



QA  
76.8  
11015  
P38

## WEB PAGES AT THE TOUCH OF A BUTTON

Microsoft and Quarterdeck Join The HTML Parade



**FIRST LOOKS**

## SQL FOR ALL

Seven Front Ends Promise Democratic Access to Data

## OFFICE SUITES

Sneak Peek: Michael Miller Previews the Next Crop

**IT'S A PRINTER !**

100 Great Products For the Small Office...

# Computing for the SMALL OFFICE

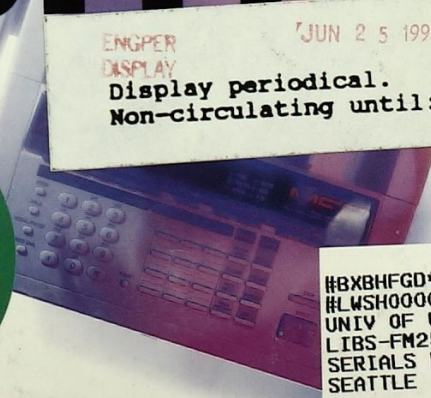
**IT'S A FAX MACHINE !**

...Including 14 Multi-function Printers

**IT'S A SCANNER !**

**IT'S A COPIER**

JUN 25 1995  
ENGPEN  
DISPLAY  
Display periodical.  
Non-circulating until:



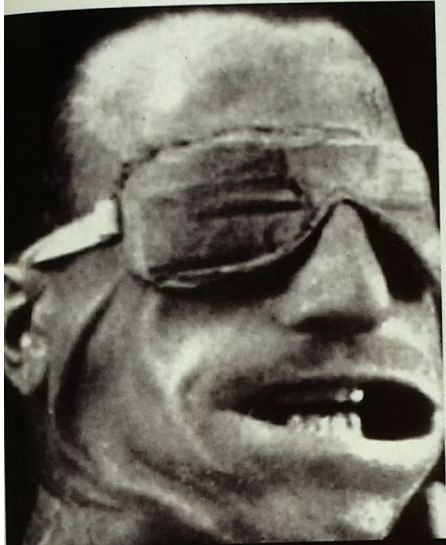
#BXBFHFGD\*\*\*\*\*5-DIGIT 98195  
#LWSH0000071 4#740200 1Q  
UNIV OF WASHINGTON MAY 98  
LIBS-FM25 DBUS  
SERIALS DIV #BU11  
SEATTLE WA 98195



*2X Speed*



*3X Speed*



*4X Speed*



*6X Speed*



**IT'S HERE.**

CIRCLE 153 ON READER SERVICE CARD

# WELCOME TO CREST SKI SCHOOL. YOUR FIRST EXERCISE FOR TODAY

IS TO

STRETCH

Next: a black diamond run.  
And why not? After a Microsoft®  
PowerPoint® 4.0 presentation,  
anything seems possible.

That's just the way Marni  
Joslyn, head instructor of the Never  
Ever Ski School, wants it. After all,  
her job is to convince every stumbling,  
wobbly-kneed, double left-footed begin-  
ner that he can make it down the mountain.  
(And you think you've got it tough.)

Not surprisingly, before Marni brings her students to  
the mountain, she brings the mountain to her students. With  
PowerPoint 4.0, the leading presentation graphics software.

Since Marni's familiar with the Microsoft Office family of  
applications, she's already familiar with PowerPoint's menus and  
toolbars. This makes getting started and navigating her way  
around as easy as getting down the bunny slope.

How can she put such persuasive presentations together?

Simple. First, she clicks into AutoContent Wizard, which  
helps her organize and outline her overall presentation  
thoughts and even offers tips on content.

Next step, she clicks into AutoLayout Gallery and chooses  
a slide layout from the more than 20 options available.

As if that wasn't easy enough, there's the handy Pick A Look

Wizard to help  
her create the right look for  
her presentation. In short, PowerPoint 4.0 helps  
Marni perform like a true professional.

As Marni is often heard telling her students, practice ma-  
kes perfect. Fortunately, the Rehearsal feature allows her to  
just that—practice, practice, practice, so she never has to  
worry about falling flat in front of her class.

What really makes Marni content at the end of the day  
is the power to take her students up that imaginary mountain  
and see them safely down again. (The only bruise she gets is



©1995 Microsoft Corporation. Microsoft Office Professional, shown here, includes Microsoft Excel, Word, the PowerPoint presentation graphics program, Microsoft Access, and a...  
Outside the U.S. and Canada, call your local Microsoft subsidiary or (206) 936-8661. Customers who are deaf or hard-of-hearing can reach Microsoft text telephone (TT/TDD) ser...

# BUTTE

YOUR

MIND.



have to show for their exhilarating descent are imaginary.)

For such a feat, she certainly deserves an award. Microsoft PowerPoint 4.0 has already won its fair share, eight of the industry's most prestigious.

Everyone has his own mountain to face, PowerPoint 4.0 can help you to face yours. Don't be afraid. Call (800) 240-4782, Department XQP for more information.

In the meantime, welcome to the great indoors. Gulp.



## Microsoft®

WHERE DO YOU WANT TO GO TODAY?™

workstation license. (Server and software must be acquired separately.) For information only: in the 50 United States, call (800) 240-4782. Dept. XQP. In Canada, call (800) 563-9048. By calling (800) 892-5234 in the U.S. or (905) 568-9641 in Canada. Microsoft and PowerPoint are registered trademarks and Where do you want to go today? is a trademark of Microsoft Corporation.

# Inside

Chances are that you or someone you know works out of a small office or home office. And while small offices come in many shapes and flavors, one thing they lack is a huge infrastructure. There's no one to answer phones, fix computers,

send faxes, do research, account for time and billing, or market products. When the brawn of the traditional office is gone, you've got to rely on brains. Part of being brainy is knowing when technology can help you.

This issue of *PC Magazine* takes a look at the products that make the small office tick. And

wrote this issue's cover story, "Small-Office Power," has a home office to die for. Jim's current state-of-the-art includes a sophisticated network, about a half-dozen computers, Kurzweil synthesizers and Mackie mixers (he's a composer, too), fax, videoconferencing, a MacroTel hybrid digital/analog PBX, and ISDN everywhere.

In our story, Seymour gives you no-nonsense buying advice for all your small-office components: everything from the perfect telephone system to utilities and integrated software, from the best small-office PCs to networks you can manage alone.

Other small-office accoutrements include

*PC Magazine* is no stranger to that ticking. Every editor here has some form of home office, e-mail, or remote dial-in capabilities. Most of our longtime contributors seldom make the trek to our New York headquarters. They don't have to. In fact, John Quain, Alfred Poor, M. David Stone, and Bruce Brown spent months talking to us about product-testing issues, on-line, without ever meeting with us face-to-face.

Columnist Jim Seymour, who

a new breed of multifunction peripherals—combination printer, fax, and copier machines. Do these hydras work, or does more go wrong as you pack more in a box? Find out in "Swiss Army Printers." And certainly the two best-loved small-office tools, the telephone and the computer, are finally trying to work together. Find out how to get in on the action as we review voice mail products in "At the Sound of the Beep..."—*Robin Raskin*

PC Magazine: The Independent Guide to Personal Computing, ISSN 0888-8507, is published biweekly except in July and August, for \$49.97 for one year. Ziff-Davis Publishing Company, L.P., One Park Ave., New York, NY 10016-5802. Second-class postage paid at New York, NY 10016-5802 and at additional mailing offices. POSTMASTER: Address changes to PC Magazine, P.O. Box 54093, Boulder, CO 80322-4093. GST Registration Number: R-123669673. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 266477.

