt stereo amplifier and a set of speakers right into the cabinet.

Sony: 800.222.7669; www.sony.com

Old school groovin'

Analog synths are making a comeback in the dance-club scene, which explains Roland's retro-looking MC-303 Groove Box. The $895 Groove Box, an all-in-one starter machine, offers 448 tones, 12 drum sets (including all the popular sounds from Roland's TR-808 and TR-909 drum machines), an 8-track sequencer, and a built-in

effects processor. The Groove Box comes pre-programmed with 130 dance patterns, all of which can be modified and stored. You can also create and store original patterns in the system's onboard memory. Although the box offers only a 16-note keypad, its analog knobs (for cutoff, resonance, LFO, envelope, and effects) offer control that is impossible to achieve with digital keyboards. And, of course, no self-respecting, analog-emulating digital synth would be complete without an arpeggiator.

Roland: 213.685.5141; www.rolandus.com

How's it do that?

The Levitron is the latest in a long line of perpetual motion machines gracing the walnut-burl desks of hip-but-bored executives. Created by a pair of physicists, this top seems to defy gravity and all the laws of physics.

The top achieves this feat thanks to magnets—one in the top and one in the base—with opposing magnetic fields. The gyroscopic force of the top's spinning keeps it stable as it floats in midair over the platform. Spun just right, the top can float in midair for as long as three minutes. It retails for $40.

Fascinations: 206.244.9834

compiled by Adam Douglas

He's dead, Jim

Vital Technologies' official Star Trek Tricorder is more than a toy. Although it can't reveal the presence of intelligent life forms, the $398 gadget can register environmental temperatures ranging from -50°C to +50°C, taking 100 readings each second and then computing an average. The device measures barometric pressure from 27.6kPa to 103.4kPa, the full range of pressure found on Earth. The current pressure reading can be stored and then recalled and compared with other pressure readings. The intensity and color of light can also be measured; and even quality and quantity of chlorophyll in plants. In addition to these functions, the Tricorder can also measure the intensity of electromagnetic fields, including those emitted by computer monitors and out of our publisher's head (which had five times more radiation than anyone else on staff).

Vital Technologies: 800.263.0096

Everything but the glass packs

A joystick doesn't respond like a real steering wheel, and an office chair doesn't feel like a bucket seat. If you're looking to add realism to your favorite racing game, check out Interactive I/O's Virtual Vehicle JD. This steel chassis features a leather-wrapped steering wheel, and an authentic race-car seat. Spring-actuated aluminum throttle and brake pedals dwell on the floor of the unit, and gear-shift buttons on the steering wheel (just as they are on Grand Prix racing cars). The whole system connects to your PC through a standard joystick port, and there's even a built-in stand for your monitor. The VVJD retails for $1,295—why, that's cheaper than a used Yugo!

Interactive I/O: 714.921.2393

Never get lost again

Products like the G2 Tracker Intelligent Navigation System seem so obvious that you have to wonder why they weren't developed a long time ago. G2 Navigation pairs a GPS satellite receiver with PC-based mapping software, so you can pinpoint your location anywhere on the globe.

Maps scroll across your laptop screen as you travel, displaying your precise location in real time. Bundled software helps track your progress, plan your route, and estimate your travel time. The complete package retails for $399.

G2 Navigation: 408.395.5989

How many Polygons?

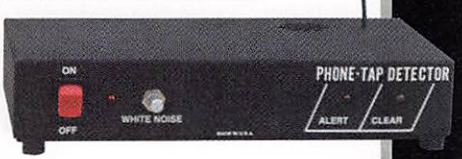
Take a deep breath before stepping up to Sega's new arcade brawler *Virtua Fighter 3*. Thanks to a graphics engine codesigned by defense-industry giant Lockheed Martin, the game's geometry engine pumps out more than one million texture-mapped polygons per second to produce the most realistic fighting game ever. Besides the high polygon rate, the board (dubbed the Model 3) is capable of trilinear interpolation; multilayered antialiasing of both textures and edges; fix, flat, and high-specular Gouraud shading; 32 levels of translucency; and fog. Parallel lighting and four spotlights add luscious ambiance to the game. *Virtua Fighter 3* should be in arcades now.

Sega Game Works: 415.802.3100

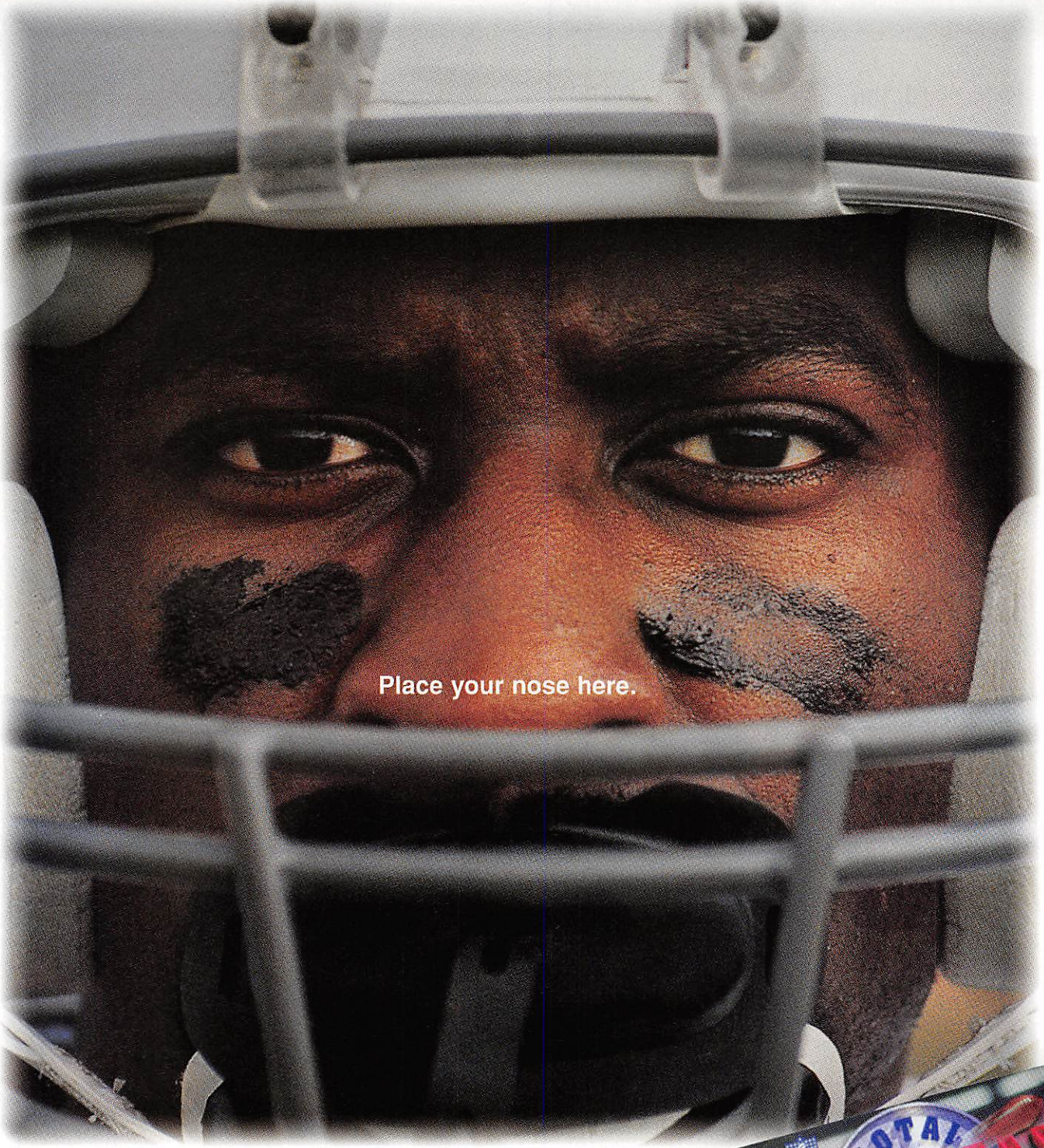
Don't bug me

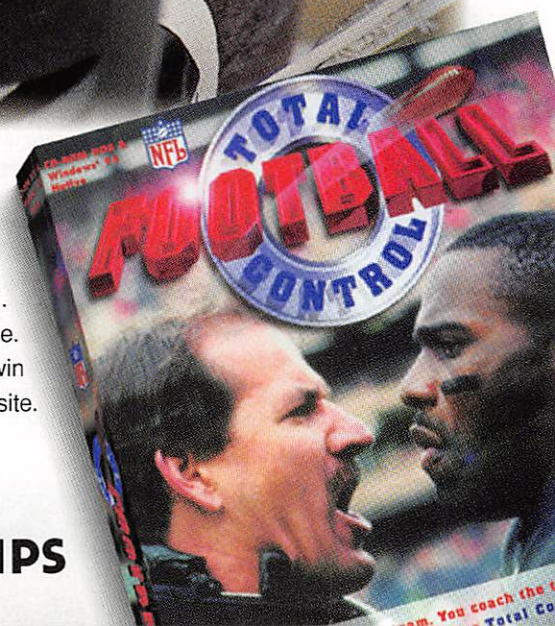
Ever feel you're being watched? Nefarious government agents staking out your home or office? Unscrupulous competitors out to steal your trade secrets? Look into the AI-5500 all-in-one counter-surveillance system from American Innovations.

Plug this handy device into your single-line telephone and it will issue a warning tone if the line is being monitored by RF, series, parallel, or line-impedance taps. It'll even let you know when someone is listening in on an extension. But that's not all. This handy device also detects the presence of AM, FM, and UHF transmitters operating in the range of 1MHz to 2,000MHz—whether they're body wires or bugs planted in lampshades. And if you can't get rid of the bug, the AI-5500's built-in white noise generator that will mask your conversation. You can't put a price on peace of mind, but the AI-5500 retails for just $379.



American Innovations: 914.735.6127; www.spysite.com





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Fire! Fire!

We take pride in our real-world product evaluations here at the bootLab. We don't hand products over to a bunch of lab-coat-wearing technicians; we use the products the same way you would. That's simply the best way to test the lofty claims that manufacturers often make for their products. Take the FireCooler 1000, for instance. When we saw that this fire safe looks remarkably like a plastic beer cooler, we resolved to put the product to an extreme test that would make Beavis proud.

The FireCooler 1000 is rated to protect computer media for one full hour in a 1,700-degree fire. But We weren't convinced.

Officials: What's going on here? • *boot* (desperately resisting the temptation to do a Butthead impersonation): Uh, we're conducting a product test.• Officials: Did you talk to the fire marshal or get a permit for this first? • *boot*: Uh, I don't think so.•Officials: Did you notify the building management you were going to do this?• *boot* Uh, I don't think so.•Officials: You guys are from Imagine Publishing, aren't you.• *boot*: Yeah! How'd you guess?•Officials: It wasn't hard.

We packed up the FireCooler with CD-ROMs, 3.5-inch floppies, and heat-sensitive 35mm slides. We dropped the safe in a two-drawer metal file cabinet and dragged it into the parking lot. To simulate the condition of a fire in a wood-construction home, we arranged a dozen Duraflame logs around and beneath the cabinet, poured two gallons of gasoline over them, and lit a match. Observing the resulting conflagration we realized that our kitchen fire extinguisher wasn't going to cut it. We were relieved to see the fire truck roll up 30 minutes later. After the fire, the FireCooler 1000 had been reduced to a molten puddle. "Looks like your product failed the test," said one police officer. But the test wasn't over yet. When we removed the safe from the cabinet, we were surprised to discover that the CD-ROMs, floppy disks, and 35mm slides had survived the fire without a scratch. This fire was intense. When we removed the file cabinet and the galvanized steel plate we had put down to protect the parking lot, we discovered that the heat had burned a hole right into the asphalt. We were stunned and amazed that a $398 plastic box could protect our media in the face of such punishment. As Butthead would say: "Huh-huh. Huh-huh. That's cool!"

Media Protection Products: 716.442.5790; www.firecooler.com

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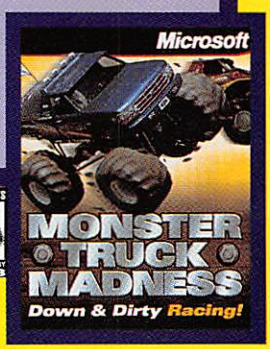

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PSYCHE OF THE DOGFACE

TRAIT STATE **PSYCHOLOGY** DRIVES THE **REALISM** IN MICROSOFT'S *CLOSE COMBAT*

"The blood! The *bloooood*!" one of your men screams, and you know he's broken under the stress of combat and is cowering in his foxhole. He's about as useful to his unit as Bill Clinton would have been to his.

This is what Microsoft's *Close Combat* is all about: Real soldiers reacting and responding to orders under the pressure of combat. No consumer simulation has ever before come even close to reproducing the realistic effects of combat, from bullet trajectories and hand-to-hand combat, right down to the subtle psychological factors that affect morale and performance. At the core of this is a set of spreadsheets, created by a psychologist specializing in combat stress, that simulate real human responses based on years of research.

The result is a real-time squad-level war game. Give commands to individual squads and they "think" and—based on their knowledge and experience—perform your order. Or maybe not: if your order is unreasonable, or the squad is too demoralized, they may simply refuse.

Say you order a squad to run across open ground under enemy fire and take a house occupied by the enemy. If you don't provide cover fire or lay down smoke, they may balk at the order, just as a real squad would if ordered to perform such a clearly suicidal move. Or maybe they *do* try to cross that open ground, and in the process all but one soldier is killed. It's pretty likely that when you check up on that soldier, he will have cracked and become useless, curled up in a fetal position. Or just maybe, he'll be so enraged at the loss of his comrades that he'll pull an Audie Murphy and single-handedly mow down every enemy in sight.

This realistic behavior is the direct result of the involvement of Dr. Steven Silver, a former Marine who flew 316 missions in F-4 Phantoms during the Vietnam conflict. As the director of the Inpatient Post-Traumatic Stress Disorder Program at the VA Hospital in Coatesville, he has counseled veterans from every war, and assiduously studied the way men behave in combat. A war game hobbyist, as well as an amateur programmer, Dr. Silver was always bothered by the way games omitted the human factor. "They let you order a human to attack in a suicidal position," he comments, "and these units will continue to move forward even in the face of annihilation. Well, that doesn't happen in the real world too often. What will usually happen is they will go as far as they can and just dig in."

Silver hooked up with developer Atomic Games while they were working on *Close Combat* (then known as "Project X") and showed them his work. At the core of this psychological model is the idea of "trait state psychology." Most people have a variety of firmly held psychological attributes based on things such as upbringing and life experiences. Everyone, for example, has a fairly consistent amount of anxiety, some more or less than others. But when put into a stressful situation that "trait anxiety" level rises. When the situation passes, the trait state gradually returns to normal.

As Dr. Silver points out, "If you have a person whose trait anxiety is relatively low, but you keep them in situations that continually evoke a state of anxiety, eventually that trait anxiety is going to climb as well. The key in all this is that a person's capacity for dealing with situations is not infinite. Everyone has their limits. Using anxiety as an example, if a person's anxiety becomes too great, it becomes unmanageable and they become dysfunctional.

"In a combat situation, what we see is that people freeze; they can't operate their weapons; they won't obey orders; they may even turn around and run away. The situation has overwhelmed both their capacity for dealing with the trait anxiety, and their capacity for dealing with the state."

Dr. Silver's research was used to create a set of probability tables for *Close Combat*, which would track behavior based on the combat situation. These tables are modified by variables based on combat experience: a unit is taken by surprise or they're prepared; they're on the defensive or they're on the attack; they've been successful in the past or they've failed; they've taken heavy casualties or none; they're physically fresh or very weary; they're well-trained or green. As Dr. Silver says, "I was looking to quantify the relative stress of these when seen as deficits or enhancements to a soldier's functioning. And this would be contrasted with a person's individual psychological profile. So, in a given situation tracking a given individual, you might see that this person does not show much initiative but does respond to orders, while the next person will take an initiative, and the third person just freezes in place."

These modifiers are all given numerical values, and an algorithm tracks all the variables in the individual psychological profile. Each element is tracked at two levels: the team level and the individual level. As John Anderson, who actually programmed the game engine, points out, "Soldiers do a lot of things they normally wouldn't do because they're part of a team. So the influence of that team and how that team reacts as a unit makes a huge difference as to whether an individual soldier will actually obey that order. We monitor the stress that the ▶ 104

"In a combat situation, what we see is that people freeze; they can't operate their weapons; they won't obey orders; they may even turn around and run away." —Dr. Steven Silver

T. LIAM MCDONALD is the all-knowing god of gaming. He also writes about computers, literature, and horror for numerous mags.

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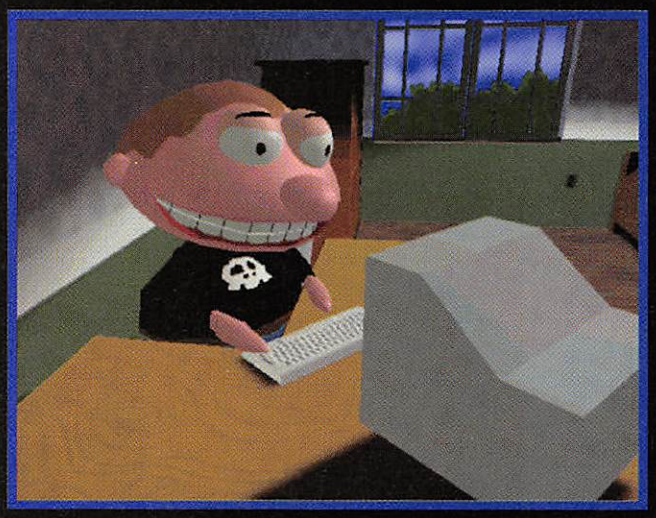

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THERE'S NO PLACE LIKE HOME

THE NET MAY BE A NARCOTIC, BUT YOU STILL NEED SUSTENANCE

It's late, and it's Friday, and The *X-Files* drew you up and away from the glow of your 17-inch Sony. But now you're back. You type and you chat, and you code, and chat, surf, chat, code, then download pictures of naked people in trashy, yet captivating QuickTime concoctions and think, "Maybe... I'll never have to leave."

And you never really have to. The Internet: it's a narcotic. It pulls you in, wraps you up in a silicon night suit, and makes you believe it's safe to stay forever. The world can be a cold, cruel place. Brrr. People delivering empty stares, honking horns, demanding more than you're willing to give. Relationship insecurities. Traffic. Crime. Pollution (which, of course, has *nothing* to do with computers, right?).

But let's be reasonable. If you're going to pursue eternal life online, there are certain basic life functions, such as food and friends, you'll have to accommodate.

Food

Even geeks gotta eat. And with our new best friend—the Internet—in the house, eating at home just got easier.

The basics: Protein + Carbohydrates + Vegetables = Pizza. Experienced connoisseurs know where Pizza Hut online is (**www.pizzahut.com**), but why not try PizzaNet.Net (**www.PizzaNet.Net/**)? It's an international network of pizza restaurants that deliver. Unfortunately, they don't have a lot of listings just yet, but the concept is good, and if you're one of the lucky blokes in the vicinity of a high-tech pizzeria, you're in for a treat. The service is not secure for credit card transactions yet, but since you're paying the delivery driver, who cares?

The service is not secure for credit card transactions yet, but since you're paying the delivery driver, who cares?

For dessert, dip into Fairy Tale brownies (**www.brownies.com/**). They are rich and chocolatey (yeah! I sampled 'em), and if you're one of those "empowered consumers" who prefers to support specific companies, this is one for you. In fact, the wonder twins that set up this choco-fix haven are so amazingly cool, I might advocate eating ONLY brownies, forever. Of course, I might just do that anyway.

For a healthful treat, check **www.2lchoices.com/** for some frozen yogurt delivered straight to your door. I don't understand how frozen yogurt can be delivered sans melting, but it's a nice thought, and much lower in fat than ice cream. (Gawd knows we're getting fatter and fatter as we type away our stomach muscles.) This site seeks feedback for new flavors—in case you're the creative type. I wonder what LowFat ActiveX might taste like...

Friends

Now that you're fed, you'll want some company. We all need friends, even if we never have to actually see or touch them.

There's never a shortage of chat rooms on services such as AOL (**www.aol.com**) and CompuServe (**www.compuserve .com**), but you'll also find chat on community-focused ISPs such as the Well (**www.well .com**) in San Francisco, or your basic BBS and IRC channels (for the raw text-based ASCII assault). These simple pleasures will always be around, despite Web tech evangelism. If you've never used IRC, trust me, it's fun. Get started at **www2 .undernet.org:8080/~cs93jtl /IRC.html** where a comprehensive FAQ lists commands, servers to log in to, and channel listings. An area code searchable source of national BBSs lives at **www.mainelink.net/~shawnc/bbslist/bbslist.html**.

Mailing lists are also a great place to interact. There are plenty of sites to help you get hooked up with lists of mail lists, not the least of which is the LISZT at **www.liszt.com/**, where you'll find more than 50,000 mail lists to subscribe to. And it's searchable!!! Type in your subject matter and get ready for high performance results. Another list of lists to try is Tile.Net at **www.tile.net/tile/listserv/**. Here you can search by keyword, subject, name, hosting country, or simple text queries. While it may not seem as enchanting as mail-order brownies and pizza, it's important to remember that friends have a significantly longer half-life than food (with the exception of Twinkies, **www.ccs.neu.edu/home/maddog/stuff/twinkies.html**).

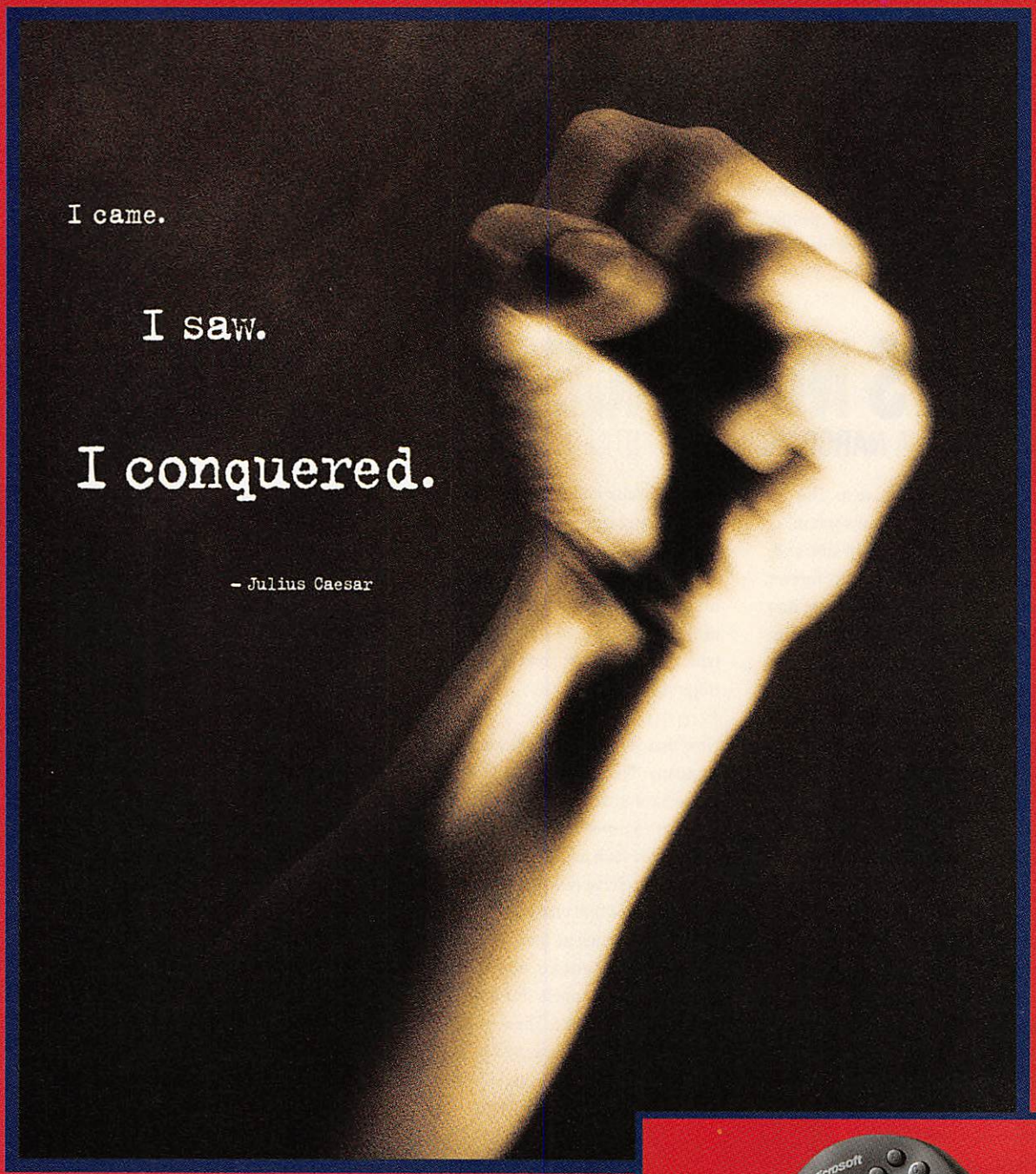
The Palace (**www.thepalace.com**) is a GUI chat forum. Like IRC, chat is typed to either an individual or to the whole group, but the interface is a fully customizable GUI with flat avatars that move across a shared-state screen. (When a character moves, everyone sees its motion.) iChat has also been busy building IRC-esque plug-ins for Netscape and Internet Explorer. Now any browser can be a hypertext chatting system. Visit iChat at **www.ichat.com**. iChat also has its own IRC client if you are unsatisfied with the one you already have.

Onlive Technologies (**www.onlive .com**) hosts a virtual chat world, where the players are masked in giant geometric 3D heads with facial expressions and voice technology. The polygon count is low, to keep interactivity and bandwidth accessibility high.

Maybe you've got the stones to go high bandwidth... *The Net* magazine (**www.the net-usa.com**) has worked with big-cheese developers (Black Sun, DimensionX, SGI, and Superscape) to produce an online virtual community with VRML and Java. Inside this world, people choose avatars and homes, communicate, store data, and cruise the metaverse looking for the life that flesh-and-blood reality just can't provide. Since when do monkeys tell time and camels fly?

And when that bird girl winks her left eye, it's time to reconsider whether or not you really want to stay home chained to your CPU.

SHEL KIMEN (shel@thenet-usa.com) has spent more time online than is reasonably healthy for one person and dreams in hypertext.



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WORLD'S SIMPLEST MACHINE

AFTER ITS **FIRST QUARTER CENTURY**, THE MICROPROCESSOR CONTINUES TO AMAZE WITH ITS **SIMPLE ELEGANCE** AND **BURGEONING POWER**

Microprocessors may *seem* complicated, but deep down they're the simplest machines in the world. Their entire universe boils down to the binary simplicity of two states: on/off, true/false, yes/no, black/white, yin/yang. You *can't* get any simpler than that. Something that exists in only one state is stateless—the essence of entropy.

Paradoxically, microprocessors are also the most complex machines ever devised by humans. Some chips weave together more than five million transistors in a fabric of logic gates whose pathways can be programmed in a virtually infinite number of ways. Modern microprocessors are so complicated that engineers cannot design them without using microprocessors. In seconds, a microprocessor can solve a classic astronomical problem that eluded human mathematicians for centuries. They can simulate reality almost to the limit of our understanding of reality. Oh, yeah, and a poorly programmed microprocessor can totally screw up your phone bill in 10 microseconds.

As you've probably guessed, I'm fascinated by microprocessors. But like most people, I used to be mystified by them—until I programmed a chip in its native machine language. This type of primitive programming lays bare the inner workings of a CPU. Elbow-deep in bits and Boolean logic, I slowly realized that the clockwork of a processor is so simple it's elemental. Basically, it's just a bunch of on/off switches. Suddenly everything made sense. So *that's* how it works! I was startled and delighted by the revelation that binary could be beautiful. I wish I could be the microbiologist or nuclear physicist who someday achieves a similar understanding of the natural universe.

Early next century, transistor geometries will shrink beyond 0.10 micron, the critical threshold at which microprocessors will be affected by quantum phenomena.

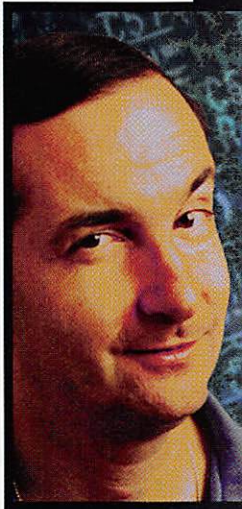
It's hard to believe that the first microprocessor was introduced only 25 years ago, on November 15, 1971. Richard M. Nixon was president; the United States was still mired in the Vietnam War; NASA's spacecraft were controlled by computers less powerful than today's programmable calculators; and the concept of a personal computer was so fantastic that even the best science fiction writers failed to foresee it. Twenty-five years later, one-third of American households have more computer power than the Pentagon once used to coordinate the air defenses of the Northern Hemisphere. (And people worry that *their* machines aren't powerful enough.)

As with other breakthrough inventions of the 20th century—radio, television, space travel, atomic energy—the general idea of the microprocessor hung in the air for years before somebody actually made one. The transistors of the 1950s led to the first integrated circuits and silicon chips of the 1960s and early '70s. The microprocessor was the next logical step in this progression toward higher integration, but still, it was invented almost by accident.

It happened because Intel, today the world's largest chip company, was too small in 1971 to fill a customer order. A Japanese company named Busicom was planning a new line of calculators and asked Intel to design about a dozen custom logic chips. Intel lacked the capacity to produce that many different chips. So an Intel engineer named Ted Hoff suggested making a more highly integrated chipset that was centered around a single, general-purpose device. This processor, and its peripheral chips, would work in all of the calculators.

Busicom liked the idea and assigned one of its own engineers, Masatoshi Shima, to the project. Two more Intel engineers, Federico Faggin and Stanley Mazor, joined as well. Creating the first microprocessor took as long as gestating a human baby: nine months. Intel quickly recognized the value of a general-purpose processor chip and repurchased the commercial rights from Busicom for $60,000.

Introduced as the Intel 4004, the first microprocessor was a 4-bit CPU that ran at a clock speed of 108kHz. (That's *kilohertz*, not megahertz.) It addressed up to 640 bytes of memory and contained 2,300 transistors. The minimum size of its components was 10 microns. It could execute about 60,000 instructions per second.



Compare that to Intel's most powerful microprocessor of 1996, the Pentium Pro. The Pro is a 32-bit CPU that currently runs at a maximum clock speed of 200MHz (about 1,800 times faster than the 4004). It addresses up to 4GB of main memory (6.7 million times as much as the 4004) or 64 terabytes of virtual memory (a feature unavailable on the 4004). The Pro's CPU contains 5.5 million transistors (2,400 times as many as the 4004). The minimum feature size is 0.35 micron (nearly 1/30 as small as the 4004's). And it can execute more than 400 million instructions per second (offering almost 7,000 times the performance of the 4004).

Architecturally, today's CPUs are even more impressive than the statistics indicate. They can predict whether you'll click "OK" or "Cancel" by observing your recent behavior, and they speculatively carry out instructions beyond that decision point even before the electrochemical computer in your skull has made up its mind.

All this makes the 4004 look amusingly primitive. But to put it in perspective, the 4004 was more powerful than ENIAC, the first electronic digital

▶ 104

TOM HALFHILL is a senior editor at *Byte* magazine and the author of two computing books. He first became interested in computers during the disco era.

boot went to Paris, France to talk with the man in charge of making *POD:* the first MMX game, a full-screen, high-adrenaline, futuristic racing game. More than 30fps, realistic light and shadows, and high-frequency music demonstrate what MMX is capable of, but it's the raw speed of the game that will feel different to the first users that crank the throttle of MMX.

Meet **FABRICE VALAY** the

Driving Force Behind MMX

boot: Is MMX going to cause a revolution?

VALAY: For sure. It brings something really new. The SIMD [simple instruction multiple data] processing means the computer is able to do many things at the same time; and for developers this means that we're able to display eight times the amount of elements. In terms of what's displayed, it is really a big difference.

boot: Motorola says MMX does nothing for games.

VALAY: Do they know anything about games? or MMX technology? I can show you *POD* on a Pentium and I can show you *POD* on an MMX and you'll have the answer.

boot: Are there games that just won't benefit from MMX?

VALAY: All the games that do not use a lot of the CPU; those that do not consume a lot of power from the engine; they will not benefit from it. But then again, a good game does not necessarily need more power. *POD* is using a lot of the machine's power and it exploits the MMX chip. And that's where the revolution will come from.

boot: Tell us about *POD*.

VALAY: It's a picturesque racing game. You can play with up to eight human players at the same time or against the computer. The way you're able to master your car, and master your track allows you to win. There is no confusion in this game; it is only a racing game. Another thing unique about the game is that it goes very, very fast in high resolution at 30 frames per second on any MMX machine. From what I've seen on the PC, this is the most amazing racing in terms of speed and behavior. The main idea was making it as fast as possible in the gameplay. We've been studying every game in the world; all the production values; all the behavior like in *Mario Cart*: the way you control the car, the gravity; or in *Ridge Racer*: the streets and the tracks. We tried to understand everything that makes a great game and figure out what was the best combination. You must know the car and the track, and understand how the car works. If you beat somebody, you'll not only be a better driver than he is, you'll be smarter. I can outsmart you by choosing better settings. You can train, but you'll never beat me because I'm smarter. The idea of fighting between the racers is very strong in this game.

"I'm working hard and I'm playing hard every day."

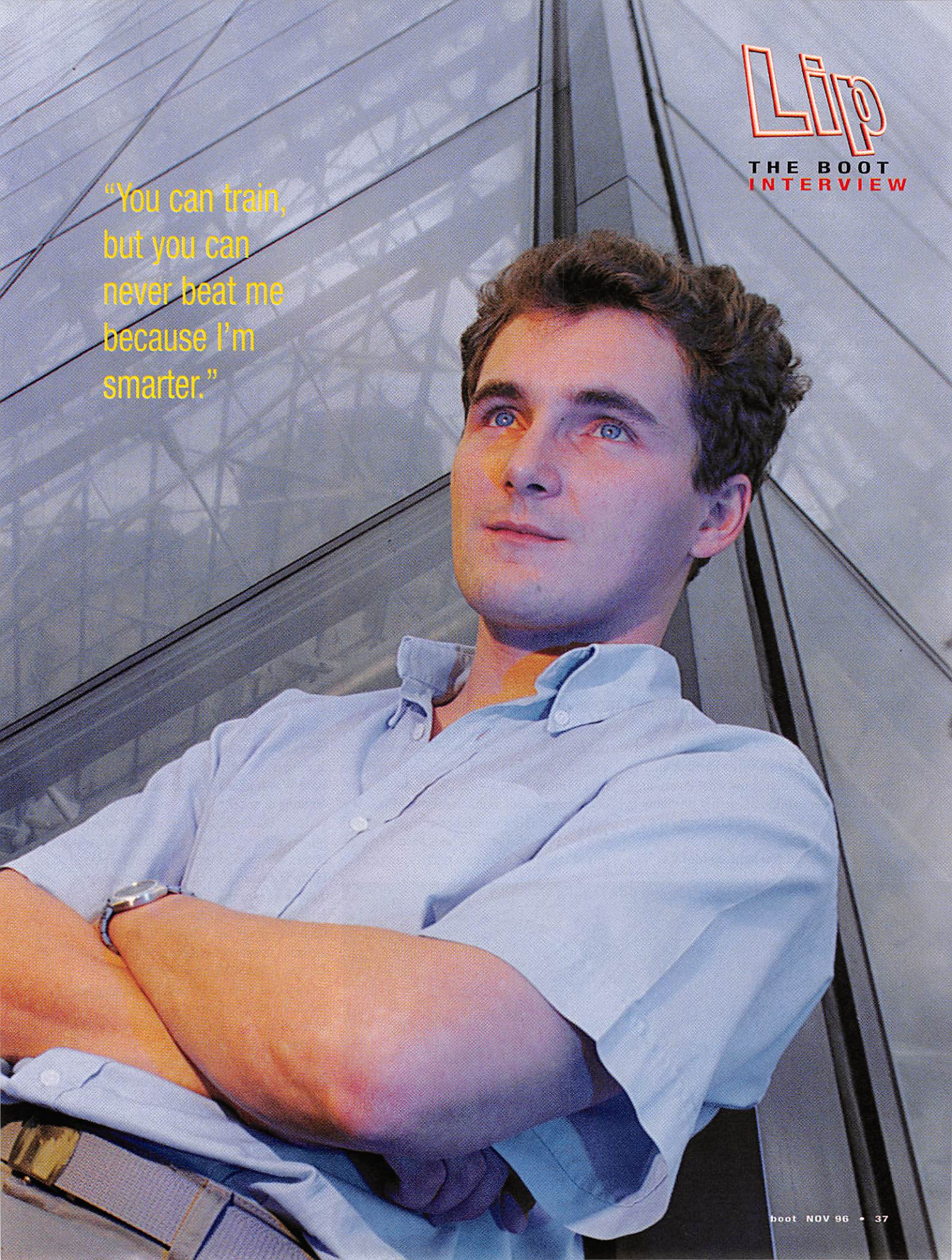
boot: Is that why everyone at the trade shows is talking about this game?

VALAY: I think so. We had two or three screens running only one game, which is nothing compared to big companies like Nintendo or EA. People were amazed only by the technology. But you cannot rely on the technology; it must be something more. It must be more than just a

PHOTOGRAPHY BY MARK MADEO

Lip

THE BOOT INTERVIEW



cool demonstration of what the MMX can do. We think right now everyone's talking about how [MMX] is a very good technology and tomorrow they will speak about [*POD*] as a very good game. Instead of just having a good product, we're going to have a hit, maybe a mega-hit. I *know* that if I have a good core technology product, it will be a hit, because in this industry everything with good technology was a hit. But in order to have a mega-hit like *Doom*, *WarCraft II*, or *Duke Nukem 3D*, you need much more than that. You need to be very good in terms of technology and gameplay.

boot: How different is programming for MMX instead of standard Pentium? Was your team coming back to you and saying, "This is a nightmare"?

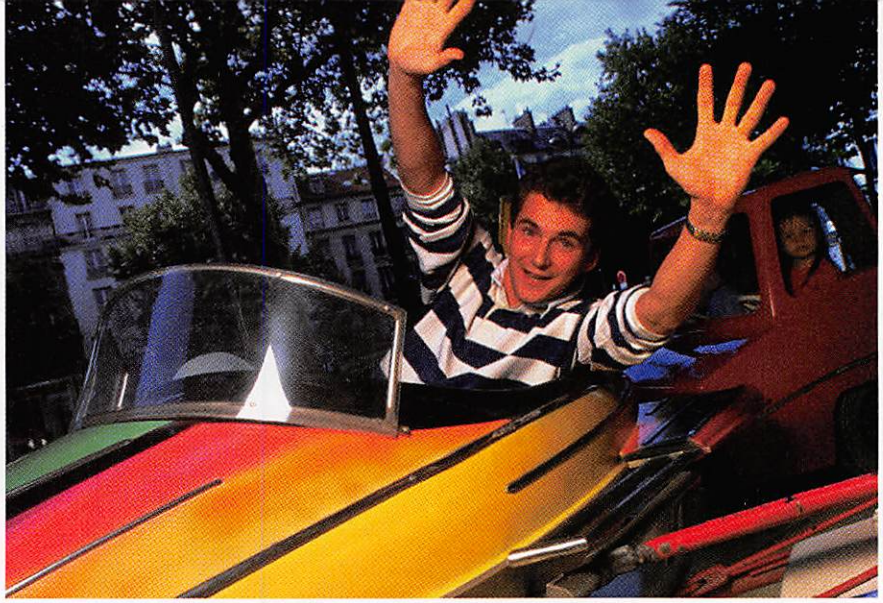
VALAY: It was easier, through the cooperation we had with Intel, because we were able to work with their MMX people directly. We coded the 3D engine and let them [Intel] explain how to exploit the chip. I think that it's even easier because of the multiple data structure. The MMX chip understands what you want to do.

boot: Was Intel a partner, overseer, consultant? How would you describe your relationship with them?

VALAY: They were much more partners. We have similar goals. They have a very good product and they want to sell it. We have a very good game and we want to sell it. To demonstrate a very good machine, you need games that show what it can do. We have been working together on many aspects of the game and technology. It's a question of helping each other.

boot: How would you sum up MMX's advantages, in terms of programming?

VALAY: The MMX is very useful for mainly three different effects. One is 3D optimization, because it allows corrections not possible on a normal Pentium. On a [non-MMX] Pentium, you see distortion. Second, because [MMX-based machines] are more powerful, we save the CPU's time for other things like artificial intelligence. In *POD*, you never see two races alike because the AI is open ended. It can adapt to the way you drive. In some racing games, if you start a game at the very left of the track and no one will every bother you. In our game this is not possible. You never know how they are going to come at you. This is the power of MMX. Finally, the sound. We're doing a lot of complex calculations thanks to MMX. We can have an infinite number of voices which was not possible before. There were 32 voices mixed together to create a realistic engine sound. You can feel it. For example, even if you don't see the other car, you'll know by what you hear that you've been passed.



Valay told us that he was pleasantly surprised by Intel's decision to push the release of MMX back, because it gave UbiSoft more time to improve the game.

"But if a [new] machine offers you technology and power that the old one did not, it allows you to put more of your dreams into the game."

boot: *POD* will be available for both MMX-enhanced and standard Pentium machines. Is the MMX version the same as the Pentium? Is it a different SKU?

VALAY: No, it's two different programs, on two different discs, and two different packages. The Pentium version will not be as rich as the MMX one. The background in the Pentium will be lacking. You will not have the same frame rate. But you can change the size of the screen to adapt it. We don't want to sacrifice gameplay for anything. The main thing racing needs is to be very fast. Of course it needs to be beautiful, too. So for the Pentium version, we had to make some choices.

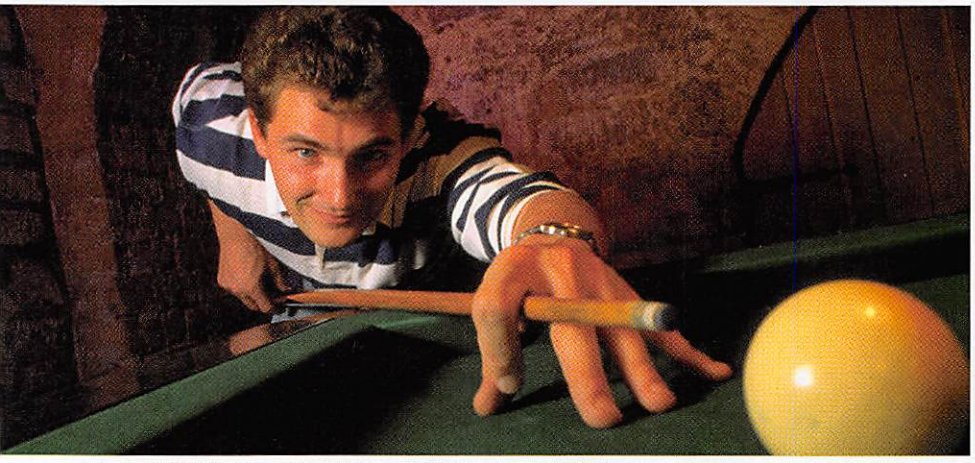
boot: Was it a headache to make two versions at once?

VALAY: You need to know exactly where you want it to go. It's a question of organization. We worked with different teams. There is a team that makes the engine, then there is a team that adapts sound, then a department that adapts the game to every 3D accelerator card. After that, we had to consider the ways we were going to treat different data. Making a Pentium version and an MMX version was like working for two different platforms.

boot: How long until MMX titles are as common as CD-ROMs?

VALAY: It's going to be released in January and Intel predicts big sales in the fall of '97. So at the end of the first quarter, all the people on top of technology will have [an MMX system].

boot: What do you see as the next step after MMX?



Around UbiSoft's offices, it's well known that Valay will gladly beat anyone at pool or cards.

VALAY: I've heard about the Pentium Pro and MMX technology merging. I'm sure Intel will make them together next year.

boot: Are there things about MMX that you've learned from making this game that you weren't able to incorporate in this project but will use in your next effort?

