OCTOBER 1994

Macworld

Run Windows on Your Mac

3 Ways to Make It Really Work

PLUS

Information Superhighway?
Caution! Detour Ahead

Excel 5.0
Insider Tips to Optimize Its Powerful Features
MANY PEOPLE STRIVE FOR PERF.
WOULD YOU SETTLE FOR PERF?
Everything in your life may not always come together. But on your Macintosh, it's another story. Because now there's a family of leading, full-featured programs for the Mac that truly work together like one.

New Microsoft Office 4.2.

Think of Office as programs that look alike. Programs that act alike. Programs that work so closely together, you'll feel like you're using just one.

An example? Let's say you want to change a sales chart that's part of a report to your boss. Go ahead. Simply click on your chart and instantly your Microsoft Excel spreadsheet tools appear. Without ever leaving Microsoft Word.

Talk about being connected.

The fact is, the walls are down. You're now free to combine words, numbers and pictures with ease. Without leaving your document.

Better yet, no matter what you're working on, you're working smart. Thanks to IntelliSense® technology, built-in intelligence that senses what you want to do, then helps you do it.

Behind Office, you'll find even more smarts: Microsoft's unlimited product support. It's available at no service charge.* Just call.

But first, call (800) 709-3787, Department YP4, to locate a retailer near you. They'll help you learn all about the new Microsoft Office Standard 4.2, in versions for both Macintosh and Power Macintosh®.

So give us a ring.

Then give your Macintosh something that most people spend a lifetime searching for.

* Support for Microsoft Office is no charge; however, normal telephone service charges apply. Microsoft support services are subject to Microsoft's then-current prices, terms, and conditions, and are subject to change without notice. © 1994 Microsoft Corp. All rights reserved. Microsoft Office Standard edition, shown here, includes Microsoft Excel, Word, PowerPoint presentation graphics program and a Mail workstation license; software must be acquired separately. For info only: in the U.S. and Canada, call (800) 800-757599. Outside the U.S. and Canada, call your local Microsoft sales office at (206) 936-9500. Customers can reach Microsoft toll-free at 1-800-852-5700 in the U.S. or 1-800-852-6734 in Canada. Microsoft and PowerPoint are registered trademarks of and IntelliSense is a trademark of Microsoft Corp. Electo and Mac are registered trademarks; and Power Macintosh is a trademark of Apple Computer, Inc.
The new NEC SiS 486 EX is you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you. And you.
Our new personal Mac® laser printer lets you say what you want to say, exactly the way you want to say it. That's because it's a true laser printer with 300 dpi resolution, along with our patented Sharp Edge Technology and Microfine toner, for crisper characters and richer, darker blacks.

And because it comes with 17 resident Adobe™ Type 1 fonts, 35 professional TrueType™ fonts, and built-in TrueType and Type 1 rasterizers.

It's loaded in other ways, as well. It has Adobe PostScript™ Level 2, so it works beautifully with any application. NEC's 6ppm print engine. 3 MB of standard RAM. And an AppleTalk® interface, for quick and easy connectivity with one or several Macs.

It also gives you what no one else does: a 2-year limited warranty that will get you a replacement printer overnight, if anything goes wrong. All for about $800.

For more information, call 1-800-NEC-INFO. Or, for information via fax, 1-800-366-0476, and request document #79640. Thank you. And you. And you.
Contents

Features

86 The Mac Does Windows
BY GALEN GRUMAN
Macworld Lab tests three options for running Windows applications on a Macintosh and gives you the lowdown on what kind of performance to expect.

96 DreamNet
BY CHARLES PILLER
Telecom giants are planning the ultimate in entertainment networks, but is that what consumers really want? A special Macworld investigation.

106 Remote Access Arrives
BY MATT CLARK
Macworld Lab examines compression and transmission rates, interface, and cost per port among seven ARA servers, the essential network tool.