**TECHNICALLY  
EXPLICIT  
MATERIAL  
ENCLOSED**

**PC Magazine CD—  
the most innovative  
PC tool ever  
developed.**

**Now 30% off  
when you  
subscribe!**



It's one thing to read about cutting-edge technology. Now, with PC Magazine CD—the on-screen companion to PC Magazine—you can see, hear and interact with it.

Just one click lets you: Walk through the newest software suites...download PC Bench 9.0, Winbench 95 and Winstone 95...pull up data and results not available in print or online...experience exclusive multimedia product demonstrations...get working samples of real applications to run on your system...access everything ever published in PC Magazine during the previous 12 months.

All this at our lowest-time-ever rate of just \$49.95 for four power-packed releases—30% off the single-disc price! Call right away to start your subscription to PC Magazine CD. There's nothing else like it on the market today!

**Call: 1 800-335-1195**

Mention Priority Code 8FAA

P.O. Box 59494 • Boulder, CO 80332-9494



Now available  
in a notebook.



Power and portability are no longer mutually exclusive. Now you can have both with an Intel Pentium® processor-based notebook. In fact, all of today's most demanding desktop software including office suites, multimedia and 3-D graphics, now runs just as great on your notebook.

intel®

© 1995 Intel Corporation. For more information on the Intel Pentium processor family contact Intel on the Internet at <http://www.intel.com/procs/pentium/>

OmniPage Pro. Think of it as an accurate  
1500 wpm typist who never takes a coffee break.



Try this powerful OCR software just once, and you'll never go back to retyping documents again.

Nobody likes wasting time typing letters, faxes and reports back into a word processor. That's why OmniPage® Pro Optical Character Recognition (OCR) software is so valuable to scanner users. It's faster and more accurate than even the fastest typist.

■ OmniPage Pro reads through each page, recognizing text in any font, from 6-point fine print to 72-point headlines. It intelligently analyzes the document for context and spelling, making smart decisions on

hard-to-read characters. It's the most accurate OCR software yet. ■ Easily edit and format documents within OmniPage Pro, or in your favorite word processor. It's fully customizable, so you can tailor OmniPage Pro to your individual needs. Or train it to recognize special characters and symbols. You'll save lots of time and thousands

of keystrokes. ■ Even the most complex layouts are no problem, because OmniPage Pro excels at handling both text and graphics on the same page. And it features Image Assistant®

So try OmniPage Pro today and stop retyping.



OmniPage Pro captures page layout, editable text and graphics just as they appear in your original document.

**TRADE UP**  
from your scanner's  
OCR software! Only  
**\$149\***

from any version of OmniPage, WordScan, or OmniScan SE, including the OCR bundled with your scanner.

Get these powerful new features:

- Increase accuracy with innovative neural network and Language Analyst™ technologies
- Retain original text and graphic layout with exclusive TruePage™
- Easily edit graphics with fully-integrated, 24-bit color Image Assistant
- Improve recognition of hard-to-read documents with 3D OCR™ and customizable OCR training
- Achieve greater fax recognition automatically with AnyFax™

\*Suggested price

**Call 1-800-535-SCAN ext. 10**



**OmniPage Pro.**  
Never retype another document.



Caere, the Caere logo, Image Assistant and OmniPage are registered trademarks of Caere Corporation. 3D OCR, Language Analyst, AnyFax and TruePage are trademarks of Caere Corporation. All other registered trademarks and trademarks are property of their respective companies.  
© 1995 Caere Corporation. All rights reserved.

CIRCLE 292 ON READER SERVICE CARD



UP FRONT

**Inside**  
Small (office) is beautiful....4

**Letters**  
On-line services: different strokes for different folks...19

**Trends**  
• Taming the text tiger  
• Impending monitor shortage  
• Satan: Good or evil?  
• Virtual reality on the Web.....29

**First Looks**  
• HP LaserJet 5MP



• Compaq Presario CDS 774  
• KPT Convolver  
• NeuralWorks Predict.....37

**New & Improved**  
BY ASA SOMERS.....61

**Read Only**  
EDITED BY TIN ALBANO .....69

COLUMNISTS

**Michael J. Miller**  
Suite Renovations .....75

**Bill Machrone**  
ISDN for the Masses?  
Not Quite.....83  
Second Looks.....85

**John C. Dvorak**  
Is Bob Really  
a Kidsworld? .....89  
Inside Track.....91

**Jim Seymour**  
Stick a Rainbow in  
Your Bag.....93

**Bill Howard**  
Real Solutions to Real  
Problems .....95

PCs

# SMALL-OFFICE POWER



BY JIM SEYMOUR

The small office has come of age. Advances in PC technology and communications have made home offices, small businesses, mobile offices, and telecommuting centers practical alternatives to

working in monolithic office towers. In this series of features, *PC Magazine*

takes a comprehensive look at the hardware, software, and communications tools you'll need to flourish on your own. Our veteran home-office contributors show you



how to make the most of on-line resources. They also share some tips on legal issues such as insurance and taxes so that you won't have to discover pitfalls the hard way.....102

*Legal Issues for the Small Office.....110*  
*Cyberspace: The Great Equalizer.....112*  
*Small-Office Software .....120*

COVER STORY

Telephony Software

# AT THE SOUND OF THE BEEP...



BY M. DAVID STONE

Voice mail for small businesses has arrived. Once the emblem of a large company, telephony software gives anyone with a PC an affordable, sophisticated-sounding voice mail system that also lets users send, receive, and forward fax messages. We review nine products targeted at your messaging needs and look at a wealth of voice-messaging options within your company's budget.....123

Products reviewed:	The Voice Mail Spectrum.....128
<i>Cheyenne BitWare for Windows 3.24</i> .....143	Answering Machines on Steroids.....142
<i>ExpressFax+ 3.0a</i> .....145	Suitability to Task.....143
<i>FaxWorks Voice 3.0</i> .....145	Messages Without the Machine.....144
<i>MultiExpressPCS 3.2</i> .....159	Voice Mail-Equipped PCs.....150
<i>Multimedia Connect 1.6.2</i> .....159	Telephone Meets Sound Card.....152
<i>ObJIX Media Manager 1.03</i> .....163	Creative Labs' Phone Blaster: Not Just Games.....160
<i>QuickLink MessageCenter 2.0</i> .....164	Summary of Features.....162
<i>SuperVoice 2.0e</i> .....166	The Next Step Up.....170
<i>VoiceFX 3.0</i> .....170	
Editors' Choice.....124	

Hardware

# SWISS ARMY PRINTERS



BY M. DAVID STONE

One dilemma facing the wave of at-home entrepreneurs is how to get printing, faxing, copying, and scanning capabilities without breaking the bank or filling the workspace with office appliances. The new breed of multifunction printers can deliver a mix of functionality in one compact unit that usually costs less than buying separate machines. Cast from different molds, these printers vary widely in price, performance, and features. We evaluate 16 units to show you which ones are tailored to your needs.....172