VALAY: When a machine comes out on the market, you do not know what it is really capable of doing. I'm sure you'll be able to do much better things with MMX than we have done right now. Each month we tweak and learn more about the hardware, what needs to be done by the software, and how it all works. I think in two years you'll see *really* amazing things with MMX.

boot: In the United States, different types of games are made in the different regions. On the West coast, for example, they're more like Hollywood productions with big sounds and movie stars. On the East coast there is a lot of attention to interface. And in the South they make shoot-'em-ups. Is there a difference in the games that are made in the different countries and regions of Europe?

VALAY: You'll always have the *French* touch and you can't compete against that [laughs]. But I think there's a big difference between English and French developers. You have a long history of development in England, and people there are moving from one company to another. This is not the story in France. Our goals are very different. First, we're trying to have the best graphics *ever*. Second, we're trying to have great gameplay. And we do all this because we are looking for a hit.

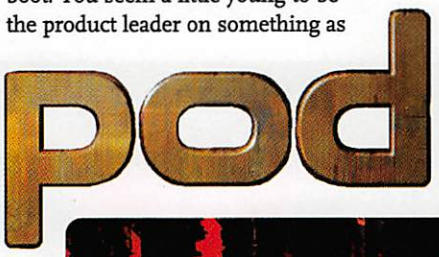
boot: You seem a little young to be the product leader on something as important as the first game bundled with MMX systems, the definitive demonstration of this new technology. What made Intel feel you were qualified?

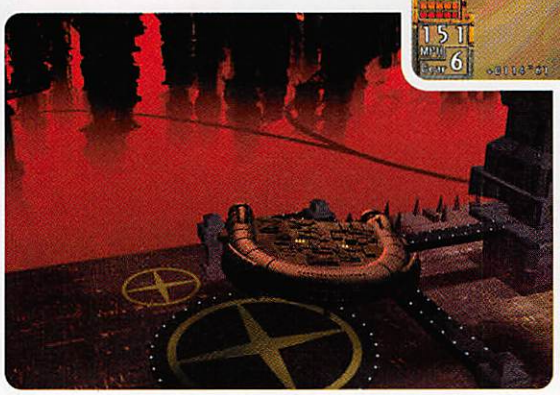
"I *know* that if I have a good core technology product, it will be a hit, because in this industry everything with good technology was a hit," says Valay.

VALAY: My passion for games. That is the thing. I also know what management means. I'm working hard and I'm playing hard every day. I really love that. I'm 28 and I'm one of the old guys in this industry. The average age on this team is something like 26. But all of us are passionate people. All the people in this company are gamers, and gamblers. That's what brought me to this company.

When we first started [*POD*] it was a year and a half before the MMX existed. Everybody knew Intel was developing a new microprocessor, but nobody knew what this computer would be able to do. Until about a year ago, we were developing without any idea of MMX. But we knew computers were able to do so much. And tomorrow they'll do more. Today we are ahead in the industry and we were ahead at E3 because we started with the assumption that the technology would allow us to do more.

boot: You mention the computers of yesterday. What was your first computer?





POD is a futuristic racing game that supports up to eight players. The graphics and sound benefit from MMX. But the speed of the game is what makes it really stand out.

Coming soon for Windows®95

REACH OUT AND TORCH SOMEONE.

F/A-18 HORNET

The hottest flight simulator game is now torching up your Windows® 95 PC. It's F/A-18 Hornet. With incredible 3-D graphics and realistic instrumentation, it'll push you to the outer limits then bring you screaming back to earth. In fact, F/A-18 Hornet closely simulates the Navy's own attack-fighter aircraft. There's 28 different Persian Gulf combat missions to test your skills — where you can blow up everything from ammunition depots using the M61 Vulcan cannon to MiG fighters with an AIM9 Sidewinder. So pick up the award winning F/A-18 Hornet today. It's the best way to get close to someone.

GRAPHIC SIMULATIONS CORPORATION

www.graphsim.com/graphsim

Product Information Number 150

VALAY: I had this old one when I was 16, and I don't even remember what it was. I didn't like it because it was only for work and school. The computer I'm using today is a big change from that one. When I got into this industry, it was because I was keen on games... and only games. I'm really in love with every type of game. And the machine didn't matter in the beginning. But if a [new] machine offers you technology and power that the old one did not, it allows you to put more of your dreams into the game. If you know how it works, with every better machine you will have a better game. Yesterday, the games were in 16 colors, today they are in 256, tomorrow they'll be in 65,000 colors, then millions, and they will have more life. If the gameplay follows, we'll have games that we only dream about right now.

boot: We've heard that *Duke* and *WarCraft* are your favorite games. What is it about those games that make them your favorites?

VALAY: They are action games *and* they are multiplayer games. They put high quality in every part of the game. I think these two products have reached a certain technical quality and put the requests of the consumers at the top. That is something I like. I first enjoyed playing *Duke* in single-player mode, so I could know the maps and the weapons and learn to behave as Duke. Since that time, I've been playing for hours with friends over a network. I think it's important for new games to give you both. That's what made *Doom* the best game of the century. It was all new to play with other human beings, and it's like sports because you can bring in your friends.

boot: Have you played *Quake*?

VALAY: Yes. But not as much as *Duke*... yet. They went a little bit further than *Duke*. They used real 3D. Right now computers are still not quite strong enough, so the playability is somewhat cut down. But in terms of atmosphere, they went further than *Duke*. I also think the monsters and characters in *Quake* are stronger than the ones you find in *Duke*. I read in an article that pigs with guns are not very realistic. Right now, I still prefer *Duke* probably because I've played it more. Come back in a month, after we finish *POD*, and maybe I'll tell which is better.

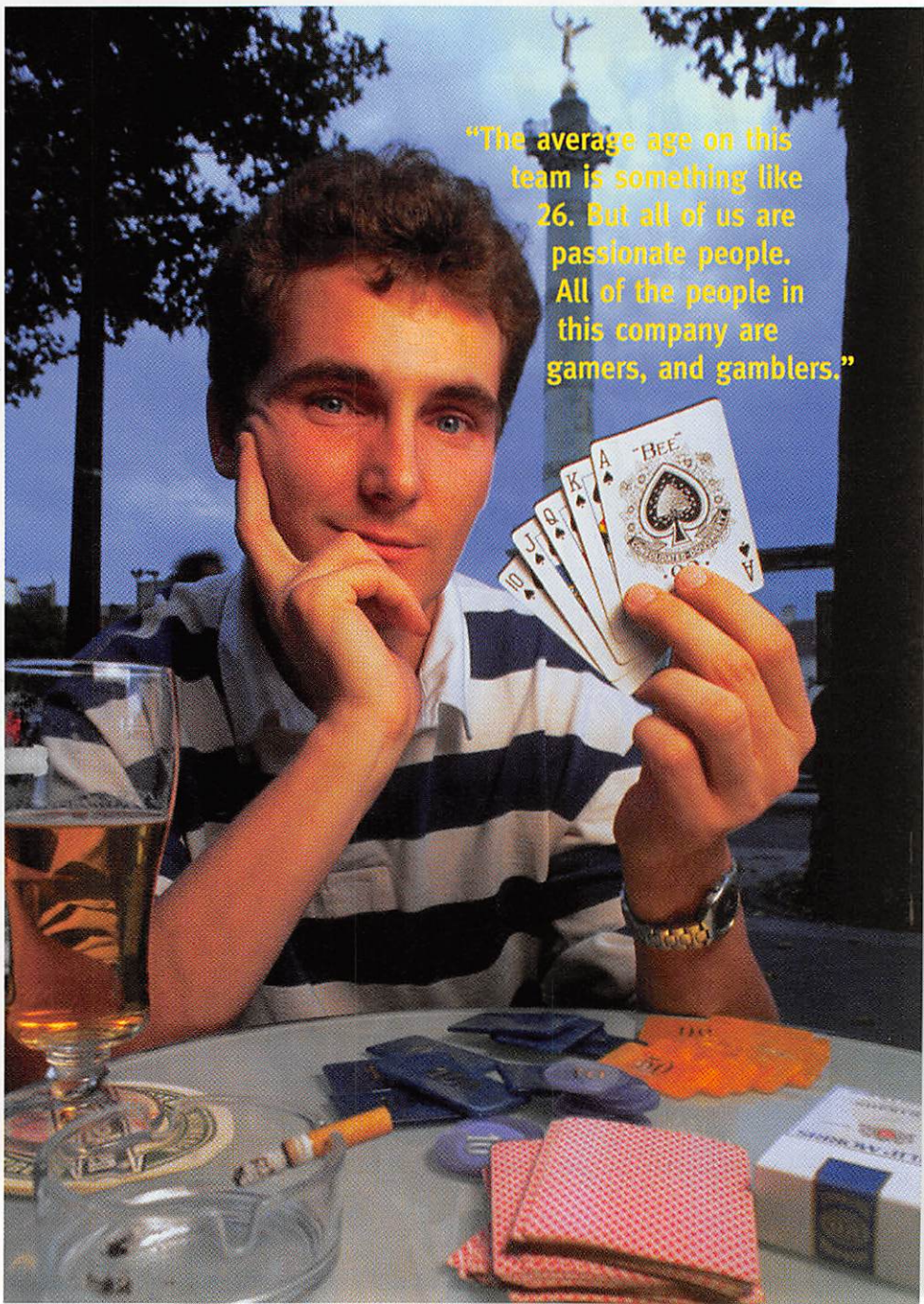
boot: How will *POD* take advantage of Internet play?

VALAY: Due to long latency times—no matter what the computer's technology is, no matter what the game is—the phone lines themselves are still the big obstacle. We're trying to play through the Internet directly, but we know the latency is still so bad that it's difficult. How much is the player willing to accept from latency to play against other human players? As a player, I am very happy to play against a machine, but no machine can challenge me the way another human being can. Our Web site is going to allow us to download new tracks, new cars, and exhibit your best record, so you can tell everybody in the world that on *this* track, you are the best.

boot: Hardware seems to be evolving faster than software. Would you agree?

VALAY: When I see *POD*, I think [software development] is moving very, very fast. A lot of people understand right now that it is real work to make games. For quite a long time, you had teams everywhere in the world who were developing games. But none of them were as proficient as the companies right now. One or two years ago, to be smart was an advantage. Now, everybody is smart and proficient. In the next six months, only the best products and games will be able to leave development.

So, I believe we're going much faster than the hardware right now. And when I say we'll move faster, I mean we'll regain the time we've lost. The two worlds need to go together.



DVD-ROM promises to deliver the **biggest** boom in desktop **power** since the **CD-ROM drive** made the kilobyte obsolete. With specs that'll make your head spin and a promised price point that makes the **sexy new technology** attainable for even the most modest desktop explorer, DVD is a major **breakthrough** that will change the way we use the **PC**. Everything from gaming to reference to applications with massive data libraries will be **revolutionized**. There's no doubt about it...

DVD is Hot!

So When Can We Have It?

The Pros and Con of DVD

PHOTOGRAPHY: AARON LAUDER ELECTRONIC MANIPULATION: L. MORRIS

BY DOUG LOMBARDI

Evolution. It's the natural development of a species or technology from its original and primitive state to its present and specialized state. And it always takes time. Just as it took 40 years for the computer to evolve from being a glorified calculator the size of a refrigerator to become a fast, multi-tasking device that can fit in a briefcase, history will prove that the evolution from 170K 5.25-inch floppy discs to 4.7GB 5.25-inch DVD-ROMs will also take time.

Everybody's heard of DVD (Digital Versatile Disc) and some even understand how the increased density of pitted data on the dual layers of a disc that for all intents and puposes appears to be a common CD-ROM represents a quantum leap. Compared to CD-ROM's chunky quarter-screen video clips, DVD will bring full-length feature movies to your PC (whether or not that's a good thing is a matter of opinion.) And movies definitely aren't the only arena DVD will bring to life on the PC: DVD is the perfect candidate to transport the ballooning software of today and tomorrow.

DVD will bring **full-length** movies to your computer. Whether or **not** that is a **good thing** is a matter of opinion.

"We're excited because we can dramatically improve audio and video qualities to the levels that customers expect," says Brad Crystal, director of OEM sales at Activision. "(Customers) have been sorely disappointed with CD-ROM, which just doesn't have the capacity."

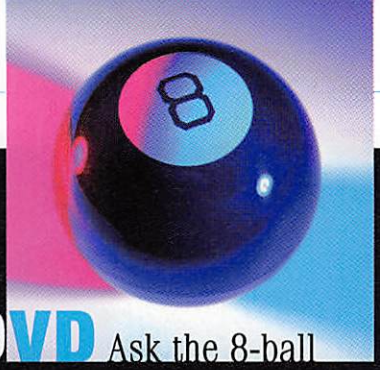
Everybody's Excited

Hardware companies recognize DVD as a huge reason for people to go out and buy a new computer system. Spokespersons from NEC, Compaq, IBM, and Sony (the first manufacturers expected to ship DVD-ROM-equipped computers) agree that DVD will arrive as an OEM product, not in retail upgrade kits. That's a reasonable assumption. DVD's MPEG2 (broadcast quality) digital video requires an additional hardware MPEG2 decoder. DVD's Dolby AC3 also requires its own decoder. Upgrade your system with these two devices, *and* a new DVD-ROM drive, *and* the fastest processor you can find (preferably one featuring the MMX instruction set) to process all this data at an acceptable speed, and you'll discover that you can buy a ready-made system for roughly the same price you'd pay for all the components. Plus, you'll spare yourself the time and cost of installation.

While they will not be among the first generation of DVD drives offered, the prospect of DVD-R technology holds tremendous promise. Unlike the complex burn cycle required by CD-R, the DVD-R drives proposed should be much less arcane. Imagine backing up a 4GB drive onto a single disc. Imagine copying all your favorite games onto a single disc.

Software publishers, with a few exceptions, are excited about producing titles with finer video, graphics, and sound on a media with the room to stretch out; no more compressing and squeezing to fit all the assets on the platter. A new wave of titles means a new wave of genres, sales, and perhaps even new customers.

Specifically, those customers who saw CD-ROM as interesting but primitive. Expect the first software to be re-releases of existing games, mastered to DVD and bundled with DVD-ROM-equipped computers. Activision, for instance, plans to release DVD versions of *Muppet Treasure Island*, *SpyCraft*, and possibly *Zork Nemesis* in this fashion. "By mid-97 there will be (an installed) base," says



DVD Ask the 8-ball

Activision's Crystal, "that's when we'll see DVD-specific titles."

But not all software publishers are as excited. A survey of software publishers taken by International Data Corporation, an industry research center, showed that 25 percent of publishers polled are not at all interested in publishing on DVD.

DVD's **Dolby AC3** audio will produce sound **rivaling** the **sexiest** home theater configuration.

Those hooked on the PC experience are salivating for the next level, that next high in computing. And the majority of computer users, especially early adopters, want to give DVD a try. Another IDC survey revealed more than half of all CD-ROM drive owners polled would buy a DVD-ROM drive within the first year of introduction.

But before getting too keyed up about the promise of DVD, let's take a hard look at all the Pros and the Con of this technology.

PRO # 1: INCREASED STORAGE CAPACITY

Imagine buying a first-person shoot-'em-up with an extensive level editor, Dolby sound, multi-player modes, 3D graphics, and more than 100 levels, ranging from strictly shooting to adventuring and then back to shooting; concluding with a 20-minute digital movie—and all on one disc. Fans know it's never been done because the raw amount of data required to produce such an extensive experience would consume many, many discs—and let's face it, the last thing you want to see when you're ready to toast your buddy is: Please Insert Disc 3. DVD, on the other hand, has the capacity to hold this sort of load on one disc. Once DVD arrives, the CD-ROM games of today, which average 30 hours of estimated gameplay, will seem as limited as *Kaboom* and *Bezerk* seemed when CD-ROM arrived. When dual-layer, double-sided DVD becomes available, expect 17GB of data on a $20 to $30 disc. And gaming is not the only experience that will benefit from fatter storage. Reference titles, currently updated annually with a new disc (for additional $$$), will be able to hold much more information out the gate and also be written with HTML code that allows downloadable updates straight off the Web. The dream of a disc that never grows stale will become a reality with DVD.

CON: YOU CAN'T HAVE IT NOW.

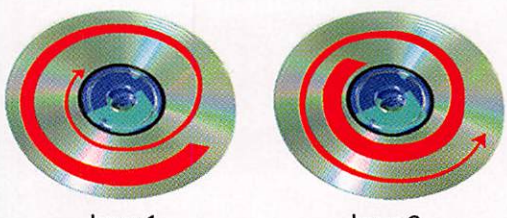
PRO # 2: RAPID TRANSFER RATES

You've just killed a creature twice your size. It required every weapon you had found in these dank halls and every ounce of ammo you could muster, but damn it! That bastard's dead. Your hands are covered with blood and you stagger onward, praying you find a medkit to mend your broken bones before some new demon finds you. But before moving on, you must wait, staring at a "loading" prompt screen, and you come down, and you realize "this is just a game." Actually, this is just CD-ROM technology. Despite its upsides, many brought about through innovative programming and faster systems, the format has been plagued by this dreaded drawback. DVD offers the fix. With transfer rates twice the speed of the fastest CD-ROM drives available today, this annoying experience will soon become a thing of the past. Data rates will vary from 1.0 to 10.0MB per second, and average 3.0MB per second. Not only will DVD drives have faster access times and transfer rates, the systems they come in will have faster processors with the MMX instruction set to accelerate the processing of video and audio data. Intel has positioned MMX as an accompaniment to DVD to make the evolution that much more dramatic to the user.

CON: YOU CAN'T HAVE IT NOW.

PRO # 3: FULL-SCREEN DIGITAL VIDEO

Multimedia titles all seem to begin with some intro movie that, even today, pales in comparison to anything beamed in on the television. Video on the PC leaves much to be desired. The hitch has always been the bulk that video data hefts with it. A single second of uncompressed full-screen, full-motion will consume 27MB. At this rate, a CD-ROM with roughly 650MB of storage space couldn't fit a single minute of video, and no data bus in the world could stream such a load. Enter DVD. With a storage capacity of 4.7GB per side, the ability to store data in multiple layers per side, and MPEG2 compatibility, DVD will bring superior quality digital motion pictures to the PC. The new format, with 720 horizontal pixels and 480 vertical lines, uses the same compression scheme employed by Digital Satellite Systems (DSS), which is superior in sharpness and resolution than even a laser disc and far better than VHS's 300-plus lines of resolution. When drives that read double-sided discs (8.5GB) are introduced, you'll be able to watch digital versions of such classics as *Smokey and the Bandit* parts I *and* II without leaving the comfort of your cushy



With dual-layer DVDs, the laser pick-up reads from the edge, spiraling in. Then it retunes its laser for the second layer and reads from the hub, spiraling out.

HOW DVD DRIVES READ A DUAL-LAYER DISC

CD-ROM TO DVD: WHAT WORKS WITH WHAT

desk chair, switching tapes, or swapping discs. And powerful forward and reverse search/scan, super-slow motion and stills features will all be on demand, so you can loop that one spectacular car stunt ad naseaum. Interactive movies and FMV titles, such as *Wing Commander IV* or *The 11th Hour*, which originally shipped on multiple CD-ROMs will come on a single disc with room to spare. And although CD-ROM-equipped PCs made it possible for *Wing Commander IV* and *The 11th Hour* to contain motion video, the quality of that video will be instantly put to shame with the introduction of DVD.

CON: YOU CAN'T HAVE IT NOW.

PRO # 4: ENHANCED SOUND

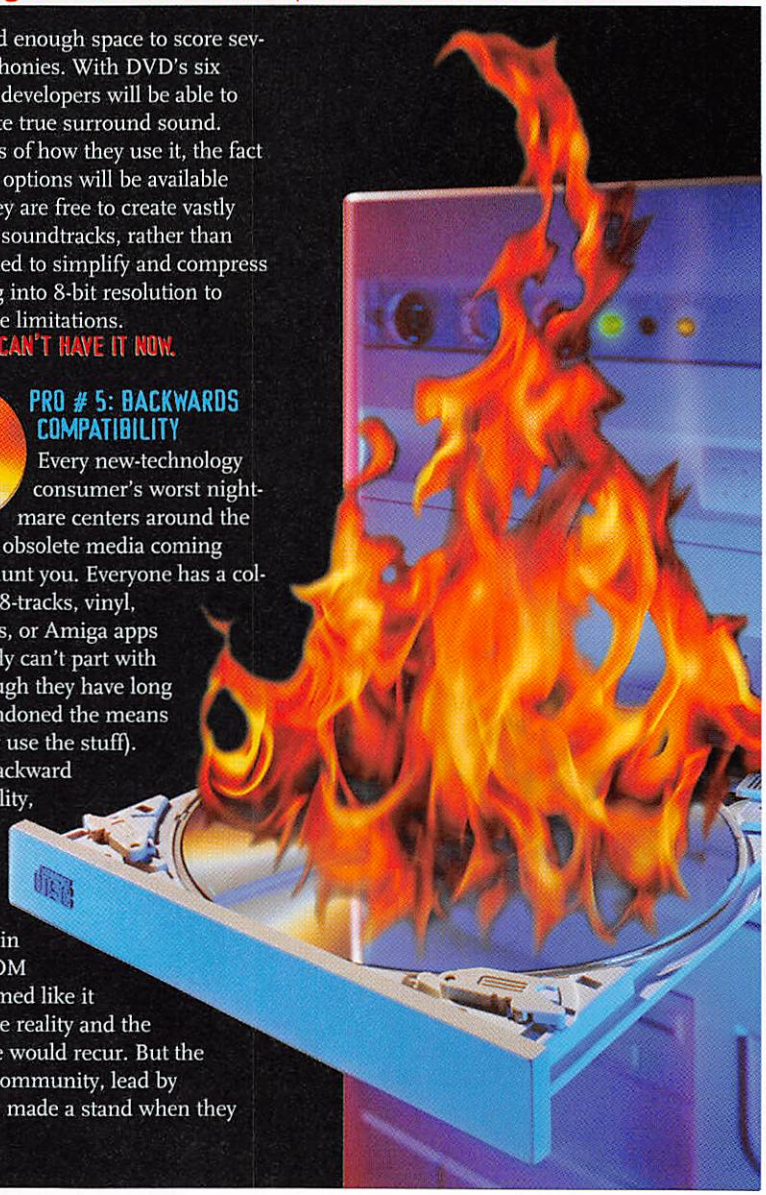
With rare exception, (*Quake* and *Zork Nemesis* come to mind) nearly every game ever made has sported a soundtrack that would make Beethoven plug his ears. Looping sequencer lines have become status quo. If the explosions, groans from the monsters, or the voice acting of the animated characters wasn't crucial to the game, we'd probably prefer to play with the sound off and our favorite audio CDs on. Just as FM defeated AM, stereo blasted mono, and THX conquered the theaters, DVD's Dolby AC3 audio capabilities will produce sound from a PC that will rival the sexiest home theater configurations and reshape our opinion of what sounds good. Specifically: six channels of audio in resolutions as high as 48KHz (better than today's audio CDs), multi-language voice tracks, and enough space to score several symphonies. With DVD's six channels, developers will be able to incorporate true surround sound. Regardless of how they use it, the fact that these options will be available means they are free to create vastly improved soundtracks, rather than being forced to simplify and compress everything into 8-bit resolution to meet space limitations.

CON: YOU CAN'T HAVE IT NOW.

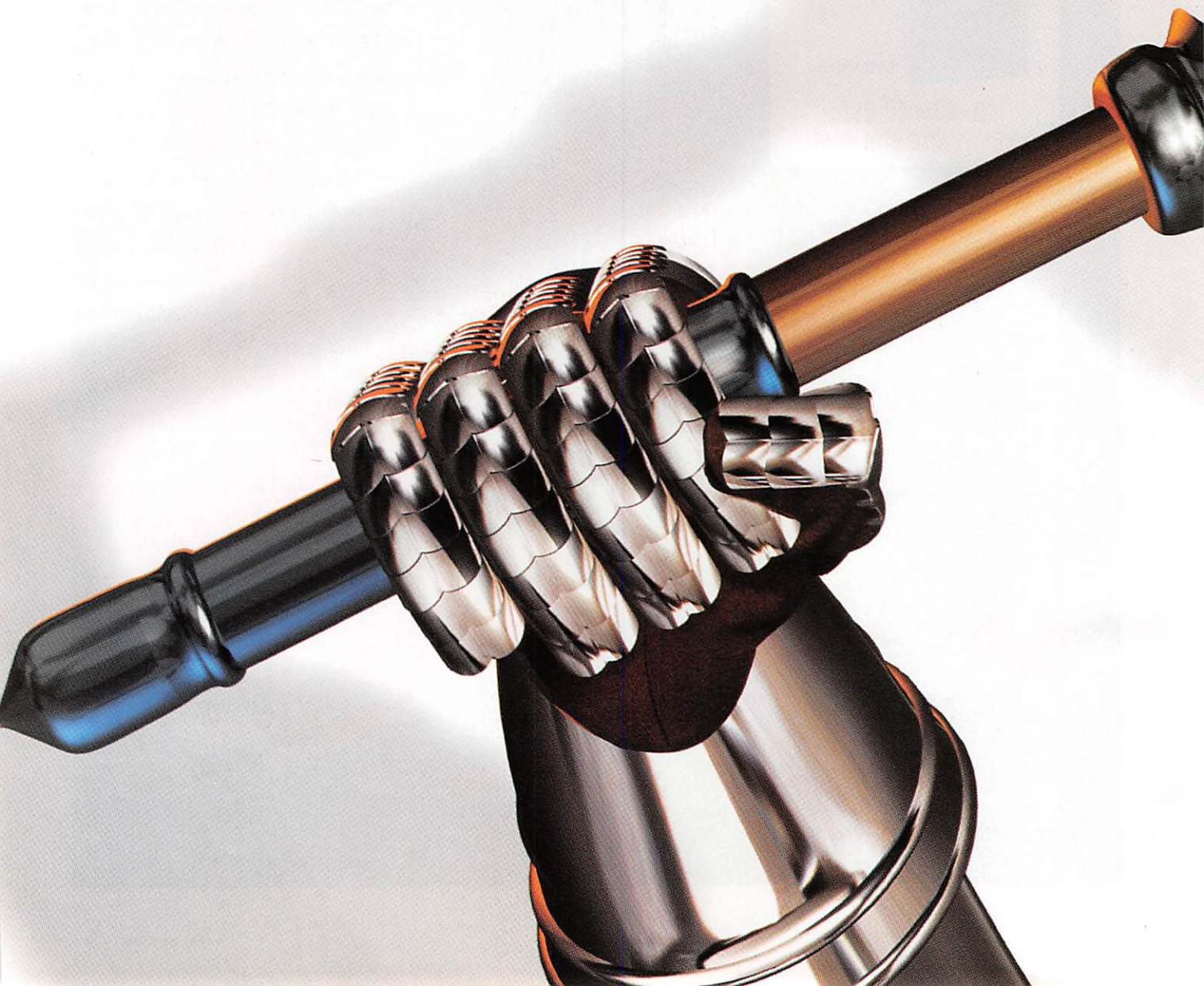
PRO # 5: BACKWARDS COMPATIBILITY

Every new-technology consumer's worst nightmare centers around the ghosts of obsolete media coming back to haunt you. Everyone has a collection of 8-tracks, vinyl, 2600 carts, or Amiga apps they simply can't part with (even though they have long since abandoned the means to actually use the stuff). At first, backward compatibility, specifically the ability to play a CD-ROM in a DVD-ROM drive, seemed like it may not be reality and the nightmare would recur. But the software community, lead by Microsoft, made a stand when they laid down an ultimatum to the DVD manufacturers: "Give us a unified standard that is compatible with CD-ROMs or we will not produce software to support it." Customer surveys proved to be in line with the software developers demands, so hardware manufacturers made CD-ROM compatibility a priority. They even took the concept a step further: Discs made exclusively for DVD movie players will also play in DVD-ROM drives, as will audio CDs. No final versions of working drives have been made available, but every manufacturer, including ▶ 104

A **single** second of uncompressed video **consumes** 27MB.



FOR A FREE DEMONSTRATION OF OUR 3-D GAMING EXPERIENCE,
SLAM THIS MAGAZINE INTO YOUR FACE.



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Product Information Number 250

Hacking Your browser supports

9 HTML Editors That Allow You To Create *Killer Webpages*

BY LAUREN GUZAK

You hear it everywhere: "HTML is a breeze... anyone can do it." Uhh, yeah, whatever. So HTML isn't C++ or Java, but gone are the days of pounding out your plain jane home page in raw ASCII with Notepad. *Today's "basic" Web pages are bursting with multimedia, from ActiveX Controls to floating frames. In order to keep up with the Jones' site, you need an HTML editor.*

Invisible tags

It only takes a handful of basic tags to create a decent Web page. But who wants to learn tags, and why settle for a "decent" (read: "pathetic") page? WYSIWYG is a solution. You'd never think to bother with putting <B>around your text to make it bold</B>, why bother when assembling your Web page? That sort of business should be invisible, as simple as selecting text and clicking a button on your toolbar. Today's excellent WYSIWYG HTML editors mimic the GUI word processor you use every day, giving you greater flexibility than you'll get with wizards. What's more, some of the most complex, powerful overall Web page packages available today include WYSIWYG editors.

GNNpress
by AOL
★★★★★

GNNpress is an excellent product, with all the features a Webster could dream of (if they ever had time to sleep, that is). Chief among them, support for HTML 3.2 specs, when most products are still only up to 3.0.

This editor starts out with a cutesy but effective online workbook and includes a customizable, intuitive toolbar. *GNNpress* also has a neat feature that lets you open multiple files—called a MiniWeb—so you can assign an icon to the group of files, for easy access to the project in its entirety.

see it on the disc
GNN Hosting Service
GNNpress seamlessly combines a Web browser with a full-featured WYSIWYG editor, as well as powerful built-in site management tools. **Freeware.**

And *GNNpress* doesn't stop there. This editor has an extensive advanced-user feature list. Java support might be the coolest. *GNNpress* makes the integration of applets into your pages as easy as choosing the Element Java Applet menu item or by copying and pasting a Java applet to your page. And if all of that weren't enough for Webmasters and wannabes, there's rich database interaction with a built-in Illustra database. In fact, you can create and edit any database form with an easy-to-understand Form menu.

You certainly can't beat the price: Nada. Zilch. Zippo. Nichts. That's right: FREE. Now, some might be thinking "It can't be any good if they're giving it away." Wrong. That's the new business model on the Web: Build a better mousetrap and give it away.

TOOLBAR

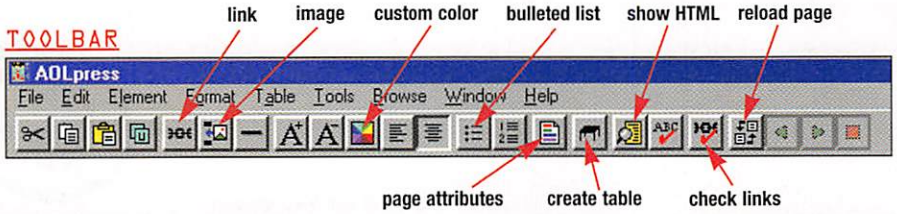
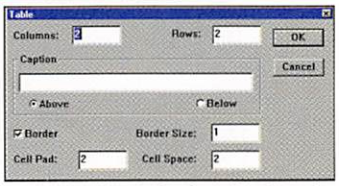


TABLE EDITOR



The Table Editor is simple and to the point.

Own HTML code

plug-ins

applets

fonts

FrontPage 1.1

by Microsoft

★★★★★

see it on the disc

Microsoft
Provides complete authoring environment for creating, deploying, and managing sophisticated Web sites. Templates, wizards and WebBots enable straightforward creation of advanced interactive content. **Evaluation copy expires Dec. 31, 1996.**

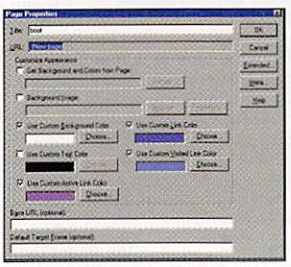
FrontPage gives you the power to bring even the most outrageously complex Web schemes to fruition. Hell, *FrontPage* packs more power than most Web grunts will ever use, but that's the beauty of it. Sure, it doesn't provide a text editor environment to manually polish your code—which necessitates running a second app simultaneously—and it currently supports HTML 3.0 only... but boy does this baby pack a lot of punch.

FrontPage combines the ease of a sophisticated WYSIWYG editor and a complex-yet-intuitive site management tool called the Explorer. The Editor, styled after Microsoft *Word* (it's designed, after all, to integrate seamlessly into the Microsoft *Office* applications), incorporates convenient wizards for stuff like frames and even the creation of threaded-discussion bulletin boards. Auto-fix of backlinks, multi-level undos, and a "hotspot" editor for imagemaps round out the long list of features.

Site management is handled by the Explorer, a tool which maps out your Web site in either a hierarchical or graphical display. There's an auto-verify utility that lists all broken links to both local pages and external Web sites. What's more, if you correct a broken link, you can choose to correct all or just some of the pages that contain it.

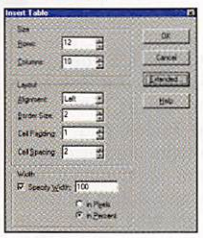
Download the latest beta of *FrontPage97*, which should be up by the time you read this article, from Microsoft's site (**www.microsoft.com/frontpage/**). It'll feature support for HTML 3.2 specs and ActiveX, as well as a powerful imaging tool called the Image Composer.

PROPERTIES EDITOR



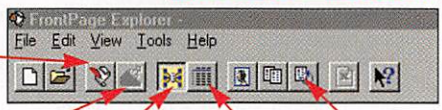
FrontPage Page Properties editor makes it easy to set the basic characteristics of your page.

INSERT TABLE EDITOR

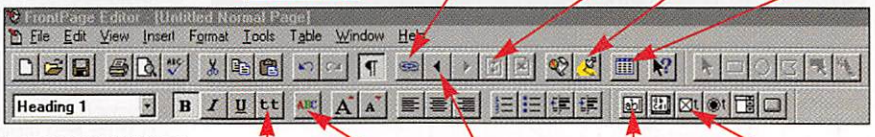


Create and insert tables in a matter of seconds with the Insert Table Editor.

EXPLORER TOOLBAR



TOOLBAR



Web.Designer32
by Corel
★★★

Web.Designer is actually a suite of products, with a WYSIWYG editor that's straightforward, if anemic (unable to handle complex page authoring with no support for ActiveX controls, *MIE* extensions, *Netscape* plug-ins, Java, user-defined tags, and the like). Without a tables or frames editor, you'll be limited to some pretty mild creations.

Stealing the thunder, though, is the collection of some 7,500 GIFs and JPEGs bundled with *Web.Designer* in the *Web.Gallery*. This thing is chock-a-block with Web graphics, all of small file size and ready to import into your pages—more stuff than you'll know what to do with. Then there's the Visual Multimedia File Manager to keep all of those backgrounds, photos, buttons, bullets, icons, dividers, alphabets, and clip art organized. The 120 matching "theme sets" are generally dorky, but are sure to be quite popular among the creatively challenged.

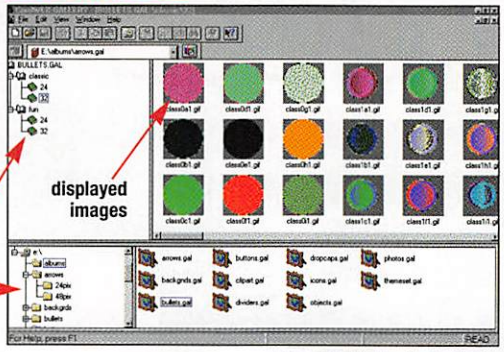
If you want to use your own images, *Web.Designer* can convert BMP, TGA, and PCX files to Web-friendly GIF and JPEG formats. The included Web.Transit application converts Microsoft *Word*, *WordPerfect*, and Lotus *WordPro* files to HTML with automated translation templates which can divide larger documents into a series of Web pages, complete with navigation buttons, and generate a Table of Contents. Once you have your pages the way you want them, *Web.Transit* allows you to work with your original source documents and update your Web pages with a mouse click.

But given the core program's inherent weaknesses, ask yourself if you want to invest that much time in *Web.Designer* before going to these lengths. Or perhaps just pick up the stand-alone versions of *Web.Gallery* or *Web.Transit*.

see it on the disc

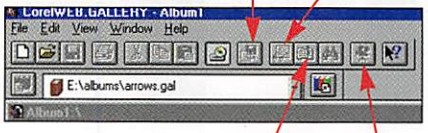
Corel
Excellent choice for simple web page creation featuring a word processor-like interface that makes page creation and editing almost intuitive, and a WYSWYG display letting you instantly preview your page. It includes a competent file conversion tool and an extensive clip-art collection. **Thirty day evaluation period.**

WEB.GALLERY



The *Web.Gallery* is the best reason to buy the *Web.Designer* package.

WEB.GALLERY TOOLBAR



TOOLBAR

Home Page
by Claris
★★★

Claris *Home Page* is a good WYSIWYG editor, but it doesn't support Java, ActiveX, or Netscape extensions. And while its toolbars are not customizable, the intuitive floating Tool Palette and Object Editor will let you get Web pages up in no time.

Like any self-respecting HTML editor, *Home Page* makes excellent use of floating toolbars , editors, and palettes. The Tool Palette is the most useful implementation—so useful, in fact, that you'll want to keep it open on your page at all times. With it, you can import objects and images, add checkboxes, and tables—and that's just for starters. Although *Home Page* is packed with functionality, it's only the essential functionality. As a result, the tools are still small in size and won't take up a lot of room on your screen. And because they're floating, you can drag the Tool Palette to any area of your document or desktop, so it's always easy to reach.

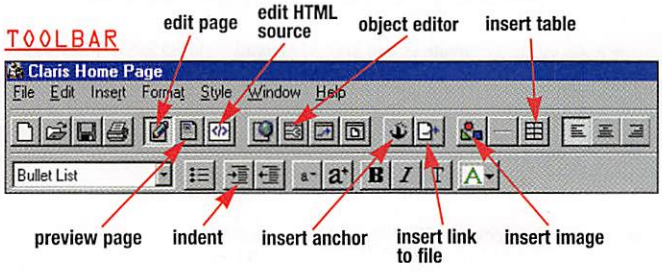
Pre-made elements provide everything you need to create forms easily. Select from text field boxes, pop-up windows, check boxes, radio buttons, password fields, hidden entries, and Submit and Clear buttons. With the Object Editor, you can edit the attributes of whatever tag or element you're currently working on. This is another good candidate to keep open and on your desktop; and if you do choose to leave it open, feel free to roam from text to an image to a horizontal rule, because the Object Editor automatically changes to reflect the item you've selected.

Although Claris *Home Page* is not the most complex or feature-packed HTML editor on the market, it's certainly a solid product that will keep you churning out pages with ease.

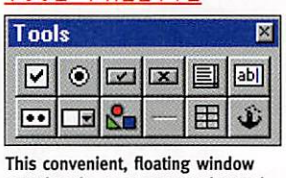
see it on the disc

Claris
Offers ease of use by hiding the complexity of code generation, yet still leaves the power to access raw HTML code for advanced editing and customization. It's features include frames support, libraries for storing frequently used, and a table editor. **Thirty day evaluation period.**

TOOLBAR



TOOL PALETTE



This convenient, floating window contains the most commonly-used tools.

Download Time

For the most comprehensive and up-to-date lists of HTML editors, begin your search at sites such as the Digital Campus' page about HTML Editors (**www.linkmag.com/library/html_tools.html**) and the Webmaster's Resource Center (**www.cio.com/WebMaster/wm_notes.html#HTML**). For reviewed and rated listings—along with ftp links to download shareware, trialware, and demos of editors-be sure to stop by sites such as Tucows (**www.tucows.com/**), Windows95.com (**www.windows95.com/**), and Stroud's CWSApps List (**www.man.poznan.pl/hypertext/cwsa/index.html**). And if you're left feeling dizzied by the sheer number of options, try the HTML Editor Selection Helper (**homepage.interaccess.com/~cdavis/selector/wiz.htm**), a neat little applet designed to help you sort through an extensive (though not exhaustive) list of editors. It uses a weighted ranking scheme to order the editors based on your input. Just enter the features you're looking for, press the "done" button, and the editors will be ranked for you.

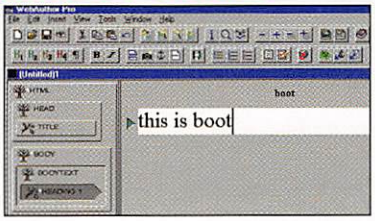
TotalWeb
by Quarterdeck
★★★★

TotalWeb is also a complete Web publishing system, which includes *WebAuthor Pro*, a good WYSIWYG editor; *WebImage*, a nice application for creating and converting images, image maps, and making your own buttons and effects; InternetSuite 2 client software; and *WebSTAR*, to manage your site.

WebAuthor Pro is based on technology from InContext *Spider* (which has its own stand-alone version of the browser), and supports Java, VRML, and Audio. There's a handy "one-button publishing" feature, for uploading your pages to a remote Web server, and there are frequent online upgrades to stay abreast of ever-changing HTML standards. *WebAuthor* is a good overall editor, but its interface is odd; with elements of wizard and WYSIWYG and text editor.

The best part of this package, though, is the collection of Internet tools bundled with it, including *Mosaic*; the *Quarterdeck Message Center* with e-mail, news, FTP, Telnet, and IRC clients; as well as a personal Web server for Windows 3.x and 95—all for under $100. Not a bad deal.

COREL WEB.GALLERY



WebAuthor's interface is a bit odd—not quite WYSIWYG, but not code-based either.

TOOLBAR

For Mature Audiences: Code-based Editors

WYSIWYG editors hide the daunting HTML tags that define a Web page. And, as the acronym says, they show how final pages will look in every single browser that might happen upon them. Right?

The problem is: HTML. Originally conceived as a simple means to provide universal access to information, the days of text-only pages—with as little formatting as humanly possible—are stone over. With all its unofficial extensions and proprietary plug-ins, HTML is evolving at such a lightning pace that no WYSIWYG editor can keep up-to-date with the latest tags. In fact, there is really no single HTML standard to which WYSIWYG editors can completely conform (e.g., HTML, HTML plus, HTML 2.0, HTML 3.0, and HTML 3.2); neither is there a single "standard" browser (e.g., *Navigator* 1.1, 2.0, 3.0, *Internet Explorer* 2.0, 2.1, 3.0, *Mosaic*). So when using a WYSIWYG HTML editor, it's a guarantee: your pages will not look the way you'd intended... through *all* browsers. You're best off targetting one particular browser and hoping your readers have all the right plug-ins. And don't spare the ALT tags!

At the end of the day, WYSIWYG editors just can't deliver full control over HTML code. The hard-core should consider themselves forwarned, and will probably want to opt for one of the code-based editors listed below.

HotDog Pro
by Sausage Software
★★★★★

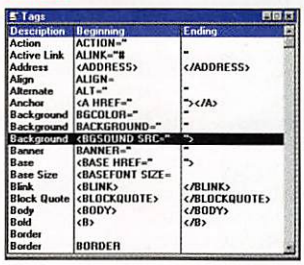
HotDog is a legend in the world of Web page creation. It's surely one of the best HTML editors available, and the 32-bit version is packed with new and improved features.

Sausage Software has tampered with perfection, removing their bottom toolbar, and taking away the ability to customize the upper toolbar. But that's OK, because they added a completely customizable (and minimizable) floating toolbar that can include from 1 to 10 buttons. There's also a great instant color editor and table creator.

The standard edition of *HotDog* is a fine editor, but the *Pro* version has features you really won't want to live without, including colored tags and *Rover*, their real-time output viewer (read: mini-Web browser). The Width Checker is pretty kickin', too, letting you see how your page will appear on monitors running with screen widths of 640, 800, or 1024. *Pro* also supports unlimited file size, a background reality checker, syntax checker, and spell checker.

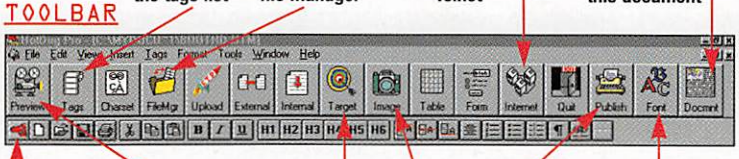
HotDog has all of the stuff you need in an editor, but most of all you've gotta love their attitude. It's all about creating great Web pages and enjoying it. At their site, they encourage you to set up the program to assign random sounds to events. It's a touch that makes you feel good about buying the product.