News

33 MacBulletin

34 News
QuickTime VR • Hi-res, low-cost monitors • Modem prices drop, and more

41 Power Mac News
Power Mac outsells Pentium • Native Excel, Word • ATM, MacWrite Pro announced, and more

43 New Products

Opinion

19 State of the Mac
BY ADRIAN MELLO
Will you use multiple operating systems?

25 Letters

171 The Desktop Critic
BY DAVID POGUE
The nitty-gritty on fax software.

179 The Iconoclast
BY STEVEN LEVY
Coping with the Undo Generation.

181 Conspicuous Consumer
BY DEBORAH BRANSCUM
Managing data security.

262 Wise Guy
BY GUY KAWASAKI
The finer points of product demonstrations.

How to Contact Macworld
Graphics

114 News Spruced-up Painter adds X2 features • Full-bleed Phaser 440 • xRes challenges image editors, and more

118 Expert Graphics BY CATHY ABES Graphics professionals share their secrets.

122 Inside QuickDraw GX Fonts BY ERFERT FENTON The what and why of QuickDraw GX fonts, and how this extension in Apple’s new System 7.5 might just change typography on the Mac.

At Work

130 News WordPerfect Office upgraded, renamed • All-in-one archiving package • FullWrite returns, and more

133 Working Smart BY JIM HEID How to protect your data from prying eyes.

146 Excel 5.0 BY STAN MIASTKOWSKI Expert advice on using Excel 5.0 to your best advantage, with previews of new features and tips on creating power spreadsheets.

155 Quick Tips BY LON POOLE Tips, tricks, and shortcuts.

Networks

162 News QuickMail 3.0 • Bigger, faster LANs • Remote-access servers for PPP, and more

167 PowerBook Notes BY CARY LU Expand your PowerBook’s storage capacity.

Buyers’ Tools

185 Editors’ Choice Top picks from our comparative articles.

187 Star Ratings More than 300 product-review summaries.

197 Streetwise Shopper Hardware and software bargains: discounts, bundles, upgrades.

Apple’s powerful, expandable PowerBook 540c reviewed, page 54.
The new AS/400.
Black goes with everything.

If your business plan includes client/server computing, rest assured that the new AS/400® Advanced Series will coordinate impeccably. Everything about it is designed with a new openness and interoperability, to thrive in client/server environments. There's open client access, to serve OS/2®, Windows®, DOS, Macintosh or UNIX® systems with equal ease and security. Powerful features that provide open database access and protocol-independent networking are built in. There's a wide choice of AS/400 Advanced Servers—high performance processors fine-tuned for client/server duty. And thousands of AS/400 client/server applications are ready today. In short, the new AS/400 is so easy to implement and manage, it represents a new generation in client/server computing: a system designed to stand out, even as it blends in. For additional information, call 1 800 IBM-6676, ext. 644.
The new AS/400 Advanced Series from IBM

Circle 179 on reader service card
Now you can print from your Macintosh to over 1,000 PC-compatible printers.


PowerPrint costs less than $150.

And includes features like built-in spooling, scaling, and custom paper sizes. It's compatible with TrueType and Adobe TypeManager fonts.

Available in Network versions.
PowerPrint/TTM for LocalTalk networks. PowerPrint/NW™ for Novell NetWare printing services.

Call 800-330-6833 for information, or contact your dealer.

Upgrade to 2.5 and Get the Power of Color!

Why you should upgrade from Grappler or MacPrint, for $75.

PowerPrint 2.5 is much faster, provides access to many printers like the Canon BJC-600 and the HP Laserjet 5P. Plus, features like better quality, background printing and printer compatibility.

Current owners of PowerPrint can upgrade for $35.

And get 32 bit color and grayscale printing, print preview and support for new printers.

www.powerprint.com

GDT Softworks
1460 Loughheed Highway
Burnaby, BC
Canada V5C 6B7

For information, call 604-291-9123
Fax 604-291-9060
AppleLink: GDTIAKT

End users circle 32 on reader service card
Dealers circle 42 on reader service card

anytime. anywhere. any printer.
128 Megabytes To Go.

Chinon's New 3 1/2” Rewritable Optical Drive.

Now you can store 128 megabytes on a 3 1/2” disk. And take it anywhere. This technology is a massive breakthrough in mass storage.

In memory-hungry applications like desktop publishing, multimedia and CAD/CAM, the lack of portable, high-capacity storage has been a real limitation—until now.