Products reviewed:	<i>Relisys HomeScan Avec 140</i> .....204
<i>Brother Multi-Function Center 4500 ML</i> .....179	<i>Ricoh MV715</i> .....204
<i>Canon Faxphone B-170</i> .....184	<i>Toshiba TF505</i> .....205
<i>HP OfficeJet</i> .....188	<i>Xerox 3002</i> .....207
<i>JetFax 4</i> .....196	<i>Xerox 3004</i> .....207
<i>Lanier 5010 MFD</i> .....196	<i>Xerox 3006</i> .....207
<i>Okidata Doc-It 4000</i> .....199	Suitability to Task.....174
<i>Panasonic PFC KX-SP100</i> .....201	Editors' Choice.....175
<i>QMS 2001 Knowledge System</i> .....202	Multifunction Others.....185
	Performance Tests.....192
	Summary of Features.....200

FEATURES

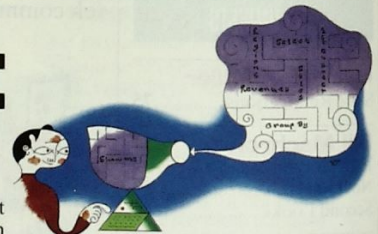
Applications Development

# SQL QUERY AND REPORTING: Straight Answers, Limited Risks

BY BRIAN BUTLER AND THOMAS MACE

You need to compare last quarter's sales figures against this quarter's. But the sales data resides in the corporate SQL database, which is a tricky place to navigate. The newest query and reporting

tools let you access that data without being a database expert, but how much do you really need to know about your database to use them? Are the figures they report the ones you thought you requested? Can your database adminis-



trator set up these tools for easy use by the database-illiterate? We gauge the power, safety, and built-in intelligence of seven packages to find out.....209

Products reviewed:	<i>Esperant 2.1</i> .....230	Editors' Choice.....211
<i>Borland Report Smith for Windows 2.5</i> .....214	<i>InfoMaker for Windows 4.0</i> .....235	Highlights.....214
<i>BusinessObjects 3.1</i> .....220	<i>Intersolv Q+E 6.1</i> .....238	Suitability to Task.....216
<i>Crystal Reports Professional 4.0</i> .....222	<i>Visualizer for OS/2 1.11</i> .....240	Usability Testing.....227
	Anatomy of a Query Tool.....210	Summary of Features.....234

## PC TECH

### User-to-User

BY NEIL J. RUBENKING

How do you delete or move all the files with the same extension? Organizing your AUTOEXEC.BAT file .....245

### Tutor

BY JEFF PROSISE

Is VFAT Ready for Prime Time? .....247

### Corporate Developer

BY BARRY SIMON

Designing with Style: The Win95 User Interface .....255

### Toolkits

BY JONATHAN WALDMAN

Create One-File Windows Programs ..259

### Power Programming

BY RAY DUNCAN

An HTML Primer .....261



### Utilities

BY NEIL J. RUBENKING

Change a Program's Address with COA .....273



Enjoy an underwater adventure with Flying Colors (page 375).

## PC SOLUTIONS

### Hardware

Distortion caused by turning a monitor on its side; a display driver that's compatible with your software .....283

### Operating Environments

Taking control of Windows' Control Panel; a technique for terminating batch file processing .....284

### Word Processing

Inserting merge fields in Word for Windows 6.0 and in 2.0 .....300

### Spreadsheets

When files are too large to import into your spreadsheet program .....300

### Databases

Two third-party wizards help you create mail-merges and envelopes in Microsoft Access 2.0 .....308



A softer look—the Windows 95 user interface (page 255).

## AFTER HOURS

### Not Just for Kids

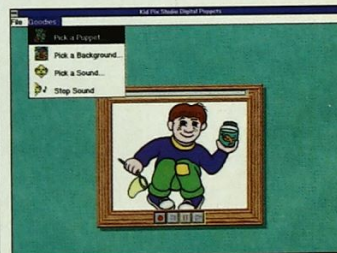
- All the fun, none of the fuss: Kids' creativity software
- CD-ROM Pick Hit: Material World
- Kids: Better Homes and Gardens Cool Crafts
- Kids: KidMail Connection
- Spotlight on Adventure: Under a Killing Moon
- Quick Clips .....375

### About, Retry, Fail?

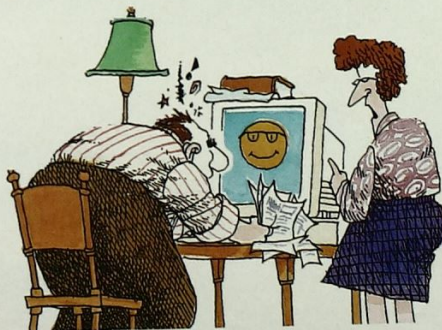
BY DON WILLMOTT .....386



Create your own video with Nickelodeon Director's Lab (page 376).



Make your own puppet with Kid Pix Studio (page 376).



The social interface meets an antisocial user (page 386).

## ALSO IN THIS ISSUE

PC Direct .....	283
Marketplace .....	335
Premier .....	335
Classified.....	348
BusinessCard.....	366
Reader Service Card.....	351
Advertisers' Index: Companies.....	369
Advertisers' Index: Products .....	370
Coming Up .....	372
Editorial Product Index .....	373

# The detail EPSON's 2400 dpi scanner really stands

© 1994 EPSON AMERICA, INC., 20770 Madrona Ave., Torrance, CA 90503. For dealer referral or warranty details, call 800-BUY-EPSON. In Canada, call 800-CO-EPSON. For Latin America, 305-265-0032. EPSON, Adobe Photoshop, Kai's Power Tools and Macintosh are trademarks or registered trademarks of SEIKO EPSON CORP., Adobe Systems Inc., HSC Software and Apple Computer, Inc., respectively.

Actual 30-bit scan

30-bit color  
out.



When it comes to detail, the new EPSON ES-1200C is in a class by itself. It's the only personal scanner with both 2400 dpi and 30-bit color internal scanning for crisp, clear image reproduction.



To ensure the best results with any image you scan, the ES-1200C provides one and three pass scanning, and standard parallel and SCSI ports allow you to connect simultaneously with two PC's. All this means the ES-1200C gives you more power than anything else in its price range.



**The ES-1200C Pro for PC.  
The highest detail  
of any personal scanner.**

The ES-1200C Pro includes top-ranked Adobe Photoshop, Kai's Power Tools, and EPSONScan II and TWAIN driver, cable and interface. There's also a Mac version.

Feature	EPSON ES-1200C Pro	HP ScanJet IICX	Microtek II HR	Umax UC1260
Optical Resolution	600	400	600	600
Max Resolution	2400	1600	2400	2400
Bits Per Pixel	10	8	8	8
One & Three Pass	yes	no	no	no
Dual Connectivity	yes	no	no	no

To see what a difference the details can make, visit your local authorized dealer or call 1-800-BUY-EPSON.