TAGS



Double-click in the specific tag you want from the tags window, and *HotDog* automatically inserts it for you.

TOOLBAR



boot *see it on the disc*

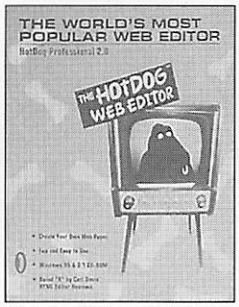
Sausage Software
One of the best code based editors, offering quick entry of up-to-date HTML tags for graphics, links, lists, tables, and scrolling marquees. Features multiple search and replace, floating customizable toolbars, event sounds, and an FTP client. Includes is a real-time viewer so that you can see your page in a WYSIWYG format and a spell-checker. **Twenty-one day evaluation period.**

HTML Editor	Home Page	Web. Designer	FrontPage	GNN Press	HotDog Pro	WebEdit Pro	WebAuthor
Version	4	1.1	1.1	1.1	1.1	2	2.5
Company	Claris	Corel	Microsoft	America Online	Anawave Software	Nesbitt Software	Quarterdeck
URL	http://www.claris.com	http://www.corel.com	http://www.microsoft.com	http://tools.gnn.com	http://www.anawave.com	http://www.nesbitt.com	http://www.quarterdeck.com
Phone	800.325.2747	800.772.6735	800.426.9400	800.819.6112	800.711.6030	619.220.8601	800-354-3222
Price	$99	$119	$149	FREE	$99.95	$129.95	$49.95
WYSIWYG	Y	Y	Y	Y	N	N	Y
Wizards	N	Y	Y	N	Y	Y	Y
Templates	Y	Y	Y	Y	Y	N	Y
Includes Clip Art	500+	7000+	N	90	N	N	N
Custom Toolbars	N	N	Y	Y	Y	Y	Y
Macros	N	N	N	N	Y	Y	via WordBasic
Style Sheets	Y	Y	Y	Y	Y	N	N
Multiple File Replace	Y	N	N	Y	Y	Y	N
Spellcheck	N	N	Y	Y	Y	Y	Y
Undo Levels	1	1	30	Limited by Memory	99	1	1
HTML 3.0 Support	Y	Y	Y	Y	Y	Y	Y
Netscape Extensions	Y	Y	Y	Y	Y	Y	Y
MIE Extensions	Y	N	Y	N	Y	Y	Y
User-defined Tags	Y	N	Y	Y	Y	Y	Y
HTML Validation	Y	Y	N	Y	Y	Y	Y
EDITORS							
Tables Editor	Y	N	Y	Y	Y	Y	Y
Frames Editor	Y	N	N	N	Y	Y	N
Image Editor	Y	Y	N	N	Y	N	N
Forms Editor	Y	Y	Y	Y	Y	Y	Y
BROWSER SUPPORTS							
Client-side Image Maps	Y	Y	Y	Y	N	Y	Y
Java	Y	N	Y	N	N	Y	Y
ActiveX	N	N	Y	N	N	Y	N
Netscape Plug-ins	N	N	Y	N	N	Y	N
IMPORTING							
RTF	Y	Y	Y	N	N	Y	Y
Microsoft Word	N	Y	Y	N	Y	Y	Y
Preformatted Text	Y	Y	Y	N	Y	N	N
Tables/Spreadsheets	N	N	Y	N	N	Y	N
BMP/PCX	Y/Y	N/Y	Y/Y	Y/N	N/N	Y/N	Y
HYPERLINKS							
Color/Graphic Tags	N	Y	N	Y	Y	Y	N
Link Verification	N	N	Y	Y	Y	Y	Y
Live Surfing for Links	N	N	N	Y	N	Y	N
SITE MANAGEMENT							
FTP Client	N	N	Y	Y	Y	Y	N
Uploads only updated Material	N	Y	Y	N	Y	N	N
Local/Host directory Management	N	N	N	Y	N	N	N
Visual Site Map	N	N	Y	Y	N	N	N
Overall Rating	**3 stars**	**3 stars**	**4 stars**	**5 stars**	**5 stars**	**5 stars**	**3 stars**

Hire a wizard

If you aren't looking to make HTML your new hobby, wizard-based editors can get you rolling with a decent page in under a half-hour. Bob down the street might think that he's cooler than you after spending six months pounding out code by hand—even learning a little Perl to script basic forms—but in the end, you could have a comparable page just using a wizard. And in a fraction of the time.

Dummy (www.sausage.com/dummy.htm) is a wizard-style editor, direct from the Aussies at Sausage Software, makers of *HotDog Pro*—one of the best HTML editors on the market. *Dummy* is "designed to take first-time Web authors firmly by the hand," prompting you at every step to fill in a little text here, a URL there... it can't get any easier than this. There are pre-generated style templates and a decent range of user-selectable options. You can download a fully functional copy of *Dummy* with a free 14-day evaluation period, and if you like it, just pay the $25 to register.



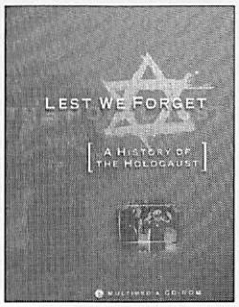
Anawave Software

Put your message on the World Wide Web using HotDog Pro's easy-to-use interface, online help and other powerful features.

[PC: WIN 3.1 or WIN 95; 486; 4mb]

Vendor Price: $99.95

Borders Price: $54.95



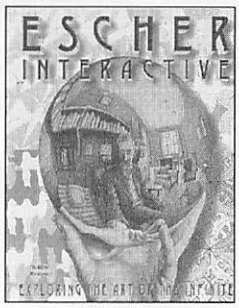
Logos Research Systems

Rare archival film footage, historical speeches, original music and documentary photographs are combined in this remarkable and poignant study of the Holocaust.

[PC: WIN 3.1 or WIN 95; 486sx33; 8mb]
[MAC: Sys 7.0; 68040; 8mb]
Hybrid: works on PC and MAC systems

Vendor Price: $69.95

Borders Price: $49.95



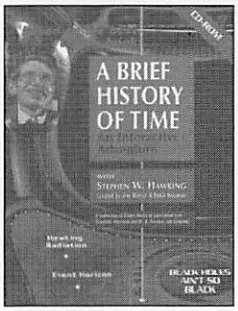
Harry N. Abrams

Explore the infinite worlds of M.C. Escher and create your own Escher-inspired designs through the magic of this interactive art experience.

[PC: WIN 3.1 or WIN 95; 486sx; 8mb]

Vendor Price: $55.00

Borders Price: $39.95



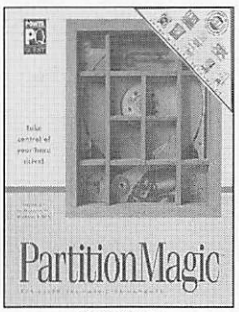
W. H. Freeman and Company

Journey to a black hole, through a subatomic landscape, even into an alternate dimension with this CD that brings Stephen Hawking's ideas to life.

[PC: WIN 3.1; 386sx; 8mb]
[MAC: Sys 7.0; LCII; 8mb]
Hybrid: works on PC and MAC systems

Vendor Price: $49.95

Borders Price: $39.95



PowerQuest

PartitionMagic replaces FDISK and FORMAT, allowing you to create, resize, move and format your own partitions with ease and speed.

[PC: WIN 3.1 or WIN 95 or DOS 5.0; 386sx; 4mb]

Vendor Price: $79.95

Borders Price: $49.95

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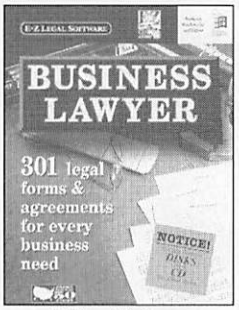


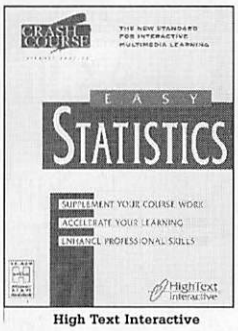
E-Z Legal Software

E-Z Legal's user-friendly Windows® software puts a complete library of 301 legal documents for business and personal use at your fingertips.

[PC: WIN 3.1; 386; 4mb]

Vendor Price: $29.95

Borders Price: $19.95



High Text Interactive

Enter your own virtual laboratory—encompassing sound, video, animation and hands-on interaction—for this CrashCourse™ in quantitative methods.

[PC: WIN 3.1 or WIN 95; 486; 4mb]
[MAC: Sys 7.0; 68030; 4mb]
Hybrid: works on PC and MAC systems

Vendor Price: $49.95

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FlexED 1.3

by InfoFlex

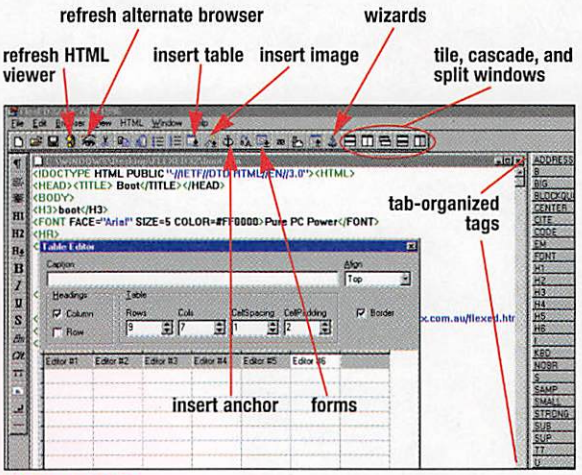
★★★★★

FlexED is an incredible shareware program. Although it's a code-based editor, a wide range of users—from the novice to the expert—will enjoy using the 32-bit stand-alone because the bevy of handy tabs make it simple. It's downloadable for free (**www.infoflex.com.au/flexed.htm**), and with just a $25 registration fee, it's dirt cheap, too.

FlexED has the details dialed, such as support for long filenames; the ability to load documents up to 60MB in size (a cruel joke on anyone connecting at 14.4); an imagemap wizard, and built-in viewer. The key to its success, though, is its intuitive and flexible interface; tabs frame your document on three sides, and there's a customizable toolbar at the top. Die-hard text-editing authors will have the freedom to type all their formatting tags directly, but still probably find toolbars are the way to go, as they're so darn convenient. All tags are color-coded, so you can keep track of them visually, rather than endlessly scanning your black-text-on-white-background pages for every stray </P> you want to purge.

And once you discover that a double click on a specific tag elicits a dialog box where you can modify the tag's parameters, you're unlikely to ever go back to k'chonking that stuff out manually. It's also comforting to know that *FlexED* won't alter any parameters it doesn't recognize, so that you can use any new parameters that it doesn't support.

This is only an editor; there's no server software here, no site management tools—and, frankly, it's a nice diversion from some of the suites crammed full of peripheral gadgets you don't want or need. *FlexED* has a host of advanced-user features, too; from support for applets to the latest *MIE* 3.0 tags, there's enough complexity built-in that even hardcore Webmasters are unlikely to tap into all of its power.



TOOLBARS

Agile

by CompWare

★★★★

Agile is another 32-bit code-based editor thats sure to make people happy. It's shareware, but don't let that deter you, because *Agile* is a great product. As the developers of this editor say at their site, they decided "to put more effort into making the software work well, and less effort into being able to list a huge number of features."

Agile supports HTML 2.0 and 3.2, and features "audience targeting," which means that you can specify the browsers and HTML standards you want to support. The interface is then dynamically reconfigured to only support those HTML features that the browsers you chose support. And, like any self-respecting code-based editor, there is a graceful use of syntax coloring (that updates as you type) making it easy to read your code and distinguish it from your content.

Agile also highlights errors as you type, although you can choose to ignore the suggestion should it be a new tag that the editor doesn't recognize. And you can edit tags in place, using a right mouse click to access an attributes dialog box. Advanced user features include support of objects, scripts, applets, plug-ins, and sounds. Download a copy at **www.compware.demon.co.uk/** and check it out.

WebEdit

by Nesbitt Software

★★★★★

This code-based editor is brimming with goodies. *WebEdit* is a superbly designed, full-featured powerhouse, just waiting to be put to the test on the most complex of pages. Beginners may find most of the bells and whistles beyond their capabilities, but it does include a page wizard and WYSIWYG previewer to make things easier on HTML neophytes.

see it on the disc

Nesbitt Software
The editor for those who prefer to work directly with HTML code. Includes support for frames, Java and ActiveX. **Thirty day evaluation period**

TABLE BUILDER

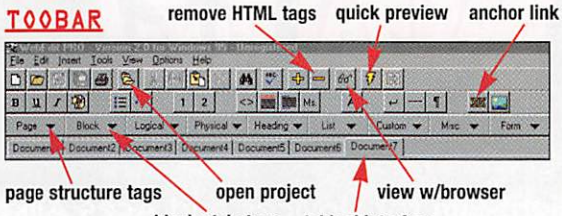
***WebEdit's* table-builder was the best of all the editors reviewed.**

Non-wizard editing will be straightforward for those with at least some experience in HTML: insert your headers, tables, forms, and frames by filling in dialog boxes or by editing code directly in an editing window, while a real-time previewer (which can be turned on and off) displays a WYSIWYG view of your file. There are two toolbars and a row of buttons or tabs (all of which are superbly intuitive, while allowing for a high degree of hierarchical complexity), which open up into drop-down lists of HTML tags. It also supports (but won't preview) frames, Java tags, and ActiveX modules.

Drag and drop, colored tags, a multilingual spell checker (American English, British English, Dutch, French, German, Italian and Spanish. Portuguese, Finnish, and Swedish), and a sensitive syntax checker are just a few of *WebEdit's* features. But don't forget FTP Upload from within *WebEdit* itself, a frame-designer, WYSIWYG form builder, link validation wizard, and the multimedia wizard—which supports audio, video, JavaScript, animation, and more. The power is intoxicating!

WebEdit 2.0 is available in two editions: *Standard* and *Pro*. The current release of *WebEdit 2.0 Standard* is available in both 16- and 32-bit versions, while *WebEdit Pro 2.0* is only available in a 32-bit release.

TOOBAR



So You Wanna Web Page

According to one famous tome, God created Earth in its infinite complexity in just seven days. Well the latest HTML editors are so sophisticated that you'll be able to produce a Web-based home of your very own in about the same time—maybe less. The right editor will help you through the trying process of creating your very own Web page... even a full-fledged site.

So if you're itching to take that plunge into Web authoring; if you have your dream domain name registered; if The Great American Hypertext Novel is collecting dust in the hollows of your mind... then get yourself an editor and go to it.

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Bug-phobic human adversaries

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Scores of ground-based and airborne bogies

A Flight-Sim for Novices and Aces Alike

Beneath the animated, exoskeleton of Banzai Bug beats the heart of a joystick-wrenching, pheromone-pumping, action-packed flight-sim. Designed for all of you gamers with better things to do than memorize a tech manual the size of a calculus book, Banzai Bug weaves a humorous story-line and wise-cracking dialogue seamlessly into the aerial action. Lead Banzai on a mission to drive the bug-phobic humans out of the house forever. Banzai Bug will be flying off your local software retailer's shelf beginning this October.

GRAVITY

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the boot 12-step program

DEALING WITH YOUR PC **OBSESSION** DAY TO DAY BY BREAKING IT DOWN INTO 12 **EASY** STEPS

this month:

How to do the dual-boot boogie

So... you still haven't got the hang of the Macarena, and you've got no one to bump and grind the Lambada with. More importantly, you've got DOS games that, no matter what Microsoft says, do not play better in Win95, and full-blown 32-bit apps that don't like anything but Windows NT. When the music kicks in and there's no mosh pit, what's a power user to do? Remember: Win95 is not the only dance in town. Dual-booting will allow you to run DOS, Windows 95, and NT 4.0 on the same system, and it lets you choose between them on startup. If you can keep the beat, this month's 12-Step will show you how to get down with your funky self.

— Sean Downey

1 DOSey-Doe

Install Win95. If you already have Win95, skip to Step 2. Step 1 is for those rugged individuals who have stuck with DOS all these years, but are now ready to get GUI. When installing Win95 in its own directory (i.e., not performing an upgrade on top of Win 3.x), the installation process automatically creates backups of your DOS system files.

You might want to back up the DOS directory before installing Win95 to keep from losing some very useful DOS commands (deltree, etc.) that will otherwise be replaced by Win95 versions.

2 The Electric Slide

Do a directory listing. If you find `autoexec.dos`, `config.dos`, and `command.dos` at the root of your hard drive, then you're already dual-boot worthy and can skip to Step 3. If these files are not present, it means you don't have the system files needed to boot into a previous version of DOS.

Transfer the necessary files from a bootable floppy (preferably one formatted using DOS 6.22). You'll need some fancy footwork to do this without trashing Win95.

On a bootable floppy, rename `command.com`, `io.sys`, and `msdos.sys` to `command.dos`, `io.dos`, and `msdos.dos`. (You might need to first strip read-only and system attributes from these files by typing **attrib -r -s** ***filename*** for each.) Copy the three files to the root of your hard drive. (Afterward, reset the copied files' attributes by typing **attrib +r +s** ***filename*** for each of them.)

3 Do the Twist

The Win95 version of the `msdos.sys` file points to other Windows files, including the Registry. More importantly, `msdos.sys` has an Options section that enables you to customize your computer's startup. Most values in this section are binary (a "one" enables the option and a "zero" disables it). You must be at a Win95 DOS prompt to edit the `msdos.sys` file. Use the same method described in Step 2 to turn off the read-only and system file attributes. (Don't forget to change them back afterward.) To enable dual-booting, set the BootMulti option to one. It's also a good idea to enable the BootMenu option, so you won't have to hit "F8" to see the menu every time you boot up. (See the screen below for other useful `msdos.sys` file settings.)

③ You will need to add some of these options to make your dual-boot fit just right.

MSDOS.SYS

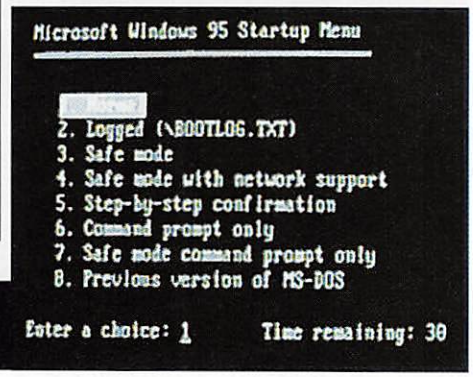
[Options]

BootDelay=0	Sets initial startup delay to zero so that the "Starting Windows . . ." message is never displayed - speeds up the boot process
BootMenu=1	Automatically displays the Windows 95 Startup Menu
BootMenuDefault=1	The default menu item in the Startup Menu. If you would like DOS to be the default item set this to 8
BootMenuDelay=10	Number of seconds the Startup Menu is displayed
Logo=0	Suppresses the full screen Windows 95 logo from covering up the boot up process
BootMulti=1	Enables dual-booting with DOS

4 Do the Hokey-Pokey

If you installed Win95 according to the instructions in Step 1, now is the time to blow out the DOS directory and replace it with the version you backed up.

Restart your system to see if you are able to boot into both Win95 and DOS 6.22. You should see the screen below on boot-up.



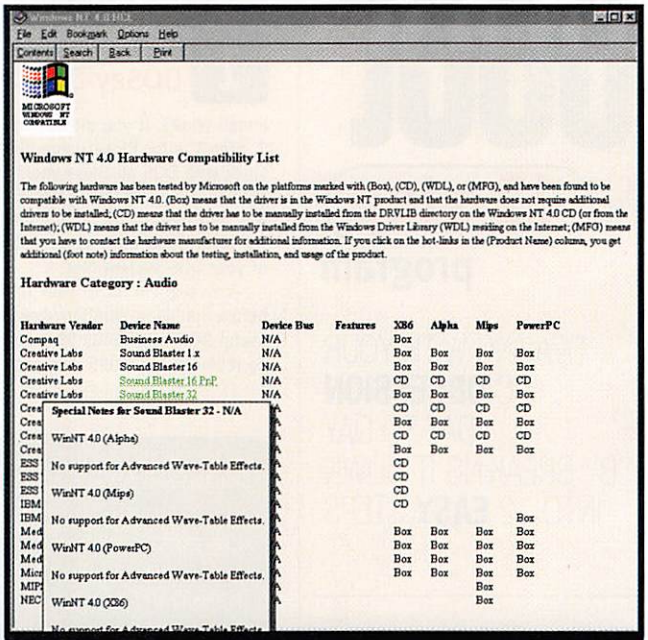
④ The Win95 Startup Menu looks a lot like a DOS Multi-Config menu.

5 The Tush-Push

You now have DOS and Win95 versions of `command.com`, `io.sys`, `msdos.sys`, `autoexec.bat`, and `config.sys`. Your DOS system files will be dynamically renamed with a .DOS extension (`autoexec.dos` for example) while you're in Win95, and your Win95 system files will get a .W40 extension while you're in DOS 6.22. You should modify both sets of `autoexec.bat` and `config.sys` files according to the operating system they'll be used with (see the examples below). To avoid the Babel Effect of two operating systems intercepting the same commands, modify your path statements so that the Win95 directory is *not* referenced from the DOS `autoexec.bat` file. The Win95 `autoexec.bat` and `config.sys` files should contain only the minimum number of real-mode drivers specifically needed; Win95 supplies its own 32-bit protected-mode drivers.

6 The Tango

Installing Windows NT 4.0 is a tricky maneuver. Improve your chances of success by making sure everything attached to your computer is on the NT hardware compatibility list. As opposed to Win95's come-as-you-are approach to hardware detection (with Plug-and-Play, auto-detection, and auto-configuration), Windows NT is an invitation-only event. Upgrading or removing any hardware that is not fully compatible with NT will save you headaches. Obtain the most recent NT H/W Compatibility List from Microsoft's Web site at **www.microsoft.com/hwtest**.



⑥ The NT Hardware Compatibility List is not a large download (234k). It runs as a standalone Help file.

⑤ Autoexec lite has a third less drivers than your regular autoexec and is less filling.

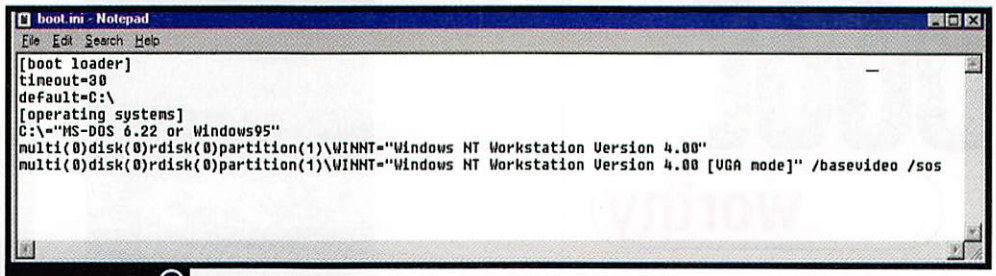
```
File  Edit  Search  View  Options  Help
                D:\AUTOEXEC.W40
@ECHO OFF
PROMPT $p$g
PATH C:\WIN95;C:\WIN95\COMMAND;c:\
SET TEMP=C:\temp
SET MIDI=SYNTH:1 MAP:E MODE:0
SET SOUND=C:\SYSTEM\AWE32\CTSND
SET BLASTER=A220 I5 D3 H7 P300 E620 T6
LH /L:1,6384 C:\WIN95\COMMAND\doskey
C:\WIN95\COMMAND\mode 80 50

                D:\Autoexec.dos
@ECHO OFF
PROMPT $p$g
PATH c:\;C:\DOS
SET TEMP=C:\temp
SET MGA=C:\system\matrox\MGA\SETUP\
LH /L:1,1712 c:\system\matrox\mga\setup\vbetsr
c:\system\matrox\mga\setup\vbesetup
LH /L:1,6384 c:\dos\doskey
LH /L:2,40896 c:\mouse.com

GOTO %CONFIG%

:DOS
mode 80 50
SET SOUND=C:\system\AWE32
SET BLASTER=A220 I5 D1 H5 P330 E620 T6
SET MIDI=SYNTH:1 MAP:E MODE:0
C:\system\AWE32\DIAGNOSE /S
C:\system\AWE32\AWEUTIL /S
C:\system\AWE32\SB16SET /P /Q
LH /L:0;2,45472 /S c:\dos\smartdrv.exe /x /u /v 4096
LH /L:2,40576 C:\system\SCSI\MSCDEX.EXE /D:ASPICD0 /M:12 /L:E
goto END

:PSCRIBE
REM Personal SCRIBE Path...
PATH C:\DOSAPPS\PSCRIBE;%PATH%
C:\DOSAPPS\PSCRIBE\HSASPI.EXE /D:MDIHSDVR
C:\DOSAPPS\PSCRIBE\MDCDEX.EXE /D:MDIHSDVR
SET PSDIR=C:\DOSAPPS\PSCRIBE

:END

F1=Help                    Line:26    Col:1
```

7 Do the Mashed Potato

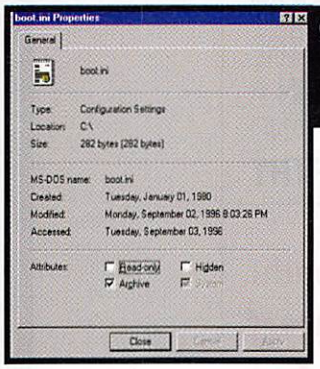
Before installing NT, you'll want to document every detail of your machine's state of existence. Write down all the IRQ settings, DMA channels, and I/O addresses for each card, and make sure there are no conflicts. An easy way to do this is by checking the system properties in Win95. Right click on My Computer, choose properties, and select the Device Manager tab. To get the low-down on IRQs, DMAs, and I/O addresses, double click on Computer. Make sure all your devices are configured correctly and that they peacefully coexist now, because NT won't allow configuration utilities (especially DOS utilities) to directly access your hardware later. Double check your `config.sys` file for device drivers that indicate potential problems with NT. The setup procedure will fail if you install it on a drive with a compression scheme that needs a `config.sys` device driver, or on a drive that needs software to be installed at boot-up before the computer will recognize it.

8 Jitter Bug

Make a complete backup of your system. A DOS backup utility will provide the easiest means of restoring your system, but it won't recreate long file names. A Win95 backup utility *will* allow long filenames, but you'll need to reinstall Win95 before you can use them. You'll be happy to have a backup if your NT installation goes awry.



⑪ You can safely edit three lines in the boot.ini file. Can you guess which ones?



⑪ This is a kindler, gentler approach to modifying attributes than the attrib command.

9 The Bunny Hop

If you have the space, it's a good idea to copy the i386 directory to one of your hard drives and install from there. This will greatly speed up the installation process. Scan for and repair any errors on your hard drive(s) before you install NT. The Setup program will scan your drives, but if it finds an error, it will ungraciously exit and instruct you to repair them. To begin installation from Win95, type *drive*:*path*\WINNT32 /b in the run command box (*drive*:*path* is the location of the i386 directory). Alternatively, you can install from a DOS prompt by typing **WINNT /b** from the i386 directory. The /b parameter will keep you from having to create boot floppies, saving you scads of time.

⑧ Beware the Evil Blue Hex Dump. It comes calling when your NT setup has gone bad.

10 The Humpty Dance

Setup will give you several important options during installation. It'll find any previously installed versions of Windows and ask if you want to install NT in the same directory. *You do not.* When you install NT in a separate directory, Setup will automatically give you dual-boot capability. Setup will also ask you to choose between the NTFS and FAT file systems for your hard drive. *Stick with FAT.* Although NTFS is more efficient, DOS and Win95 can't access it. If everything goes well, you'll notice a new menu displayed at boot-up before the Win95 Startup Menu (see below).

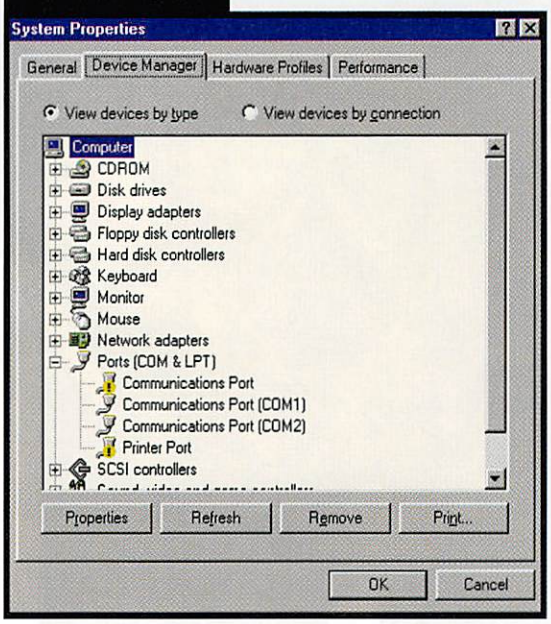
11 Shake your bootie

You can change the default operating system highlighted in the OS loader by right-clicking on the My Computer icon, choosing Properties, and selecting the Startup\Shutdown tab. You can also adjust how long NT displays the boot menu. Editing the `boot.ini` file (see above) at the root of your hard drive will customize this menu even more. You must remove the read-only attribute from this file before you can edit it. Do this by right-clicking on the file, selecting Properties, then unchecking the read-on box (see above).

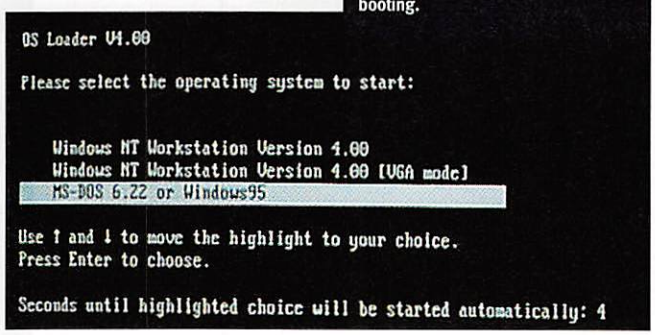
12 The Achy-Breaky

Now we'll install OS/2 Warp. Yeah, right.

⑦ 95 is more generous than NT when it comes to hardware conflicts.



⑩ Windows NT relocates the DOS/Win95 boot sector and installs its own that launches an OS Loader that points back to the relocated DOS/Win95 boot sector when dual-booting.



boot worthy

EACH MONTH, **BOOT** EDITORS COMPILE THE BEST **PRODUCTS** IN A SPECIFIC CATEGORY AND DEEM THEM: BOOT**WORTHY**

this month:

High-end 3D Graphics Accelerators

PCs are so much more than entertainment appliances. Yet, many computer manufacturers seem content to define their computers as game machines and nothing more. The truth is, computers empower you to create. And if you're equipped with a fast computer, Windows NT, and the right software—*3D Studio Max*, *Softimage 3D*, or the like—you have the tools to outgun almost anything Hollywood had in its arsenal just a few years ago. But all that processor power and slick code amounts to little if your graphics card wimps out when it comes time to render. You need a card that doesn't compromise in resolution and color depth; one that doesn't take shortcuts in the name of speed or price. You need a card that's all bang—and to hell with the buck.

The cards we chose had to offer awesome 3D performance, 2D VGA support for Windows NT, and drivers for OpenGL. The bootWorthy contenders? Diamond Multimedia's Fire GL, ELSA's GLoria-M, Intergraph's Intense 3D, and Matrox's Millennium MGA.

— Chris Dunphy

Diamond Multimedia Fire GL

PRICE: $1,195
CHIPSET: 3DLabs' GLiNT 300SX; S3's VISION968 for VGA
CONFIGURATION: 8MB VRAM frame buffer; 8MB DRAM Z-buffer
COMPANY: Diamond Multimedia
PHONE: 800.380.0030
URL: www.diamondmm.com

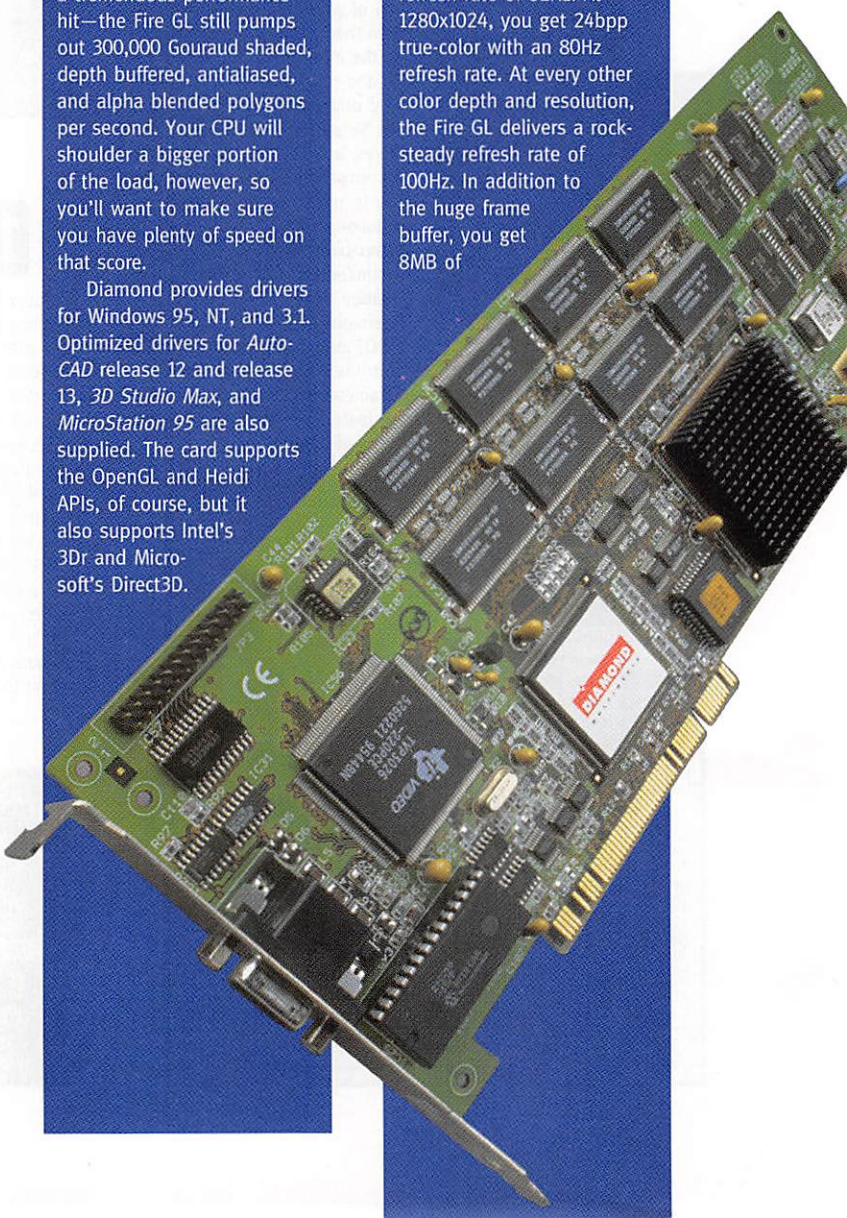
The Fire GL from Diamond Multimedia delivers no-compromises OpenGL performance at an incredible price. Based on the same 3Dlabs GLiNT 300SX chip as the GLoria-M, the Fire GL sacrifices the Delta coprocessor for a larger frame buffer and lower cost. Fortunately, this design trade-off doesn't carry a tremendous performance hit—the Fire GL still pumps out 300,000 Gouraud shaded, depth buffered, antialiased, and alpha blended polygons per second. Your CPU will shoulder a bigger portion of the load, however, so you'll want to make sure you have plenty of speed on that score.

Diamond provides drivers for Windows 95, NT, and 3.1. Optimized drivers for *AutoCAD* release 12 and release 13, *3D Studio Max*, and *MicroStation 95* are also supplied. The card supports the OpenGL and Heidi APIs, of course, but it also supports Intel's 3Dr and Microsoft's Direct3D.

The huge 8MB VRAM frame buffer, combined with a 220MHz RAMDAC, delivers resolutions as high as

Diamond Multimedia Fire GL

1600x1200 at 16bpp with a refresh rate of 82Hz. At 1280x1024, you get 24bpp true-color with an 80Hz refresh rate. At every other color depth and resolution, the Fire GL delivers a rock-steady refresh rate of 100Hz. In addition to the huge frame buffer, you get 8MB of



DRAM for a dedicated Z-buffer. If your needs run to the extreme, you can expand the card's Z-buffer to 12MB for generating particularly complex scenes.

VGA support on the Fire GL is not an afterthought, which is a good thing since you can't bypass it. Diamond uses S3's Vision968 chip to provide the VGA and 2D Windows acceleration functionality, and the chip is given access to the card's entire 8MB VRAM frame buffer. This allows a full range of supported VGA resolutions and color depths, and the Vision968's performance as a 2D accelerator is certainly respectable.

Two other cards in the Fire GL line add performance and power in exchange for higher price tags. The Fire GL 2000 ($1,995) features the same chipset and memory configuration but offers support for dual monitors, so you can view an object in wire-frame mode on one monitor and fully rendered on the other, for example. The recently announced Fire GL 3000 $2,495 will feature the 3Dlabs GLiNT 500TX rendering and GLiNT Delta geometry engines, with 8MB VRAM of and 8MB EDO DRAM.

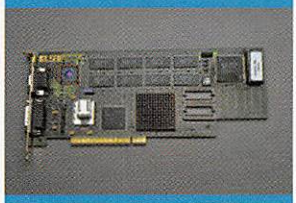
The Fire GL is a great value for a full featured OpenGL accelerator. It's well suited to CAD, 3D animation, VRML, and virtual reality work. If you need support for OpenGL and no-nonsense VGA on one, relatively inexpensive card, this is a good place to look.

ELSA GLoria-M

PRICE: $1,999
CHIPSET: 3DLabs GLiNT 300SX with a GLiNT Delta coprocessor; S3 ViRGE for VGA
CONFIGURATION: 4MB VRAM display buffer; 4MB DRAM Z-buffer
COMPANY: ELSA
PHONE: 800.272.3572
URL: www.elsa.com

ELSA's GLoria-M pairs 3Dlabs' popular GLiNT 300SX chip with a GLiNT Delta coprocessor to deliver 300,000 Gouraud shaded, depth buffered, antialiased, and alpha-blended polygons per second. The Delta is a 100Mflop coprocessor that offloads 3D setup calculations from the host CPU. The Delta is capable of plotting one million vertices per second, while reducing the load on the host CPU by 70 percent and halving the PCI bandwidth consumption that 3D rendering usually requires.

The GLoria-M supports both Windows NT and 95, including NT running on DEC Alpha platforms. Support is provided for OpenGL, Direct3D, and Heidi APIs. ELSA provides optimized display-list drivers for *AutoCAD* release 12 and release 13, and *MicroStation 95*.



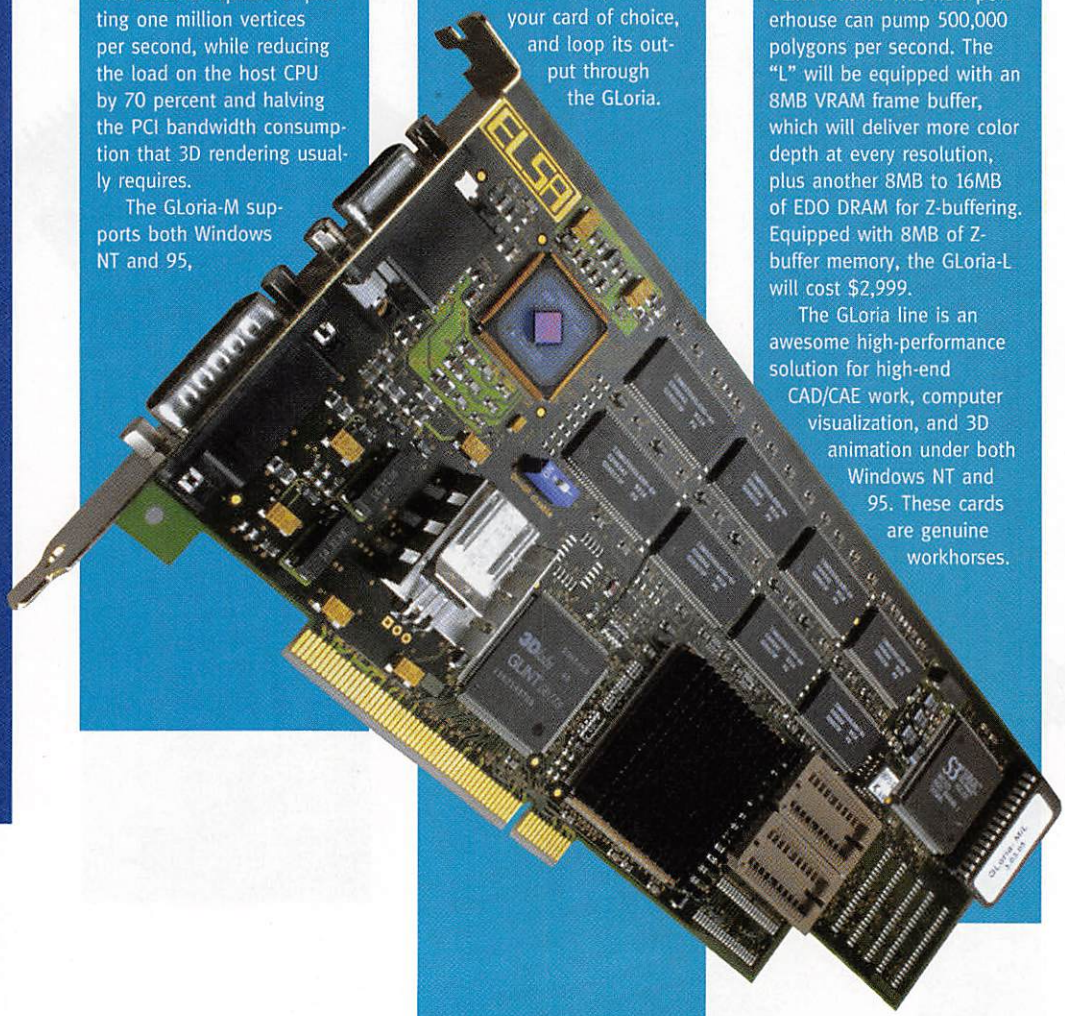
ELSA GLoria-M

VGA support is handled by the proven S3 ViRGE 2D/3D graphics accelerator, coupled with 1MB of dedicated DRAM. If you need better VGA solution, disable the onboard VGA, add your card of choice, and loop its output through the GLoria.

The 4MB VRAM display buffer allows resolutions up to 1600x1200 with 32,000 colors, and 1152x864 with 16.7 million colors when double-buffering and Z-buffering are turned off. With the extra buffering turned on, you can do 1152x864 with 32,000 colors and 800x600 with 16.7 million colors. If that's not enough for you, add another 4MB of DRAM of Z-buffer memory for even better 3D performance. (The extra memory does not deliver increased color depth.)

ELSA has announced, but not shipped, the next card in the GLoria line. The GLoria-L will feature 3Dlabs' new GLiNT 500TX. This new powerhouse can pump 500,000 polygons per second. The "L" will be equipped with an 8MB VRAM frame buffer, which will deliver more color depth at every resolution, plus another 8MB to 16MB of EDO DRAM for Z-buffering. Equipped with 8MB of Z-buffer memory, the GLoria-L will cost $2,999.

The GLoria line is an awesome high-performance solution for high-end CAD/CAE work, computer visualization, and 3D animation under both Windows NT and 95. These cards are genuine workhorses.

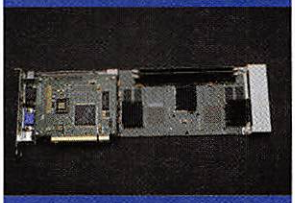


Intergraph Intense 3D

PRICE: $2,499; add $425 for 4MB of texture memory; add $2,790 for geometry engine
CHIPSET: Custom
CONFIGURATION: 16MB OF 128-bit SDRAM
COMPANY: Intergraph
PHONE: 800.763.0242
URL: www.intergraph.com

Intergraph is the company to go to if you want a NT workstation to rival an SGI. Now for the first time they have made the graphics acceleration guts of their to-die-for workstations available separately as an add-in card. The Intense 3D is a monster, and it lives in two adjacent full-length PCI slots. Imagine 810,000 lit, Gouraud shaded, texture mapped, antialiased, clipped, masked, alpha blended, fogged, and stenciled triangles per second. Then add the 480Mflop geometry engine into a third PCI slot so that all of this 3D flies with minimal load on your CPU and bus. Ok, stop imagining, you're drooling on the magazine.