Chinon’s rewritable optical drives help you take full advantage of this exciting new technology. They offer the same rock-solid reliability and durable construction that has built Chinon's quality reputation. And their unique, proprietary dust protection system shields the drive mechanism, safeguarding your data for years to come.

Chinon optical drives are fast, too—with a 43ms access time, they're almost as fast as a hard drive. And the optical medium provides unsurpassed safety and data integrity.

External and internal versions are available for IBM and compatibles, external only for Macintosh. Best of all, Chinon optical drives are offered at a very competitive price.

Call Chinon today for the reseller nearest you. And get your data to go!
Engineered Software,
Generating isometrics with PowerDraw is easy and very quick thanks to the many dedicated isometric tools. The results look sharp—as if created using time-honored technical illustration techniques!

PowerDraw does for CAD what the Mac did for computers.

Sincerely,

Fred Goodman

Circle 274 on reader service card
Searching for new ways to pour on your creativity? Fractal Design Painter® 3.0 is filled with a whole new lineup of outstanding features with something really cool for everyone!

Painter’s award-winning heritage of advanced Natural-Media® painting and drawing tools have been combined with the revolutionary multiple floating selection capabilities originally pioneered with PainterX2™ — all in one spectacular product!

MULTIMEDIA GETS ANIMATED!

If you’ve been waiting for professional-quality desktop software to create cutting-edge, frame-by-frame animation for multimedia or video, Painter 3.0 is sure to get your reels rolling! All of the really cool features and special effects in Painter 3.0 can be easily applied to imported QuickTime® and Video for Windows™ files. Edit-out objects in individual frames — then re-touch your movie frames with any of the countless brush and texture effects available. You can rotoscope your images as well as apply Painter sessions across a series of frames!

CREATE AN ENTIRELY NEW LOOK!

Easier to use Painter 3.0 offers yet another new way to paint or illustrate digitally with a wide variety of true-to-tradition realistic brushes that actually simulate loading a brush with multiple colors of paint. These great new brushes give your work a dynamic and expressive quality that you can control down to the smallest bristle!

Easy-to-Use Interface & Image Spraying!

A new user interface reduces on-screen clutter & increases your productivity. Plus, you can now paint with an awesome new brush called the Image Bristle™. Dabs of paint are replaced with a series of images or graphic elements for super-natural media effects!

A MYRIAD OF OTHER NEW FEATURES

Added snazzy new features in Painter 3.0 include: a new gradient composer; selective masking & color adjustment tools; a bezier frisket tool; automatic drop shadows; image warping; canvas size adjustment and page rotation for ergonomic tablet use. And naturally, new Painter 3.0 is available for Windows® and Macintosh® platforms. But unlike other Mac applications, users get Painter 3.0 for Macintosh and Power Macintosh® together for the same low upgrade price! So pour it on, before time runs out!

Special Limited-Time Upgrade Price!

**ONLY $149**

For registered Painter X2 owners ($199 for registered Painter X2 owners. Offer good in the U.S. & Canada only & expires 1/25/94).

To Order or for More Information

800-297-COOL

VISA, MASTERCARD & AMERICAN EXPRESS GAMES ACCEPTED

Fractal Design

Painter 3.0

Circle 190 on reader service card
We put our beads together and devised an incredible offer on our Power Utilities bundle that adds up to the best value in Mac utility software. You’ll get the newest MasterJuggler 1.90 ($69.95 if purchased separately) and the renowned DiskExpress II ($89.95 if purchased separately).

MasterJuggler “One of the best productivity enhancers.” Macworld 4/94

The complete font manager, MasterJuggler allows you to group fonts together in named sets and work with just the fonts you need at any given time. No need to restart your Mac or all of your applications!

DiskExpress II “Best all-around optimizer.” Macworld 3/94

Patented technology in DiskExpress II keeps your hard disks running at their absolute fastest. No floppy boot disk included. Set it for automatic or manual optimization. Includes disk error detection and more.

Five Free Bonus Utilities

The Power Utilities bundle also includes utilities not available anywhere else. You’ll get DiskCheck, ScreenEclipse, DiskFlash, MenuExtend plus MultiDisk! All this adds up to an intelligent offer that doesn’t take a genius to figure out.