**EPSON**



**Editor-in-Chief Michael J. Miller**

**Editor Robin Raskin**

**Executive Editors Rick Ayre, Bill Howard, Don Willmott**

**Executive Director, PC Labs C. James Galley III Art Director Laura Baer**

**Senior Networking Editor Frank J. Derfler, Jr.**

**Senior Editors David Greenfield (Networking and Communications),  
Brian Nadel (First Looks), Sebastian Rupley (West Coast)**

**Managing Editor Paul B. Ross Assistant Managing Editor Dianne H. McDonald**

**Senior Associate Editors** Ted Stevenson (Software), Sharon Terdeman (Technical Columns) **Associate Editors** John Clyman (PCs), Gayle C. Ehrenman (After Hours), Leon Erlanger (Hardware), Carol Levin (Trends), Thomas Mace (Applications Development), Gail Shaffer (Networking and Communications), Lance N. Ulanoff (Graphics) **Technical Editor** Neil J. Rubenking **Senior Production Editor** Kim Schueler **Production Editor** Monica Sirignano **Copy Chief** Glen Boisseau **Becker Staff Editors** Tin Albano, Jamie M. Bsales, Kathleen Caster, Elisabeth H. Holzer, Elynn J. McCasland, Michael W. Muchmore, Todd Spangler, Sarah L. Roberts, Michael Ryan, Craig L. Stark, Carol A. Venezia, Leslie Wygant, Anush Yegazarian **Senior Writer** Robert S. Anthony **Staff Writer** William P. Flanagan **Assistant Editor** Asa Somers **Senior Copy Editors** Jeanne Albrecht, Jill Léger **Copy Editors** Elliott Thomas Grant, Joseph N. Levine, Ann Ovodow, Tracy Reppert **Assistant Copy Editors** Marian Berelowitz, Peter J. McLaughlin **Layout Manager** Linda Harms **Senior Layout Editor** Lillian Gaffney **Layout Editor** Shari L. Girouard **Library Assistant** Dolores Williams **Editorial Assistant** Melissa J. Perenson **Senior Editorial Researchers** Brad Stülwell, Jodi L. Wynblatt **Editorial Researchers** Mary E. Behr, Eryn R. Brown, Yvonne Koulouthros, Cade Metz, Gregory Sewell **System Support Manager** Craig Ellison **PC Support Analyst** Melvin Acevedo **Production System Support Manager** Patricia Perkowski **Production System Support Analyst** Thomas DeVito **Communications Manager** Diana Garelik **Assistant to the Editor-in-Chief** Tara Solon **Assistant to the Editor** Rita Abrahamian **Assistant to the Executive Editors** Christina M. Evelyn **Administrative Assistant** Christina Okang **Sysop, PC MagNet** Ken Hippie

**Contributing Editors** Bill Machrone (VP, Technology), Douglas Boling, Bruce Brown, Brian Butler, Sheryl Canter, Diane Danielle, Ray Duncan, John C. Dvorak, Michael J. Mefford, Edward Mendelson, Charles Petzold, Alfred Poor, Jeff Prossie, John R. Quain, Sal Ricciardi, Steve Rigney, Winn L. Rosch, Joe Salemi, Jim Seymour, Richard Hale Shaw, Barry Simon, Luisa Simone, Craig Stinson, M. David Stone

**Senior Associate Art Director** Donna Panagakos **Associate Art Directors** Charles Conover, Richard Demler **Assistant Art Director** Le Chau (Betty) Thai **Associate Graphics Director** David Foster **Graphic Artist** Mark Tyner **Assistant to the Art Director** Frieda T. Smallwood **Contributing Photographer** Thom O'Connor

**Director, PC Labs, West Coast** Steve Buehler **Technical Directors** Ben Z. Gottesman (Software), Robert P. Lipschutz (Networking and Communications), Nick Stam (Hardware) **Director, Operations** John R. Delaney **Project Leaders** Richard Fisco (PCs), Thomas Kreyche (Client/Server), Jeff Mace (Graphics), Jay Munro (Applications Development), Amarendra Singh (Software), Jeffrey G. Witt (Networking and Communications), Michael J. Zulich (Hardware) **Programmers** Richard V. Dragan, Kenneth Prakobcharit **Product Testing Manager** Charles Rodriguez **Senior Technical Analysts** John Garris, O. Ryan **Tabular Technical Analysts** Daniel A. Begun, Alan Chan, Laura Cox, Tim M. Crawford, Kason Leung, Anatoly Novoskiy, Margaret A. Piemonte, Deval Shah, Dan Smith **Support Technicians** Peter Bastide, Bruce Deodatt, Charles Lin, Melanio Lopez, Denis Tom, Mark Valentine **Inventory Control Coordinators** Bryan Hughes, Rob Graydon, William Pagan **Administrative Assistant** Jacqueline Paredes

**PC MAGAZINE CD**

**Executive Editor** Peter McKie **Art Director** Curtis M. Fields

**PC MAGAZINE ON-LINE**

**Associate Editor** Jenny Donelan **Technical Associate** Thomas W. Giebel **Staff Editor** Angela Hickman

**Publisher Daniel Rosensweig**

**National Associate Publisher** Nancy Newman **Associate Publisher, Marketing** Susan Delman **National Sales Manager** Bill Stephen **Business Manager** Chris Eisenhardt **Director, Business Development** John Wisdom **Events Manager** Dawn Gudelis **Manager, Promotion and Public Relations** Lynne Hasluck **Research Managers** Elyse Berman, Audra Lee

**Senior Advertising Production Manager** Lori Iacino **Advertising Production Manager** Susan Conrad **Assistant Advertising Production Managers** Barbara Adams, Robert Joy **Editorial Production Manager** Pamela J. Berkowitz **Coordinator, Editorial Production** Louise Laberge

**Advertising Office:** One Park Ave., New York, NY 10016-5802; 800 33 MAG AD, 212-503-5100

**Ziff-Davis Publishing Company  
Chairman and CEO Eric Hippeau**

**Business Media Group  
President Ronni Sonnenberg**

**Executive Vice President** Claude P. Sheer **Vice Presidents** Joseph Gillespie (Magazine Networks), Bob Bader (Central Advertising Sales), Don Byrnes, Al DiGuido, Dan Farber, J. Sam Huey, Michael J. Miller, Paul Somerson, Jim Stafford **Executive Directors, Ziff-Davis Magazine Networks** Ellen Atkinson, Anna Zornosa **Managing Director** Lucy Wohlman (Ziff-Davis Preferred Customer Program) **Directors, Ziff-Davis Magazine Networks** Ann Fitzpatrick, Mark Glasner, Michael Kreiger, Jeff Lehman, Scott Murphy **Marketing Director, Ziff-Davis Magazine Networks** Michael Perkowski **West Coast Marketing Director, Ziff-Davis Magazine Networks** Jeff Bruce Director, **Public Relations** Brenda Wheeler **Co-Directors of ZD Benchmark Operation** Bill Catchings, Mark L. Van Name **Director, ZD Labs** Bob Kane

**Ziff-Davis Publishing Company**

**Presidents** J. Scott Briggs (Consumer Media Group), Jeff Ballowe (Ziff-Davis Marketing and Development), Bob Brown (Computer Intelligence/InfoCorp), J.B. Holston III (International Media Group)

**Senior Vice Presidents** Baird Davis (Circulation), Rachel Greenfield **Vice Presidents** Tom McGrade (Assistant to the Chairman), T.L. Thompson (Business Manager), James F. Ramaley (Circulation Services), Elda Vale (Corporate Research and Analysis), Timothy J. Mitchell (Controller and Treasurer), J. Malcolm Morris (General Counsel and Secretary), Bruce W. Bourne (General Manager), Rayna Brown (Human Resources), Herbert Stern (Marketing and Development Group), Roger Herrmann (Production), Bill Machrone (Technology) **Chief Information Officer** Wellington Y. Chiu **Executive Director, Information Systems** Owen Weekley **Executive Director, Marketing Services** Jim Manning **Production Director** Walter J. Terlecki **Director of Licensing** Jean Lamensdorf **Director of Public Relations** Gregory Jarboe

**Subscription Inquiries,  
Address Changes**

**Subscription Services:** For subscription service questions, address changes, or ordering information, call 303-665-8930 or fax 303-604-7455 in the U.S. or Canada; all other countries, please call 303-604-7445 or fax 303-604-0540. Or write to PC Magazine, P.O. Box 54093, Boulder, CO 80322-4093.