The Intense 3D works only with Windows NT, and supports the OpenGL, Direct3D, RenderGL, and Heidi APIs. Supported resolutions peak at 1280x1024, but at that resolution you're processing an amazing 100bpp if you have all the effects turned on. At 1152x864 and less, the card pushes 128bpp; you'll never be impressed by 24bpp color again. The Intense 3D supports 32-bit double buffering and boasts a 24-bit Z-buffer. Video-in-a-window is provided, with hardware-based YUV-to-RGB colorspace conversion. Add 4MB of RAM for a texture buffer and you get trilinear, mip-mapped textures rendered flawlessly to any surface without taking a performance hit.



Intergraph Intense 3D

Onboard VGA support is minimal-just enough to boot NT. Resolution tops out at 800x600 with only 16 colors and a 60Hz refresh rate. If that doesn't float your boat, you can disable that circuitry, plug in your favorite 2D accelerator, and pipe its video back through the Intense 3D. (Do you have a fourth PCI slot free?)

If you want 3D graphics to rip through the screen and grab you by the head, hook up a pair of stereoscopic glasses to the jack that's provided. Still not enough power for you? Add a second Intense 3D for dual-monitor action, with both cards sharing the same geometry engine. (How many free PCI slots do you have?!?!)

The Intense 3D is intense. If you have the slots and the skills to tame this beast and put it to use, this card will rock your world.

The Intense 3D is *intense.* This card will rock your world.

Matrox MGA Millennium

PRICE: $498
CHIPSET: MGA 2064W
CONFIGURATION: 8MB WDRAM
COMPANY: Matrox Graphics
PHONE: 800.660.1969
URL: www.matrox.com/mga

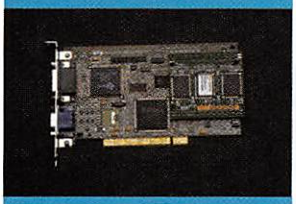
The Matrox Millennium is such a good value that this versatile card makes the short list for OpenGL-based 3D graphics accelerators, Windows accelerators, *and* DOS accelerators. The card delivers astounding 2D VGA performance and Matrox has a proven track record for improving the card's performance with new device drivers. Matrox's version 3.0 drivers, which should be available by the time you read this, are supposed to deliver a 20 percent performance boost across the board.

Even when it's decked out with a full 8MB of WDRAM, the Millennium's OpenGL performance doesn't approach the performance of the rest of this field, but with a price tag under $500, the card definitely delivers the most bang for the buck.

Matrox's MGA 2064W chip can pump out 190,00 Gouraud shaded, 16-bit Z-buffered triangles per second. On the downside, the card doesn't support 32-bit Z-buffering, antialiasing, or fogging in hardware. And like the other cards here (except the Intense 3D), the Millennium doesn't offer hardware-based texture mapping, either. You do get double buffering, on the other hand, as well as hardware-supported YUV-to-RGB colorspace conversion and video scaling for flawless video

playback at any resolution, color depth, or window size.

Matrox provides drivers for Windows NT, 95, and 3.11. The company also bundles special display-list drivers for accelerating *AutoCAD* and *MicroStation*.



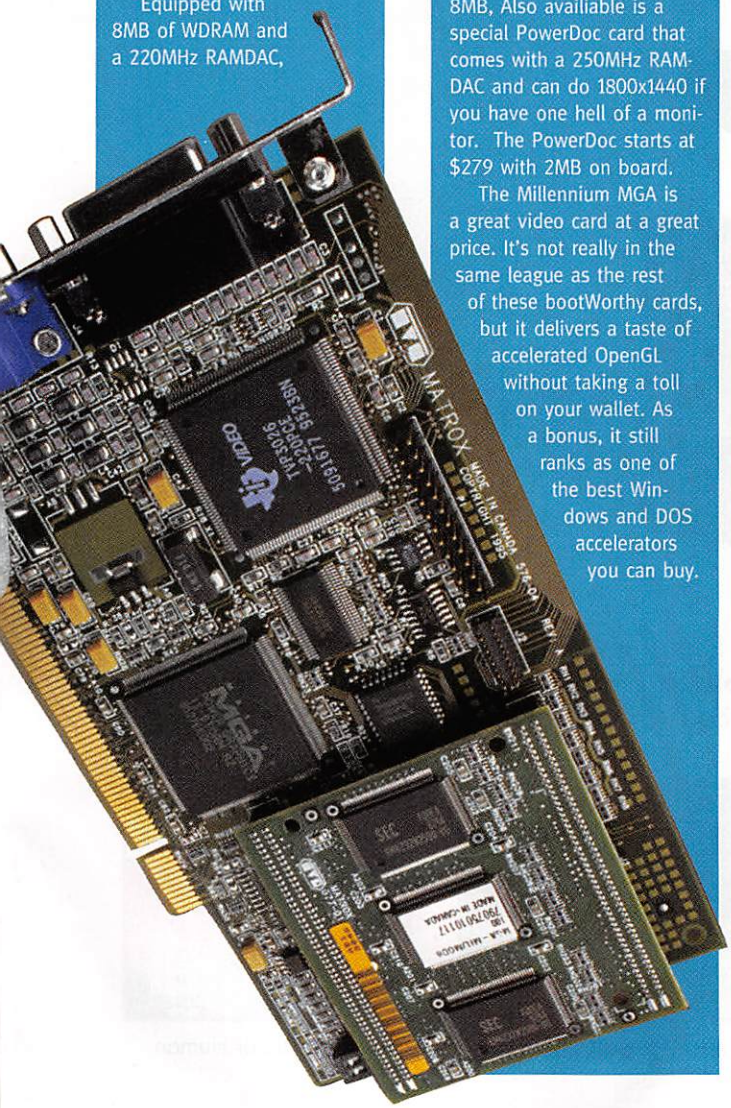
Matrox MGA Millennium

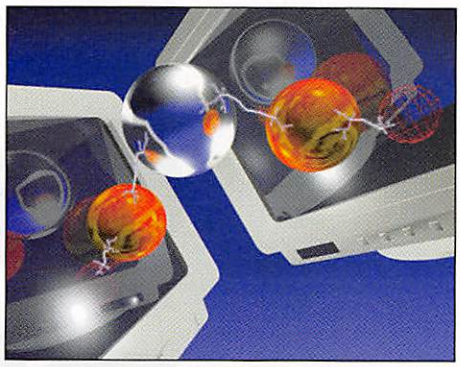
The card supports the OpenGL, Direct3D, and Renderware APIs.

Equipped with 8MB of WDRAM and a 220MHz RAMDAC, the Millennium can do 2D apps at 1600x1200 with 16.7 million colors with an 85Hz refresh rate. When accelerating 3D apps at this resolution, the color depth drops down to 8bpp. At 1280x1204, however, it supports 65,000 colors and a 110Hz refresh rate; at 1024x768, it supports 16.7 million colors and a 120Hz refresh rate.

The Millenium also comes in 2MB ($219) and 4MB ($299) flavors, both of which can be upgraded to a full 8MB, Also availiable is a special PowerDoc card that comes with a 250MHz RAMDAC and can do 1800x1440 if you have one hell of a monitor. The PowerDoc starts at $279 with 2MB on board.

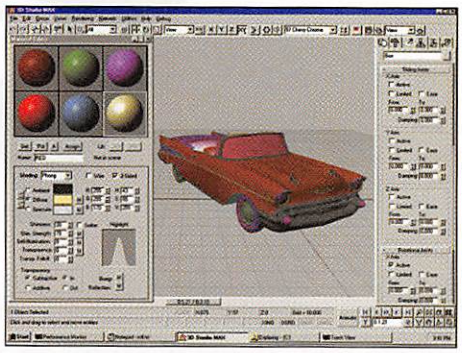
The Millennium MGA is a great video card at a great price. It's not really in the same league as the rest of these bootWorthy cards, but it delivers a taste of accelerated OpenGL without taking a toll on your wallet. As a bonus, it still ranks as one of the best Windows and DOS accelerators you can buy.





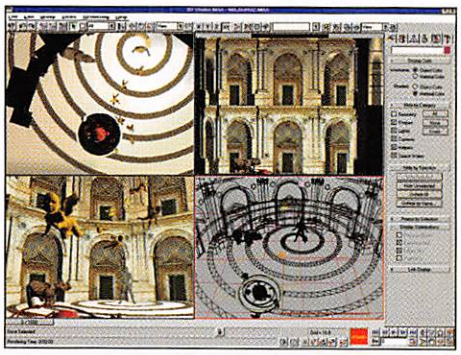
The *Diamond Fire GL* is a great OpenGL solution that does not sacrifice VGA performance.

Diamond Multimedia Fire GL



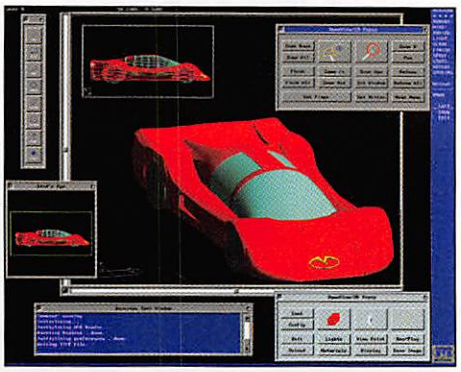
The *Elsa GLoria-M*, with it's dedicated geometry coprocessor, is a 3D pumping machine.

ELSA GLoria-M



If your system has the slots to handle it, the *Intergraph Intense 3D* can give you performance to rival an SGI.

Intergraph Intense 3D



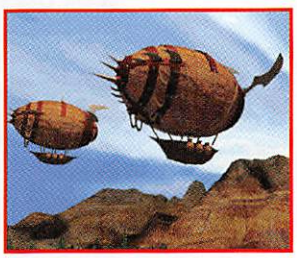
The *Matrox Millenium* is such a good all-around performer that you will be hard pressed to find a task it is not suited to. DOS, Windows, NT, OpenGL—it does it all.

Matrox MGA Millennium

Game of the Year.

#1 Selling PC Game, Jan-April 1996 PC Data Report • **Game of the Year,** PC Gamer • **Multiplayer Game of the Year,** PC Gamer • **Golden Triad Award,** Computer Game Review• **Game of the Year,** Computer Gaming World Readers' Choice • **Best On-line Game,** C/NET

8 Players Head to Head



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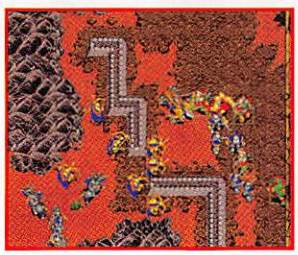
The Expansion Set.



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Product Information Number 120

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previews

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H/W

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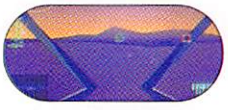
72 ATI 3D **Xpression** PC2TV

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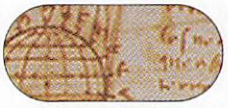
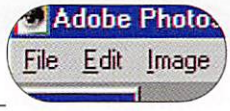

71 **Leonardo** da Vinci



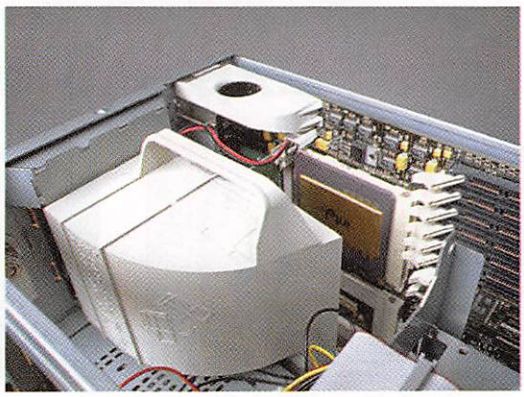
73 **Photo**shop 4.0

H/W

HP Vectra XW
Personal Workstation
When you're not playing games

As much as we love our PCs, the machines just don't have the horsepower for designing, rendering, and animating with programs such as *3D Studio Max* or *Softimage 3D*. You need a workstation-class number cruncher. The problem has always been that the price gap between PCs and workstations is at least as wide as the performance gap, relatively speaking.

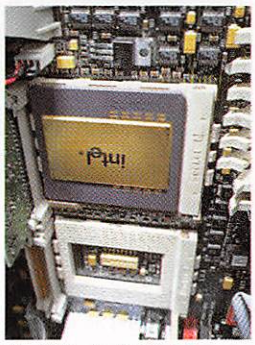
Fortunately, the distinction between PCs and workstations—in terms of both price and performance—is growing increasingly blurred, and Hewlett-Packard is contributing to the cause. The company is combining its expertise at building Unix workstations with its experience at building high-end, Intel-based, Windows-powered personal computers. HP's new Vectra XW series will team high-performance architecture with a tasty lineup of high-end components, including 200MHz Pentium Pro processors, 3D graphics accelerators, and built-in networking capabilities. But these machines will run Windows NT, not Unix.


This massive air duct keeps the 200MHz Pentium Pro running cool.

A base configuration (model D4505A) will consist of a 200MHz Pentium Pro, 256K of four-way associated write-back L2 cache, 64MB of ECC RAM, and a 2GB SCSI-2 hard-disk drive. Video will be handled by an AccelPro TX 2500 3D graphics accelerator. The $8,249 suggested list price for this system looks expensive when compared to a PC, but HP claims that when equipped with 192MB of RAM (boosting the price to $12,336), the single-processor Vectra XW will outperform a $41,000 Silicon Graphics Indigo2 workstation in at least some applications.

HP says the Vectra XW line is optimized for dual processing, multitasking, and multithreaded applications. Each system will offer sockets for two 200MHz Pentium Pro processors and two sets of external cache, for example. The XW uses 72-bit ECC DIMMs (error-correcting code dual in-line memory modules), which offer a number of advantages over 32-bit SIMMs used in PCs. DIMMs provide a memory path that's 128-bits wide, compared to the 64-bit memory path of SIMMs; and the error correcting code assures data integrity by detecting and correcting memory errors without interrupting running applications. With eight DIMM sockets on the motherboard, memory is expandable to a whopping 512MB.

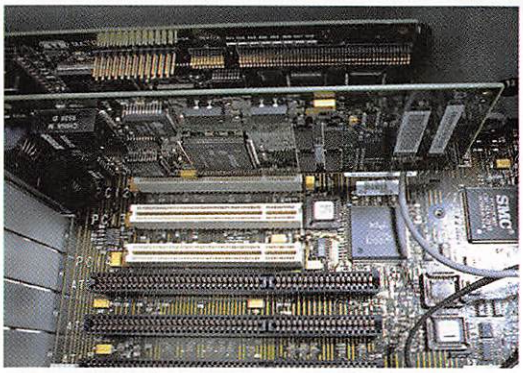
Video will be handled by an AccelGraphics AccelPro TX/2500 3D graphics accelerator installed in one of the machine's four PCI slots.



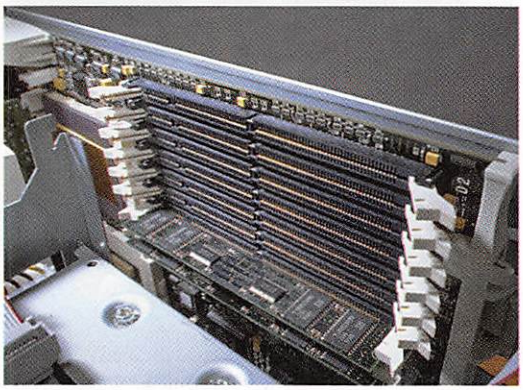
The HP Vectra XW features sockets for two 200MHz Pentium Pros. We've removed the heat sink for this shot.

The AccelPro card is based on 3DLabs' Glint 500TX rendering engine and Delta setup processor. The card features a high-speed frame buffer (8MB of VRAM), with 24-bit-per-pixel color depth at 1024x768 resolution, 16-bit color at 1280x1024, and double-buffering support for high-speed viewing and rendering at full-screen resolution. Another 8MB of DRAM is dedicated to Z-buffering and texture maps.

The card supports Gouraud shading, fog, antialiasing, and alpha blending for drawing partially transparent polygons. Onboard VGA support is provided for full-screen DOS support under Windows NT. HP provides OpenGL drivers for applications such as *Pro/Engineer* and *Softimage 3D*, and a Heidi driver for *3D Studio Max*.



The expansion bus features three ISA slots and four PCI slots. Two of the latter are occupied by a 3D graphics accelerator and a network interface card.



These DIMM slots can be filled to 512MB of 128-bit ECC memory.

A PCI Ultra SCSI controller (with 20MB/sec throughput) and a PCI bus master Enhanced IDE interface are integrated into the motherboard. Single-processor models will ship with a 2GB SCSI-2 hard-disk drive; the dual-processor model will ship with a 4GB SCSI-2 drive. All three systems will include an 8x CD-ROM drive. The XW chassis has three front-accessible drive bays (one 3.5-inch and two 5.25-inch), plus one 3.5-inch internal drive bay available for expansion.

Sound is handled by a Sound Blaster-compatible audio processor integrated into the motherboard, leaving the system's three ISA slots open. HP wisely mounts microphone and headphone jacks, plus a volume control, on the machine's front panel (this is in addition to the headphone jack and volume control on the CD-ROM drive).

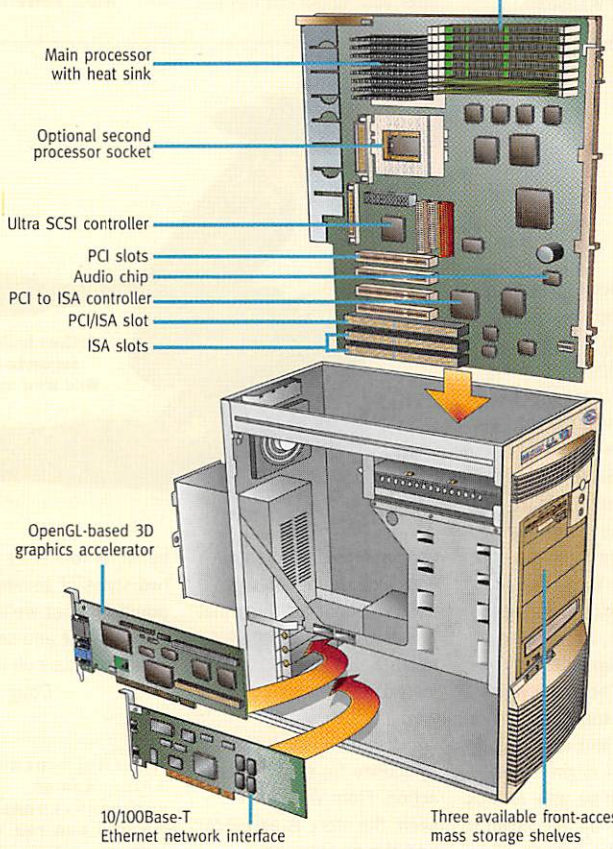
Built-in networking support is provided by a 10Base-T/100Base-T network interface card that consumes a second PCI slot. The card automatically senses whether it's plugged into a traditional 10Mbit/sec LAN or a high-speed 100Mbit/sec LAN and configures itself accordingly.

The top-of-the-line Vectra XW model D4510A, equipped with two 200MHz Pentium Pro processors (each with 256K of external cache), 128MB of ECC RAM, a 4GB SCSI-2 hard drive, and all the other components previously described, lists for $10,874. HP planned to ship the first Vectra XW systems beginning in October.

— *Michael Brown*

AVAILABLE: NOW
PRICE: $8,249 TO $10,874
COMPANY: HEWLETT-PACKARD
PHONE: 800.322.4772
URL: www.hp.com/go/vectra

HP's Tower of Power



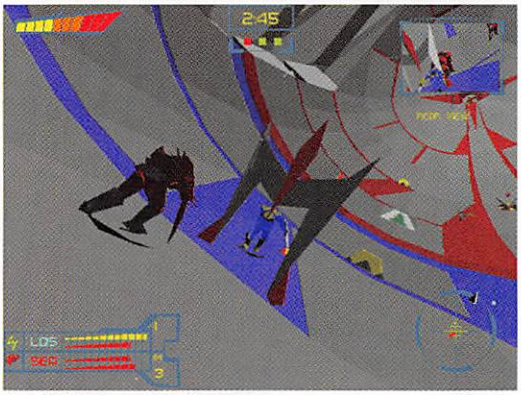
SEE IT ON THE DISC

HyperBlade

Rough 'n' retro action

Strap on your inline skates, pick up your stick, and slide your flat-shaded polygon player out onto one of the 12 half-cylinder arenas in Activision's upcoming title, *HyperBlade*, a break-neck action game with a cool retro look.

Reminiscent of the 1975 film *Rollerball*, *HyperBlade* may initially look like a throwback, but will actually take advantage of many of the latest technologies, including Direct3D support for 3D graphics accelerators and motion-capture techniques, so characters move as realistically as possible. And with more than 200 extreme skating moves, the action can get pretty aggro.



The players have more than 200 extreme skating moves achieved through motion-capture technology.

The game is like three-on-three hockey with you controlling your team's two forwards while the computer drives your goalie and the other team. Multiplayer modes will allow up to three more to join in via serial, modem, or network connections.

Each of the 12 teams packs a unique style of play, from martial arts to brute strength to raw speed; and a custom stadium, complete with obstacles such as turnstiles and ramps.

Make no mistake... *HyperBlade* is a full-contact action game, but you will get flagged for cheap shots.

HyperBlade's accurate physics will lend an air of gravity to the game. Once you skate to the top of the half-cylinder playing field, gravity will pull you and the puck back down. Likewise, shots or passes made up or downhill will have the same increase or decrease in velocity as they would in a real environment.

Feeling a little frustrated after your opponent has put the biscuit in the basket a few too many times? Throw 'em a cheap shot before the ensuing face-off. But don't get too out of control, or the refs will throw you out of the game—and even great games suck when you're watching them from the bench.

— *Doug Lombardi*

AVAILABLE: NOV 96
PRICE: $39.95
COMPANY: ACTIVISION
PHONE: 800.477.3650
URL: www.activision.com

Outlaws

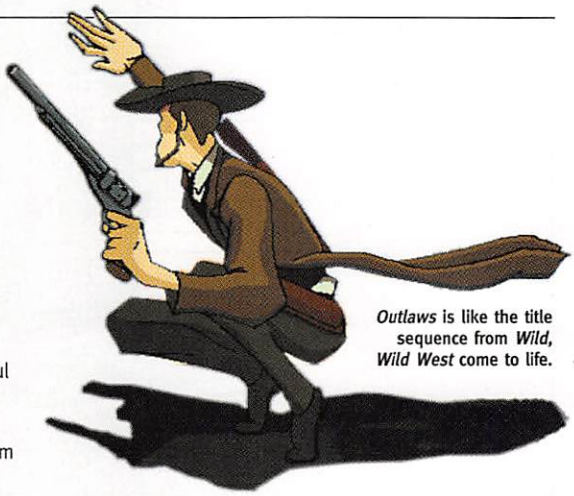
Dark Forces *meets* Hang 'em High

Outlaws is a tribute to the spaghetti western. And you're the gun-slinging hero.

Set in an old western town, *Outlaws* unfolds within the confines of the local saloon, bank, hotel, and out in the streets and wild outdoors. You'll spend your dusty days dealing with a gang of bandits holed up in a nearby ghost town.

***Outlaws* combines graphic-adventure gaming and first-person action via the game engines from *Dark Forces* and *Rebel Assault II*.**

Developer LucasArts is melding graphic-adventure gaming with first-person-action gaming by drawing on two of its most powerful game engines: the 3D engine from *Dark Forces* and the INSANE engine from *Rebel Assault II*. Unlike *Dust*, last year's miserable FMV western from Cyberflix, *you* control the action in *Outlaws*—except during the hand-drawn, animated cut scenes designed to advance the story. The game won't deliver the total freedom of movement and exploration that gamers might expect, but you will be able to look (and shoot) up and down to spot and pick off any wily varmints looking to ambush your hide. Sometimes you'll need to shoot anything that moves; sometimes you'll need to use your brain instead of your six-gun to win.



***Outlaws* is like the title sequence from *Wild, Wild West* come to life.**

The game will support DirectPlay for multiplayer action. From what we've seen, the story is excellent and the graphics are beautiful. Blending these two styles of gaming sounds promising, but we'll just have to wait and see if LucasArts can pull it off.

— *Doug Lombardi*

AVAILABLE: DEC 96
PRICE: $39.95
COMPANY: LUCASARTS
PHONE: 800.782.7927
URL: www.lucasarts.com

S/W

Agents of Justice

Do like the superheroes do

Being a superhero in this day and age means packing the punch to beat a bad guy senseless, but having the self-restraint to apprehend him without resorting to violence—and still getting the girl in the end. In Agents of Justice, *an action/strategy game, you play just such a superhero.*

Agents of Justice *(the name might change before the game is published) bears a slight resemblance to developer SimTex's* X-COM *series, but lead producer Rob Corell and his crew are taking a different approach to the creation of the environments, characters, and AI.*

boot: What's up with this superhero game?
Corell: This is a turn-based strategy game. The goal is to destroy the three groups of supervillains by ultimately defeating the master-minds of each of the super-villainous groups.

boot: The characters in this game really catch your eye. How are they being created?
Corell: All of the art is being done in *3D Studio Max*, which we just got. Each hero has 50 to 60 animation [sequences]. We estimate that if all the characters we have planned make it into the final game, we'll have over half a million frames of character animation.

boot: What powers will the heroes pack?
Corell: Each of the 14 hero types will have every superpower available to them. Energy blasts, mystic blasts, missile deflection, flight, and a host of other powers. We didn't think it was going to snowball as much as it did, but...

Like *X-COM*, *Agents* will have a world view and a tactical view.

Your task is to stop three villainous groups from taking over the world.

boot: But what's the difference between one hero and another? Is one smart, one strong?
Corell: I missed that in my spiel, didn't I. There are more than 50 powers that you can have, and each one of them has three possible modifications. Each character can become highly unique. Although it has been a bit of an artistic nightmare, we have allowed each of the heroes to take on any of the powers. That will help because all of the villainous groups are quite different.

boot: It looks as though the game will have an interesting perspective.
Corell: It's got multiple levels. So the things on the first floor don't go away when you look at the things on the second floor. And you are able to rotate the map. I got frustrated with people being behind walls. The way *SimCity 2000* got around it was by making it possible to rotate the map. With this true voxel, tile-based engine, it was pretty easy to do. So you can turn things 180 degrees and get a look from the other side.

boot: Even though it's turn-based, it seems there's a lot of action in this game.
Corell: We were tweaking the AI today and a bunch of thugs were attacking a hero who's currently called Quake—that [name] will probably be changed—but he threw one thug into another. You'll also be able to throw newspaper stands, fireplugs, and destroy buildings.

Agents of Justice **will cast you as a futuristic superhero on a mission to save the world from three groups of supervillains.**

All of the art, including the 14 heroes, is being created in *3D Studio Max*.

The superheroes possess powers that can be modified throughout the game.

boot: All in good fun, right?
Corell: It's good, wholesome entertainment [laughs]. But you *are* penalized for killing the innocent, and even the bad guys. We're going for four-color morality, where the goal is to capture the bad guys and incarcerate them, not kill them.

— Doug Lombardi

AVAILABLE: LATE 97
PRICE: TBA
COMPANY: MICROPROSE
PHONE: 800.695.4263
URL: www.microprose.com

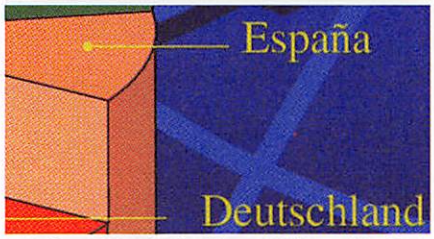
H/W

Tektronix Phaser 350

This ain't no inkjet

Dollar for dollar, inkjet printers produce amazing work, but they can't approach the quality of a laser printer. The price/performance gulf between the two technologies remains substantial, but the new Phaser 350 color laser printer from Tektronix seeks to bridge the gap to high-quality color prints.

Priced at $3,495, the Phaser 350 costs 30 percent less than its predecessor, the model 340; plus, when you're counting pennies, keep in mind: Tektronix will supply free black ink, reducing the cost-per-page to about five cents. (Each time you buy color ink, a black ink cartridge will be included free. If you need more, Tektronix will supply additional black ink on request.) At this page rate, Tektronix claims using the Phaser 350 is as cost effective as a color copier for multiple documents.



In "enhanced" mode, the Phaser 350 is capable of 600x300 dpi resolution.

In Fast color mode, the Phaser 350's laser engine prints six pages per minute at a quality that Tektronix says is appropriate for presentations and business graphics. The printer's Best quality prints will feature 600x300 dpi resolution.

The Phaser 350 will come equipped with Tektronix' PhaserShare network card and software, which allow much more than just printer sharing. Using the *PhaserLink* software and your favorite Web browser, you'll be able to determine the printer's status remotely. *PhaserLink* will also provide built-in links to Tektronix's Web site, where you'll be able to access online manuals and other support information.

— Michael Brown

The new Phaser 350 color laser printer from Tektronix brings the cost of color printing to a new low.

AVAILABLE: SEP 96
COMPANY: TEKTRONIX
PHONE: 800.835.6100
URL: www.tek.com/Color_Printers/

NEW LINKS LS: TOUR WITH THE LEGENDS IN SPORTS

What's New About Links LS? Every Leaf, Every Contour, Every Chirp...

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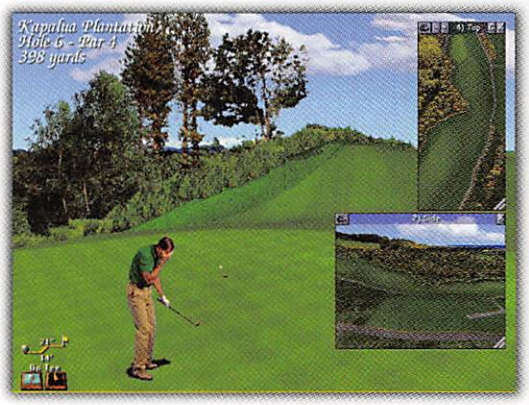

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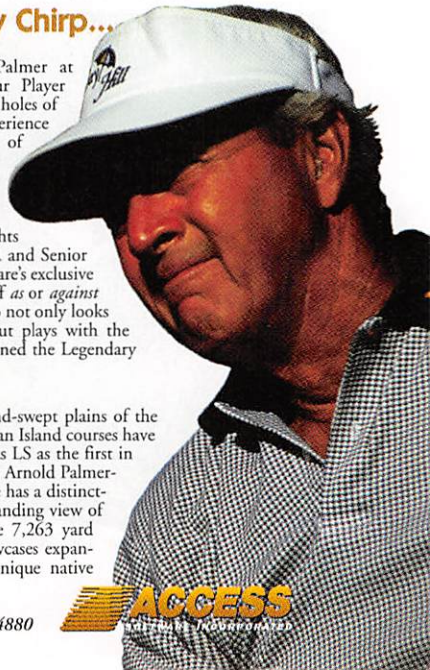
...Arnold Palmer– Arnold Palmer at Latrobe—the first in our Tour Player Series, delivers far more than 18 holes of golf. The Arnold Palmer experience includes a virtual reality tour of Arnie's workshop, office and trophy room. Roam freely in 360 degrees and examine the tools of the trade behind the legend. Listen to Mr. Palmer give insights and recollections about his PGA and Senior PGA tours through Access Software's exclusive multimedia footage. Then tee off *as* or *against* the digitized Arnold Palmer, who not only looks & sounds exactly like Arnie, but plays with the same style and tenacity that defined the Legendary Grand Master of Golf

...Kapalua– Resting on the wind-swept plains of the Golf Coast, two glorious Hawaiian Island courses have been selected to inaugurate Links LS as the first in the series of Resort Courses. The Arnold Palmer-designed Kapalua Village Course has a distinctly European flavor and a commanding view of the West Maui mountains. The 7,263 yard Kapalua Plantation Course showcases expansive slopes, deep valleys and unique native vegetation.



For more info, call 1-800-800-4880

ACCESS

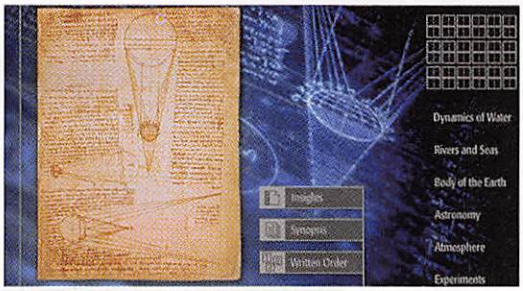
S/W

Leonardo da Vinci

A portrait of the artist

Leonardo da Vinci's genius has inspired millions, including Bill Gates. In 1994, Gates acquired da Vinci's *Codex Leicester*—a notebook of da Vinci's scientific notes and observations—from the Armand Hammer estate. After the documents toured museums around the world, Gates had the developers at his Corbis Publishing operation begin producing this essential da Vinci retrospective.

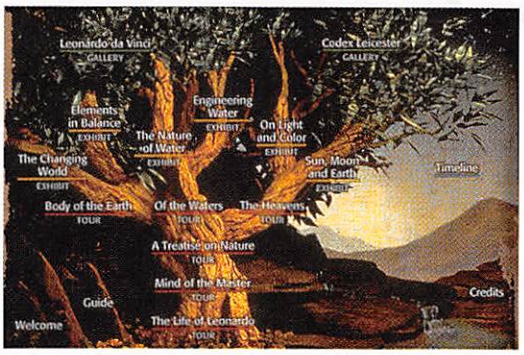
The ensuing CD-ROM will be rich with material taken directly from the pen of the Renaissance master, including a series of digitized architectural sketches—and 3D renderings based on those sketches—never before publicly exhibited.



Corbis Publishing's *Leonardo da Vinci* features 3D renderings of the artist's architectural sketches.

The disc will track the details of the artist/inventor's life with a dynamic timeline that is augmented by audio and video clips of historians, such as Oxford's Martin Kemp, discussing da Vinci's works and the impact his ideas have had.

Da Vinci had a peculiar habit of writing in mirror image, so Corbis developed the Codescope. This on-screen device allows the user to read da Vinci's original words by reversing the writing while preserving its original presentation. And the text can be presented either in its original Italian or in an English translation.



Corbis uses a tree-of-knowledge motif for the disc's main menu.

Corbis is also building an eight-room virtual gallery on the disc that will house da Vinci's drawings, paintings, and correspondence. Here, you'll find a number of interactive exhibits in which you can test da Vinci's theories on astronomy, geology, and physics.

It looks as though Corbis may have another winner on their hands. (The company has already produced great documentary titles, including *A Passion for Art*, *Critical Mass*, and *Volcanoes*.) If Corbis cuts loose a little and dives into less conservative topics, the folks over at Voyager better start looking over their shoulders.

— Doug Lombardi

AVAILABLE: NOV 96
PRICE: $35 (EST. RETAIL)
COMPANY: CORBIS PUBLISHING
PHONE: 800.260.0444
URL: www.corbis.com

2 LEVELS OF PLAY
3 NARRATIVE PATHS
7 DIFFERENT ENDINGS
THE Pandora DIRECTIVE
23 UNIQUE CHARACTERS
58 PLAYABLE ROOMS
360 DEGREES OF FREEDOM

THE PANDORA DIRECTIVE: PLAY IT AGAIN, AND AGAIN...

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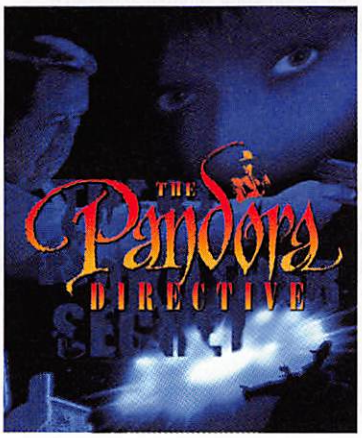
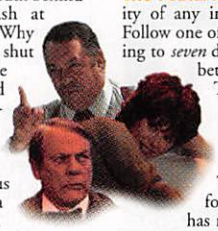


An Enormous Six-CD Cinematic Epic!

The Story– What is the truth behind the rumored UFO crash at Roswell, New Mexico? Why did the military suddenly shut down and seal off the Roswell complex? And why the frequent references to the lost Mayan civilization? It starts out like a hundred other cases. $500 a day (plus expenses) to track down a missing person. As you pick up Thomas Malloy's trail, you realize you're not the only one looking for him. By the time you discover that he's ex-military and knows what really happened on July 6, 1947, it's too late. The government's biggest secret is loose and you're trapped in a deadly game of cat and mouse with the most powerful and ruthless agency in the world. Based on the novel by Aaron Conners.



The Features– The most replayability of any interactive movie to date! Follow one of *three* narrative paths leading to *seven* different endings. Choose between *two* levels of play. The first level offers a complete on-line hint system to help you through the tougher puzzles. The second level—for expert gamers—has no hints available, but rewards players with higher bonus points, extra puzzles and locations. Our unique "Virtual World" engine allows you to slip under desks, rifle through drawers, and see the flies tanning in the light fixtures. Without the restrictions of rendered paths, you can explore Tex's three-dimensional world with full freedom of movement.

The Cast– Enjoy the difference Hollywood cinematography, acting, editing, stunt work, music, and direction make as the world of Tex Murphy becomes amazingly real. Starring Barry Corbin (*Northern Exposure*, *War Games*), Tanya Roberts (*View to a Kill*, *Beastmaster*), Kevin McCarthy (*Invasion of the Body Snatchers*, *Just Cause*), and Chris Jones (*Under a Killing Moon*, *Martian Memorandum*, *Mean Streets*) as Tex Murphy. Directed by Adrian Carr (*Quigly Down Under*, *Man from Snowy River*, *The Power Rangers*). Original music by Richie Havens and Nicole Tindall.

For more info, call 1-800-800-4880

ACCESS SOFTWARE INCORPORATED

Product Information Number 80

H/W

Olympus D-300L Digital Camera

Loaded with memory and resolution

Long a player in the 35mm SLR field, Olympus wants to make an impression with its first digital camera. Their D-300L will offer some excellent features, including the highest resolution images of any camera in its price range.

Using 6MB of flash memory and JPEG image compression, the camera will be capable of storing 30 images at 1024x768, or 120 images at 512x384; all with 24-bit color depth. In addition to a conventional viewfinder, the D-300L will have a color LCD panel on the back, so you can frame your shots and review pictures you've taken. Unlike some digital-camera LCD panels, the video on the Olympus will update in real time like the viewfinders on video camcorders.

Olympus has designed its own autofocus lens (with macro), which features five elements arranged in four groups. The lens has a focal length of 5mm (equivalent to 36mm on a 35mm film camera), with an aperture range of f/2.8 to f/11. In normal mode, the focusing range is from 29.5 inches to infinity; in macro mode, the range is 7.9 inches to 29.5 inches. Shutter speeds range from 1/8 of a second to 1/500.

The camera will have a built-in "red-eye" reducing electronic flash, which pulse-flashes for a fraction of a second before the shutter opens. Other flash modes include fill flash and a backlight compensating setting. Light metering is handled by a center-weighted CCD imager (ISO 50-equivalent).

Using the LCD screen to review images you've shot, you can selectively delete individual images or "lock" them so they cannot be deleted accidentally. Images can then be downloaded to a PC using the built-in RS232C port.

— *Michael Brown*

Olympus' D-300L will feature 6MB of flash memory and the ability to capture images with 1024x768 resolution and 24-bit color depth.

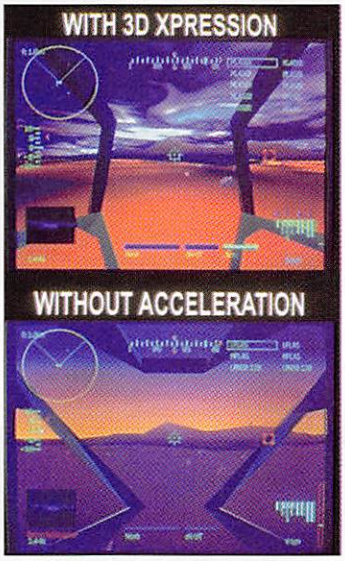
AVAILABLE: NOV 96
PRICE: $899
COMPANY: OLYMPUS AMERICA
PHONE: 800.347.4027
URL: www.olympusamerica.com

ATI 3D Xpression PC2TV

Card features second-generation 3D Rage chip

Microsoft's grand plan (according to their *PC 97 Hardware Design Guide*) includes displaying your PC's video output on your television. Dubious? Once you've seen *Quake* on a 30-inch screen and heard it on your home theater system, you'll think you've died and gone to gamer heaven. ATI will be among those to bring you to this nirvana first, with their new 3D Xpression PC2TV card.

The PC2TV will feature two new ATI video chips: The first is the ImpacTV, which will provide scaled, flicker-free composite and S-video output. All resolutions up through 800x600 are supported, and you can simultaneously output video to your monitor and to your TV. There's one catch: When outputting video to a TV monitor, the card drops its refresh rate to 60Hz, which will cause noticeable flicker on your computer monitor.



ATI's 3D Xpression PC2TV lets you pump your computer's video out to any television monitor, and it offers twice the 3D acceleration of ATI's first 3D Xpression.

The second new chip will be ATI's 3D Rage II, a faster version of the impressive 3D Rage. The Rage II is hardware- and software-compatible with its predecessor, but ATI promises it will offer double the 3D performance of the first-generation part, and 2D video performance that's at least 20 percent better. The Rage II supports resolutions up to 1600x1200 at 60Hz, and support for 24-bit color through 1280x1024 resolution at 75Hz. ATI claims that hardware support for smooth scaling, color-space conversion, and software MPEG decoding will deliver flawless full-screen video at 30fps.

The Rage II chip will run all the games that have already been tuned for the 3D Rage (ATI expects there will be more than 50 such titles available by Christmas). Rage-compatible versions of *MechWarrior 2*, *WipeOut*, *PhotoSuite Image Editor*, and *WIRL* (a VRML Web browser) will be bundled with the card, as will drivers for Windows 95, 3.1, and NT; Direct3D; OS/2; and *AutoCAD*.

ATI plans to offer an optional video-capture/TV tuner add-on card for the PC2TV that will also feature a hardware MPEG decoder (pricing and availability have not been announced).

— *Chris Dunphy*

AVAILABLE: SEP 96
PRICE: $219 WITH 2MB RAM; $299 WITH 4MB (2MB CARD UPGRADEABLE TO 4MB)
COMPANY: ATI TECHNOLOGIES
PHONE: 905.882.2600
URL: www.atitech.ca

S/W

Adobe Photoshop 4.0

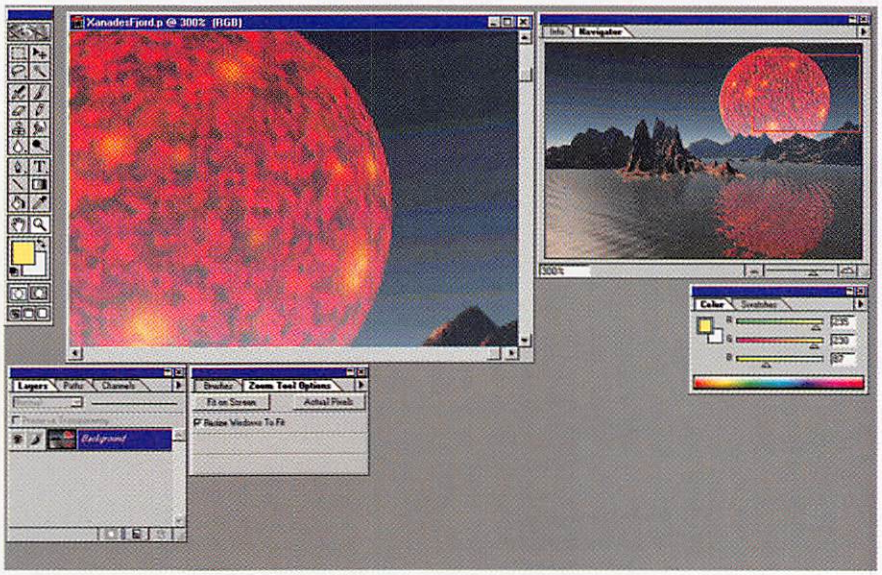
32-bit visual speed

If you're a pixel pusher, *Photoshop* is your tool. Period.