Special Price of $29.95 x 2 Payments

For a limited time you can get the entire Power Utilities bundle for two payments of $29.95. When you order with a credit card we’ll charge the first payment and rush you a copy of Power Utilities. The second payment will not be charged until 30 days after the first payment date.

Value Guarantee – Love it or the Second Payment is Free

If you don’t agree that Power Utilities is worth more than the price in this special offer, just notify us before the second payment due date and the second payment is free!

Call to order or for details 800-ALSOFT

Circle 98 on reader service card
Out of chaos comes order.

Special offer!* $49
To order, call 1 800 544 8554 ext. 200
30-day money-back guarantee!

Order now.

Claris Organizer.
The first P.I.M. that's got it all together.

If you've tried to use your computer to get organized, you know that most personal information managers (PIMs) do one or two things well. But the things they do, aren't well integrated. Until now.

New Claris Organizer™ software is the first program to seamlessly integrate four PIM environments into a single easy-to-use intelligent application.

- Calendar—appointments and tasks displayed in customizable daily, weekly and monthly views.
- Contacts—a powerful database that handles all your contact information—easily sortable by name, zip code, company, etc.
- Tasks—manage all to-do items, including recurring tasks.
- Notes—the flexible way to write, categorize, search, and sort your notes and memos.

With its breakthrough intelligent assistance, all your calendar entries, notes, to-do lists, phone numbers and addresses can be automatically linked—putting everything at your fingertips, from anywhere in the program. Plus, a Smart Search feature finds what you're looking for just by typing phrases in plain English.

Combine its integration and intelligence with the ability to print in many formats, including DayRunner, Filofax and Avery labels, and you have the ultimate personal organizer for Macintosh computer users. At a compact 800K, it's perfect for all PowerBook or desktop Macintosh computers!

Want a PIM that's smart enough to really simplify your life? Order Claris Organizer. It'll bring order to the chaos, fast.

Simply powerful software.*

*Try new Claris Organizer risk-free for 30 days. Price and money-back guarantee offer good only in the U.S. from Claris, and is subject to change. Shipping and handling costs are additional. Price offer not good with any other discounts or promotions. Retail prices and terms may vary. Requires System 7.0 or higher. ©1994 Claris Corporation. All Rights Reserved. Claris, Claris Organizer, and Simply powerful software are trademarks of Claris Corporation. Macintosh and PowerBook are registered trademarks of Apple Computer, Inc. DayRunner, Filofax and Avery are trademarks of their respective manufacturers.
MacWorld readers love FutureBASIC!

Thanks for voting FutureBASIC the best programming language of 1994!

Thousands like you are finding they don't need a degree in programming to write full-powered Macintosh applications.

With step-by-step instructions, clear documentation, direct toolbox support and hundreds of examples, no programming project is out of your reach!

FutureBASIC is a remarkably feature-packed tool that contains much of the complexity of Macintosh programming. Yet it's capable of producing compiled code that rivals the performance of programs written in more difficult, high-level languages. FutureBASIC is a long-needed tool for Macintosh development.

Byte, January 1994 Award of Distinction

If you have already discovered that HyperCard really just produces stacks rather than programs and have a bookmark permanently stuck in the Think C manual's "Learn OOP" tutorial, FutureBASIC may represent your best hope for learning your ideas into a Mac application.

MacWorld, June 1993

"The Best Mac Desk Ever."

NEW!

- Ergonomic
- Fully Adjustable
- Strong
- Guaranteed
- VAR Inquiries Welcome

Macworld readers love FutureBASIC!

Call 1-800-482-4567 to order, or send name, address, phone #, $79.75 + tax to Zedcor, 4500 E. Speedway, Suite 22, Tucson, AZ 85712 (FAX: 1-602-881-1841)

Shipping and handling, $15.00 CA, $15 all other countries. Payments: Visa, MC, Discover, AmEx, or check.

Through 10/94, we're offering FutureBASIC bundled with the book Programming the Macintosh with FutureBASIC, The Best of Inside BASIC, magazine on disk, and the entertaining Educational Game Pack—only for $79.75.