**Subscription Rate:** The subscription rate is \$49.97 for a one-year subscription (22 issues), Canada and all other countries, please add \$36.00 for postage.

**Back Issues:** For back issues (subject to availability), \$8 per issue (\$9 outside the U.S.), send check or money order to Back Issues Dept., Ziff-Davis Publishing Company, P.O. Box 53131, Boulder, CO 80322-3131.

**Computer Select:** PC Magazine is available on Computer Select, a CD-ROM published by Computer Library. For subscription information, call Computer Library at 800-827-7889, ext. 708.

**How to Contact the Editors**

We welcome letters. However, we cannot look up stories from past issues, recommend products, or diagnose problems with your PC by phone. Send your written questions, complaints, and compliments to PC Magazine, One Park Ave., New York, NY 10016-5802. Please include a daytime telephone number. Send electronic mail to MCI Mail box 157-9301, to CompuServe address 72241.104, to Internet address 157.9301@mcimail.com, or to PC MagNet (see below). PC Magazine's general number is 212-503-5255. The West Coast Operations number is 415-378-5500.

If you are dissatisfied with a product advertised in PC Magazine and cannot resolve the problem with the vendor, write (do not call) any Cimetta, Advertising Department, at the above address. Include copies of your correspondence with the vendor.

PC Magazine does not accept unsolicited manuscripts. We will pay \$50 for Solutions and Programming user tips and for Abort, Retry, Fail? submissions. If you submit artwork or newspaper clippings with Abort, Retry, Fail?, mark up the photocopy, not the original.

**PC MagNet**

PC Magazine operates PC MagNet, an on-line service of ZiffNet, hosted by CompuServe. To join, set your communications software for 7 data bits, even parity, 1 stop bit, and full duplex. To find the number nearest you, dial 800-346-3247. (In Canada, dial 800-635-6225, voice only.)

At the Host Name prompt, enter PHONES. Follow the menu, note the number closest to you, then hang up and dial the number. At the HOST Name prompt, enter CIS. At the USER ID prompt, enter 177000.5000. Enter PCMAGNET at the PASSWORD prompt and PCMCIS95 at the ENTER AGREEMENT NUMBER prompt. When you join ZiffNet, you will be enrolled in both ZiffNet and CompuServe, for a charge of \$13.45 a month. The connect-time charge is \$4.80 an hour, billed by the minute. Areas free of connect charges for ZiffNet members are PC Magazine Editors' Choice awards, the ZiffNet Magazine Index, Buyers' Resources, Newsbytes, ZiffNet Highlights, and the current Utility (type GO ZNT-FREEUTIL). For ZiffNet member services, call 617-252-5566. You can also visit PC Magazine on the World-Wide Web at <http://www.ziff.com/~pcmag>.

If you are on the Internet, you can download the utility from our anonymous FTP server at <ftp.pcmag.ziff.com>.

You can also receive the free utility on disk by faxing to 617-374-4007.

**Permissions, Reprints**

Material in this publication may not be reproduced in any form without permission. If you want to quote from an article or use PC Magazine's logo in conjunction with an Editors' Choice designation, write Chantal Tucker; for information on reprints in quantities of 500 or more, write Carol Peters.

**PC Magazine Reviews**

Except where noted: All PC Magazine reviews are of currently available products. Benchmark and performance tests are run on Compaq Deskpro 486/33Ms.

**Editorial and Business Office:** One Park Ave., New York, NY 10016-5802. Editorial: 212-503-5255; Advertising: 800 33 MAG AD, 212-503-5100.

The following are registered trademarks of Ziff-Davis Publishing Company: DOSMark, NetBench, PC Direct, PC Labs, PC Magazine, PC Magazine Award for Technical Excellence, PC Magazine Editors' Choice, PC MagNet, ServerBench, WinBench, Winstone, and ZD.

The following are trademarks of Ziff-Davis Publishing Company: Abort, Retry, Fail?, After Hours, BusinessCard, Corporate Developer, CPLmark, Extending Your Apps, Features Plus, First Looks, First Looks Plus, Lab Notes, New & Improved, Off the Stack, PC Bench, PC Magazine At Home, PC Magazine CD, PC Magazine Marketplace, PC Solutions, PC Tech, Pipeline, Power Programming, Quick Clips, Read Only, ScreenDemos, Tech Notes, Tutor, User-to-User, WinDrain, ZDmag, and ZiffNet.

Other trademarks and names used throughout the publication are the property of their respective owners.

Copyright (c) 1995 Ziff-Davis Publishing Company. All rights reserved. Reproduction in whole or in part without permission is prohibited.

PRINTED IN THE U.S.A.

# Drivers' Ed

CHAPTER

## the speed trap.

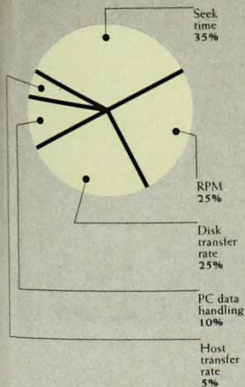
© 1995 Western Digital Corporation. Western Digital and Caviar are registered trademarks of Western Digital Corporation.

Everyone loves speed and performance.

The only problem is that when it comes to drives, some people confuse one for the other.

Some think seek time or the latest host transfer buzzwords like Mode 4 PIO represent a drive's performance. In actuality, a drive's performance is the combination of media rates, buffer sizes and host rates, as well as seek and spin times. So it hardly matters how impressive a drive's individual speed specs are if the other factors hamper its overall performance.

Relative influence of factors affecting drive performance.



Typical random I/O operation.

With our extensive expertise in engineering and manufacturing products for entire computer systems, Western Digital is far more committed to a drive's overall, "integrated" performance. This broader perspective enables us to optimize all the drive technologies, so we can deliver drives with the industry's best performance. So before someone tries to pull a fast one on you, remember: there's more to drives than speed alone.

Phone: 1-800-832-4778 Internet: <http://www.wdc.com/> DocuFAX: 714-932-4300

For more detailed information on hard drive performance, ask for Driver's Ed: Chapter 1