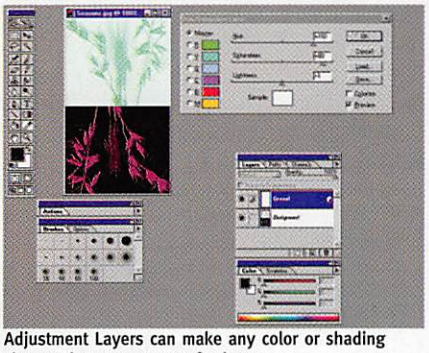
There just isn't another tool that possesses the grace and power of Adobe's dominant graphic design app. Since Version 3.0's introduction two years ago, *Photoshop* has remained largely the same, other than small bug fixes/updates. *Photoshop 4.0*—available for Windows 3.1, 95, and NT—takes a major leap forward.

The first feature many will notice is actually located under the hood: a redesigned engine built for speed. And Adobe promises particularly dramatic boosts for 32-bit OSs, such as Win95 and NT. On MMX-enabled PCs, *Photoshop 4.0* will run four to six times faster than on non-MMX machines, including Power Macs, where it has become a mainstay. To witness this velocity, (or to use *Photoshop* as a benchmarking tool), *4.0* will even display how long a given operation takes.

Veteran *Photoshop* users will immediately appreciate the reorganized tool palette—part of Adobe's strategy to give all their major programs (*Photoshop*, *Illustrator*, *Pagemaker*) a consistent interface. This means Guides and Grids, long-time features in *Pagemaker* and *Illustrator*, will now be in *Photoshop*. Also part of this strategy is a redesigned API to allow plug-in developers such as MetaTools and Extensis to implement application-wide changes, such as new tool palettes and color swatches.

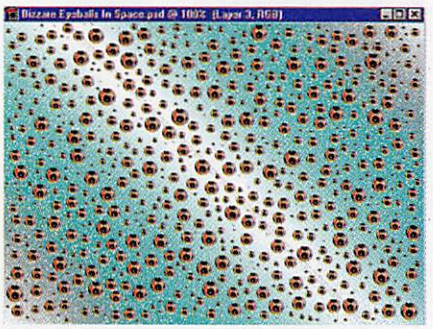


Moving around a large image in *Photoshop 4.0* is easy with the Navigator window at top right.



Adjustment Layers can make any color or shading change the appearance of a layer.

The Action palette is sure to give Equilibrium, creators of *DeBabelizer*, fits—this new feature records a sequence of commands and saves them for future use. Each "action" is presented in an easily edited list; operations can be changed by dragging them into any order. Prompts can call for user's input, or default values can be used. Adobe also says a batch mode will enable multiple files to have any action applied to them across the board.



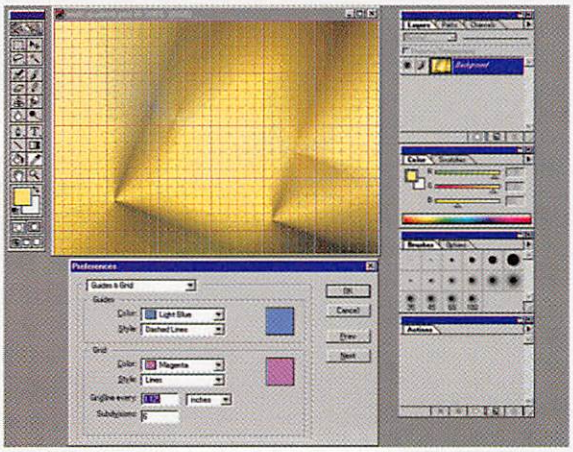
Getting tiled images ready for the Web is a breeze with *Photoshop 4.0*'s Action Palette.

Layers aren't just for compositing anymore: Everything under the Image Adjust menu, including curves, levels and hue/saturation, can now be turned into a layer. If you're always adding a specific green tint to your images, now you can create an "Adjustment Layer" that will affect everything underneath it in the Layers palette.

And if you want to protect those signature green-tinted images, Adobe will include *Imagemarc* software from Digimarc that embeds an invisible watermark into your image. Copyright information will show up when the image is opened—even after editing or scanning.

Along with a host of new features, and speed to burn, Adobe is also adding support for PNG, PDG, and Progressive JPEG formats. All this should make four a magic number for *Photoshop* and its many fans.

— *Michael Lynch*

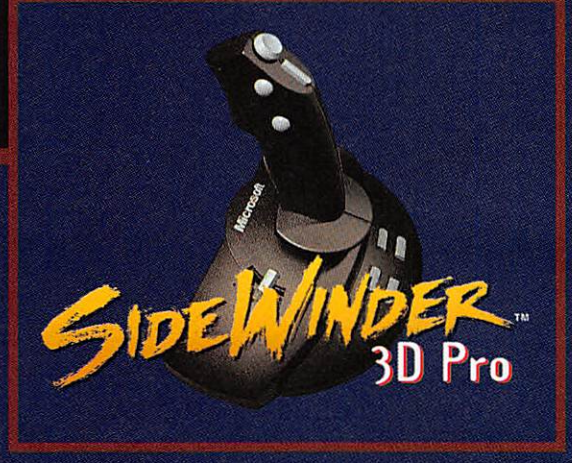


***Pagemaker*-style grids and guides are now standard parts of *Photoshop*.**

AVAILABLE: FALL 96
PRICE: $895 (UPGRADE $149)
COMPANY: ADOBE SYSTEMS INC.
PHONE: 415.961.4400
URL: www.adobe.com

The reason lightning doesn't strike twice in the same place is that the same place isn't there the second time.

— Willie Tyler



Digital precision. Deadly accuracy.

Imagine scorching your enemies with razor-sharp precision. With the world's first digital-optical joystick, the SideWinder™ 3D Pro, you'll balance complex moves with maximum control to get the ultimate in responsive game play. You won't have to recalibrate, even after hours of play. And every handle rotation instantly changes your viewpoint. Digital Overdrive lets the joystick communicate more efficiently with your Windows® 95-based games. All the better to singe your competition.

Microsoft

Where do you want to go today? www.microsoft.com/sidewinder/

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H/W

HP Pavilion 7295V

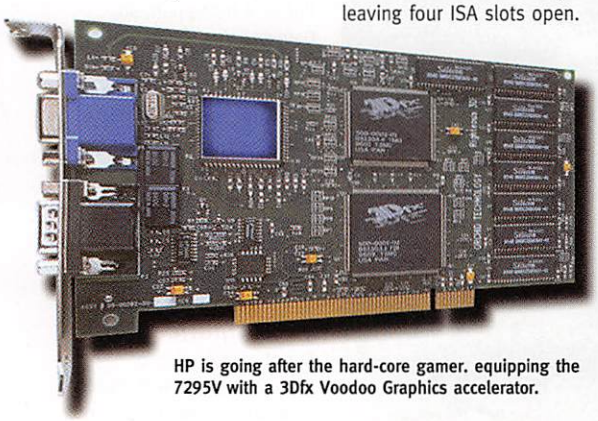
Duelin' 3D

Hewlett-Packard's Pavilion 7295V keeps the same exterior and expansion options as last year's models, but pumps up the power with components, including a 200MHz Pentium, 256K of pipeline burst cache, and wavetable audio.

Although it's a few months late getting to the 3D party, Hewlett-Packard's latest Pavilion will soon join the ranks of high-end multimedia systems offering dual 3D-graphics accelerators. The Pavilion 7295V will feature both the 3Dfx Voodoo Graphics chipset and the S3 ViRGE 2D/3D graphics accelerator.

HP will use the same chassis and stylishly molded body of the first Pavilion models, but you'll find a number of hardware upgrades under the hood. Focusing on the hard-core gamer, HP is planting a 200MHz Pentium, 256K of pipeline burst cache, 32MB of EDO DRAM, and a Triton HX core-logic chipset on an Intel Ruby 3 motherboard. Storage will be handled by a massive 3.8GB hard-disk drive and an 8x CD-ROM drive.

The Voodoo Graphics chipset will be located on a PCI card with 4MB of EDO DRAM, consuming one of the system's two PCI slots. (We review two Voodoo-powered add-on cards on page 87.) An additional 2MB of EDO DRAM will be provided for the ViRGE chip. A 33.6Kbps fax/modem with DSVD and videophone capabilities will be installed in an ISA slot, leaving four ISA slots open.



HP is going after the hard-core gamer. equipping the 7295V with a 3Dfx Voodoo Graphics accelerator.

The videophone will use Intel's ProShare technology to receive videophone transmissions over normal telephone lines.

For tweakers who enjoy loading up their system, the 7295V will feature two open, front-accessible 5.25-inch drive bays; plus one open, front accessible 3.5-inch bay. The solo open PCI slot, on the other hand, will dampen some people's enthusiasm. As far as USB is concerned, HP has apparently decided not to implement the technology until the standard becomes more widely adopted; the 7295V will not have USB ports. Considering that there are no USB peripherals available today, that shouldn't be too much of a problem.

HP is upgrading the Pavilion's sound capabilities, but certainly not by leaps and bounds (then again, neither is anyone else). They're putting Yamaha's OPL4-ML FM/wavetable-hybrid synth on the motherboard. A pair of custom-designed Altec Lansing speakers will be bundled, but not a subwoofer. The speakers can be used either stand-alone or mounted on the sides of HP's monitor.

Bundled with the system will be several games tweaked for the Voodoo chipset including: Interplay's *VR Soccer* and *Whiplash*. All together, HP plans to bundle more than 40 software titles with the machine, including Adobe's *PhotoDeluxe* image-processing software. Unlike the dual-3D gaming systems from Compaq and NEC (which are priced at $100 and $300 more, respectively), HP won't be bundling a joystick or game pad with the computer.

HP is also preparing to ship a number of other high-end multimedia systems, including a model with a 166MHz Pentium, 16MB of RAM, and a built-in PhotoDrive; and a model with a 166MHz Pentium, 16MB of RAM, and a built-in iomega Zip drive.

— *Michael Brown*

AVAILABLE: DEC 96
PRICE: $3,199
COMPANY: HEWLETT-PACKARD
PHONE: 800.322.4772
URL: www.hp.com/info/pchome1

boot reviews

KICKIN' THE TIRES ON THE LATEST **HARDWARE** AND TAKIN' THE NEWEST **SOFTWARE** OUT FOR A SPIN

H/W

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Only the **best** earn enough respect to be worthy of our **editors' choice** award.

RATINGS SYSTEM

90 to 100% Dreamy This category expands the realm of The Possible. If you care about computing, you must have this stuff.

80 to 89% Excellent Doesn't push the envelope quite as hard, but offers excellent performance. Some of this stuff is esoteric enough that it holds only limited appeal.

70 to 79% Solid These are more than "me too" products. They fine-tune the use of new technology, rather than push the envelope.

60 to 69% Good Look around and you'll find several nearly identical competitors. In most instances, however, there is some feature that makes it worth a second look.

50 to 59% Fair These products are behind the performance curve and fail to take advantage of readily available technology that could make them much better.

40 to 49% Lacking Anything in this category exhibits serious flaws, but it has a few redeeming qualities.

0 to 39 % Dregs Flat-out junk. The management of any company that produces more than one of these in a single year should be sacked.

H/W

Gateway G6-180

The Pentium's dead! Long live the Pentium!

Gateway thinks it's time we buried the Pentium, and their new G6-180 is the first nail in that processor's coffin. Intel needn't worry about losing any business, however, because Gateway is herding their customers toward the Pentium Pro.

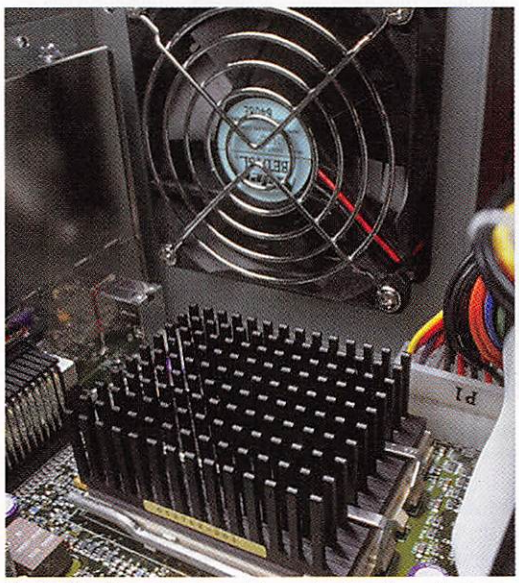
As you've probably deduced, the "180" in the model number refers to the 180MHz P-Pro that Gateway has planted on their motherboard. This isn't the fastest P-Pro around, but Gateway believes the 180 is the future—even for running Win95.

Given that the P-Pro is optimized for running 32-bit code, and considering that Win95 has a lot of 16-bit code, the G6's performance is surprisingly good. It helps that the system is equipped with 32MB of EDO DRAM, 256K of pipeline burst cache, and a 3GB EIDE hard drive. The system's performance with DOS games, on the other hand, was less exciting.

On the Case

The G6-180 features a minitower case that has "feet" on all four sides, so it can be set up either vertically or horizontally. The cover slides off easily enough, but because of the way the feet are attached to the case, the machine leans when you use it as a tower with the case removed. What's more, getting the case back on is a major pain. For these reasons, I prefer Gateway's full-size tower design, and ordering the same system in the full-size tower case tacks just $35 on the price tag.

Unlike most minitowers, the expansion slots on Gateway's motherboard are not located on a riser card. In fact, Gateway sacrificed neither slots nor drive bays in its downsizing effort (the case stands 17.5 inches tall, compared to Gateway's 23-inch tall full-size towers). All the system's components are readily accessible, and there's plenty of room for expansion.



The Pentium Pro and its heat sink are almost as big as the huge fan Gateway puts on the G6-180.

One of the G6's four PCI slots is occupied by an STB Lightspeed 2D graphics accelerator (using Tseng Labs' ET6000 chip and featuring 2MB of MDRAM); the other three are open. Two of the four ISA slots are occupied: an Ensoniq VIVO wavetable sound card (with 1MB of sounds in ROM) resides in one, and a 33.6Kbps U.S. Robotics Sportster Voice fax/modem (which Gateway labels as its own TelePath) is in the other. Two of the four SIMM slots are occupied by 16MB SIMMs.

There are two open 5.25-inch, front-accessible drive bays, plus two 3.5-inch drive bays that are not accessible from the front. The massive P-Pro can get hot as a frying pan, so Gateway placed the CPU and its heat sink directly below a massive fan mounted on the bottom of the power supply (there's another fan on the back of the power supply). After passing over the CPU, air moves directly across the expansion bus.

Performance

Set at a resolution of 1024x768 pixels with 16-bit color depth, the STB Lightspeed 128 delivered an impressive 32 million pixels per second in Ziff-Davis' Graphics WinMark 96 test. Gateway doesn't include

Gateway's G6-180 moves the 180MHz Pentium Pro into the mainstream of personal computing.

STB's *Vision 95* display utility, so you can't change the card's refresh rates independent of its resolution settings. At 1024x768, the card refreshes the display at a rock-solid 75Hz; boost the resolution to 1280x1024, however, and without *Vision 95* you experience interlaced video at 43Hz (Excedrin headache comin' right up).

The G6-180 delivered outstanding results on Ziff-Davis' Winstone32 benchmark, which specifically evaluates the performance of 32-bit Win95 apps. The test reported a Winstone32 score of 115.4, trouncing the mid-90s scores we've seen from 200MHz Pentium systems.

Playing DOS games on the G6-180 yielded mixed results. With *Descent II*, the machine churned out only 15.6fps at 640x480, and just 10.5fps at 800x600. Compare that to the Compaq Presario 8710 with its 200MHz Pentium (reviewed in *boot* 02), which delivered frame rates of 18.1fps and 11.1fps, respectively. The G6-180 did better with *Duke Nukem 3D*, churning out 25fps at 640x480 and 17fps at 800x600, compared to the Presario 8710's 22fps and 13fps performances.

under the hood

the brains

CPU.....180MHz Pentium Pro
External Cache.....256K pipeline burst
RAM.....32MB EDO DRAM (128MB max)
Video.....STB Lightspeed 128, 2MB MDRAM

the brawn

Hard Drive.....3.2GB EIDE Quantum Fireball
CD-ROM.....Toshiba XM-5602B 8x ATAPI
Expansion Bus.....4 full-length PCI, 3 full-length ISA
Fax/Modem.....33.6Kbps Gateway TelePath

the beauty

Monitor.....Gateway Vivitron 17-inch aperture grille
Sound Card.....Ensoniq VIVO (1MB sounds in ROM)
Speakers.....Altec Lansing ACS-40

According to the folks at id, the P-Pro is supposed to be a great *Quake* platform, but the G6-180's results weren't all that spectacular: 18fps at 640x480 and 17fps at 800x600. (As per id's recommendation, we configured the game so that it draws to system memory instead of video memory.) By comparison, we've seen a Pentium 166 with the same STB Lightspeed video card deliver *Quake* at 640x80 framerates of 25fps.

The Altec Lansing ACS-40 speakers aren't bad, as midrange speakers go. They offer good stereo separation and a decent midrange, but the highs sound shrill and grating. Without a subwoofer, there just isn't that in-your-chest bass response. But there is a subwoofer out, so it's easy to add one.

The price listed includes Gateway's own Vivitron 17-inch aperture-grille monitor: A bright display with a 15.9-inch viewable area. If you'd prefer to buy your own monitor, deduct $490 from the system's price.

Double Take

SURE THE G6-180 COMES IN WITH MIDDLING MARKS ON WIN 95 TESTS, ITS P-PRO CPU IS A NEXT GEN HEART THAT BURNS FOR NEXT GEN SOFTWARE. KUDOS TO GATEWAY FOR BRINGING THE PROCESSOR INTEL SAID WE COULDN'T HAVE TO THE HOME DESKTOP.

— Brad Dosland

All things considered, the G6-180 is a fence straddler. Here and today, a 200MHz vanilla Pentium out-performs the G6-180 in Win95, but the P-Pro is clearly the processor of the future—especially for running 32-bit apps. On the other hand, if you're interested in creating a triple-boot system capable of booting to DOS, Windows 95, or NT (see this month's 12-Step on page 57) the G6-180 is your leading candidate. It offers much of the performance of a faster P-Pro system for much less money.

— *Michael Brown*

PRICE: $2,859
COMPANY: GATEWAY 2000
PHONE: 888.200.0629
URL: www.gw2k.com

boot verdict: 89%
An elegant compromise

See it on boot Net

Tweakin' the P-Pro for speed

It's no secret the Pentium Pro is not the ultimate platform for DOS games. But there are ways to improve its graphics performance in DOS, Windows 95, and NT.

One way is to use John Hinkley's *FastVid* 1.04 utility. This program enables features of the P-Pro that are often left turned off by default.

FastVid will turn on the P-Pro's Write Posting feature, which can increase the speed of writes from the motherboard to the graphics card from 8MB/sec to 18MB/sec (a feature that was already enabled on the G6-180). It will also turn on Write Combining (which combines several writes into a cache line that can be burst out to the PCI bus) to boost throughput to video RAM to a staggering 88MB/sec.

Download this utility from our Web site by pointing your browser to **www.bootnet.com**. You'll also need the DOS extender *DOS4GW* (also available at our site) in order for the program to work. The program does not function on regular Pentium systems.

Restart your system in DOS. The first time you run it, the program asks which features you want to enable. When it finishes, you can automatically set those features. If you like it, edit your autoexec.bat to add dos4gw.exe to your search path and add a line to execute *FastVid* on startup.

The second tweak is specific to *Quake*. To run *Quake* faster in any VESA resolution mode, force the game to draw to system memory instead of video memory by issuing a "vid_nopageflip" command from the game's console. Next, set whatever video mode you wish to use. To set video to 640x480, for example, type "vid_mode 15" and hit Enter.

After running *FastVid*, the frame rates for all of our test games improved; as did some of the Ziff-Davis benchmarks. We registered modest gains with *Duke* (rates increased by 2fps) and *Descent II* (an increase of 3fps). But using *FastVid* and then setting *Quake*'s "pageflip" mode to write to system memory delivered a performance boost of nearly 10fps, and id reports seeing even more dramatic improvements on some systems.

— *M.B.*

H/W

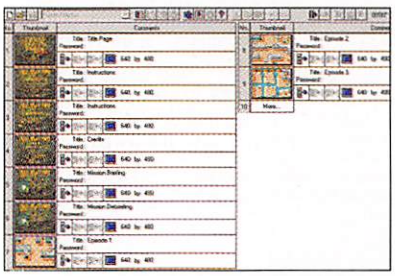
Click & Create

Never judge a book by its cover

Despite being saddled with a cheesy title, Corel's *Click & Create* is a hearty, object-oriented application development environment with lots of potential. In fact, some of its features are more advanced than Macromedia's *Director*, the behemoth of multimedia authoring.

Click & Create works because it delivers a number of advances in object-oriented programming. Everything in a *Click & Create* environment—backdrops, timers, animated sprites, transitions, you name it—is an object. This makes it possible to create a sprite; an evil four-armed Blargian Sinderblat, for instance; and imbue it with enough native intelligence to change its appearance when moving in different directions, fire laser beams at the heroine if she moves too close, negotiate barriers, and more. And you needn't write a single line of code.

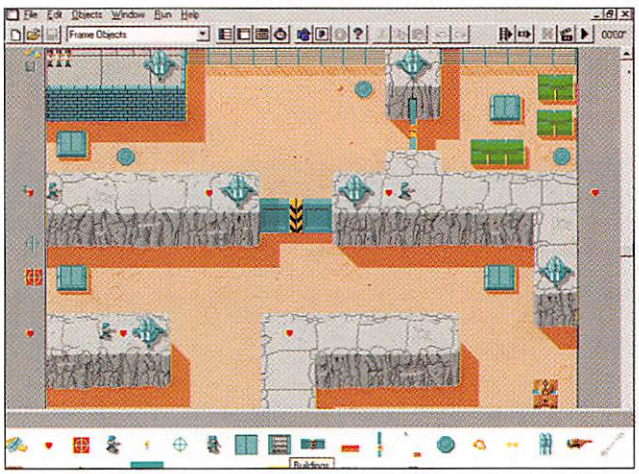
Although Corel positions this product as a multimedia authoring tool, it's pretty weak in that area if you define multimedia as kiosks and presentations. It is, on the other hand, one of the best products I have ever seen for creating side-scrolling, arcade-style games. Although such games have mostly fallen out of vogue, it can be a ton o' fun to create one from scratch and impress your friends and neighbors.



The first step in creating a *Click & Create* production is to prepare a set of storyboards. These are for the gratuitously violent action game *Urban Assault Force*.

Documentation is sparse, and online help isn't much better. The graphic editing tools are anemic, at best. If you need to put together an animated presentation, stick with your existing tools. But if you're yearning to blow away a few Blargian Sinderblats, arm yourself with *Click & Create*.

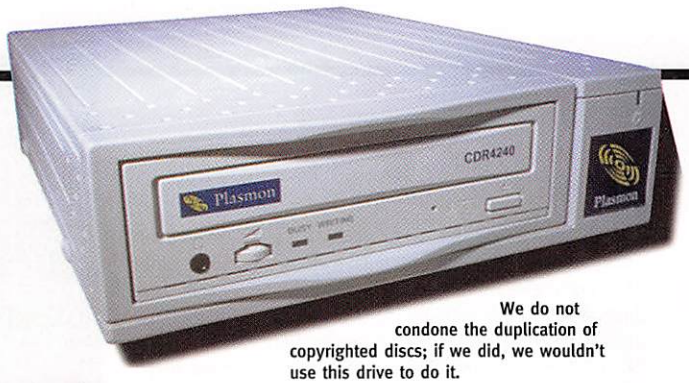
— *Kurt Cagle*



One frame from *Urban Assault Force*, showing the game's sprites and background.

PRICE: $521
COMPANY: COREL
PHONE: 800.772.6735
URL: www.corel.com/click&create/index.htm

boot verdict: 89%
Make your games



We do not condone the duplication of copyrighted discs; if we did, we wouldn't use this drive to do it.

Plasmon Afterburner

Burnin' down the house

Quake is not an easy disc to duplicate.

It's a mixed-mode disc with data on the first track, followed by 10 Red Book audio tracks. It's tough to get data and digital-audio tracks to coexist peacefully, and it requires two different types of fixation to knit all the information into a tidy bundle. Mixed-mode discs make an excellent test of how well a CD-ROM recorder can handle digital audio extraction, so we used them to evaluate Plasmon's Afterburner CDR4240.

The Afterburner is an external CD-R, based on a Matsushita multisession-capable 2x write/4x read mechanism, with a 1MB buffer for regulating data flow. The device is capable of producing CD-ROM, CD-ROM XA, and CD-i discs, as well as Red Book digital audio discs. The model we reviewed lists for $869 and includes an Adaptec ISA-bus SCSI adapter and a two-foot SCSI cable that proved to be worthless because it was so short. Plasmon bundles Incat Systems' *Easy CD Pro 1.1* mastering software for Windows 95, 3.1, and NT. Other models are also available; an internal model, without SCSI adapter, lists for $699.

Easy CD Pro took more than an hour to write the *Quake* data to an ISO image file on the hard drive (longer than average), but it eventually proved to be up to the task. Burning the disc was pretty damn fast, but speed is less of an issue when writing the image file to the CD-R drive, as the image is just one huge file with files and structures already in order and divided into CD-ROM sectors.

Writing to a disc on the fly, on the other hand, can be a real pain. The CD-R software must consult its database to find out where each file should go in the image and where it is actually stored on the hard drive. Then it must open and divide files into CD-ROM sectors, all the while sending the data in a smooth continuous stream to the burner.

When we force-fed the Afterburner with 2,000 compressed icon files at its 2x recording speed, the drive choked on a buffer underrun—producing a shiny $10 Frisbee. (An underrun occurs when the buffer empties and the data flow is interrupted.) The drive could handle this torture test only when we set it to write at 1x speed.

The Afterburner also failed to perform acceptably when copying a single digital-audio track from a commercial audio CD (Peter Gabriel sounded remarkably like the Mushmouth character from the old *Fat Albert* TV show). Writing Red Book tracks from WAV files, however, presented no problem for the drive.

If your CD-R needs are relatively simple, Plasmon's aggressive pricing of the Afterburner CDR4240 is an attractive solution. But if your requirements are complex or if you need a fast burner, there are better (albeit more expensive) drives on the market.

— *Sean Downey*

PRICE: $869
COMPANY: PLASMON
PHONE: 800.445.9400
URL: www.plasmon.com

boot verdict: 78%
Unsafe at high speeds

AST Advantage 9314

Quick! To the bat cave!

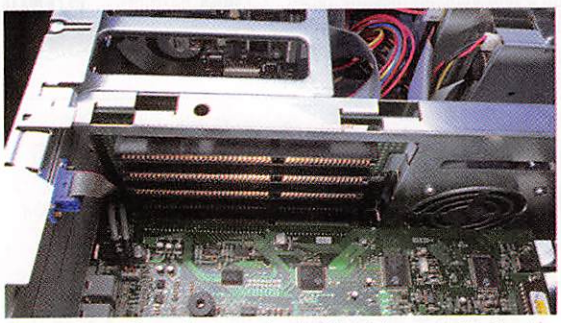
It's always interesting to crack the case of a new PC; you never know what those wacky engineers will come up with next. In minitower systems, for instance, it's becoming increasingly common to find the expansion bus on a riser board jutting out perpendicular from the motherboard and the add-on cards stacked up neatly parallel to the motherboard. The Advantage 9314 puts a spin on this design by orienting the expansion bus so that the cards hang upside down—like so many green bats clinging by their golden toenails.

Sure this peculiar design leaves plenty of room inside the case, but it makes accessing the bus extremely difficult. First, you have to unplug every cable, then remove the case (simple thumb screws make this step easy), flip the computer completely over onto its top, and then remove a steel plate from the bottom of the case.

The bus orientation gave the designers enough room to put seven full-length slots in the chassis (including support brackets on the far side), but then they spec'd the machine for five ISA slots and only *two* PCI slots. Video is handled by an S3 ViRGE 2D/3D 64-bit graphics accelerator and 2MB of video memory on the motherboard, leaving both PCI slots open; but a third PCI slot would be much more useful than five ISA slots.

On the bright side, the 9314 is solidly built, with a heavy-gauge steel cover and what seems like enough steel in its chassis to build a small Go Kart. There are two 5.25-inch drive bays accessible from the front of the machine, and two 3.5-inch drive bays accessible from the back (the 9314's whopping 4GB hard-disk drive is mounted in a third bay here). Offering rear access is a great idea, especially since the drive cage obscures the SIMM slots and must be slid out before you can get to them. Speaking of SIMMs, the 9314 offers 24MB of EDO DRAM, but uses all four of the SIMM slots provided in doing so.

When we powered up the 9314 for the first time and checked its video settings, we noticed that it was set to produce a refresh rate of just 60Hz at 640x480 and 800x600, and its refresh rates for 1024x768 and 1280x1024 were set to 43Hz interlaced. We reset the Win95 display settings to drive the monitor at the highest refresh rates the hardware would put out (75Hz at 1280x1024; 85Hz for everything else), but then we discovered that the ASTVision 7L 17-inch monitor that came with the unit couldn't handle 1024x768 at 85Hz. (The monitor is a $500 option.)



There's plenty of room for expansion, but the slots are upside down!

The 9314 delivered excellent benchmarks in most areas. The 4GB hard-disk drive scored an impressive 1,260K/sec on the Ziff-Davis Disk WinMark 96, and the 8x CD-ROM drive delivered 791K/sec. With the ViRGE chip set to display 8-bit color at 1024x768 resolution and a 75Hz refresh rate, the system scored an impressive 27 million pixels per second on the Graphics WinMark 96 test. When we boosted color depth to 16-bits per pixel, however, that WinMark rating dropped to 18.8 million pixels per second.

Our DOS game tests yielded results we've come to expect from the ViRGE. Playing *Duke Nukem 3D*, the 9314 pumped out 25fps at 640x480 and 15fps at 800x600. Loading up *Descent II*, we saw 21.2fps at 640x480 and 13.9fps at 800x600. It's becoming clear that the ViRGE is a great all-purpose video chip, but for the best in 2D and 3D graphics acceleration you'll want to upgrade with a faster video card. (There goes one of those two PCI slots!)

under the hood

the brains

CPU	200MHz Pentium
External Cache	256K pipeline burst
RAM	24MB (128MB max)
Video	S3 ViRGE 64-bit 2D/3D with 2MB EDO DRAM

the brawn

Hard Drive	4GB EIDE (supplier varies)
CD-ROM	8x Torisan/Sanyo
Expansion Bus	2 full-length PCI, 5 full-length ISA
Fax/Modem	33.6Kbps data/voice/fax with full-duplex speaker phone and ASVD

the beauty

Sound Card	Yamaha OPL4 FM/wavetable-hybrid on motherboard
Speakers	Labtec LCS-1020
Other	2 USB ports

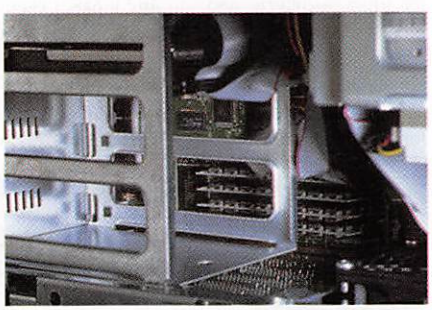
The Advantage 9314 is built like a vault, with a heavy steel chassis and case.

As for audio, AST wisely went with a wavetable synth (mounted on a tiny card that's connected to the motherboard via a ribbon cable, not an ISA slot, oddly enough). The Yamaha OPL4 FM/wavetable-hybrid synth delivered good sound and compatibility, but chances are you won't like AST's choice of speakers. Labtec makes some good speakers, but the LCS-1020's included with the 9314 aren't among them. The speakers force everything into the middle of the audio spectrum, rendering music to mud, vocals to mumbles, and sound effects to muted distortion.

Sometimes you don't miss something until you need it. Using *Angel Devoid* (a DOS game known more for its finicky operating requirements than its gameplay) to test Sound Blaster-compatibility, we succeeded in crashing the system. This instantly revealed that the 9314 doesn't have a hardware-reset button—you must power off the computer if a three-finger salute won't suffice.

The Advantage 9314 features a 200MHz CPU; 24MB of RAM; ViRGE video; two USB ports; and a huge, fast hard drive. Aside from those tasty vittles, the only other eyebrow-raising feature is the estimated street price of $2,799. But if you're the type who's constantly tweaking inside your machine, you'll quickly tire of the bat-cave-inspired expansion bus.

— Michael Brown



This rear-mounted drive bay obscures the SIMM slots and must be slid out for access.

PRICE: $2,799 (EST. STREET)
COMPANY: AST RESEARCH
PHONE: 800.876.4278
URL: www.ast.com

boot verdict: 81%

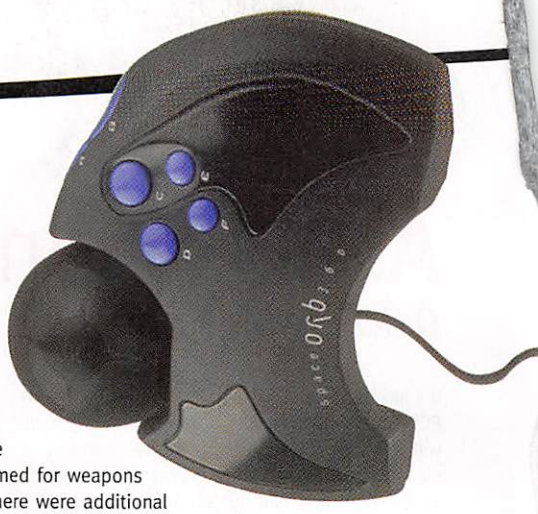
Not tweaker friendly

H/W

boot KICK ASS! PRODUCT

SpaceOrb 360

Spin 'til ya win



The SpaceOrb 360 will make you so good everyone will hate you.

Want an unfair advantage? Check out the most innovative, intuitive controller available: SpaceOrb 360. The original Spaceball made a quantum leap in game controller technology when introduced early last year, but the device was expensive, awkward to use, and difficult to master. After studying the criticism, SpaceTec refined the technology, and produced the SpaceOrb 360.

With six degrees freedom of movement, six programmable buttons, and a palm-sized rubber ball for speed and directional control, this device will have you grinning like a hungry dog in a butcher shop—especially when immersed in a first-person action game.

The SpaceOrb 360 combines the best joystick features with those of a game pad. The rubber ball, which houses a sensor measuring pressure and angle of movement, is more comfortable than a joystick—even after long hours of play. The ball doesn't spin, but responds to twisting and directional pressure. Move left, right, up, and down by rotating, pushing, or pulling the ball; and combine these movements to pull off actions such as strafing, sliding, jumping, rolling, and spinning. You can even make unconventional moves, such as sharp-angled turns, rolling serpentines, and symmetrical spirals; and modify the orientation (how you hold it), skill level (basic to full freedom), and axis sensitivity to take advantage of the full range of motions.

The SpaceOrb's six, easily accessible buttons can be independently programmed for weapons and other game functions. But I wish there were additional buttons on its underbelly for even more firepower.

The SpaceOrb's closest competitor is Logitech's Wingman Warrior, which features a traditional joystick, weighted base, and a small spin-control dial. But the Warrior's joystick, hat switch, and spin dial are not as flexible or as intuitive as the SpaceOrb; and the Warrior's footprint is three-quarters as big as a keyboard, so you have to clear your desktop to use it.

The SpaceOrb 360 plugs into a serial port (the Warrior requires both a game port *and* a serial port) and includes drivers for both Win95 and DOS. You won't have to worry about compatibility with Win95 games, but DOS titles require specific support. The SpaceOrb 360 comes with control settings for 19 such games (including *MechWarrior 2*, *Descent II*, and *Hexen*), and more can be downloaded from SpaceTec's Web site.

With a little practice, you'll find yourself mowing down opponents without mercy until no one will play with you anymore.

— *Bryan Del Rizzo*

PRICE: $99
COMPANY: SPACETEC
PHONE: 508.970.0330
URL: www.spacetec.com

boot verdict: 95%

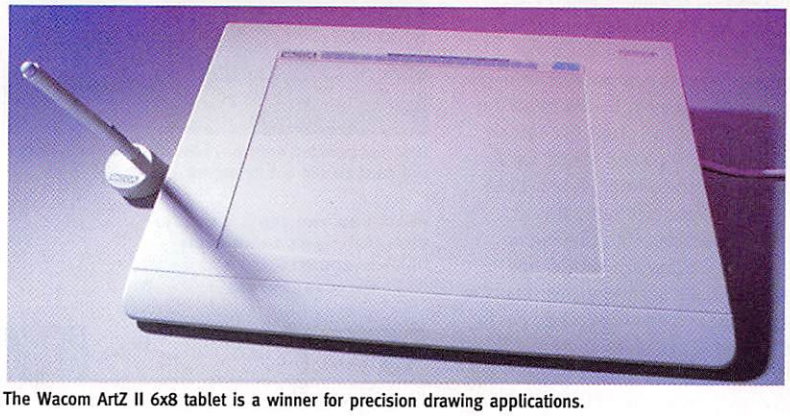
The SpaceOrb 360 is fast, furious, and fun

Wacom ArtZ II 6x8

Death to rodents!

Mice are ubiquitous, but for artists, architects, and others needing precision drawing tools, drawing tablets are a much better solution. I've used tablets for years, but after spending only weeks with Wacom's ArtZ II 6x8, I believe the mouse should be outlawed.

If you're going to draw with a mouse, you might as well drag a brick of cheddar across your desk. Using a pen and tablet is a much more natural experience. This model features an active area measuring 6x8 inches and a cordless, programmable, two-button pen. (Other ArtZ II tablets range from a diminutive $174.99, 4x5-inch model to a $2,449.99, 18x25-inch table-topper. Wacom also offers a variety of pen models.) The tablet responds to 256 levels of pressure, and provides a transparent overlay and a programmable menu strip along the top.



The Wacom ArtZ II 6x8 tablet is a winner for precision drawing applications.

A mouse is nearly impossible to keep completely still when you click one of its buttons, and is completely unsuited for applying subtle brush strokes in paint programs. Wacom's pen, on the other hand, possesses the balance and feel of an elegant writing instrument. It's cordless and battery free, weighs just one-third of an ounce, and transmits up to 60 degrees of tilt data. The ArtZ II shines when used with programs such as *Fractal Painter*, where support for pressure-sensitive input mimics deft airbrush techniques or exotic paintbrush strokes, but *Photoshop*'s eraser tool afforded more precision than the pen's built-in eraser tip.

Installation was a little problematic because of conflicts with device drivers left behind from the installation of an earlier Wacom model.

Using a tablet—even this one—takes some getting used to. Although getting both a mouse *and* a tablet to cohabitate is a chore, the ArtZ II is a definite must-have for graphics professionals and computer artists.

— *Kurt Cagle*

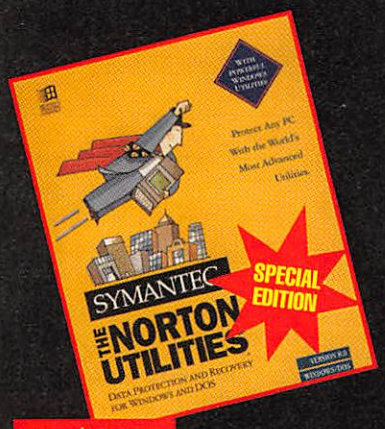
PRICE: $389.99
COMPANY: WACOM TECHNOLOGY
PHONE: 206.750.8882
URL: www.wacom.com

boot verdict: 92%

Best of the best, but tablets aren't everyone's cup o' tea

FOR SOME PEOPLE THE PC IS MORE THAN A MACHINE...

IT'S AN OBSESSION



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S/W

Windows Draw 5.0

Have I got a deal for you

Micrografx's *Windows Draw 5.0* is an incredible bargain. Priced at just $49, this suite of programs delivers the same tools as software priced 10 times more. Whether you're designing unique greeting cards, scanning continuous-tone images, or turning simple sketches into works of art, you'll find the tools you need here.

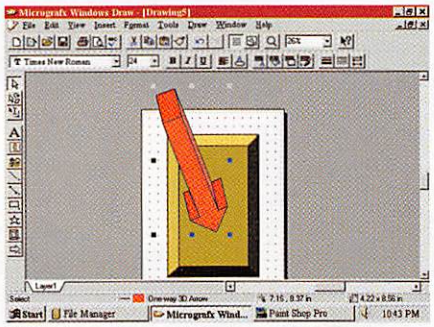
Windows Draw is designed for the casual artist, but unlike many such programs, it doesn't assume you're a moron. Interested in applying the traditional design concepts of texture, surface, value, and weight to your designs? *Draw 5.0* has the power, but makes it easy with simple tools for adding drop shadows, gradient blends, watermarks, and backgrounds. You can also incorporate layers into your work. And even the most complex illustrations—with multiple strata of text, shapes, and objects—can be easily navigated and manipulated. The program delivers precise control of the presentation of your illustrations, thanks to percentage-assisted scaling aided by rulers and grid controls.

Moving into the territory of such high-end drawing programs as Corel's $700 *Draw* package, Micrografx has added 3D vector-handling abilities to *Draw 5.0*. Using the Instant3D engine, it's easy to create objects containing depth, textures, and shading. The package includes a library of 90 customizable 3D objects complete with textures and lighting. Once you've adjusted the lighting and rotation to your liking, you can drag and drop the object into any Win95 application.

If you're feeling artistically intimidated, creatively tapped, or just plain uninspired, *Draw 5.0*'s Project Wizard contains more than 300 predesigned templates, ranging from certificates and flyers to business cards and forms. With this tool, creating an invitation can be as easy as typing in the pertinent information, or you can customize the template by adding images from the library of 20,000 pieces of clip art and photographs you'll find on the CD.

Using the PhotoMagic tool, you can scan, retouch, or manipulate photographs and then instantly drop them into any open drawing or document. Image-editing tools are provided for cropping, resizing, rotating, and painting. You can also perform corrections to scanned images' hue, contrast, and brightness.

Greeting Cards are among the variety of templates included within the program. Whether you're a dabbler or a designer, *Draw 5.0* makes it easy to produce something presentable.



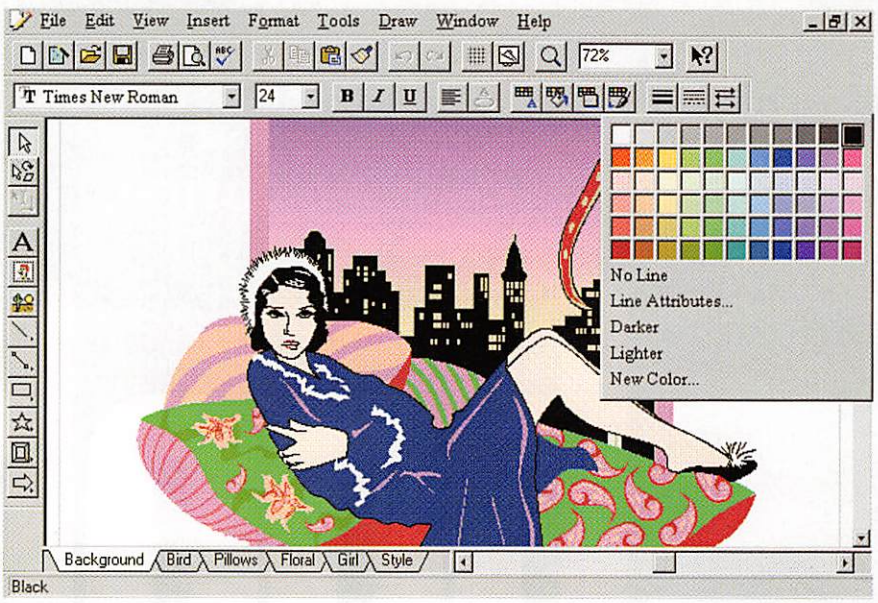
With this easy-to-use 3D tool, you can customize an object's depth and shading.

The Project Wizard puts a host of quality premade templates at your disposal.