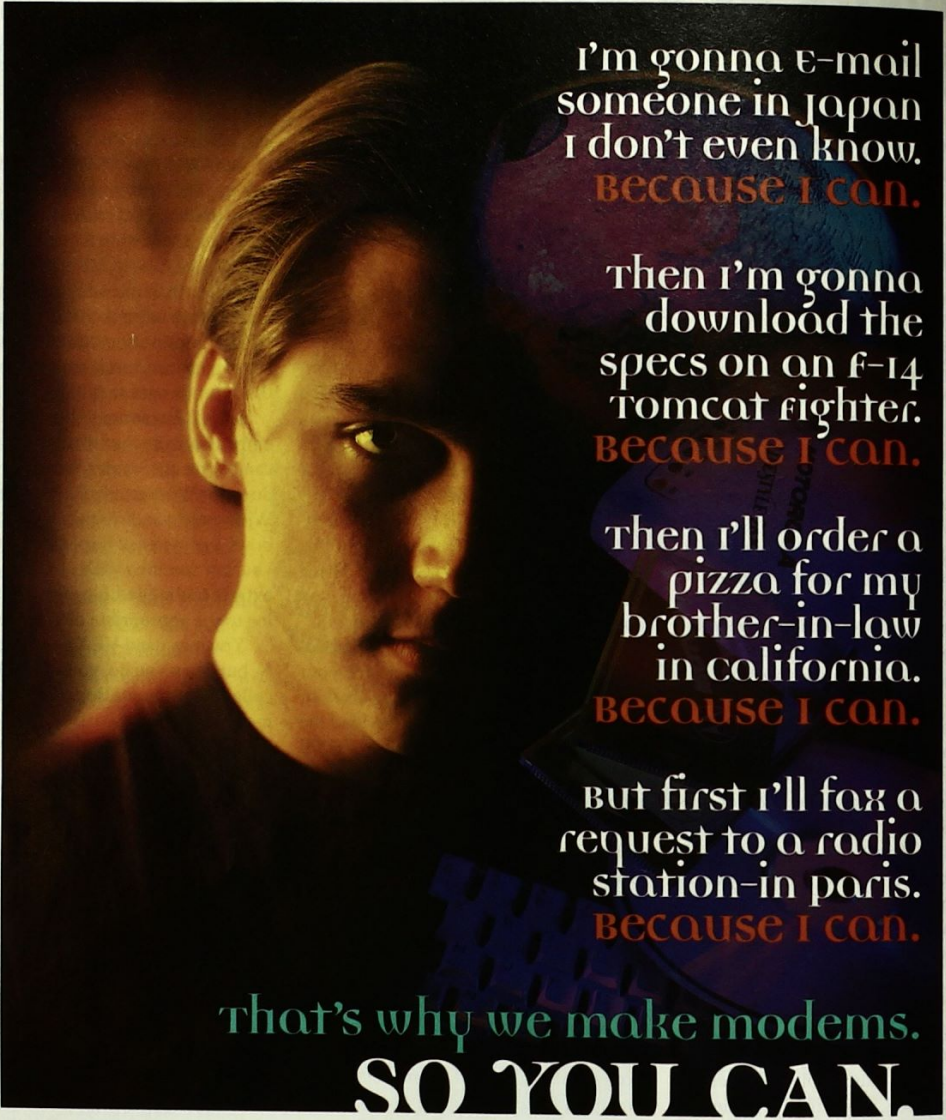
FOR A LIST OF RETAILERS AND DISTRIBUTORS THAT CARRY WESTERN DIGITAL DRIVES, CALL 1-800-832-4778.

CIRCLE 237 ON READER SERVICE CARD



WESTERN DIGITAL





I'm gonna e-mail  
someone in Japan  
I don't even know.  
**BECAUSE I CAN.**

Then I'm gonna  
download the  
specs on an F-14  
Tomcat fighter.  
**BECAUSE I CAN.**

Then I'll order a  
pizza for my  
brother-in-law  
in California.  
**BECAUSE I CAN.**

But first I'll fax a  
request to a radio  
station in Paris.  
**BECAUSE I CAN.**

That's why we make modems.  
**SO YOU CAN.**



HOW CAN YOU? WITH A PHONE LINE AND A MOTOROLA 28.8 LIFESTYLE SERIES™ OR POWER CLASS™ MODEM. THEY'RE REALLY FAST. WHICH MEANS LESS WAITING AND TIME PAID FOR ONLINE. AND THEY OFFER UNSURPASSED RELIABILITY, FAX CAPABILITY AND V.34 PERFORMANCE. TO LEARN MORE, CALL 800-766-4883 OR VISIT YOUR LOCAL RETAILER. THEN HOOK UP AND BE AMAZED AT WHAT YOU CAN DO.

©1995. M, Motorola, Lifestyle Series and Power Class are trademarks of Motorola, Inc.

NOBODY BEATS THE WIZ  
1-800-253-0186

PC WAREHOUSE  
1-800-PC STORE

OFFICE DEPOT  
1-800-485-9800

J&R COMPUTERWORLD  
1-800-221-9180

CIRCLE 367 ON READER SERVICE CARD



mark the term and definition, respectively. For example, the HTML sequence

```
<UL>
<LI>Here is a list item.
<LI>Here is another item.
<LI>Here is the last item.
</UL>
```

would be rendered as

- Here is a list item.
- Here is another item.
- Here is the last item.

Nested lists are fully supported, and some browsers even make an attempt to use a reasonable hierarchy of differently shaped or colored bullets for unordered lists. Hanging indents, spacing, and other critical aspects of lists are not under the author's control, unfortunately. In the current versions of HTML, lists are about the only way to present highly structured information attractively, but they are really a pretty weak construct. As HTML 3.0 comes into widespread use, along with Web browsers that fully support the HTML 3.0 table facilities, we can expect to see many of the current uses for list tags fade away.

Additional examples of the various types of lists can be found in Figures 5, 6, 7, and 8.

**SPECIAL CHARACTERS** The HTML specification defines the character set for HTML documents to be the ISO 8859/1 8-bit single-byte-coded graphical character set, also known as Latin Alphabet No. 1 or Latin-1. This is a 256-character set that includes many graphic elements and the accented characters needed for text written in the most widely used European languages as well as English. The lower 128 character codes of ISO 8859/1 are essentially the same as the ASCII character set, and this subset is sometimes referred to as the International Reference Version or ISO-646.

In practice, most HTML documents are implemented in lowest-common-denominator ASCII because of keyboard limitations and for purposes of portability across CPU and operating system platforms. But many symbols commonly needed in electronic publishing, such as accented or otherwise modified charac-

```
<HTML>
<HEAD>
<TITLE>HTML Nested and Definition Lists</TITLE>
</HEAD>
<BODY>
<H1>This Demonstrates Nested Lists</H1>
<HR>
<UL>
<LI>This is the 1st item.
<UL>
<LI>This is a nested bulleted item.
<LI>This is another nested bulleted item.
</UL>
<LI>This is the 2nd item.
<OL>
<LI>This is a nested numbered item.
<LI>This is another nested numbered item.
</OL>
<LI>This is the 3rd item.
</UL>
<HR>
<H1>This is a Definition List</H1>
<HR>
<DL>
<DT>This is the first term.
<DD>This is a description of the first term. The description can be
very long. This is more description of the first term.
<DT>This is the second term.
<DD>This is a description of the second term. The description can be
very long. This is more description of the second term.
</DL>
<HR>
<ADDRESS>
Created 3/13/95 / Last Modified 3/13/95<BR>
Cedars-Sinai Medical Center / duncan@csmc.edu
</ADDRESS>
</BODY>
</HTML>
```



Figure 7: This HTML source code demonstrates nested lists and definition lists.

ters, currency symbols, and the trademark and copyright symbols, are not included in the ASCII character set. Additionally, we need some way to display characters that would otherwise be interpreted as part of an HTML formatting command: < (less than), > (greater than), & (ampersand), and " (double quote).

To meet these display needs, HTML defines special "escape sequences" that you can use to encode non-ASCII glyphs and HTML command delimiters. The HTML specification refers to these special escape sequences as *character entities*, which has a faintly Star Trekish ring about it. Here are a few of the more important symbolic escape sequences:

Escape Sequence	Displays As
&lt;	<
&gt;	>
&amp;	&
&quot;	"

Special characters can also be encoded with a numeric escape sequence, where

the number corresponds to the ISO 8859 code for the character. For example:

Escape Sequence	Displays As
&#60;	<
&#62;	>
&#38;	&
&#34;	"
&#169;	©
&#174;	®

The full list of escape sequences is quite lengthy; the best reference for it is the HTML 2.0 specification, which is available in hypertext at many different locations on the World-Wide Web (try <http://info.cern.ch> as a starting point).

Note that the special-character escape sequences are case sensitive, according to the HTML specification. But some browsers (including Netscape Navigator) will honor the tags in uppercase as well as lowercase.

**IN-LINE GRAPHICS TAGS** One of the most compelling aspects of the World-Wide Web is its "multimedia" capability;

that is, the ability to merge pictures, icons, video clips, and sound seamlessly with the supporting text and present the result in a visually rich, attractive, and integrated manner. This fundamental graphical orientation is the main reason, I believe, that the World-Wide Web exploded out of nowhere during 1994 and virtually overnight eclipsed its text-only predecessors, the slow-growing worldwide network of Gopher servers and clients.

The smooth integration of graphics perceived by the user of a Web browser, however, is more apparent than real. From the document author's point of view, proper handling of graphics is enormously time-consuming. There are image acquisition and ownership issues, there are aesthetic issues, there are hyperlink validation issues, there are technical issues of image formats and palette mapping, and last but not least, there are extremely important performance issues.

At the simplest level, graphics elements are *in-lined* with text by use of the <IMG> tag. The tag includes a URL that specifies the actual location of the graphics object in a separate file and some optional display-tweaking information. In other words, the graphic is not actually embedded into the HTML document but is incorporated by reference. The URL may be absolute or relative, so the image may reside on the same system as the HTML document that refers to it, on any other addressable Web server, or even on the user's local hard disk. The full form of the <IMG> tag is

```
<IMG SRC="URL" [ALIGN=TOP|MIDDLE|
BOTTOM] [ALT="text"]>
```

When the user views the HTML document, the browser will retrieve any graphics objects referred to by the document in separate transactions, then merge them into the displayed text according to the optional alignment parameter, with the default alignment being BOTTOM. The optional ALT parameter specifies text to be displayed in place of the graphic for character-mode-only Web browsers such as Lynx. Most graphical browsers can handle several types of in-line images, including JPEG files, X bitmaps, and

CompuServe .GIF files. The predominant image type is .GIF, although this may change rapidly over the next year because of recent legal skirmishes.

Let's look at a simple example of an in-line graphic. The following sequence in an HTML document would result in display of the graphics file JOHN-DOE.GIF at the left margin of the browser window, with the text "John Doe" displayed on the right side of the graphic and with the text baseline aligned with an imaginary vertical halfway mark on the graphic.

```
<P>
<IMG SRC="JOHNDOE.GIF" ALIGN=MIDDLE>
John Doe<P>
```

Notice that the graphics file's URL is relative, so the browser will try to retrieve the graphics file from the same location as

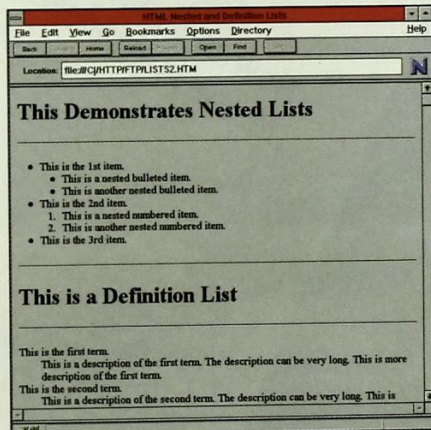


Figure 8: These nested and definition lists were produced by the HTML code in Figure 7.

it got the HTML document file that referred to the graphic.

URL-validation and graphics-performance issues are the bane of multimedia Web publishing. Because HTML documents and their in-line graphics actually reside in separate files on the Web server, it is easy for documents and the names or locations of their associated graphics elements to get out of sync. When surfing the net, you will frequently see your Web browser render some in-line graphic as a generic icon, meaning "I can't find this puppy at the URL specified by the

<IMG> tag!" More subtle errors can also occur, as when the content of a graphics file is updated or completely changed after the creation of the HTML document that references it, or when a filename collision on the remote system or an error in URL coding results in display of the wrong graphic. As more sophisticated Web authoring systems emerge, this sort of problem will no doubt become less significant.

Performance issues, on the other hand, will be with us for the foreseeable future. A few kilobytes of HTML-coded text may translate to several pages of formatted text on the screen, but even the teensiest 256-color graphic object other than an icon is usually at least a few kilobytes, and a full-screen graphic can easily require over 100K. You can well imagine, therefore, that heavy use of graphics in a document will degrade browser performance enormously, especially if the user is accessing the Internet via a 14.4-Kbps modem and a SLIP connection, or via a 56-Kbps leased line.

The first widely used Web browser, Mosaic 1.0.3, did not allow the user to do anything until all the graphics referenced in an HTML document had been downloaded, unless image loading was disabled altogether. At the time I first started using Mosaic, my company had only a relatively low-grade (56-Kbps) connection to the Internet backbone. I remember gnashing my teeth frequently as I waited for Mosaic to display Web documents splattered

throughout with icons and large maps and pictures, written by thoughtless authors who were working on machines with multimegabit hardwired connections to the Internet and who assumed everyone else in the world had the same privileged access.

Second-generation Web browsers, such as Netscape Navigator, have circumvented the graphics-performance problem to some extent by placing graphics retrieval in "background threads," allowing the user to scroll through the text of a document or jump to another document be-

# See.

It's that simple.

Just open these colorfully illustrated guide-books and watch the answers to your software questions unfold.

The How To USE books from Ziff-Davis Press make computing easy by presenting each task visually on two facing pages. You'll see what you want to achieve, and exactly how to achieve it.