No art program can be an island, so *Draw 5.0* includes 50 file-import filters, including PhotoCD, Corel *Draw*, TIFF, BMP, and WMF. Projects can also be saved in a wide variety of formats, including JPEG, GIF, and interlaced GIF. If you're interested in Web design and publishing, Micrografx's ABC QuickSilver plug-in makes it possible to place, view, and edit vector-based graphics from within your favorite Web browser.

Sometimes, a hobby is just a hobby and nothing more. If you're just testing the waters, you probably aren't interested in sinking almost a thousand dollars into software. *Windows Draw 5.0* is the perfect vehicle for exploring computer-aided drawing and illustration. You won't find the depth and power of high-end programs such as Adobe's *Photoshop* or *Illustrator* here, and the package doesn't feature the complete graphic production environment of a program such as Corel's *Draw* suite. What you will find is software offering an astounding price/performance ratio.

— Quintin Doroquez



MicroGrafx's *Windows Draw 5.0* features an easy-to-navigate interface so nearly all the program's features are just a mouse-click away.

PRICE: $49.95
COMPANY: MICROGRAFX
PHONE: 800.653.2610
URL: www.micrografx.com

boot verdict: 87%

A complete graphics tool for the home and office

H/W

Fujitsu Montego

Lean, but not very mean

The Montego sports a snazzy slim-line design and weighs less than five pounds.

There are two problems with portable computers. First, there's the battery. There's nothing more frustrating than your notebook crapping out in the middle of a presentation or, god forbid, a quick round of *Z*. Second, there's the weight. Anyone who's lugged a portable computer has experienced the phenomenon where ounces begin to feel like pounds. Packing eight pounds for four hours is the equivalent of working out with more than 100 pounds for 15 minutes. That's fine if you're in the gym, but it sucks if you're in a suit at a trade show.

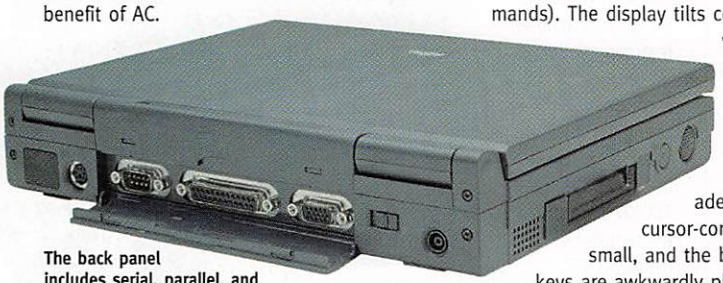
Montego, Fujitsu's new subnotebook, weighs in at just 4.9 pounds and is only 1.9-inches thick. It offers 1GB of hard-disk storage and, unlike most computers in its class, features a built-in floppy drive. The Montego, however, is equally lean in terms of its computing power. The machine is equipped with a 10.4-inch active matrix LCD, a 100MHz Pentium (with no external cache), and just 8MB of EDO DRAM (expandable to 40MB). If you're looking for a multimedia powerhouse, look elsewhere; the Montego is designed for portability and long battery life, not speed.

Swap out the floppy drive for a second lithium-ion battery (included), and you can run the machine for more than five hours without the benefit of AC. Alternatively, you can shave another nine ounces by leaving the bay empty. If you don't need to load data or hand out diskettes, this is the way to go. At four pounds, the Montego packs only half the heft of kitchen-sink-included laptops.

An infrared port is built in and Fujitsu bundles a 28.8Kbps fax/modem with the machine, but since nearly all software comes shipped on CD-ROM, you'll eventually want to invest in a portable CD-ROM drive. There are a number of other ways to do this (infrared, modem, LAN), but none are as simple or convenient.

An LCD panel at the top of the Montego's keyboard displays battery life, disk access, and other conditions; and the LCD remains visible even with the lid closed (an excellent feature). The computer also issues an audible warning when battery power begins to dip, giving you ample time to save your files and switch to AC.

At 10.4 inches, the active matrix screen is small, but very legible. The Chips & Technologies 65548 video chipset and 1MB of VRAM produce resolutions up to 800x600, with 16-bit color depth. An analog thumb wheel on the side of the display controls brightness (much easier to use than any combination of keyboard commands). The display tilts completely flat for use with an external monitor, and it's rigid enough to resist flexing.



The back panel includes serial, parallel, and external monitor connections. There's a PS/2-style mouse/keyboard port too.

Most of the keyboard's 82 keys are adequately sized, but the cursor-control keys are absurdly small, and the backspace and delete keys are awkwardly placed. The keys have just enough travel to provide a pleasantly spongy tactile response.

Sound is provided by a Sound Blaster-compatible ESS 1688 FM-synth chip, but the Montego features only one onboard speaker (stereo output is available via the headphone jack). External monitor, PS/2-style mouse/keyboard, serial, and parallel ports are located on the back panel. There is no docking-station connector.

The Montego's performance on the Ziff-Davis benchmark suite was mixed. The machine's hard drive delivered only 626K/sec on the Disk WinMark 96 test, for example. Fujitsu's use of VRAM, however, delivered excellent video performance for a laptop. At 800x600 with 16-bit color, the Montego produced 6.36 million pixels per second on the Graphics WinMark 96 test. The machine also did well on our DOS game tests, pumping out *Duke Nukem* at 41fps and *Descent II* at 39fps (with both games at 320x200 resolution); and 18fps and 15fps, respectively, at 640x480 resolution.

The Montego isn't as versatile as a multimedia laptop, but it delivers almost twice the battery life and it won't break your back on those miserably long business trips.

— Bryan Del Rizzo

Double Take

My job keeps me chained to my desk most of the time, so I spend only a little time on the road. For that reason, I'd gladly trade a little extra weight for features such as a bigger screen, a modular CD-ROM drive, and a docking-station port. I do love the placement of the Montego's LCD and its ability to swap the floppy drive for a second battery. Such features should be incorporated into all laptops.

— Michael Brown

under the hood

the brains

CPU	100MHz Intel Pentium
RAM	8MB EDO DRAM (40MB max)
Video	C&T 65548, 1MB VRAM

the brawn

Hard Drive	IBM DSOA-21080, 1GB
Expansion	2 Type II PC Cards or 1 Type III

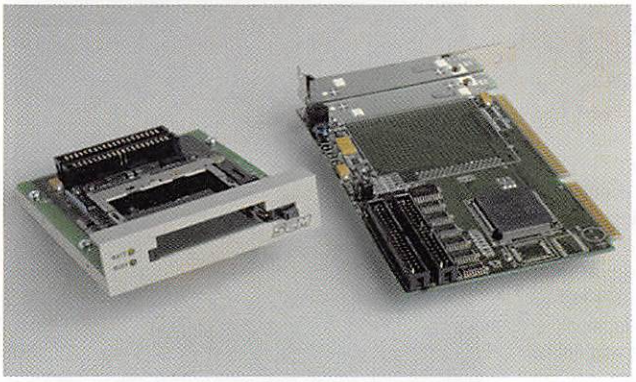
the beauty

Display	10.4-inch active matrix
Video	800x600 max res, 64,000 colors
Sound	ESS 1688 FM synth, Sound Blaster compatible
Speakers	Mono speaker, stereo headphone jack
Weight	4.9 pounds with floppy and battery
Communications	Infrared port, 28.8Kbps fax/modem

PRICE: $2,999.99
COMPANY: FUJITSU PC
PHONE: 888.466.8434
URL: www.fujitsu.com

boot verdict: 82%

Weighs great, less filling



The SwapBox lets you use any PCMCIA card with your desktop PC for the ultimate in computer compatibility.

SwapBox Classic SBI-D1

Pick a card, any card

You've just packed a few hundred digital images into your digital camera's 5MB flash memory card, and you're ready to transfer them to your PC. Sure, your camera has a serial port, but your PC's comm ports are already occupied. Anyway, crawling under the desk and swappin' cables is a pain; for that matter, so is waiting for a few hundred files to suck down a straw-like serial cable. SCM Microsystems has the perfect alternative: the SwapBox PCMCIA card reader.

The SwapBox is available in several configurations; we reviewed the SBI-D1, a single card reader. The SwapBox is as easy to use as a floppy drive, but it can be used for more than storage. Pop any PCMCIA peripheral (Type I, II, or III) into the slot and you can use it with your desktop machine. To use a modem or a SCSI adapter, you'll need to install appropriate Win95 drivers as well. If you're planning to use the SwapBox to read flash memory cards, make sure the camera uses ATA-type flash memory. (For example, the Ricoh RDC-1 digital camera uses proprietary flash memory the SwapBox won't recognize.)

The SwapBox requires an ISA slot for its interface card and mounts into a 3.5-inch expansion bay (a 5.25-inch chassis converter is also included, but you'll need mounting rails to secure it in place). Installing the controller card and driver software took mere minutes (even though this model is *not* Plug-and-Play compatible), and Win95 automatically assigned a new drive letter to the device when the system rebooted. You can hot swap cards without rebooting—a handy feature if you're using multiple cards.

The SwapBox has limited appeal, but it's the perfect companion to a digital camera; and is useful if you own a laptop with multiple PCMCIA peripherals such as ISDN, modems, TV tuners, and SCSI interface cards. And it's cheap enough to be of tremendous value even if you only occasionally use flash memory cards. The ability to use your laptop peripherals on your desktop machine is just icing on the cake.

— Bryan Del Rizzo

PRICE: $119.95
COMPANY: SCM MICROSYSTEMS
PHONE: 408.370.4888
URL: www.scmmicro.com

boot verdict: 85%
Perfect for the power user

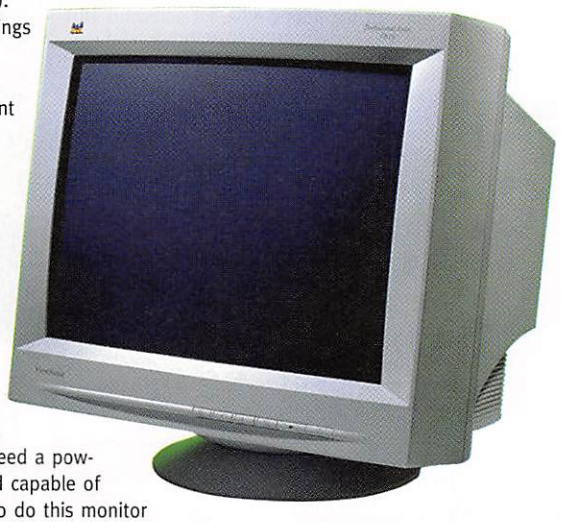
ViewSonic Professional Series P810

Size does matter...

My desktop runs 1280x1024 on a 17-inch screen. It's not that I love fine print, it's just that I crave information. I want everything right now—without shuffling, scrolling, and clicking.

For people like me, 21-inch monitors such as the ViewSonic P810, are a blessing. With so much screenage, 1280x1024 at 88Hz is a joy and text isn't tiny any more. But the P810 goes a step beyond. With ultrafine .25mm dot pitch and 200MHz of input bandwidth, it can run 1600x1200 at a rock solid 76Hz. Zoom in on the details in your 3D models or edit individual pixels in your scanned photos... and you can *still* see the rest of the image. Sure, text is tiny again, but once you've experienced this vastness, anything less feels claustrophobic.

The high-contrast P810's flat/square Advanced Invar shadow mask tube provides a remarkably sharp picture, with consistent colors; no noticeable distortion at the corners; and indiscernible glare or reflections. Front-mounted controls and on-screen menus allow you to adjust not only screen brightness, contrast, position, and size; but also modify the pincushion, trapezoid, parallelogram, rotation, moire reduction, degaussing, and color levels (for use with third-party color calibration setups). Thirteen user settings are automatically saved in memory. Power management features are supported with a standby mode and automatic shutdown, as are the strict Swedish TCO'92 standards for reduced electromagnetic emissions.



The ViewSonic P810 gives you 21 glorious inches to play with.

Plug-and-Play setup is a breeze, but you'll really need a powerful graphics card capable of high resolutions to do this monitor justice. For our tests we used Number Nine's Imagine 128 Series 2 card, and the duo worked beautifully together. You'll also need a strong back to hoist this 60-pound monster onto your desk.

Once you've experienced a big, bright, and beautiful screen like the P810; everything else seems lacking.

— Chris Dunphy

PRICE: $1845.00
COMPANY: VIEWSONIC
PHONE: 800.888.8583
URL: www.viewsonic.com

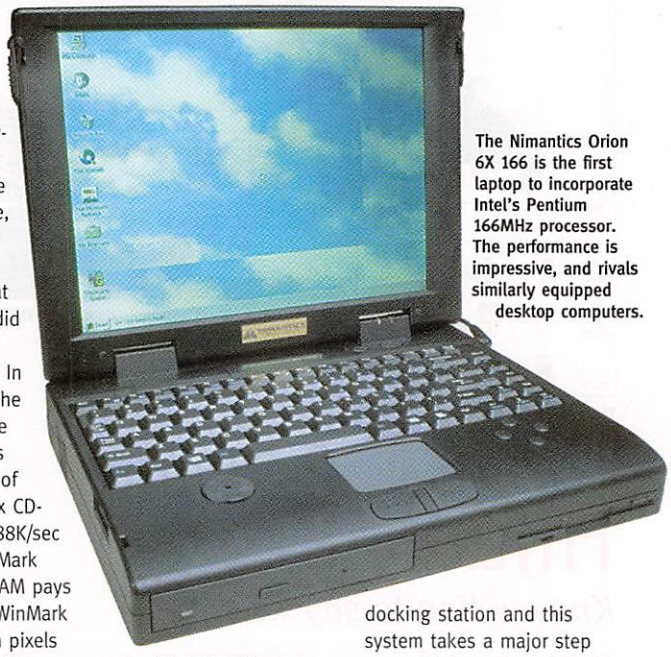
boot verdict: 92%
1,920,000 *useable* pixels means bigger is better

H/W

boot KICK ASS! PRODUCT

Nimantics Orion 6X 166

The Tool Man would be proud



The Nimantics Orion 6X 166 is the first laptop to incorporate Intel's Pentium 166MHz processor. The performance is impressive, and rivals similarly equipped desktop computers.

Whoever said "You can't take it with you" wasn't talking about Nimantics' Orion 6X 166. This laptop is so fully loaded that its motto should be "Why leave home without it?"

In most laptops, a 133MHz Pentium is considered top of the line. Why, Intel only recently began shipping limited quantities of their 150MHz Mobile Pentium; yet, Nimantics' Orion laptop packs a 166MHz Pentium.

How?

By shoehorning the 166MHz *desktop* Pentium into the portable's case. With that much power (and 32MB of RAM) under the hood, you might expect the Orion to double as a grill for a short-order cook. But Nimantics has also devised a unique heat sink and fan system that keeps the system remarkably cool. The fan isn't dead quiet, but it isn't obtrusively noisy, either.

Our friend, the second law of thermodynamics, tells us that the excess heat a desktop processor generates must be coming from somewhere. And that somewhere in this case is those poor portable batteries. Don't expect an hour of constant use before the battery (NiHM, yuck!) peters out. Fortunately, you can bolt a second battery (a $200 option) onto the back of the machine. Although you can't monitor battery life from within Win95, the system does emit an audible alarm when expected battery life dips below three minutes; leaving you plenty of time to save your files or switch to AC.

Continuing on the kitchen-sink theme, Nimantics built a game/MIDI port into the side of the chassis and a Gravis game pad into the deck below the keyboard. In the end, these features are more gimmicky than useful. The game port uses a PCMCIA interface, so you'll need to buy a $20 adapter cable before you can plug a conventional game controller or MIDI device into the port. The game pad is difficult to use because you can't hold it in your hand as you would a real game pad. Plus, only two of the pad's four buttons are functional at a time. Oh well, at least it all looks impressive.

The keyboard is nicely laid out and offers solid tactile feedback. Some of the 86 keys (notably the Ctrl, Alt, and spacebar) should be bigger. The touchpad is very responsive, but the two buttons mounted on the sloping deck are difficult to use.

The rear panel hides all the additional connection points you'll ever need.

The Orion features a gorgeous 12.1-inch active-matrix display, and the Cirrus Logic 7543 chipset (with 2MB of VRAM!) is capable of pouring 65,000 colors at 800x600 all over it. The screen is bright, vibrant, and legible even when viewed off axis. The lid exhibits very little flex and folds completely flat for driving a desktop monitor. In addition to the VGA-out, back-panel connections include infrared, parallel, and serial ports, plus a docking station port and a PS/2-style keyboard/mouse combo port. On the side are jacks for microphone, line-in, line-out, and headphone.

With all that meat and potatoes, how did the Orion perform in our real-world tests? In a word: Awesome. The 2.1GB hard-disk drive delivered a Ziff-Davis Disk WinMark score of 705K/sec, and the 6x CD-ROM drive scored 588K/sec on the CD-ROM WinMark test. The 2MB of VRAM pays off with a Graphics WinMark score of 5.82 million pixels per second (at 800x600 resolution and 16-bit color depth). Our *Duke* and *Descent* tests produced frame rates of 15fps at 640x480, making the Nimantics the first laptop to render these games playable in high-res mode. (At 320x200, *Duke* screamed along at an astounding 50fps.)

Weighing in at just under eight pounds with the battery, CD-ROM, and floppy drive installed, the Orion 6X 166 is comparable to other multimedia portables. Pack in an extra battery and the AC-adapter brick, and your payload balloons past 11 pounds. Ouch! Add a docking station and this system takes a major step toward being a true desktop replacement. And with a price tag of just $4,499, the Orion won't weigh nearly as heavy on your wallet as many less capable laptops.

— *Bryan Del Rizzo*

under the hood

the brains

CPU	166MHz Intel Pentium
RAM	32MB EDO DRAM (32MB max)
Video	Cirrus Logic 7543, 2MB VRAM

the brawn

Hard Drive	Toshiba MK2720FC EIDE 2.1GB
CD-ROM	Teac 6x
Expansion Bus	2 Type II PC Card or 1 Type III
Communications	IrDA infrared port

the beauty

Display	12.1-inch active matrix
Video	800x600 max res with 65,000 colors
Sound	ESS 1788 FM synth
Speakers	Stereo, plus headphone jack
Weight	7.8 pounds with floppy, CD-ROM and battery
Other	Built-in game port *and* game pad

Double Take

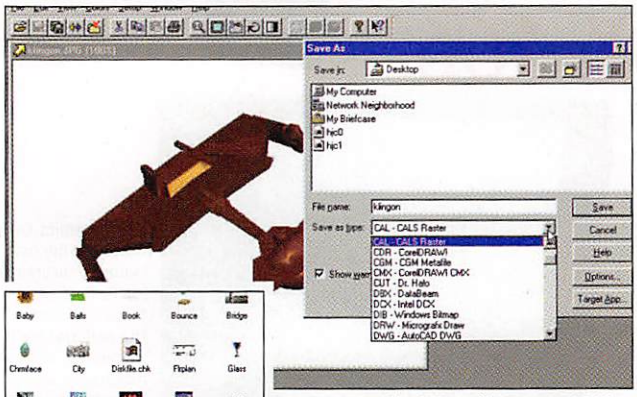
EVERY TIME I TOOK THE NIMANTICS ON THE ROAD, I HAD TO REPRESS A PRIMAL URGE TO HOLD IT OVER MY HEAD AND SCREAM „I HAVE THE POWER!" OF COURSE, IF I HAD TO SCHLEP THIS 11-POUND BOOMBOX THROUGH A MUGGY AIRPORT, I MIGHT SCREAM I NEED A SHOWER! BUT WHO CARES ABOUT PERSONAL HYGIENE WHEN YOU'VE GOT THE MOST POWERFUL PORTABLE MONEY CAN BUY?

— *Michael Brown*

PRICE: $4,499; REAR-BATTERY OPTION: $199
COMPANY: NIMANTICS
PHONE: 800.646.5005
URL: www.nimantics.com

boot verdict: 95%

Nimantics tossed in everything, including the kitchen (heat) sink!



***HiJaak Pro* will convert a VRML file to any other 2D format.**

The catalog system allows you to view the contents of a graphic file based on its icon.

HiJaak **Pro**

Know when to say when

HiJaak humbly started out many years ago as a screen-capture routine. Because this function has long since been incorporated into Windows, the program evolved into an image-processing Swiss Army Knife to justify its existence. What was once a handy, nimble graphics utility now has so many gadgets and gewgaws hanging off it that it's become bulky, slow, and difficult to use.

One of *HiJaak*'s strengths has always been its ability to open almost any graphic file and save it as almost anything else. The latest version, *HiJaak Pro*, will open several 3D file formats (including files stored in 3Dstudio, DXF, and VRML formats) and allow you to navigate around those objects. *HiJaak Pro*'s navigational tools, however, are awkward and not at all intuitive. Worse, its viewing engine is slow and does a poor job of rendering.

On a related note, *HiJaak Pro* can convert a raw EPS file into a raster image (and it can trace a raster image and convert it to EPS format), but the quality of the resulting image is far inferior to what could be accomplished using *Photoshop* or *Freehand*. The program really surprised me by allowing me to try and convert a JPEG file into a 3D image. After pounding away for five minutes attempting to parse the file, *HiJaak Pro* finally hung my computer. What's needed here is a safeguard against attempting the patently absurd.

There are a number of similar problems with this program, including a feature that produces icons based on thumbnail images of the files they represent. It's a great idea, but it triggers significant performance hits on the hard drive because it takes so long to catalog the contents of a folder and render all the tiny thumbnails.

HiJaak is an acceptable program if your needs are simple, but the we-do-it-all approach doesn't make a lot of sense in the multitasking world of Win95. If you need power graphics tools, you'd be better served by more specialized software.

— Kurt Cagle

PRICE: $279.95
COMPANY: QUARTERDECK
PHONE: 800.683.6696
URL: www.quarterdeck.com

boot verdict: 65%
HiJaak of all trades, master of none

boot DISC
SEE IT ON THE DISC

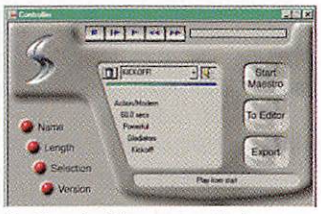
SmartSound for Multimedia

Make that funky music

SmartSound for Multimedia lets you create movie-caliber soundtracks for your projects or presentations. And, if you're like me, and can't tell a G minor from a B flat, don't worry. *SmartSound for Multimedia* is so easy to use, it should have been called Soundtracks for the Musically Challenged. But with a price tag of $179.95, it might be cheaper to take music lessons.

The SmartSound Maestro guides you through questions about the soundtrack you are creating. Choose the purpose (such as an opener/finale), and decide if you want background music for voice-overs, or just special effects to highlight points of the presentation. Next you'll decide the length and timing of sounds and choose from more than 45 colorful soundtrack styles including Kick Off, Driving Solo, Quick Lick, and Street Smarts.

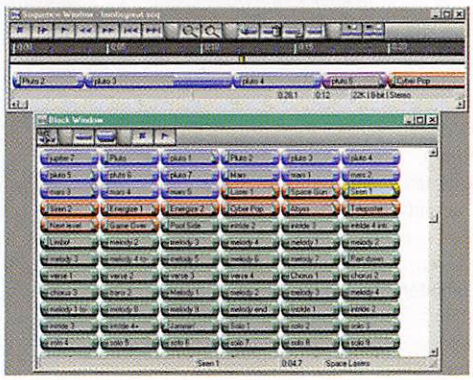
Use the soundtracks as is, or use the included editor to customize them. The Editor is intuitive and simple, breaking down the soundtrack into individual segments (called Smart Blocks) for easy manipulation and modification. There are 15 special effects (including flanging, fading, and ping-ponging stereo) to choose from, and you can also import standard WAV files. And, if you have the audacity to merge something like a Latin lap dance with a classical concerto, an automatic hinting system kicks in, alerting you to the musical blunder. You can save your final soundtrack as a WAV file, but future versions promise AIFF and AU extensions as well.



The Operator lets you move between the *SmartSound* Maestro and the Editor, or you can play back your current soundtrack.

A soundtrack can be integral to a presentation, or used to spice up a Web page, desktop theme, *Word* document, or *PowerPoint* presentation. If you think a metronome is where the Minnesota Twins play baseball, *SmartSound for Multimedia* is for you.

— Bryan Del Rizzo



The *SmartSound* Editor lets you customize the soundtrack, add effects, and sample individual sound segments.

PRICE: $179.95
COMPANY: SONIC DESKTOP SOFTWARE
PHONE: 818.718.9999
URL: www.sonicdesktop.com

boot verdict: 89%
It's hip to be square

S/W

Righteous 3D and Monster 3D

The Voodoo priests

The 3Dfx Voodoo Graphics chipset is at the top of the heap of the game-quality 3D graphics accelerators. Orchid is bringing the chipset home first with their Righteous 3D card, followed closely by Diamond with their Monster 3D. Both offer 2MB of screen buffer and 2MB of texture memory, support for Direct3D and 3Dfx native games, and both should provide nearly identical performance, not to mention software compatibility. The only way we could differentiate the two 3D accelerators was by comparing bundled software.

But there's a catch.

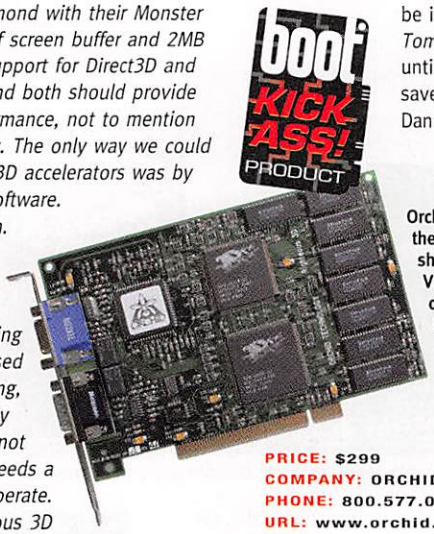
The Voodoo Graphics chipset is a 3D-only accelerator. This is a good thing in that 3Dfx has focused on doing just one thing, and doing it amazingly well. But your PC cannot live on 3D alone; it needs a capable 2D card to operate. With both the Righteous 3D and Monster 3D cards, you use a small supplied cable to jack your current VGA out to the 3D accelerator, and then hook your monitor to the 3D card's output. This works great if you have an excellent 2D accelerator—you get the best of both worlds. But if you're build-ing a new system, or if you also need to upgrade your 2D; buying two graphics cards can be expensive.

The bigger gotcha is that the Voodoo does not cooperate with your 2D card. Your monitor can display either standard 2D, or the output from the 3Dfx in full screen. There's no way to encapsulate 3D into a window. This means, unlike integrated 2D/3D cards, the Voodoo is of no use for displaying VRML-rendered 3D Web pages or accelerating other applications that provide a mixed 2D/3D environment.

That said, here's what the Voodoo chip is good for: games. Glorious, beautiful, 3D games. At last, your $3,000 machine will be able to whip the Saturn's and PlayStation's asses. Ignore the fact that it took a card costing more than either of those machines to do it. The Voodoo chipset supports all the 3D buzz words such as perspective-corrected texture mapping, mip mapping, Z-buffering, fogging, alpha blending, compressed textures, and bilinear filtering—all while running at resolutions up to 800x600 with 16-bit color (640x480 max for games using a Z-buffer).

Orchid Righteous 3D

The Righteous 3D bundle is almost completely finalized. Gremlin's *Actua Soccer Semifinals* and *Whiplash*; and demo versions of Interplay's *Descent 2*, Criterion's *Scorched Planet*, and Microsoft's *Monster Truck Rally* and *Hellbender* will definitely be included. The shareware version of id's *Quake* and a demo version of Eidos' *Tomb Raiders* are possible, but unconfirmed at this time. The list won't be finalized until the card ships at the end of September. Orchid is also working on a 3D screen saver. "Instead of flat fish, imagine a 3D dolphin swimming around," says Orchid's Danny Sanchez.



Orchid's Righteous 3D is the first 3D accelerator to ship with the 3Dfx Voodoo Graphics chipset. The card will be populated with 4MB of EDO DRAM.

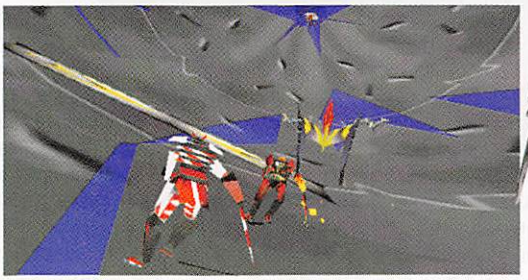
***Whiplash* flies on the Voodoo Graphics chipset, even with all the texture maps turned on.**

PRICE: $299
COMPANY: ORCHID TECHNOLOGY
PHONE: 800.577.0977
URL: www.orchid.com

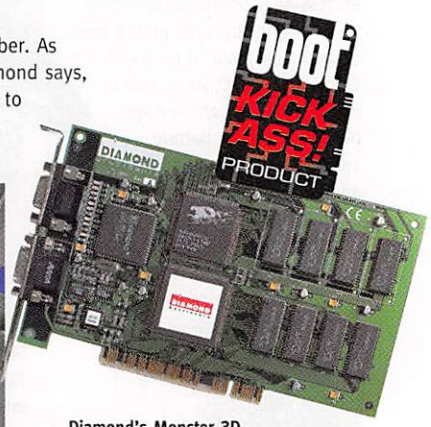
boot verdict: 91%
Gets there first

Diamond Monster 3D

The Monster 3D is due to hit shelves in the middle of October. As such, the bundle has not been finalized. Kim Stowe of Diamond says, "We are looking at PC, arcade, and console titles, and plan to include three to five full games." The full bundle should be listed on the Diamond Web site by the time you read this.



***HyperBlade* is an entirely different experience with 3D acceleration.**



Diamond's Monster 3D also uses the 3Dfx Voodoo Graphics chipset and 4MB of EDO DRAM.

PRICE: $299
COMPANY: DIAMOND MULTIMEDIA
PHONE: 800.468.5846
URL: www.diamondmm.com

boot verdict: 91%
We dig that voodoo that you do

You want the best? You want it now?

If the answer is "yes," you just need to go out and decide which software bundle suits you best. If you can settle for a little less 3D oomph and want an all around 2D/3D solution, the Vérité-based Creative Labs PCI 3D Blaster and intergraph Reactor cards are due soon, as is the Rage 2-powered 3D Xpression PC 2 TV from ATI. But right here, right now, the Voodoo-powered Monster 3D and Righteous 3D are the best you can get.

— Chris Dunphy

H/W

Kodak Digital Science DC20 and DC50 Cameras

Small is beautiful and bigger is better

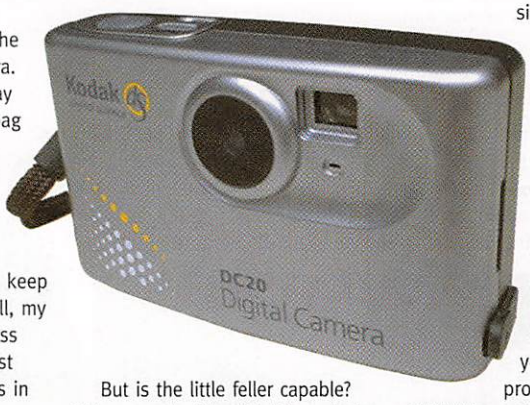
When it comes to photography, no one should be surprised that the Kodak company knows a thing or two. From the first mass marketed cameras (simply shoot the roll and mail the entire camera back to Rochester, N.Y. for processing), to the Brownie line of cameras that brought photography to the masses, to the most popular line of photographic films ever produced, Kodak has become synonymous with photography. It shouldn't come as any surprise then that Kodak is in the vanguard of digital photography. With a top-notch line of professional imaging systems that attach to Nikon and Canon SLR bodies, Kodak has developed powerful technology in the digital arena. And like the technology developed for race cars that ends up in the family sedan, Kodak is bringing their digital photography to the masses in their Digital Science series of filmless cameras.

Even at its lower resolution (320x240), the DC20 creates sharp images.

Kodak DC20

Your digital pocket pal

The best PDA is the one you always have on your person; the same is true of a digital camera. Professional photographers may be willing to lug a 20-pound bag of gear, but most of us aren't. The Kodak DC20, in its sturdy plastic case, is light enough (4.4 ounces with battery and wrist strap) and small enough (1.2x4.0x2.4 inches) to keep in your pocket at all times. Hell, my wallet, packed with old business cards, ATM receipts, and dentist appointment reminders, weighs in at over six ounces!



While there is some mottling in the shadow areas, the DC20 handles tough lighting situations gracefully.

But is the little feller capable? Able to pack eight "high" resolution (493x373) or 16 "low" resolution (320x240) images into its 1MB of internal storage, the DC20's images are as sharp with detail as can be expected from a fixed-focus point-and-shoot camera. Exposure is entirely auto, as a program balancing shutter speeds from 1/30 to 1/4000 of a second with apertures ranging from f4 to f11. This, combined with a relative 800 to 1600 ISO, allows you to click pix in a broad range of lighting situations. Open shade maintains detail with minimum noise, but colors fade fast as your light source dims. The camera's images also suffer in backlight situations. Still, for general daylight shooting, the DC20 is a very capable camera.

The hoot with digital cameras is the instant gratification of seeing images on screen nearly as quickly as you can click them off. Simply hook the DC20 to your serial port via the provided cable, use TWAIN to suck your images down into the application of your choice (a copy of *Kai's PowerGoo*, a *Photoshop* plug-in, and a special edition of *PhotoEnhancer* are included on the bundled disc).

It takes less than five minutes to download eight high-res images, and you *will* want to stick with the high-res mode unless you're only creating thumbnail images to be posted online. And since you'll have only eight images to work with, it would be really handy if the camera's Spartan controls (a red LED, a yellow LED, and a green LED) included a way to delete specific images—or at least the last image.

Since people are the most commonly photographed subject matter, skin tones are a critical test for any digital camera. The DC20 is generally solid, but tends blue in open shade.

As it stands, you'll want to travel with a notebook computer to really enjoy this camera.

Maybe it isn't so light after all, but it's still a blast to steal a snap, goo your boss's face, and toss it up on the company intranet anonymously.

— *Brad Dosland*

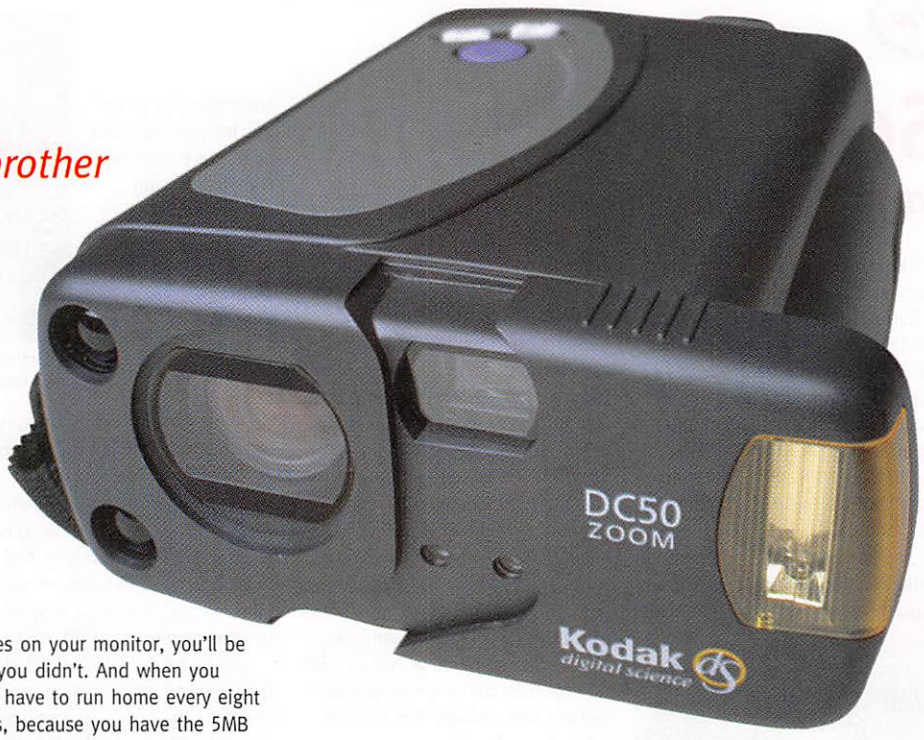
PRICE: $349
COMPANY: EASTMAN KODAK COMPANY
PHONE: 800.235.6325
URL: www.kodak.com/daiHome/DC20/index.shtml

boot verdict: 86%

Always there for you

Kodak DC50

Like a tough guy big brother



In this corner, weighing in at a hearty 1 pound and 5.1 ounces... the reigning champeen of the Kodak consumer digital camera stable... the DC50!

That additional weight carries with it a substantial increase in power from the diminutive DC20, but the relative bulk (5.8x4.3x2.5 inches) makes it more of a chore to lug. It ain't gonna weigh you down, but after holding it up to your eye for five minutes, waiting for just the right moment to capture a scene, you'll probably wish you brought the DC20.

But when you get home and see the beautiful 24-bit, 756x504-pixel images on your monitor, you'll be glad you didn't. And when you don't have to run home every eight snaps, because you have the 5MB PCMCIA-ATA Type I or II removable storage cards expanding the camera's 1MB permanent memory (which usually holds 22 "Good" quality images, or 11 "Better" quality images, or 7 "Best" quality images) you'll be even happier. With the card inserted, the DC50 holds 120 "Good" images, or 55 "Better" images, or 35 "Best" images before needing a serial port to download into. A set of four AA lithium batteries should keep you clicking through 500 pictures.

Even in areas where contrasting colors meet, the DC50's images were sharp, but not jagged.

Everything the DC20 does, the DC50 does better. Fixed focus—which means everything is equally out of focus—has been upgraded to IR beam autofocus with multi-spot, center-spot, and close-up capabilities. The blinking LEDs have been replaced with a graphical LCD that controls everything from the 10-second self-timer to a flash override for the camera's built-in light source.

The DC50 adds a zoom lens that equates to a 37mm to 111mm zoom lens on a traditional 35mm camera, and the lens can focus from 19 inches in close-up mode, and 28 inches in normal. Shutter speeds range from 1/15 to 1/500 of a second and the DC50 automatically sets apertures ranging from f/2.6 to f/24, but allows automatic exposure override. The camera's KAF-0400C image sensor provides an ISO equivalent of 84.

Operating the DC50 is as simple as the DC20. Simply open the lens cover to power up the unit and flash, point, and shoot. When you're finished, run to a nearby PC and download your booty via the included *PhotoEnhancer* software, where you can view, edit, and save your images in a variety of formats, including GIF, JPEG, and BMP. The DC50's proprietary RADC (Run Adaptive Differential Coding) CODEC creates lossy image files around 1MB in size, easily tossed onto an floppy for blackmail purposes.

While definitely not a heavyweight, compared to more expensive, elaborate, (and delicate) professional digital cameras, the hearty DC50 packs enough punch to be a solid contender.

— Brad Dosland

Subtle gradations, such as those found in this flat-lit still life, are not banded with the DC50's KAF-0400C CCD and its 400,000 separate photosensitive elements..

With the DC50's IR beam focusing, images have distinct depth of field.

PRICE: $1,000
COMPANY: EASTMAN KODAK COMPANY
PHONE: 800.235.6325
URL: www.kodak.com/daiHome/DC50/indexDC50.shtml

boot verdict: 89%
Much more muscle

H/W

Scorched Planet

Save some ass, kick some ass

The Voraxians have broken a peace treaty and are invading the world of Dator 5. Human military forces are days away. The planet will fall and its inhabitants be enslaved unless you, a washed-up ex-fighter pilot who's just passing through, can play hero one more time. You can't win this fight, but you might be able to save a few of the colonists.

Scorched Planet offers plenty of audio/visual atmosphere. Everything is rendered in 3D, and texture-mapped with luscious bitmaps. An invincible Voraxian mother ship fills the air with an ominous thrumming as it hovers over the settlements of Dator 5, turning buildings into dust with its powerful lasers. Driving a vehicle that morphs between a heavily armored tank and a nimble aircraft, you maneuver through rugged canyons and smoking settlements, picking up survivors. Your craft can carry only five passengers, so you'll need to fly through a series of transporter rings to beam them back to the ship you've left in orbit.

As you engage in an aerial dogfight, settlers on the ground await rescue.

Colonists come in two varieties: settlers and soldiers. The soldiers will defend themselves against attack, letting out a gutsy "Let's kick ass!" as they disembark for the fight. Settlers can help, too; scavenging for power-ups for your craft. But don't leave them on their own for too long; otherwise, Voraxian spiders will turn them into zombies, and flying Voraxian creatures will carry them off.

A soldier looks on as his town is leveled and his buddy is carried off.

This is one of the first games to be accelerated for the 3Dfx Voodoo Graphics chipset, and it looks gorgeous and fast running on it. Fortunately, the nonaccelerated version also looks good; especially if you set the detail levels to high and run it on a fast Pentium. In multiplayer mode, the game supports up to four people on an IPX network.

Scorched Planet straddles the line between shoot-'em-up action and strategy, but it accomplishes the trick only modestly. There's enough variety in terrain, monsters, and weapons to keep the action going, but the strategic elements are limited. Aside from those caveats, the game offers a rockin' way to hone your search-and-rescue skills while piling up a body count.

— *Chris Dunphy*

PRICE: $39.95 (EST. STREET)
COMPANY: CRITERION STUDIOS AND VIRGIN INTERACTIVE ENTERTAINMENT
PHONE: 714.833.8710
URL: www.vie.com

boot verdict: 85%

While you can't win, you'll want to keep coming back for more

Panasonic PanaSync/Pro P17

The next best thing to 21 inches

With anything less than a 17-inch monitor, you miss out on the full experience your machine has to offer. Anything larger, and the price escalates so fast that it overwhelms your budget, not to mention your desktop. The 17-incher is fast becoming a standard for its fine balance of Formica and RGB real estate.

The Panasonic PanaSync/Pro P17 represents the high end of the 17-inch spectrum with its ultrafine .25mm dot pitch and display bandwidth of 135MHz. The monitor shines in 1280x1024 mode at 75Hz–everything is beautifully sharp, the colors are bright, and the picture is excellent. The flat/square screen seems immune to glare and reflections, and no distortion or color inconsistency could be found in the corners.

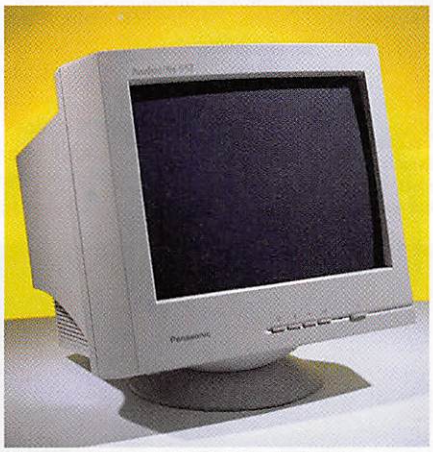
While it can resolve an amazing maximum resolution of 1600x1200, this can only be achieved at 65Hz–which may induce eyestrain headaches with prolonged use. At this res, all but colossal text is illegible. Still, res junkies with high-end graphics cards will find this mode invaluable for getting a look at the big picture in CAD, 3D modeling, and image editing apps.

Like many new monitors, the P17 fully supports Plug-and-Play, and it provides four levels of power management (on, standby, suspend, and off) to prolong display life and conserve electricity. To prolong *your* life, Sweden's strict TCO'92 standards for reduced EM emissions are adhered to. All controls are easily accessed from the front panel, with on-screen menus. In addition to basic brightness, contrast, size, and positioning, controls are also provided to adjust trapezoid, pincushion, parallelogram, rotation, moire pattern removal, manual degaussing, and color (for use with third-party color matching software). Thirteen user settings are automatically preserved in memory.

On the downside, the P17 didn't respond gracefully to input signals out of its sync range. Rather than going black or displaying a warning message like many other monitors, it desperately tries to sync–leaving a strobing screen to hypnotize you.

When deciding where to spend on your system, a sharp monitor will matter more to you than a few extra MHz in your CPU. The Panasonic P17 may cost more, but the extra sharpness, brightness, and ultra-high resolutions make it worth the investment.

— *Chris Dunphy*



With the ability to do 1600x1200, the PanaSync/Pro P17 gets you as close to the 21-inch experience as 17 inches will allow.

PRICE: $879.00
COMPANY: PANASONIC
PHONE: 800.742.8086
URL: www.panasonic.com

boot verdict: 88%

An investment in sharpness

S/W

3D Home Architect Edition 2

So easy, but not so pretty

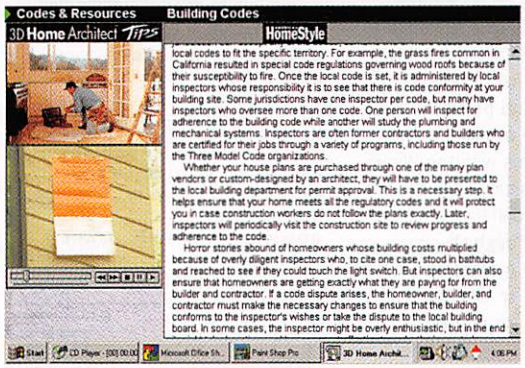
If you're feeling ambitious and looking to design Bucky Fuller-esque geodesic domes, stick with *AutoCAD* to snap your lines and create your arcs; but if you aren't an architect or engineer by profession and have something more traditional in mind, *3D Home Architect*'s "object-oriented" approach should be all the CAD you need to build your dreams.

By providing a library of ready-made shapes—walls, windows, furniture—for some of the more complex elements you'll be working with, *Home Architect allows* you to quickly drag and drop complete building elements straight into place.

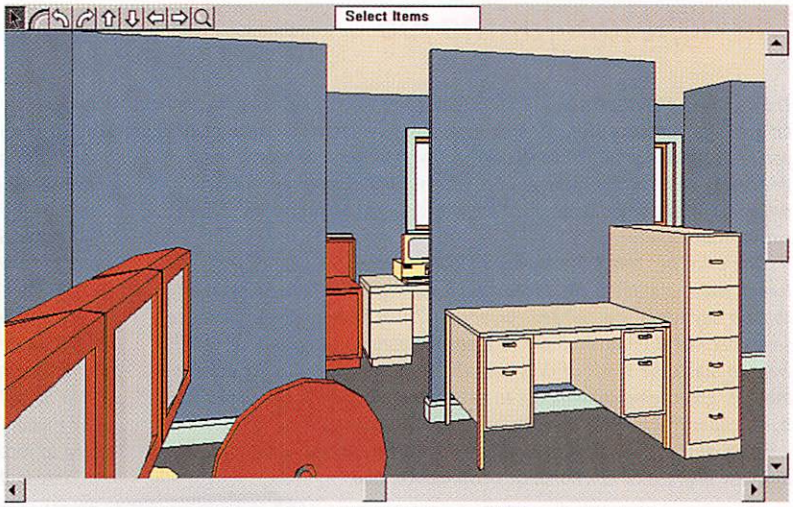
A floppy-based version of *3D Home Architect* has been available for a while, but the CD-ROM adds new features, including a library of fixtures and furniture items, and architectural tips.

After spending a little time with the comprehensive reference manual, familiarizing yourself with the tools —which are pretty intuitive— you'll be up and designing in no time. Editing your plan is a cinch: resize and move elements; color them; view them with various 3D options; jumping back and forth between 2D and 3D quickly and easily. Most designing occurs in the 2D plan/blueprint mode, but *Home Architect*'s interactive 3D editing updates your 2D plans whenever you make changes in 3D.

The program automatically checks dimensioning, while the PlanCheck and Materials List features are handy for providing a rough guide. PlanCheck alerts you to your most glaring building code violations—but it's only a guide and you'll need to check your local codes and consult a pro before pouring the foundation of your dream home on the San Adreas fault. The Materials feature keeps track of your construction budget with a spreadsheet of the materials you've selected, and space for you to enter unit pricing. *Home Architect* then calculates building material costs for you. Once again, only use this as a guide. Labor costs are not factored in and they're a hefty part of the building equation.



The Tips section of the disc has both video and text to help you make informed decisions when planning your home.

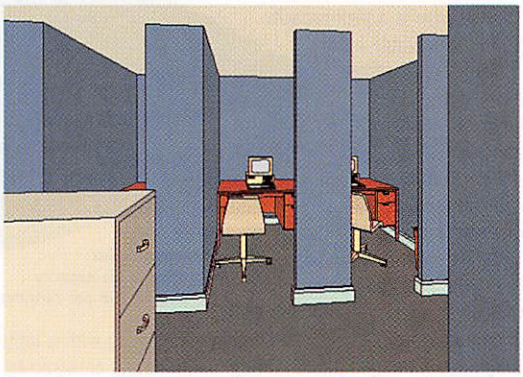


It may not look prrrtttty, but it's a quick and brutal 3D image. *3D Home Architect* offers several 3D viewing options, and you can tilt your viewing angle.

Roofs are tricky to design and *Home Architect*'s Roof Designer is a blessing, with a selection ranging from gambrel to gull wing.

If you're stumped for new home or renovation ideas, *Home Architect* comes with sample plans to get you started. They're all pretty traditional, but still a good jumping-off point. You can also link to Broderbund's Web site which has tutorials and other info relevant to the program.

Home Architect handles multiple floors and allows you to print plans for your contractor. You can export TXT files (for spreadsheets), DXF, or WMF files. Roofs are tricky to design and *Home Architect*'s Roof Designer is a blessing, with a selection ranging from gambrel to gull wing.



If you have ambitions of stunningly refined interior settings, you may be disappointed by *3D Home Architect*'s palette of colors and options for the application of those colors.

The Tips section of the disc is comprehensive, covering estimation of costs, and design and construction issues. There are HomePro video clips—but these are none too inspiring—and tons of articles from *American HomeStyle* magazine.

The 3D views sometimes look crude and selecting color for walls and furniture is limited: You're restricted in the number of colors you can select for any one type of item in a particular room, and there is no textures palette. Though this may thwart your grand visions of elaborate interiors, it's not the point of this particular program. The focus of *3D Home Architect* is to make planning your home in 3D a snap, and it is here that it succeeds.

— Ingrid Bush

boot verdict: 80%

Easy 3D, but not too pretty.

PRICE: $69.95
COMPANY: BRODERBUND SOFTWARE
PHONE: 800.521.6263
URL: www.broderbund/3DHome

H/W

Removable Media Drives

The right tool for the job

The fact is, 1.44MB just doesn't cut it anymore. Video, digital audio, and fat graphics consume storage, and no matter how large the hard drive, you're going to run out of space. So you embark on a search for new devices to store or transport or back up your most important files and programs, only to find a forest of storage devices, each offering its own path toward salvation.

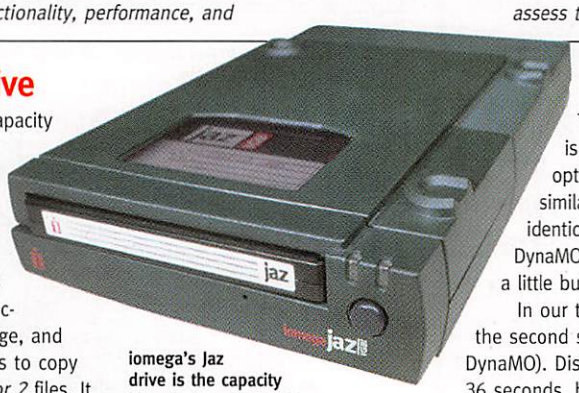
The price per megabyte for fixed media storage has plummeted in recent years, and multi-gig drives are increasingly common. Still, there'll come a day when you can see the end of 2.1GB Street, or you'll want to send that 40MB Photoshop *file to a service bureau for output, or you'll want to stash the scads of GIFs and JPEGs you've been sucking down off the Net. Enter removable media to save the day! Today's cartridge drives boast capacities in the gig realm and speed that rivals fixed disks.*

Each of these drives is geared toward a different task, and each offers different degrees of functionality, performance, and compatibility. For this reason, we've highlighted the features you'll want to know about—portability, compatibility, access times, data throughput, and cost-per-megabyte of storage—when making your purchase decision.

We tested the drives on a generic Pentium 166, with an Adaptec AHA 2940 PCI SCSI interface. The Fujitsu DynaMO 230 is designed for use with laptops, so we also tested it with SCM's SwapBox PC-card reader and Fujitsu's Montego notebook computer (both are reviewed in this issue).

The real-world tests were comprised of five parts: formatting, file transfer, file access, file retrieval, and application launching. We recorded how long it took to: format media; copy the entire directory of MechWarrior 2 *(92MB in multiple folders); copy one 18MB graphic file; and open that file using* HiJaak Pro. *We also launched* MechWarrior 2 *from the removable media to record how long it took to play the complete introduction and to assess the fluidity of the video and audio playback.*

iomega Jaz drive



iomega's Jaz drive is the capacity king at 1GB per cartridge.

The Jaz drive is a high-capacity SCSI II removable hard drive, useful for transporting large files, large quantities of files, and backing up fixed drives. Performance was solid: It took only 35 seconds to format a cartridge, and 1 minute and 20 seconds to copy the 92MB of *MechWarrior 2* files. It took 15 seconds to copy the 18MB graphic file, and 22 seconds to open the image with *HiJaak Pro*. Playing *MechWarrior 2* was impressive, and the intro required only 7 seconds to finish playing. In fact, there was no perceptible difference between playing *MechWarrior 2* on the Jaz drive instead of an EIDE hard drive.

The Jaz drive is Plug-and-Play compliant, and installation was a breeze. Iomega throws in a second cartridge including cataloging and file search utilities. Give iomega credit for also including a snazzy musical interlude (with a jazz musician, no less) that demonstrates various product features while enticing you to purchase other iomega products. A clear window on the top of the drive lets you view the cartridge label when inserted, and the eject button is located conveniently on the front panel.

The 8.5 inch long by 5 inch wide Jaz drive weighs 31 ounces; heavy for toting with a laptop. The drive is solidly constructed but offers no protection to the cartridge once inserted into the drive—the front of the cartridge protrudes slightly from the front of the drive.

The Jaz drive is like the San Antonio Spurs' center David Robinson: big enough to do the job and fast enough to compete with any comers.

IOMEGA JAZ
1070MB CARTRIDGES
COST PER MB: $.10
SPEED: ★★★★★
RELIABILITY: ★★★★

PRICE: EXTERNAL SCSI: $499.95; INTERNAL SCSI: $399.95; CARTRIDGES: $99
COMPANY: IOMEGA
PHONE: 800.697.8833
URL: www.iomega.com

boot verdict: 90%
Big and fast

Olympus MOS330E

The Olympus MOS330 is a 3.5-inch magneto-optical drive. Its design is similar (and functionally identical) to the Fujitsu DynaMO, but its mechanism is a little bulkier.

In our tests, the Olympus was the second slowest (next to the DynaMO). Disk formatting took 36 seconds, but it took almost 3 minutes to copy the 92MB of *MechWarrior 2* files, and exactly 1 minute to copy the 18MB image file. It took 21 seconds for *HiJaak Pro* to open the graphic file; and *MechWarrior 2* took 25 seconds to play the intro, with very little degradation in video and audio playback.

The Olympus MOS330E has a steel shell and is shipped bolted into a 5.25-inch drive mounting chassis for internal installation (external SCSI and parallel port models are also available). There were no problems with the Win95 Plug-and-Play installation, and the drive was immediately recognized on boot-up. Although Olympus claims the drive incorporates an air flow engineered to eliminate airborne particles, we noticed an opening between the drive and chassis that could allow dust or other contaminants to enter.

The Olympus MOS330E weighs in at 22 ounces, and measures six-inches square. The drive ships with SCSI termination on and includes a 256K cache. Even though the test results for this drive were slower than the drives from iomega and SyQuest, the Olympus is still worth a look because of its aggressive price point and its inexpensive ISO media.

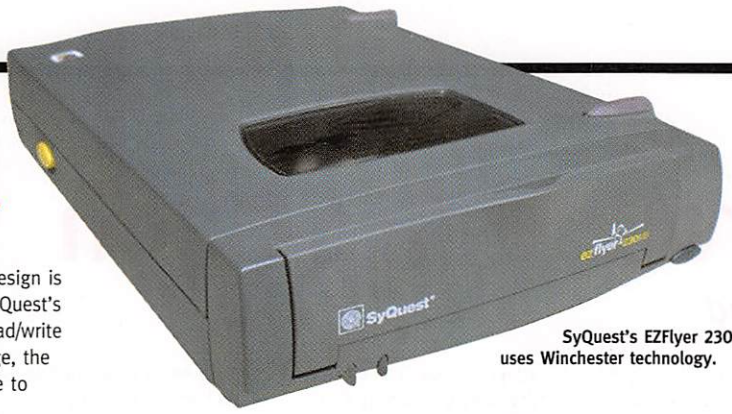
The Olympus MOS330E is also available in an external configuration.

OLYMPUS MOS330E
230MB CARTRIDGES
COST PER MB: $.04
SPEED: ★★★
RELIABILITY: ★★★★

PRICE: INTERNAL SCSI: $299.95; EXTERNAL SCSI: $359.00; EXTERNAL PARALLEL: $389.00; CARTRIDGES: $10
COMPANY: OLYMPUS IMAGE SYSTEMS
PHONE: 800.347.4027
URL: www.olympus america.com

boot verdict: 84%
Solid price point, standard media

SyQuest EZFlyer



SyQuest's EZFlyer 230 uses Winchester technology.

The SyQuest EZFlyer 230's Winchester-based cartridge design is backward-compatible with SyQuest's EZ135 drive, but since the read/write head is built into the cartridge, the EZFlyer's media is susceptible to head crashes.

Overall performance was acceptable—it took 35 seconds to format the cartridge, and copying the *MechWarrior 2* directory took only 65 seconds. It required 17 seconds to transfer the 18MB graphic file, and 30 seconds to open it with *Hijaak Pro*. The *MechWarrior 2* introduction finished playing in 25 seconds, and with only one major flaw in playback—the video and audio were out of sync for approximately 3 seconds.

The EZFlyer 230 is housed in a sleek case measuring only 5 inches wide by 8 inches long, and weighing 24 ounces. The front panel includes the eject button and a window that protects the cartridge and drive from dust contamination. A SCSI cable and external power supply are included. (Internal and parallel port models are also available.)

We encountered no problems during the Win95 installation, but the drive crashed our test computer while we were formatting our first cartridge. Afterward, we couldn't get Win95 to recognize the drive, even after we replaced the defective cartridge. SyQuest's tech-support department believed the error was due to a sound-card driver conflict, but the problems persisted even after we deleted the driver and installed a fresh cartridge.

We reinstalled the sound card drivers and the EZFlyer 230 with a fresh cartridge and managed to get the system up and recognizing the drive, only to have the same problem occur when we tried to use the original cartridge. The bootLab's conclusion: A faulty cartridge can bring down your entire system.

If you buy one of these drives and need tech support, we hope you get better service. SyQuest's automated technical support system is a long-distance nightmare. It doesn't give you an option to immediately contact a support specialist, forcing you to listen to endless levels of pre-recorded scenarios. It took almost seven minutes before the system offered another toll number, resulting in a six-minute long-distance call.

Aside from the tech horrors, the EZFlyer 230's performance was second only to the Jaz drive, and it's the only drive capable of serving as a boot disk. Could come in handy.

SYQUEST EZFLYER
230MB CARTRIDGES
COST PER MB: $.13
SPEED: ★★★
RELIABILITY: ★★★

PRICE: EXTERNAL SCSI: $299.95; MEDIA: $29.95
COMPANY: SYQUEST TECHNOLOGY
PHONE: 800.245.2278
URL: www.syquest.com

boot verdict: 79%
Beware bad cartridges

The Shape of Things to Come

The **Passport Hard Drive** is a new removable hard drive solution from JTS Corporation. The Passport includes a pair of 640MB hard drives, which can be connected externally through a serial port. A carrying case and software allowing for direct IDE plug-in will also be included.

Estimated street price for the complete kit is $299.

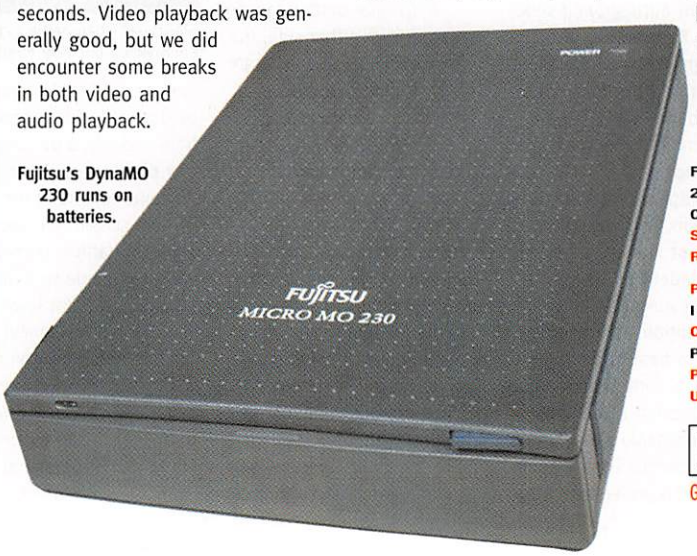
The **a:drive** from O.R. Technology is a cool replacement for your current 1.44-inch floppy disk drive. The a:drive fits into a 3.5-inch drive bay and can read and write to standard 720K and 1.44MB floppy diskettes five times faster than a regular drive. But the a:drive will also utilize a new type of diskette that boasts capacity of 120MB each. The a:drive is expected to sell for $210. Its media will cost about $15 each.

Look for reviews of the Passport and the a:drive in a future issue.

Fujitsu DynaMO 230

The DynaMO 230 is a portable magneto-optical disk drive that works with any computer equipped with a PCMCIA Type II slot. Because of its PCMCIA card/IDE interface, the DynaMO delivered the slowest performance of all the drives tested. It required 80 seconds to format a disk; a whopping 5 minutes to copy the *MechWarrior 2* files; and 18 seconds to copy the 18MB graphic file. *Hijaak Pro* took 23 seconds to open the same graphic file, and the *MechWarrior 2* introduction took 22 seconds. Video playback was generally good, but we did encounter some breaks in both video and audio playback.

With its low profile, rugged design, and sharp black case, the DynaMO 230 definitely looks cool. The front panel flips up to protect inserted disks, and the eject button and power buttons are conveniently located on the front and rear respectively. The drive will run on either AC or battery for use on the road. The included AA battery pack provides roughly one hour of continued operation; two to three hours in sleep mode. Unlike most transformers, Fujitsu's power adapter is smartly designed and not much bigger than a normal plug head.



Fujitsu's DynaMO 230 runs on batteries.

The DynaMO 230 weighs only 15 ounces without the battery pack (20.5 ounces with the pack), and it has a small footprint (6.5 inches long by 4.5 inches wide), so it's well-suited to mobile computing. The DynaMO 230 is compatible with all MO drives that conform to ISO standards. The greatest drawback to the DynaMO 230 is its speed. A SCSI interface would require more battery power, but would deliver much better performance. Still, if you need a truly portable solution, the DynaMO 230 is definitely worth a look.

▶ 104

FUJITSU DYNAMO
230MB CARTRIDGES
COST PER MB: $.09
SPEED: ★★
RELIABILITY: ★★★★

PRICE: $499.95 (INTERFACE INCLUDED); CARTRIDGES: $20
COMPANY: FUJITSU COMPUTER PRODUCTS
PHONE: 800.626.4686
URL: www.fcpa.com

boot verdict: 82%
Great for mobility and compatibility

S/W

Battleground 4: Shiloh

Some wars never end

The fourth installment in TalonSoft's *Battleground* series, and their second Civil War game, *Shiloh* possesses all the ingredients that have made this series great: the powerful Battleview combat engine, historical accuracy, beautiful graphics, and an easy-to-use interface.

The 2D view is less visually appealing, but enables you to see more hexes.

Veterans of *Battleground 2: Gettysburg* can jump into *Shiloh* with little or no difficulty because the basic commands and options are the same. This game's AI, on the other hand, is dramatically improved. Your computer opponent is more aggressive and less predictable, especially when it plays as the Confederates. The 78-turn "Hold on, Hold out" scenario is one of the game's best, allowing the unorganized Confederate forces to attack one day earlier—as originally planned by Confederate commander Albert Sidney Johnston.

In addition, *Shiloh* offers multiplayer options in the form of head-to-head and e-mail gameplay. Since this is a turn-based strategy game, the e-mail feature delivers nearly the same result as head-to-head play without racking up toll charges.

Watching battles unfold in the close-up 3D perspective offers a detailed view of the Civil War's first major battle in the Western Theater. Unfortunately, the units are so big and so detailed in this mode you can only see a small fraction of the battlefield at any one time. If you want to stay on top of things, use the conventional 2D view. It's not as pretty, but it's practical.

The principal drawback of *Shiloh*'s hex-grid format is that you lose the ebb-and-flow of battle. Unlike other military sims, such as *The Blue and Gray* or even *Close Combat*, you can't make tactical adjustments any time you feel the need; you can only move during certain phases and fire your weapons in others, so battles don't have much continuity. Winning an engagement requires close attention to a host of variables (troop strength, terrain, fatigue, unit quality, and so on).

You can navigate to specific hexes on the map using the Location dialog.

The trade-off of a highly accurate simulation is managing minutiae. If contemplative realism is what you're after, *Shiloh* is a standout.

— *Andrew Miller*

PRICE: $44.95
COMPANY: TALONSOFT
PHONE: 410.933.9191
URL: www.talonsoft.com

boot verdict: 85%

Historically accurate, but chess-like in its pacing

Robert E. Lee: Civil War General

Just me and Bobby Lee

There's no such thing as a "perfect" Civil War game. The subject is just too vast for a game to represent *everything* and still be playable. *Robert E. Lee* is the brainchild of Impressions/Sierra designer Jeff Fiske, whose avowed goal was to present the saga of the Army of Northern Virginia in a style that was easy to play yet deep enough and complex enough "under the hood," to satisfy demands for historical accuracy.

As a Civil War historian, and a reviewer who has played every extant CW game in the PC format, I think he has succeeded admirably. This game eschews the cinematic realism of the successful *Battleground* series from TalonSoft in favor of a highly stylized representation that does for CW battlegrounds what *Panzer General* did for World War II campaigns.

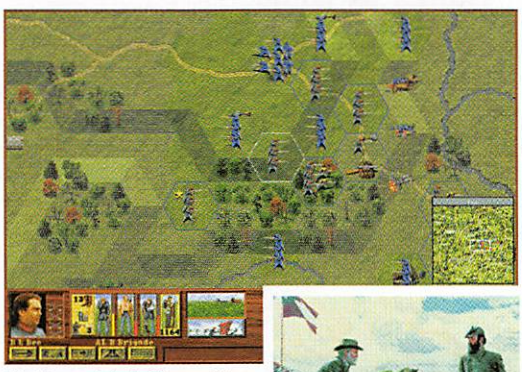
Graphics are sleek, post-modern, and simplified; no attempt is made to disguise the underlying hex grids. But beyond that hoary convention, *REL* incorporates a fresh approach—there is considerable depth and realism below the approachable surface, but the interface could not be easier to understand and the game mechanics are practically self-explanatory.

Individual battles can be played from either side, but the campaign is Confederate-only. I don't see that as a drawback: Most gamers like to play the underdog, and given the North's advantages in manpower and technology, only a hopeless lout could fail to eventually win by playing the Yankee side.

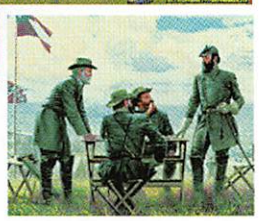
Movement is accomplished through simple point-and-click commands, while drop-down menus and icons present you with all the detailed information and fine-tuning options you could ask for. The action is intense, and is reinforced by dramatic video clips from acclaimed documentary director Jay Wertz. One welcome feature is the Arsenal screen that appears between battles, permitting you to upgrade weapons for selected units (at least until you run out of money).

This is an ideal entry-level war game, yet it is also respectful enough of history to appeal to the experienced desktop general.

— *William R. Trotter*



Miniatures-style battle graphics are stylized but very effective.



Splash panels by noted Civil War artist Mort Kunstler add class to the game's visual appeal.

PRICE: $59.95
COMPANY: SIERRA/IMPRESSIONS
PHONE: 800.853.7788
URL: www.sierra.com

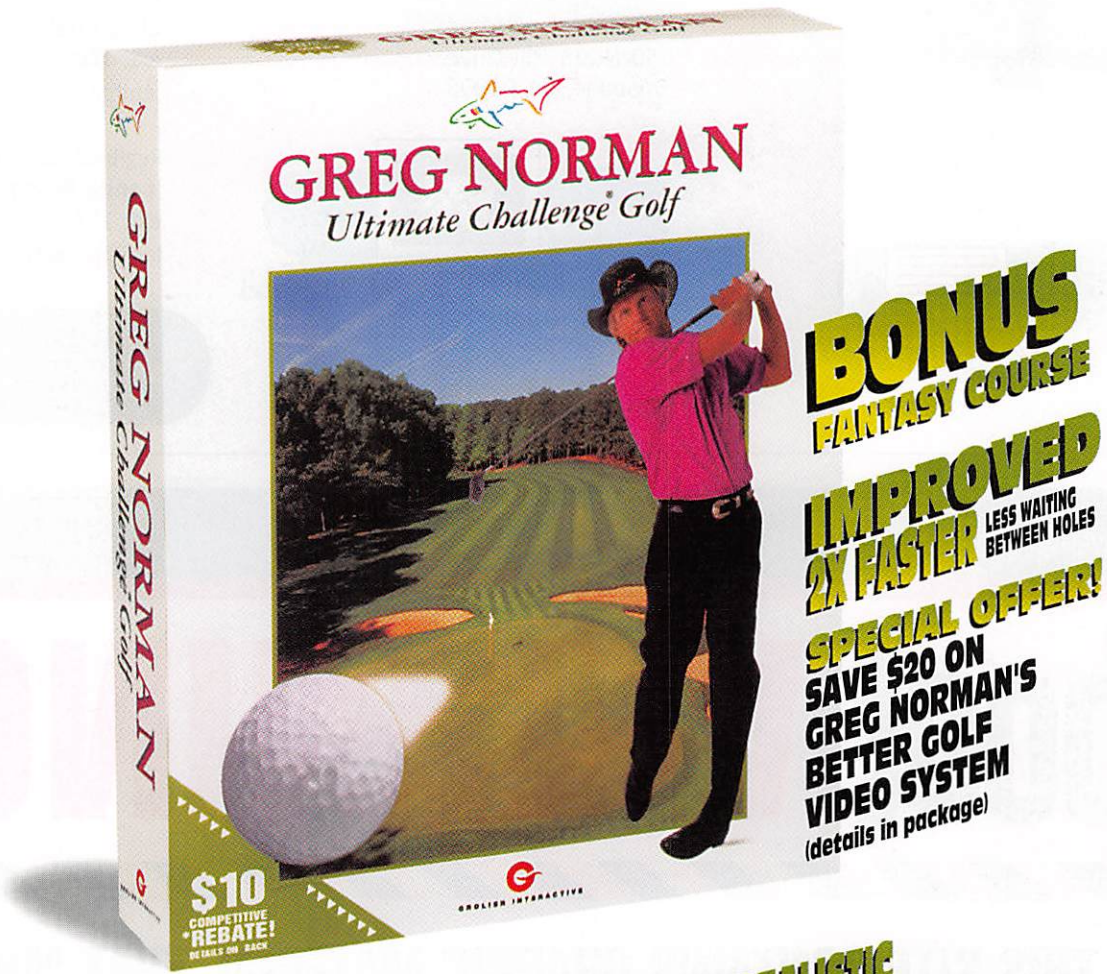
boot verdict: 88%

Excellent for beginners; some "grognards" will love it, too

GOLF REAL!

"Of the dozens of computer golf games we've played, the *'Greg Norman Ultimate Challenge'* Golf CD is by far the most realistic."

–GOLF MAGAZINE, March '96



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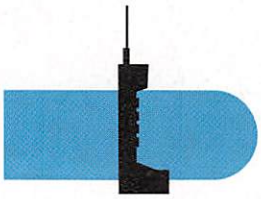

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boot

H/W

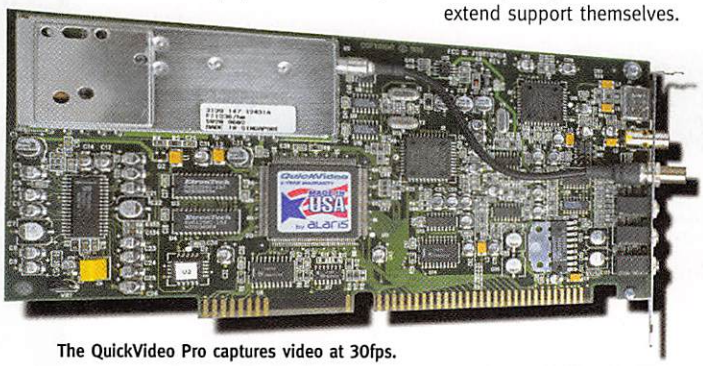
Alaris QuickVideo Pro

Quirky gadget has a ways to go

Sure, e-mail is expedient, but text is so dry and impersonal. Enter Alaris' QuickVideo Pro. This hardware/software combo captures an audio/video clip, compresses the bejeezus out of it, embeds a tiny player program, and e-mails the resulting VideoGram to a correspondent. This is definitely a cool product, but it's not without a few rough edges.

QuickVideo Pro's software imbues the product with a not-quite-finished air. For example, the software doesn't support long file names. And if you use an ADPCM codec, the VideoGram packager will fail. Alaris claims this is due to a bug common to many sound-card drivers. The other codecs that Alaris provides work fine.

A more serious flaw is that VideoGrams only work with Windows. A Mac player is planned for December, but the company has no plans for other platforms. Alaris should publish the file format and release the player source code, so that enterprising hackers can extend support themselves.



The QuickVideo Pro captures video at 30fps.

Installation is a snap. The ISA card has composite and S-video inputs and two audio inputs (configurable as line-in and mic-in). Snap on the optional TV tuner and capture video clips from television programming. Digitizing occurs at up to 30fps at 320x240 resolution, with 16-bit stereo sampling rates up to 44.1kHz. (The $299 Basic model is more limited.) Alaris' compression algorithm, which kicks in during VideoGram packaging, is fabulous: I captured a 54-second 160x120 AVI clip that produced a 108MB file, and QuickVideo Pro squashed it into a 681K VideoGram—including the embedded player!

Compare the size and quality of these frames: one from an AVI file (left), and compressed into a VideoGram (right).

And as soon as Alaris releases its *Navigator* plug-in, you'll be able to install VideoGrams into a Web site, where surfers can view your videos by streaming them over the Net.

QuickVideo Pro is an excellent means of bringing video into your computer for any purpose, including Internet video conferencing.

— *Chris Dunphy*

PRICE: $299 (BASIC); $599 (PRO); $70 (TV TUNER OPTION)
COMPANY: ALARIS
PHONE: 800.317.2348
URL: www.alaris.com

boot verdict: 80%

Send a videogram to Grandma today

The Philips PCA80SC SCSI 8x CD-ROM suffers from remarkably slow transfer rates and access times.

Philips PCA80SC 8x CD-ROM Drive

Slower than a slug

Darwin's theory tells us that CD-ROM drives have survived these past 10 years because each generation has been at least marginally faster than the last. Why then does Philips' new PCA80SC 8x SCSI drive deliver performance reminiscent of primordial ooze?

The PCA80SC has all the trappings of a premium product: SCSI-2 interface, Win95 Plug-and-Play compatibility, and a sustained data-transfer rate of 1,200K/sec. Philips targets the drive at professionals using large graphics files and MPEG-encoded video. But during our tests, conducted with Ziff-Davis' WinBench 96 benchmarking software running on a generic 166MHz Pentium system with an Adaptec 2940 SCSI interface card, the drive exhibited performance way below par.

We were taken aback by the drive's average access time of just 215ms and its average data-transfer rate of only 545K/sec. In recent tests, other 8x drives (see "8x Drive By" in *boot* 02) displayed average access times of 143ms and average data-transfer rates of 722K/sec. Philips claims the drive is optimized for reading very large files from CD-ROMs, so we opened a number of 15MB and larger images from a CD-ROM-based clip-art library using *HiJaak Pro* and recorded the time the drive needed to open each file. For the sake of comparison, we then reinstalled the TEAC 6x IDE/ATAPI drive previously installed in our 166 and opened the same files. Surprise! The TEAC 6x opened about half the files faster than the Philips 8x and was only marginally slower opening the other half.

In terms of CPU utilization, the Philips monopolized only 30 percent of the CPU's power, compared to 56 percent for the TEAC. This makes the Philips well suited for applications such as streaming video off disc. But even in this area, the drive didn't perform as well as other 8x SCSI drives we've tested. (NEC's MultiSpin 8Xi SCSI drive, for example, consumed just 24 percent of the CPU's clock cycles during last month's testing.)

And don't be alarmed if stray dogs gather around your chair every time you fire up this drive; it emits an annoying high-pitch whine when spun up. Philips claims this is normal with drives accessing at fast speeds, but we've never noticed this phenomenon with other drives.

Considering Philips' position as the co-inventor of the CD-ROM, you might expect its drives to be performance leaders. But we'd relegate the PCA80SC to the back of the class.

— *Bryan Del Rizzo*

PRICE: $249 (EXTERNAL MODEL: $349)
COMPANY: PHILIPS
PHONE: 800.235.7373
URL: www.pps.philips.com

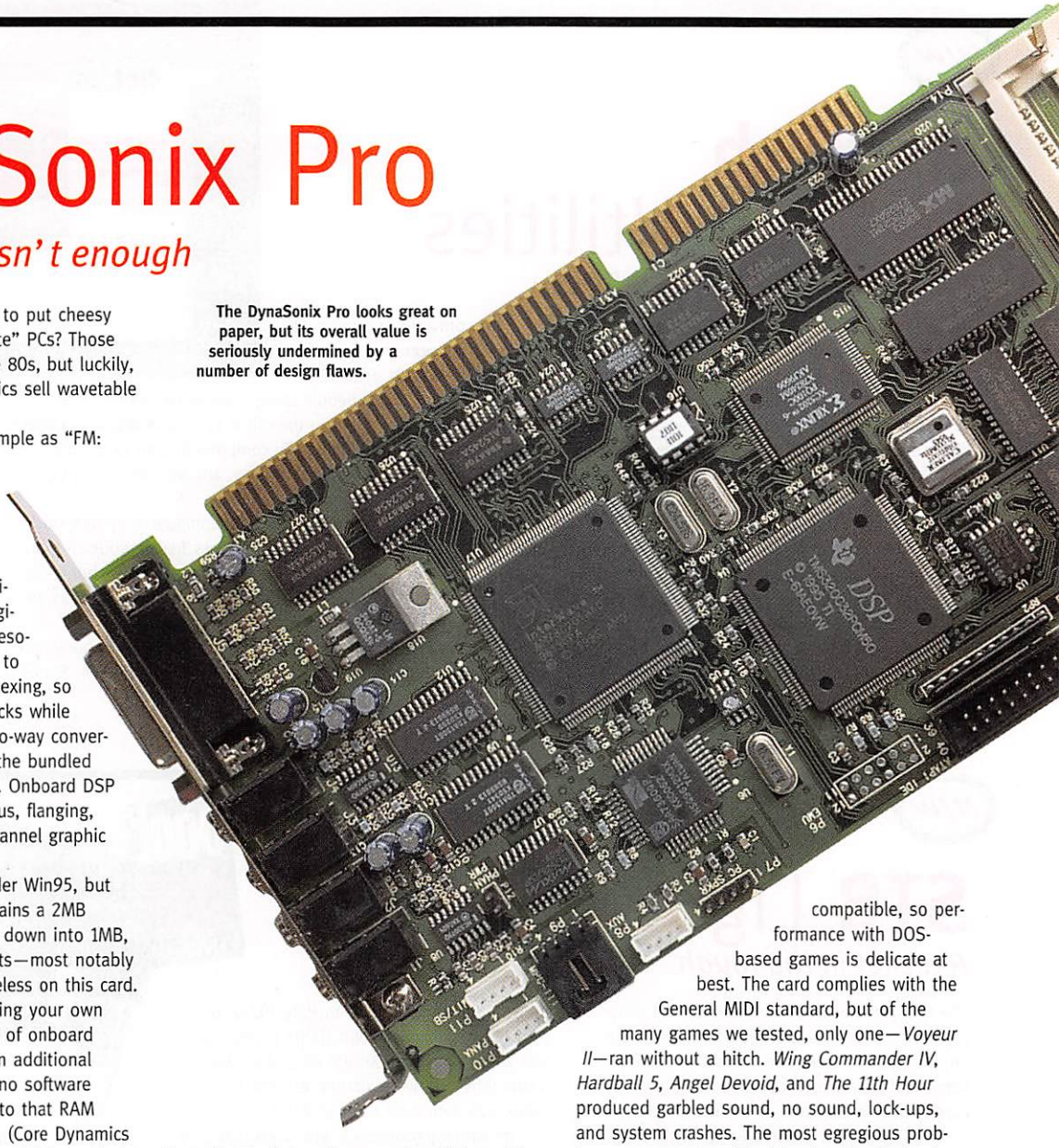
boot verdict: 47%

This drive is a dog

H/W

DynaSonix Pro

Wavetable just isn't enough



The DynaSonix Pro looks great on paper, but its overall value is seriously undermined by a number of design flaws.

Why do manufacturers continue to put cheesy FM synthesizers in their "ultimate" PCs? Those chips should have died with the 80s, but luckily, companies such as Core Dynamics sell wavetable sound card upgrades.

Still, the situation isn't as simple as "FM: *Bad*. Wavetable: *Good*."

On paper, the DynaSonix Pro seems impressive. Its AMD InterWave synth offers wavetable audio with 32-note polyphony, 16-part multi-timbrality, SRS surround sound, and digital audio recording with 16-bit resolution and sampling rates of up to 48kHz. It also supports full-duplexing, so you can simultaneously play tracks while recording new ones (or have two-way conversations over the Internet using the bundled copy of Quarterdeck's *WebTalk*). Onboard DSP capabilities include reverb, chorus, flanging, tremolo, and a 10-band, dual-channel graphic equalizer.

The card sounds spunky under Win95, but because the InterWave chip contains a 2MB wavetable ROM set compressed down into 1MB, difficult to synthesize instruments—most notably trumpets and pianos—sound lifeless on this card.

If you're interested in recording your own samples, the card features 512K of onboard DRAM (with SIMM sockets for an additional 8MB). Unfortunately, there was no software available for loading samples into that RAM when we conducted this review. (Core Dynamics promises such a utility will be available on their Web site soon.) In addition, the chip relies on a proprietary file format that isn't supported by any sound library publishers. Assuming there were such libraries and you bought the additional memory in which you would load them, the card doesn't support multiple patch banks; so you can't simultaneously access the sounds loaded into that memory and the 1MB of ROM-based sounds at the same time.

As if these shortcomings weren't enough, the DynaSonix Pro is not Sound Blaster hardware compatible, so performance with DOS-based games is delicate at best. The card complies with the General MIDI standard, but of the many games we tested, only one—*Voyeur II*—ran without a hitch. *Wing Commander IV*, *Hardball 5*, *Angel Devoid*, and *The 11th Hour* produced garbled sound, no sound, lock-ups, and system crashes. The most egregious problem we encountered had to do with *Quake*. A bug in early versions of the game caused the DynaSonix to produce sound effects that approximated strangling ducks. (The bug has no effect on cards that are hardware compatible with the Sound Blaster.) id is aware of the bug and has already released a patch, but would you be willing to wait if id decided the fix wasn't a priority?

In the final analysis, the DynaSonix Pro isn't suitable for games, and it doesn't meet the needs of a musician either. So just what application is the card well suited to? Good question.

— Bryan Del Rizzo

Recording Station **lets you create songs one track at a time or use previously recorded digital audio tracks such as your voice or live electric guitar.**

Jammin' Keys **lets you improvise a solo with the on-screen keyboard (or actual MIDI keyboard) and supplies a five-part band for backups and riffs.**

PRICE: $299
COMPANY: CORE DYNAMICS
PHONE: 800.611.2673
URL: www.core-dynamics.com

boot verdict: 49%

Poor compatibility for gamers; not a good value for musicians

S/W

Starfish Internet Utilities

For the surfer with everything

Starfish Internet Utilities **automatically tracks and organizes your bookmarks.**

No doubt you have your favorite utilities; small programs that perform seemingly minor tasks exceedingly well. *Starfish Internet Utilities* is a bundle of little programs designed to make your life on the Net easier. Taken as a whole, this collection is nothing to write home about, but there are enough gems here to consider the package.

Of these, the *QuickMarks* utility is the brightest. This hotlist/bookmark organizer enables you to store URLs from *Navigator* and *Explorer* in a single location. It even creates icons for each bookmark, making them far easier to locate when you've accumulated a big collection.

QuickMarks also uses intelligent agent technology to update your bookmark list every time you're online. This utility alone is almost worth the cost of the package.

If your monthly ISP and online-service bills inflict sticker shock, you'll appreciate *NetMeter*. This handy program logs the hours you spend online and can track a single service provider or even multiple accounts for active Net-heads or families with multiple people using a single computer. If you log your online time on the office T1 line, *NetMeter* is useless.

QuickZip handles file compression and decompression with point-and-click simplicity, and you can use it to create self-extracting archives.

NetClock synchronizes your computer's system clock with Internet Time servers. I guess freeing yourself from having to set your system clock has its value, but using the Internet to find out what time it is strikes me as an inane use of technology.

If you spend a lot of time surfing the Web, bookmarking a lot of sites, or handling lots of zipped files, *Starfish Internet Utilities* is a worthwhile investment.

— *Shel Kimen*

PRICE: $39.95
COMPANY: STARFISH SOFTWARE
PHONE: 888.782.7347
URL: www.starfish.com

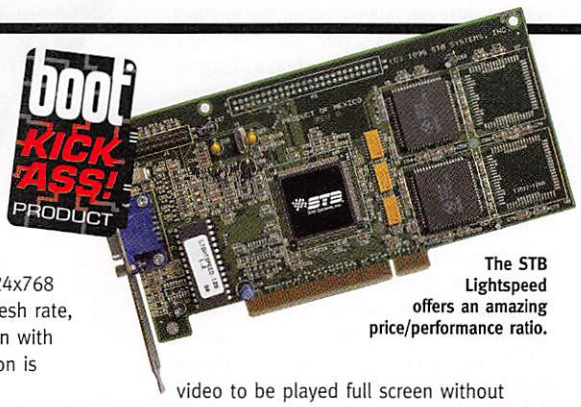
boot verdict: 87%

A swimming good time

H/W

STB Lightspeed 128

A rocket in the rough



The STB Lightspeed offers an amazing price/performance ratio.

The STB Lightspeed 128's low price and lofty performance sounds too good to be true. But any 2D graphics card that makes the vanilla version of *Quake* look comparable to the 3D accelerated version is a dream come true.

The Lightspeed 128 is built around Tseng Labs' ET6000 128-bit graphics engine, coupled with 2.25MB of Multibank DRAM. Some might argue that the ET6000 shouldn't be described as a 128-bit graphics chip because its data path to memory consists of two parallel 32-bit channels that are read twice per clock cycle; not a single 128-bit-wide path. But there's no arguing with the Lightspeed's performance.

Quake **playable at 800x600,** ***fast*** **at 640x480.**

Resolutions supported include 1024x768 with 16-bit color at a solid 100Hz refresh rate, and 24-bit color at 800x600 resolution with 100Hz refresh. The maximum resolution is 1280x1024 with 8-bit color at 75Hz.

The card's performance with both DOS and Windows applications was phenomenal. Using Ziff-Davis' Graphics WinMark 96 test, the card delivered 26.5 million pixels per second at 800x600 resolution with 24-bit color depth; at 1280x1024 and 8-bit color, it delivered 38.4 million pixels per second. With *Duke Nukem 3D*, we saw 37fps at 640x480, and an astounding 25fps at 800x600. If you're a *Quake* lover, the Lightspeed makes the game shine. On a P166, we saw *Quake* frame rates of 10fps to 15fps at 800x600, and around 25fps at 640x480.

Installation was a plug-and-play affair, with device drivers provided for Win95 and 3.1. (OS/2 drivers are available on the Web.) STB's *STB Vision 95* display utility offers handy, if unpolished, tools. It provides a hardware-assisted zoom, and a virtual desktop mode (with a bird's-eye view).