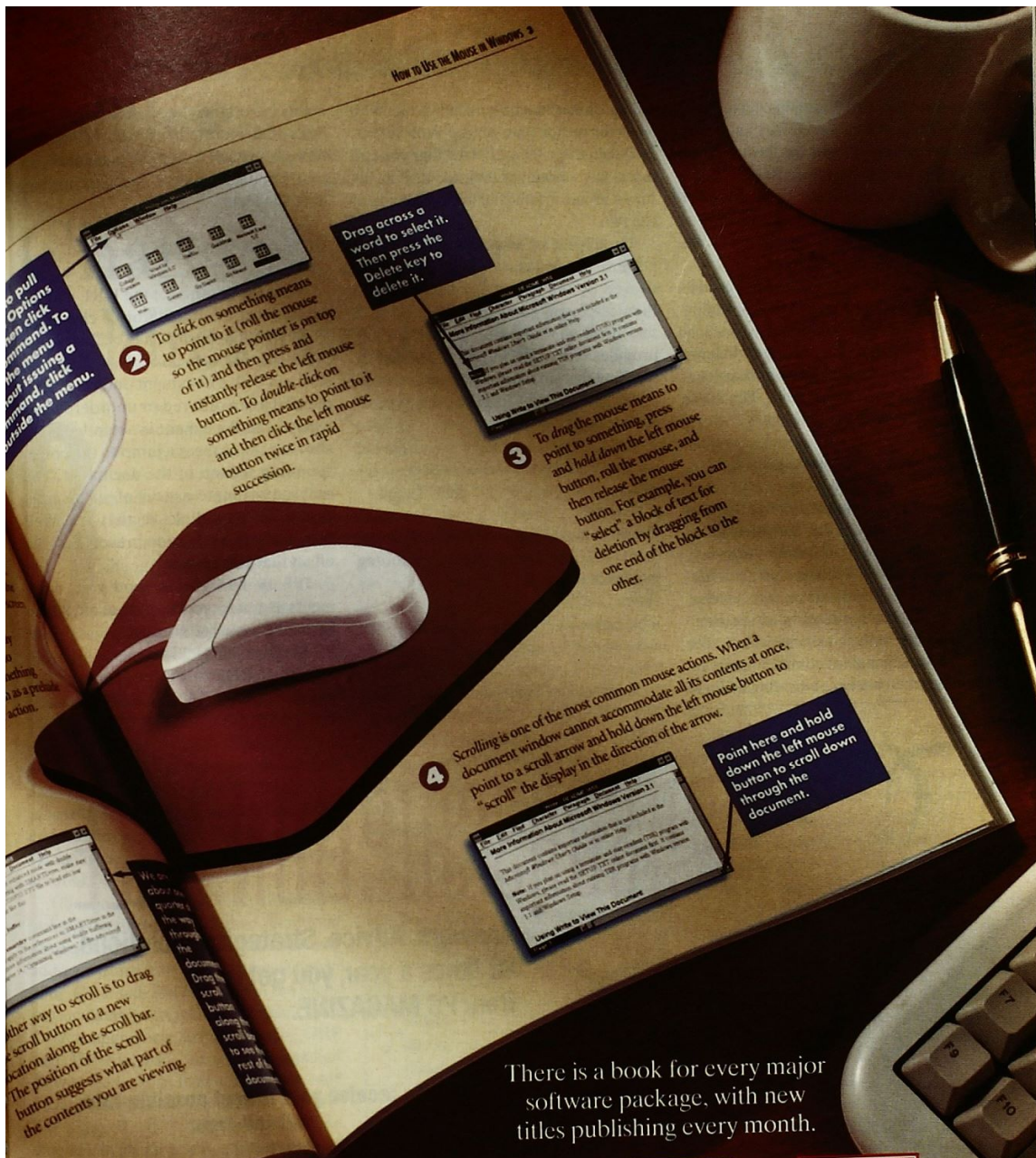
There's no guess work. No need to plow through page after page of the other computer books. No need to wait for what seems like an eternity for your turn on the technical support hotline. No need to ask for yet another favor from your local computer expert.

The How To USE books are the affordable alternative for those of us who would rather let the computer do the work.

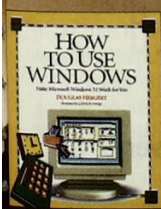
Seeing is believing. If you see yourself taking advantage of the power and ease of today's technology, see the How To USE series at your local bookstore, or call us at

**1-800-688-0448,**  
ext. 259 for more information.

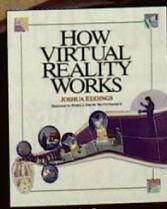




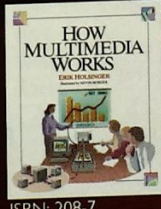
There is a book for every major software package, with new titles publishing every month.



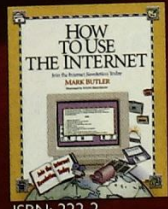
ISBN: 190-0  
Price: \$17.95



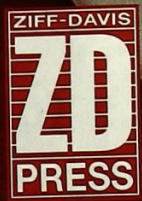
ISBN: 230-3  
Price: \$24.95



ISBN: 208-7  
Price: \$24.95



ISBN: 222-2  
Price: \$17.95



fore the graphics elements have been completely downloaded. But as a Web document author, you can best address the graphics-performance issue by using graphics elements only where they are really needed and by judicious use of in-line "thumbnail" images that are hotlinked to the full-size graphics.

**ANCHOR TAGS** Anchor tags are used to encode hyperlinks, the colored or underlined chunks of text or bitmaps with a special border that users can click on to jump to another document or to another location in the same document. The basic form of a hyperlink anchor tag is

```
<A HREF="URL">some text here</A>
```

where "some text here" is what the user sees, and the URL is the "destination" of the hyperlink. The URL can be *absolute*, containing the full hostname and filename of the target document; *relative*, meaning the hostname and starting directory for the path is assumed to be the same as the document containing the anchor tag; or even *local*, indicating a file re-

siding on the machine running the Web browser rather than on the Web server. Between the <A> and </A> tags you can insert any amount of text, an <IMG> tag for an in-line graphic, or a combination of the two.

Ordinarily, when a user clicks on a hyperlink, the destination document is retrieved by the browser, formatted, and then displayed starting at the top in a scrollable window. But the anchor tag provides the option of immediately scrolling to a label within the target document. The general form for this type of anchor tag is

```
<A HREF="URL#label">some text here</A>
```

The label must be encoded in the destination HTML document with an anchor tag that takes the form

```
<A NAME="label">user-visible text here</A>
```

Support for labels in HTML docu-

ments introduces the possibility of hyperlinks that merely cause the browser to reposition itself within the document currently being displayed. Such anchor tags have the form

```
<A HREF="#label">some text here</A>
```

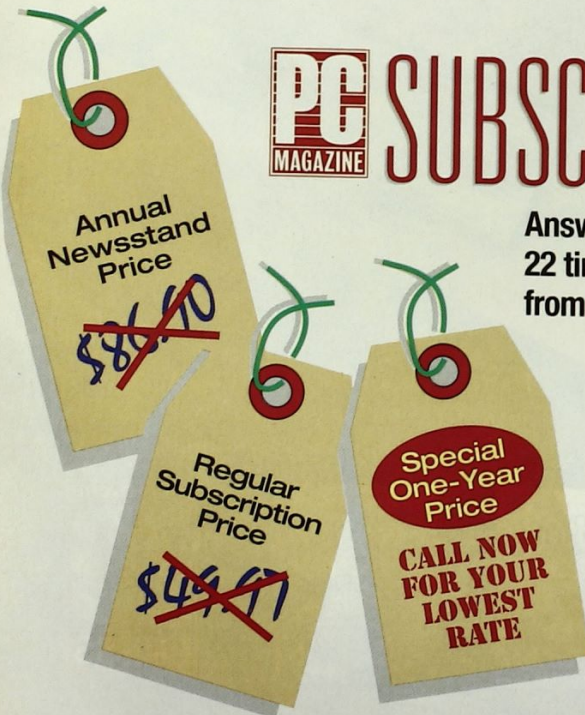
Note the absence of the URL and the presence of the mandatory # character. This type of hyperlink has become quite popular in Web documents, which often start out with a document outline (implemented as an ordered or unordered list) wherein each element is actually an anchor tag that causes a jump to the corresponding section of the document. The only unfortunate aspect of such same-document hyperlinks is that the Web browser's Back button never has the effect that you expect!

**THE IN BOX** Please send your comments and suggestions to me at any of the following e-mail addresses:

PC MagNet: 72241,52

MCI Mail: RDUNCAN

Internet: [DUNCAN@CERF.NET](mailto:DUNCAN@CERF.NET)



# SUBSCRIPTION SALE

Answers. Advice. Strategies. Solutions.  
22 times a year, you get it all  
from PC MAGAZINE.

To receive your lowest possible rate,  
call toll-free:

1-800-289-0429

**BONUS:**  
Free Home or Office Delivery