The Lightspeed does a great job of accelerating video; even software-decoded MPEG looks great. The onboard scaling hardware allows video to be played full screen without slowdown, and no matter what your actual color depth, the video always looks to be true-color. Only at 1280x1024 did things slow down and look dithered.

STB bundles Sierra On-Line's *Earth Siege 2* and *Silent Thunder: A-10 Tank Killer II*, plus the first 10 levels of Looking Glass Technologies' *TerraNova*.

The Lightspeed 128 delivers amazing performance at an amazing price. STB promises a new release of their software later this fall that should clear up the rough appearance of their display utility, but who needs looks when you have a rocket in your pocket?

— *Chris Dunphy*

PRICE: $179
COMPANY: STB SYSTEMS
PHONE: 214.234.8750
URL: www.stb.com

boot verdict: 95%

Lightspeed is only a slight exaggeration

S/W

Steven Spielberg's Director's Chair

Ready for your close-up?

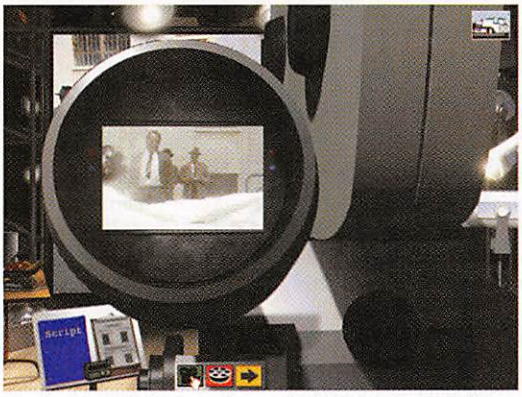
Steven Spielberg and a host of Hollywood's top production talent offer you film production tips.

Hell must have frozen over because Hollywood has finally made a good game. And it uses FMV, a technology many thought would never earn a place in gaming.

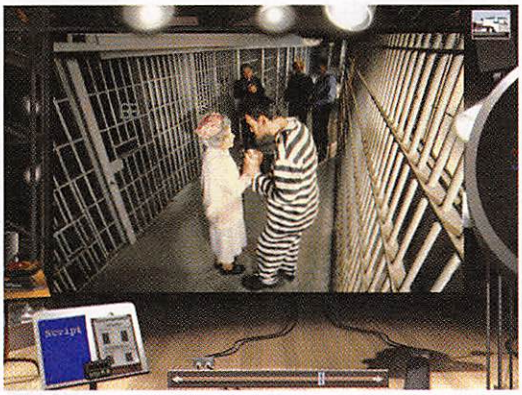
Steven Spielberg's Director's Chair is not one of those abysmal "interactive" movies starring a cast of Hollywood has-beens. In this sim you play the role of an up-and-coming film director—and Steven Spielberg is your mentor.

Until hologram technology is perfected, this may be your only chance to direct Quentin Tarantino and Jennifer Aniston, with tutelage from some of the biggest behind-the-scenes names in modern filmmaking. But this game won't be everyone's cup of tea. Just as some people don't like flight sims and others don't like God games, some won't find the notion of balancing all the details of film production appealing. But if you've ever sat through a movie and thought *you* could do better, *Director's Chair* is something you'll want to check out.

The closer a sim gets to the real thing, the more fun it is, and *Director's Chair* gets pretty damn close because your entire crew consists of working professionals. At each stage of the production, people such as screenwriters Ted Elliott and Terry Rossio (*Aladdin*), cinematographer Dean Cundey (*Jurassic Park*, *Apollo 13*), and art director David Lowery (*Twister*) pop in and offer their advice on the task at hand.



The view through the camera's lens. In this scene, Barry Corbin smiles as Tarantino's body—still smoking from the electric chair—is wheeled past on a gurney.



As a beginning director, you're given only one camera angle from which to shoot (indicated by the green box in this scene). As your experience—and budget—grows, you'll be given more flexibility.

Your movie comes together in the film-editing suite.

Being a new director, the studio that hired you keeps a very close eye on your progress. Your budget's pretty small, which means the scope of story you can tell, the type of shots you can shoot, and the amount of action that will take place will be restricted.

The plot revolves around Tarantino, a prisoner on death row for murder, and Aniston, who plays his girlfriend. Depending on the directorial choices you make, Tarantino can be guilty or innocent; he can die in the electric chair, break out of prison, or be pardoned at the last minute. Aniston, meanwhile, can mourn Tarantino's death, frame him for the murder, or discover the real killer.

Go over budget and the studio might pull the plug on your film before it's finished. Manage to finish the picture on time and on budget (and that means everything from shooting film, to recording music and Foley effects, to creating a movie poster), and you'll be rewarded with a bigger budget and more time for your next project.

The scripts, the more than 100 minutes of footage (shot by Spielberg himself), and the music and sound effects are so flexible that the same elements can be seamlessly edited into an almost unlimited number of dramatic or comedic productions with the capable game engine.

Director's Chair gets damn close to reality.

On the downside: The acting is a bit hokey; you can't put visual transitions between cuts; and you can't view your finished films without loading the entire game. (The program renders the audio track and an edit list to your hard drive, then interleaves the audio with the video streaming off the CDs; a remarkable technical achievement). I reserve my biggest criticism, however, for the 256-color palette the game uses. The game's pre-rendered QuickTime movies look OK, but your movies' color-banded pixelosity makes Ted Turner's version of *It's a Wonderful Life* look good.

I spent more than three hours creating my first film—a drama—but I could have easily spent another three hours shooting it as a farce. And that two-minute film used only a fraction of the actors and assets included with the game. Although it takes too long to get the juicy parts, there's many hours of gaming in this title. At the end of a long day under the klieg lights, when your shooting is done, *Steven Spielberg's Director's Chair* is a wrap and a helluva lot of fun.

— *Michael Brown*

PRICE: $54.95
COMPANY: KNOWLEDGE ADVENTURE
PHONE: 818.246.4400
URL: www.directorschair.com

boot verdict: 87%

Acting is so 80s; these days, everybody wants to direct

S/W

Time Commando

If looks could kill

Time Commando is a fine demonstration of how *bad* a beautiful game can be. With its realistic 3D characters, lush environment, and many levels of play, this game has a lot going for it. But peel back the flashy veneer and you discover a mind-numbingly slow fighting game.

A mysterious computer virus has sent you back in time, and you must battle your way back to the present. (This storyline is introduced in a long 3D animation sequence that has absolutely nothing to do with the game.) Getting back to the present simply involves walking along a designated path, collecting the colorful power-ups strewn about, and beating the crap out of anyone—or anything—you encounter.

Each level consists of an epoch, beginning with the dawn of man, populated by humans and animals appropriate to that period. In the first level, for instance, your mission is to stone, club, or spear saber-toothed tigers, gorillas, bears, and people clad in leopard-skin outfits. Once you've dispatched everything on this level, you're teleported to the time of ancient Rome to battle centurions and such. Overall, you'll encounter more than 80 opponents populating nine historical periods (each with two levels), including medieval Europe and America's Old West.

Good fighting games contain extremely fast action. *Time Commando* does not.

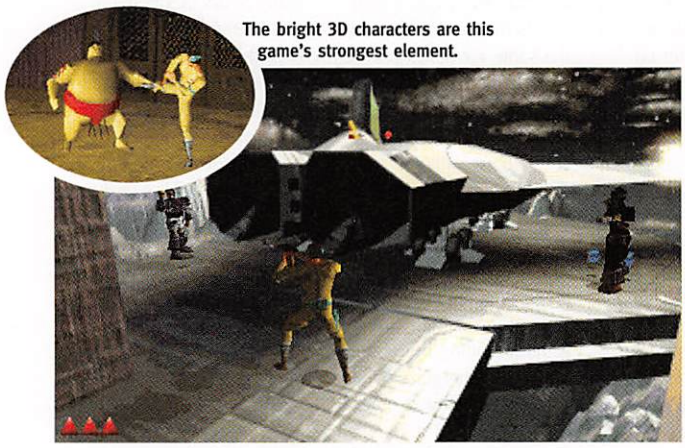
Your weapons (and those used against you) are appropriate for each period (wooden spears give way to iron swords, which are eventually replaced by guns), but game controls—and by extension, your character's movements—are simplistic in the extreme. There are no puzzles to solve, no mysteries to unravel, and no real goals to achieve.

Boiled down, *Time Commando* is a 3D fighting game that's broken free of the arena. Judged in this context, the game fails even more miserably because of poor speed and character control.

— *Doug Lombardi*

PRICE: $49.95
COMPANY: ACTIVISION
PHONE: 800.477.3650
URL: www.activision.com

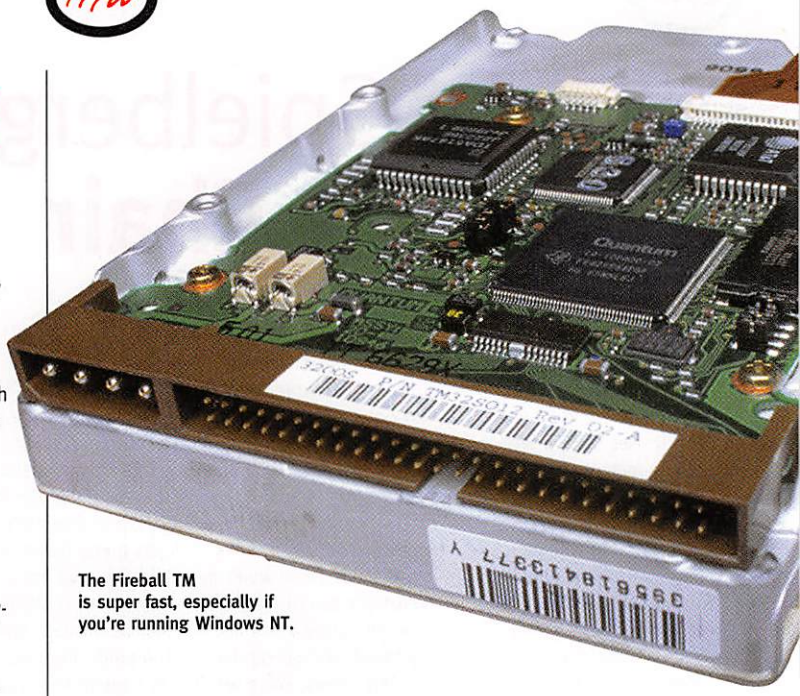
boot verdict: 70%
A pretty, slow game



The bright 3D characters are this game's strongest element.

***Time Commando* features more than 80 enemies in its 18 levels of play.**

H/W



The Fireball TM is super fast, especially if you're running Windows NT.

3.2GB Quantum Fireball TM

Blazing a fiery trail

If you're running out of hard drive space (and who isn't), or using a high-end machine that's begging for a higher sustained transfer rate, you're in luck. Quantum's new Fireball TM is a monster of a hard drive. With 3.2GB of data storage capacity, SCSI 3 interface and a seek time of only 10ms, the Fireball TM should satisfy even the most discriminating power user.

We originally tested the Fireball TM on a generic Pentium 166MHz machine equipped with Win95 and Adaptec's AHA-2940 Ultra Wide PCI SCSI Adapter. Using three test programs: Ziff-Davis' Disk WinMark 96, *SAW*'s hard disk speed test utility, and *Premiere*'s hard drive speed test; we achieved an average sustained transfer rate of 702K/sec and an average seek time of 10.3 seconds.

But, since Win95 isn't really optimized to take advantage of SCSI, we also tested the Fireball NT on Hewlett-Packard's Vectra XU Pentium Pro 150 running Windows NT 4.0. This time the average sustained transfer rate was 1183K/sec, an increase of almost 500K/sec. Even if your PC is top of the line, bear in mind your choice of OS may determine overall speed and performance.

If you're doing any intensive transfers, such as video capturing, you'll definitely want the fastest drive possible. With its roomy 3.2GB of storage and impressive performance, the Fireball TM is perfectly suited for heavy-duty multitasking environments, or applications requiring a higher data throughput.

— *Bryan Del Rizzo*

PRICE: $525
COMPANY: QUANTUM CORP.
PHONE: 800.624.5545
URL: www.quantum.com

boot verdict: 88%
Satisfies the need for speed

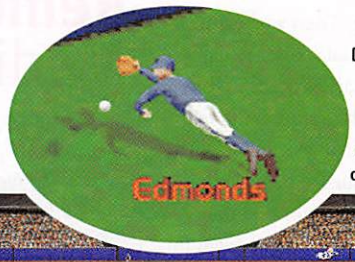
S/W

boot KICK ASS! PRODUCT

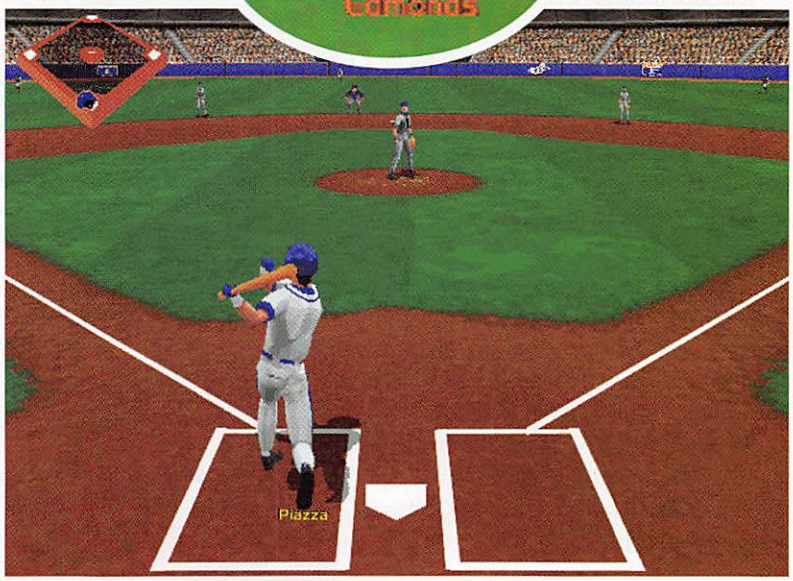
boot DISC — SEE IT ON THE DISC

Triple Play 97

This roster has depth and power



Be careful when diving for the ball—hit the ground too hard and you may end up on the injured roster.



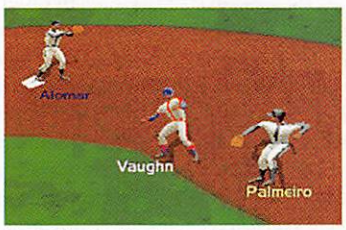
The instant replay feature lets you control camera angles and view the action from any player position.

The triple play is the rarest play in baseball and EA Sports' *Triple Play 97* is the rarest of all baseball sims... one that manages to satisfy both purists with a hunger for numbers and twitchy arcade addicts.

Even the hardest of the hard-core control freaks will be maxed out running up to six teams at once during a simulated season; playing, managing, or just simulating the long grind of a 26, 52, 104, or a full 162 game season. You can also play an exhibition game, an All-Star game, a playoff series, a championship series, or open up your stance and swing for the walls in a Home Run Derby. Throughout your seasons, you'll want to trade players from active rosters or the free-agent pool, and *Triple Play 97* makes that easy. With full MLB and MLBPA licenses, *Triple Play 97* includes the full team rosters from opening day 1996 and each player's full stats from the 1995 season. If you can't find someone from the bigs to suit your team's needs, create your own custom sluggers from 17 definable attributes including: experience, stance, running speed, reaction time, and contact chance. Increase your big boy's weight and watch his waistline balloon. There are also digital versions of many players' Upper Deck baseball cards, but due to late trades, some players sport past colors.

From the highly detailed stadiums rendered with EA's Virtual Stadium technology to the Motion Designed players that play by real physics and cast accurate shadows, *Triple Play 97* looks great. Each of the 28 ballparks is realistically recreated, with meticulous attention paid to the playing surface, field distance, wall height, and crowd capacity. Even the stadium scoreboards are true to life.

Gameplay is equally impressive. Complete with hot and cold streaks, players are fluid and lifelike; and the extremely detailed animations make it fun just to watch the second baseman or shortstop attempt to hold a runner on second, or a batter get beaned by an inside pitch. But be careful out there. Players can get injured for up to a week, even during routine plays such as pop-ups or a head-first slam into the center-field fence. Mister Franchise won't help you win games riding the pine. At the end of each game, the computer highlights players who had an outstanding game, and the leader board is automatically updated.



Looks like Mo Vaughn is about to get run down and tagged out by Rafael Palmeiro.

Additional game controls include: fielding and batting views ranging from eye level to upper deck; day or night games; weather; and the number of innings (one inning games can be a bitch). Defensive maneuvers include: pick-off moves; 10 pitches; and jumping or diving for a ball just out of reach. You also decide how hard to throw the ball to tag the runner or if your runner should attempt a head-first slide.

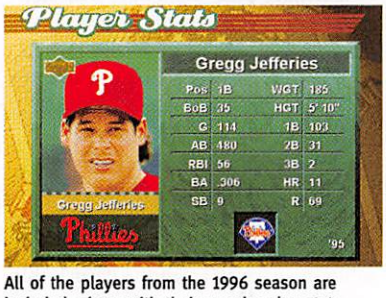
About the only thing you can't control in *Triple Play 97* is the Skydome's retractable roof (which would be too cool).

The excellent play-by-play commentary is voiced by Jim Hughson (former voice of the Toronto Blue Jays). Realistic? Heck, other *boot* staffers thought I had snuck a TV into the office and was watching a live game.

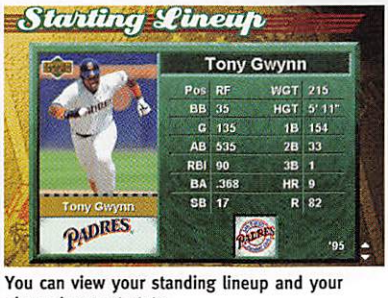
Although a joystick or gamepad is heavily recommended for maximum control, EA claims the Gravis GrIP allows simultaneous six-player diamond action, either cooperative or competitive; Gravis says their GrIP only allows four. We agree with Gravis. Head-to-head modem play is supported, but curiously, network play is not. This may be the game's only significant shortcoming.

While many baseball sims foul out attempting the delicate balance between dusty, adrenaline-packed gameplay and nerves-of-steel management techniques, *Triple Play 97* actually satisfies both with room to spare.

— *Bryan Del Rizzo*



All of the players from the 1996 season are included, along with their opening-day stats.



You can view your standing lineup and your players' current stats.

PRICE: $49.95
COMPANY: ELECTRONIC ARTS
PHONE: 800.245.4525
URL: www.ea.com

boot verdict: 97%

Triple Play 97 shuts out the competition

GAME THEORY

◀ 29 whole team is subjected to, so we can determine whether the team as a whole decides to reject an order. Then we deal with the morale of the individual soldier to determine if he performs as part of the team or does something else, such as run off the map."

Some 2000 lines of code in *Close Combat* are dedicated to these issues alone. Still more code details every piece of armor and the effect of every shell and bullet, right down to their trajectories and penetration values.

It is this depth and staggering attention to detail that took Atomic Games so long to perfect, and which make *Close Combat* unlike any war or strategy game around. These are "real" men making their own decisions and acting in real time. Your role is to command them the best way possible and protect them, because the strength of their mental states directly affects how well you're going to do. "Take command of men who act like real soldiers," *Close Combat* promises. The first time you watch a man break and run away, or crack and wander in a daze, you'll see just how true this is.

FAST FORWARD

◀ 33 computer. Back in the 1940s and '50s, ENIAC contained 18,000 vacuum tubes and filled an entire building. Workers carried spare parts in carpenter's aprons and constantly replaced blown tubes while it ran. By cramming more processing power than ENIAC could muster into a cheap, solid-state package the size of an insect, the 4004 was a genuine breakthrough.

Early next century, transistor geometries will shrink beyond 0.10 micron, the critical threshold at which microprocessors will be affected by quantum phenomena. At that point, the elemental nature of binary logic will collide with the elemental forces of nature. It's disquieting to think that the accuracy of your future spreadsheets may depend on how well physicists can predict the random behavior of subatomic particles.

Perhaps by then another idea that's hanging in the air will be made practical. Fiber-optic computers? Diamondoid semiconductors? Nanomachines? Maybe we'll have analog computers that think as fuzzily as we do, only a whole lot faster. I'll probably be an old man by then, but I'll love to hack some code on *that* machine.

REVIEWS

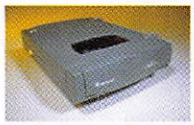
Removable Media Drives

◀ 93 *When deciding which drive to go with, consider how you'll be using it. If you're just transferring files between your own machines or backing up data, any of these drives will suffice. If you plan to bring files home from the office, share data with friends, or ship work to a service bureau, you'll need the same type of drive on both sides. If the other party is already using something, you'll probably have to buy the same drive as them. If it's an outdated standard, such as SyQuest's 5.25-inch drives or Iomega's old Bernoulli, agree to upgrade to a new format based on your mutual needs.*

In our survey of 10 local service bureaus, iomega's 100MB Zip drive and SyQuest's older products were the most common platforms in use. Of the formats reviewed here, MO drives edged out the proprietary formats, but many houses were planning to add Jaz drives in the near future.

*The speedy **Jaz drive** offers performance to spare and boasts the greatest capacity by a wide margin. But it's also the heaviest unit, and it tied for being the most expensive; especially when you consider its $100-a-pop media.*

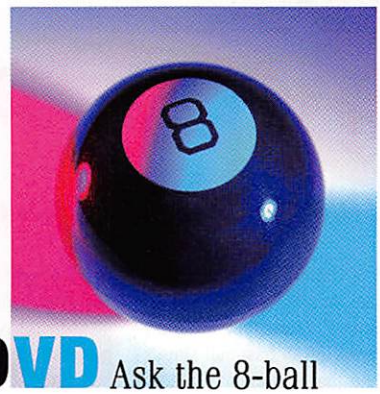
*The **EZFlyer** came in a close second in our performance tests. The external model is handy for use with a laptop, but it doesn't run on batteries. Still, both SyQuest and iomega use proprietary media, and both companies have a history of abandoning their formats (and their users) in the quest for higher capacity and performance. The 230MB SyQuest cartridges are three times more expensive than **Olympus' 230MB MO** disks.*



*If portability is your driving need, **Fujitsu's DynaMO** is the best choice because it'll run on batteries. And because it uses the same media as the Olympus, you can use Olympus' ultra-cheap MO disks with it. The $499 price tag is steep, but that's mitigated by the inclusion of a PCMCIA interface card.*

No matter what your needs and limitations, there's a removable media storage solution in this new breed that will suit anyone. It's just a matter of choosing the best tool for the job.

— Bryan Del Rizzo



DVD Ask the 8-ball

◀ 45 those in the rival Philips/Sony and Toshiba/Time Warner camps, have assured that all DVD-ROM drives will be cross compatible without exception. Wake up! Your nightmares will end with the release of DVD.

CON: YOU CAN'T HAVE IT NOW.

I Want My DVD

The technology that drives DVD exists right now. The means to produce and channels to ship DVD are already here. The reason you can't have DVD right now is simple: No one can come up with a copy-protection solution that satisfies the system manufacturers, software developers, *and* the Hollywood studios. And there's no reason to believe a solution will be forthcoming.

In order to ship DVD products in time for Christmas, everyone involved agreed copy protection issues would have to be resolved by July. That still hasn't happened.

Members of both the hardware and software camps have made it clear that copy protection is *not* their concern. "Copy Protection is holding up both the movie player and PC device," says Ken Jones, Toshiba's director of marketing for DVD products. "It is strictly an issue that was raised by the motion picture industry."

Software publishers have had their titles copied and sent across the Internet more times than they care to mention. And, for the first few months of its existence, recordable DVD will not be a reality. But, as part of their agreement with the motion picture industry, Toshiba, the software publishers, and the other members of the DVD joint camp are working on a solution as we all await the launch this new format.

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boot radar

PRODUCT ANNOUNCEMENTS: THEY **TELL** US, WE **PASS** IT ALONG

By Design

Multimedia Graphics: The Best of Global Hyperdesign explores multimedia design by dissecting projects ranging from The Residents' Bad Day on

the Midway CD-ROM to the Internet-based HotWired magazine to an interactive kiosk project designed for the Doors of Perception conference (from which this image was captured). The large-format book (13 inches wide, 10 inches tall) book is priced at $49.95 until January 1, then it goes up to $60. **Chronicle Books: 800.722.6657; www.chronbooks.com**

Instant Office

The **NoteJet IIIcx** is the no-compromise notebook computer/color printer combo. Along with an integrated 10-sheet feeder for the printer, the NoteJet IIIcx also has an interchangeable Twain-compliant modular scanner. You can scan photos and use your OCR software to turn pages into editable text. Add a modem and you can scan and send, and receive and print hard-copy faxes. A fast Intel Pentium processor teamed with Win95 ensures that the NoteJet IIIcx keeps up with deskbound machines. **Canon: 800.848.4123; www.ccsi.canon.com**

Take it with you

Using the $1,000 **ShareStore** portable CD-R you can write data to CDs from any DOS/Windows notebook or desktop. The ShareStore is an external CD reader/recorder that is a 2x CD writer and 6x CD reader. There's no need to install additional controller boards—the ShareStore connects via a standard parallel port. Record up to 650MB of data or 74 minutes of audio on one CD-R disc. It also reads standard digital and audio CDs. **Portable Systems Solutions: 800.340.7274**

Psion's new PDA

The **Siena** organizer comes with either 512K or 1MB RAM and has a built-in word processor, database, agenda, and spreadsheet that are compatible with various apps. Priced at $249 and $299 respectively, you can also buy an agenda synchronizer that coordinates information between contact managers on a desktop computer and the Siena via an infrared connection. **Psion: www.psion.com/news/launchsiena.html**

Go fetch

Using advanced AI techniques licensed from Cambridge Neurodynamics, **AutoNomy** learns a user's interests and then searches the Net for relevant material. Through a process of training, the agent learns more and more about its user's tastes, providing progressively better results with each Net search. Web pages, text, and graphics are brought back as files, allowing speedy review of information; and because the hypertext links are still live, you can jump to the site you want with the press of the mouse button. Users will be able to purchase agents that have been pre-trained in a wide variety of common-interest subjects and then tailor them to their specific needs.

AutoNomy, retailing for $79, works either online or offline, allowing the real-time monitoring of searches by a user or letting a user switch off and have the agent return back to the local computer from a server when the user is ready. **AutoNomy: 415.326.6300; www.agentware.com**

Next in the series

The **Psion Series 3c**, retailing for $599, completes the Series 3 line of palmtop computers. The new model comes with 2MB of RAM and RS-232 serial connection, and an optional PC card adapter will be available later this fall. New features for the applications include: updated sorting capabilities for the database; editing for the digital voice recording feature; and a new file manager. Psion expects e-mail and Web browser software to be available later this fall. **Psion: www.psion.com/news/launchsiena.html**

Make it bright

Hewlett Packard has expanded its line of handheld organizers with the addition of the **OmniGo 120**. New features include a screen which uses holographic technology to make the display brighter. The OmniGo 120 uses the Geos operating system from Geoworks and has both pen and keyboard entry capability. In notepad mode, you fold the screen over to write notes, while you view keystrokes in another mode. An optional Connectivity Pack automates file management, backup, and synchronization between the OmniGo and your PC. The pack also enables use of built-in Clip&Go software which allows cut and paste operations between the organizer and your desktop. The OmniGo 120 is expected to retail for $399 and its ship date is yet to be announced. **Hewlett Packard: 800.243.9812; www.hp.com**

Serving you the Web

This step-by-step, comprehensive introduction to Web servers starts with the basics: Learn what Web servers are, what they do, and what your options are for connecting to the Web. Then walk through installing and configuring popular Web servers for Linux, Unix, Windows 3.1, 95, and NT. **The Web Server Handbook** presents guidance for making your Web page attractive, useful and compatible with your viewers' browser software. Discover new ways to publicize your Web site, make it more interactive, keep it secure, and well-maintained. The accompanying CD-ROM includes sample templates, CGI and Perl scripts, popular Web server software packages, and a Web page that links to many of the world's best sites for Internet and Web server shareware and freeware. **Prentice Hall: 800.811.0912; www.prenhall.com**

Play it again

Video Express Viewer is an all-in-one video file playback utility for Windows for Workgroups, 3.1, 95 and NT. Along with support for every important video file format, the 32-bit version of Video Express Viewer also handles streaming media formats for accessing video and audio broadcasts over the Internet/company intranets, CD-ROM, hard disk drives and network servers with synchronized sound up to 30fps. It also supports multiple motion media formats: video for Windows, MPEG, QuickTime for Windows, MJPEG, animation and sound files. **Imagemind: 800.321.5933; www.imagemind.com**

Getting all ergy

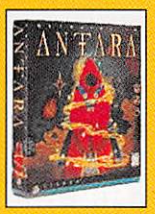
Ergobreak for Office tracks your keystrokes and mouse activity and reminds you to take breaks at regular intervals to avoid computer-related RSI. Each break consists of stretching exercises for your eyes, neck, shoulders, hands, wrists, back and legs. The animated software retails for $59.95. **Vanity Software: 800.643.2881**

Virtual Home Improvement

The **Showoff** series lets you see how adding brick, stucco, a new roof, a deck, and plants to your home will look; or, if you're thinking of building a new home, it offers hundreds of house plans to choose from. The program features actual photographs of real products to help you visualize your home's new look, and you can add to the library by scanning in your own images. Each program in the Showoff series is priced at about $50. **Visual Applications: 888.374.6963; www.showoff.com**

Two roads lead to Krondor

Combine the SVGA graphics and digital sound features of a classic adventure game, add an updated version of the Betrayal at Krondor interface, mix in new combat and magic systems, new characters, an all-new world, and a hefty helping of side-quests and puzzles and you have **Betrayal in Antara**. Available this month, Antara lets you build the skills and attributes of up to three characters at a time, and features an innovative new magic system that enables your characters to learn from spells cast against them. **Sierra: 800.757.7707; www.sierra.com**



Save your brain

The 24-button **MasterPilot** console gives you quick descriptions of various flight-sim functions. Insert the corresponding game card in the top slot, enter the appropriate game number code and the console is automatically customized for the selected game. The commands are color coded by function group and can be enabled or disabled by pressing the Mode Select buttons at the base of the unit. Each game cartridges holds about 30 game settings and can be upgraded for a small fee. You can connect up to three MasterPilots to one computer and they sell for between $80 and $100 each. **Quick Shot: 408.263.4163; www.quickshot.com**

LETTERS TO THE EDITOR

SEPT. 2, 1996: It was the day America broke the Internet. An unprecedented increase in Labor Day traffic shut down major backbone networks across the continental U.S. The networks that remained operational were subsequently flooded with incoming data. Some routers went haywire, and countless data packets fell into the wrong hands.

SEPT. 2, 1996: It was the day *Motherboards Monthly* and *Feline Fanatics* received each other's e-mail. The following documents testify to the severe ramifications of these events...

READERS BYTE BACK

with Chuck Schuck

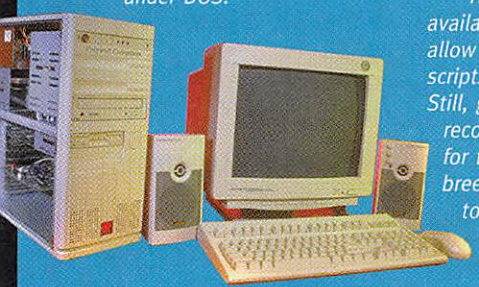
Dear Editor,
I recently adopted an abandoned calico. This adorable little cutey seems happy enough in her new home, but her coat is still dull, matted, and mangy. Any suggestions on how I can restore that trademark calico vibrancy?
— *Jane Seward, Sacramento, CA*

This is an easy one, Jane. As the Sacramento SPCA essentially ships vanilla felines, you'll need a video card upgrade to accurately render your cat's full color palette and all of her high-res calico markings. We suggest you go for broke, and install an Imagine 128 Series II with 4MB of VRAM. Granted, most calicoes lack the requisite PCI expansion slot, but you can circumvent this minor hitch by "opening up kitty's hood," so to speak, and "getting your hands dirty." Simply make a 4-inch incision across the midsection, remove the pancreas, and install the video card into the open slot. Your new 128-bit mountain lion will now appear remarkably lifelike at 1600x1200 pixels, although you may notice an occasional choppiness in the way she walks under DOS.

Dear Editor,
As the proud owner of four easily trained German shepherds, I was disappointed to find that my new cat—a lusciously curly Selkirk Rex—is by comparison a complete doody brain. I'd like to teach him a few tricks, but he can't even remember where we keep the litter box. Is there any hope my cat will eventually pick up even the most basic commands?
— *Eleanor Potter, East Lansing, MI*

Congratulations, Eleanor. You've discovered an annoying architectural bug common to this otherwise practical new breed: Unlike every other cat on the market, the Selkirk Rex does not write user commands directly to its hard disc. Instead, the Rex caches these instructions in RAM, and—you guessed it—flushes them out once he goes to sleep. It seems the cat's original breeders decided all essential feline functions would be executed by onboard ROM, but in order to ship in time for the Spring 1995 Cat Show in New York, these functions were limited to the most rudimentary operations, such as eating, sleeping, and chasing inanimate objects mistaken for prey.

There is a software patch available, however, that will allow you to add up to 20 event scripts to your cat's repertoire. Still, given that Rex's speech recognition software is coded for the voice of the original breeder, you might do better to simply buy another cat.



The Catbird Seat

hosted by Clara Beaumont

Dear Editor,
I've got a hand-built P166, and I clock major hours on all the top flight sims. I'm running 128 Kbps, and I'm a full-on FTP freak. I eat bytes and I crap bits. Are you getting the picture?

The trouble is: I like to eat bagel dogs when I'm at the computer. The wife says my keyboard looks like something the cat dragged in. I tell her to go to hell.

So you got a cleaning tip, or what? Help me out here.
— Bruce Brinski, Philadelphia, PA

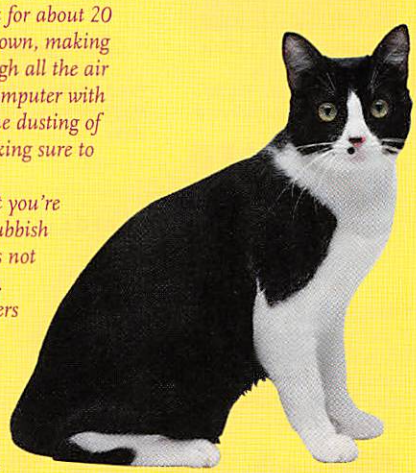
Bruce, you naughty, naughty boy. You must clean not only your keyboard, but your entire computer posthaste. Computers are finicky devices, and yours won't be a happy camper if left unkempt. First, fill a tub full of warm, soapy water. Now unplug your entire system—CPU, monitor, speakers, keyboard, the whole shebang—and place it in the tub. Let the system soak for about 20 minutes, then rinse it down, making sure to run water through all the air vents. Now fluff your computer with a towel, and apply a fine dusting of flea powder, again, making sure to reach all the air vents.

Sure, we know what you're thinking, but all that rubbish you've heard about PCs not liking water is a fallacy. Those Macintosh breeders will stop at nothing to spread misinformation about PCs.

And, Bruce, you may consider being more polite to your wife.

Dear Editor,
When I come home from work and look at my measly Packard Bell 486/66, I just get disgusted. I feel like ripping open that pathetic little bastard, and tearing out its lily-livered heart. Out with the sound card, out with the video card, out with the whole damn motherboard. Any suggestions where I should make the first cuts?
— Jake Bremner, Lake Shasta, CA

Listen, Jake, we don't know what kind of bizarre Santeria rituals you people perform around Lake Shasta, but if you think we're going to stand by idle while you wreak mayhem on a helpless Packard Bell, well then, you've got another thing coming, Mister Man. We've notified your local cat club, and once it verifies the Packard Bell pedigree (we too had never heard of this particular breed), well then, Jake, the fur will fly!



Jon Phillips is Features Editor of *The Net* magazine (www.thenet-usa.com). Send hate mail and love letters to jphil@slip.net.

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From Full Motion Productions
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By Info Pages
Contains over 1100 JPEG images of women in provocative poses. Suitable for posting on the Internet.
51130 MAC/PC **$18**

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39113 MAC/PC **$35**

Diva X Rebecca
By Pixis
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50432 PC **$35**

Pandora's Poker Palace
By Atlantean Interactive
Featuring the hottest star around-Stella Stevens. Join in on the hottest card game in town.
49790 MAC/PC **$26**

Skin
By Atlantean Interactive
You must find a Hollywood starlet who mysteriously disappears during the bizarre Festival of Tattoos.
44869 MAC/PC **$38**

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Queen of the Court
By Atlantean Interactive
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53016 MAC/PC **$27**

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By Atlantean Interactive
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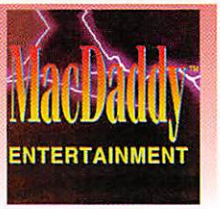

Exposed: Heidi's Girls
By MacDaddy
The controversial Heidi Fleiss, from the Hollywood scandal, displays the wares of her most beautiful girls.
50853 MAC/PC **$16**

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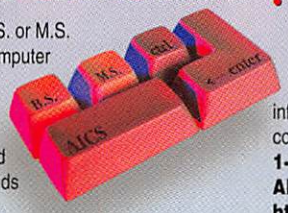

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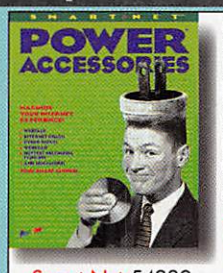

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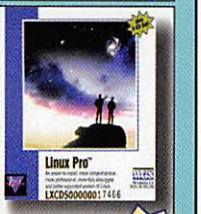

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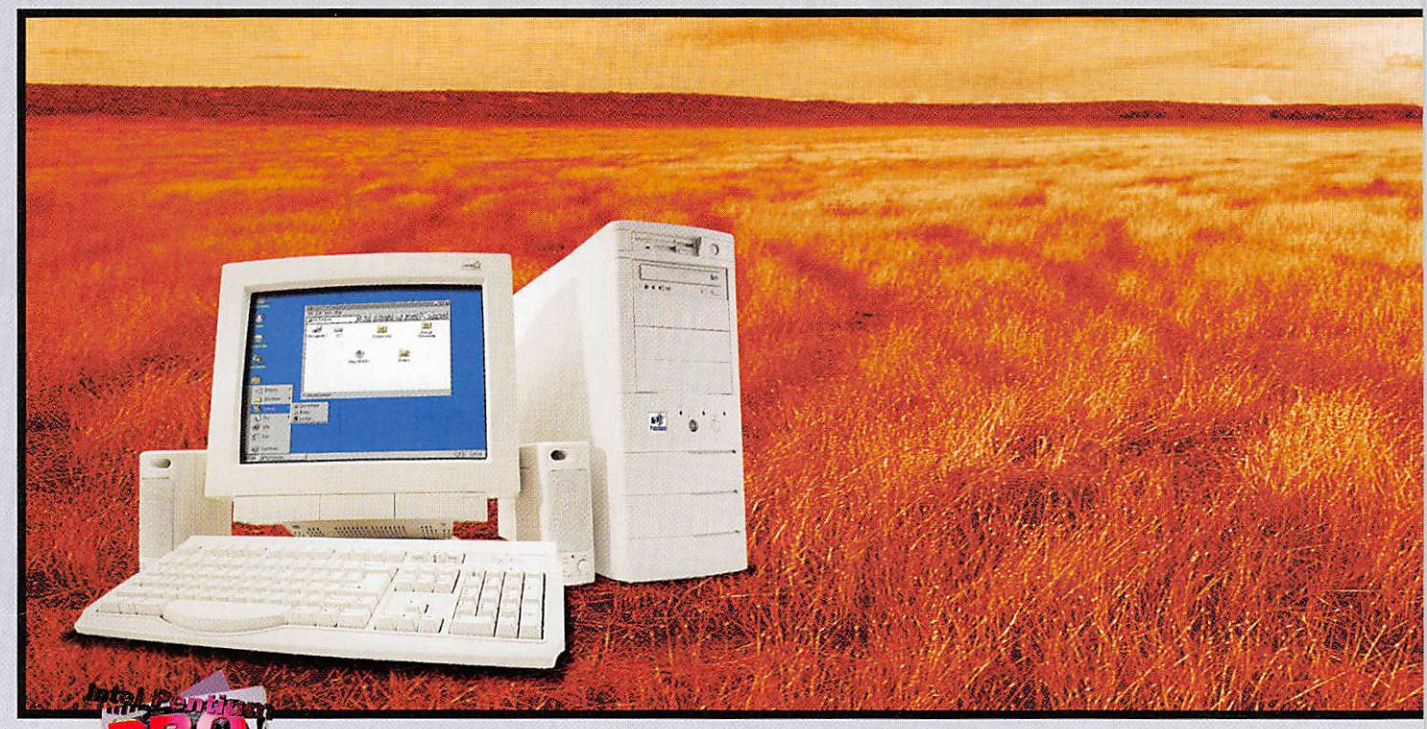

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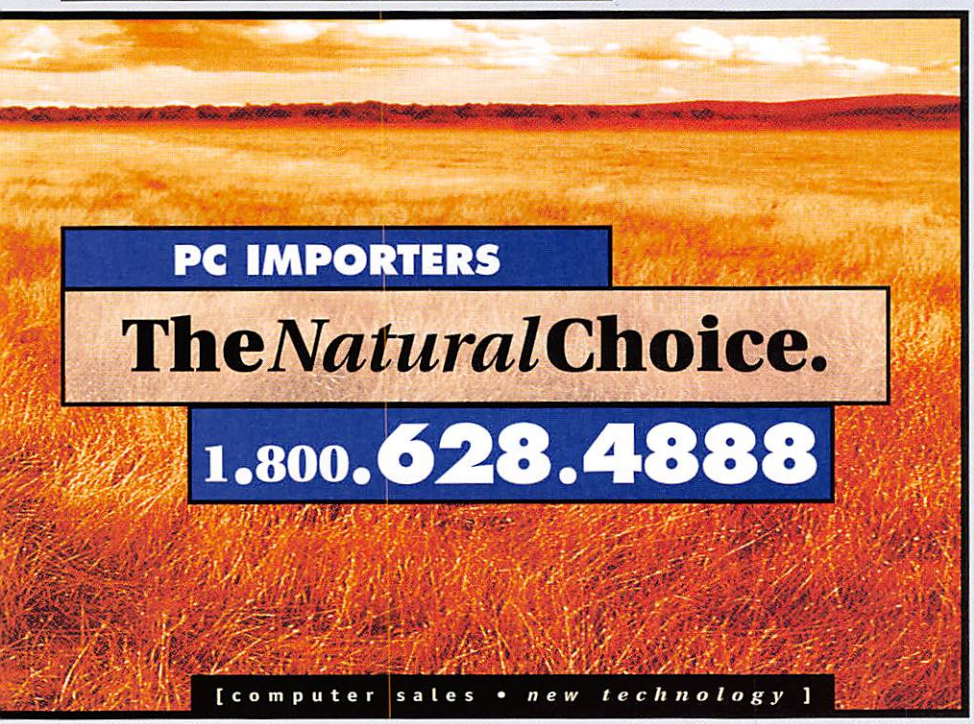

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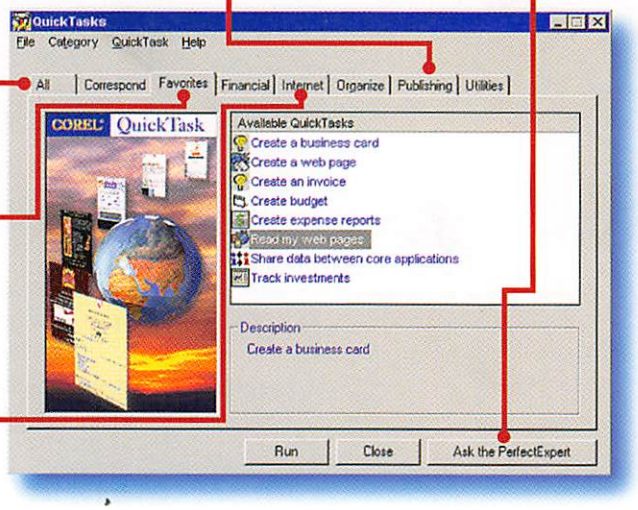

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