Copyriglht 1994 FutureBASIC, Inc. FutureBASIC is a trademark of FutureBASIC, Inc.
NEW IN THE PHENOMENALLY SUCCESSFUL SERIES OF KAI'S POWER TOOLS...

KPT Bryce

Ask your reseller for "Suite Imaging," KPT Bryce and Kai's Power Tools 2.1 Together!

HSC SOFTWARE PRESENTS A STANDALONE APPLICATION, "KPT BRYCE"
STARRING A UNIQUE INTERFACE TO DESIGN & RENDER LANDSCAPES REAL & SURREAL
AVAILABLE AT COMPUTERWARE, 800/376-0092, COMPUSA, 600/875-7800, MAC ZONE, 800/248-8900 & OTHERS
HSC SOFTWARE 6303 CARPINTERIA AVE., CARPINTERIA CA 93013
TALK TO US @ info@hsc-software.com, KEYWORD "KPT" ON AMERICA ONLINE, CALL YOUR FAVORITE RESSELLER AND ASK FOR KPT BRYCE, KPT BRYCE 1999 USD

© 1998 HSC Software Corp. All Rights Reserved.
KPT Bryce and Kai's Power Tools are trademarks of HSC Software Corp.
La Cie's Summer Offers

QUANTUM 3.5" HARD DRIVES

La Cie hard drives with Silverlining™ hard disk management software deliver the best performance and value. La Cie's Tsunami drives are sleek, portable and powerful. With features like switchable active termination for maximum data integrity and up to a five year warranty, Tsunami drives can be used with confidence.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Internal</th>
<th>Tsunami</th>
</tr>
</thead>
<tbody>
<tr>
<td>170MB</td>
<td>$199</td>
<td>$259</td>
</tr>
<tr>
<td>270MB</td>
<td>$269</td>
<td>$329</td>
</tr>
<tr>
<td>340MB</td>
<td>$299</td>
<td>$359</td>
</tr>
<tr>
<td>540MB</td>
<td>$399</td>
<td>$499</td>
</tr>
<tr>
<td>1080MB</td>
<td>$749</td>
<td>$849</td>
</tr>
<tr>
<td>1400MB</td>
<td>$939</td>
<td>$999</td>
</tr>
<tr>
<td>2100MB</td>
<td>$1339</td>
<td>$1399</td>
</tr>
<tr>
<td>1650MB</td>
<td>$1979</td>
<td>$2039</td>
</tr>
</tbody>
</table>

La Cie hard drives with Silverlining™ deliver the best performance and value.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Internal</th>
<th>Tsunami</th>
</tr>
</thead>
<tbody>
<tr>
<td>2050MB</td>
<td>$2269</td>
<td>$2329</td>
</tr>
</tbody>
</table>

S=Seagate mechanism (1 year warranty)

PowerBook Drives (2.5" Internal)

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Internal</th>
<th>Tsunami</th>
</tr>
</thead>
<tbody>
<tr>
<td>85MB</td>
<td>$199</td>
<td></td>
</tr>
<tr>
<td>170MB</td>
<td>$259</td>
<td></td>
</tr>
<tr>
<td>256MB</td>
<td>$349</td>
<td></td>
</tr>
</tbody>
</table>

LaserWriter 630 installation kit available

ZFP REMOVABLE MEDIA SOLUTIONS

For reliability and quality in removable media solutions, choose La Cie. Our SyQuest drives offer capacities from 88MB to 270MB. Our CD-ROM drive supports both single and double speed data transfer, plus Photo CD. Our new optical drive offers quiet, reliable operation with cost-effective media. Protect your valuable data with our high-capacity DAT drives. For economical back-up for smaller capacities, try our TEAC tape drives. We have your selection. External drives are shipped in zero-footprint cases.

**SyQuest Drives**

<table>
<thead>
<tr>
<th>Drive</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>88C MB</td>
<td>$399</td>
<td>$459</td>
</tr>
<tr>
<td>200MB</td>
<td>$559</td>
<td>$599</td>
</tr>
<tr>
<td>105MB</td>
<td>$349</td>
<td></td>
</tr>
<tr>
<td>270MB</td>
<td>$599</td>
<td></td>
</tr>
</tbody>
</table>

**CD-ROM Drives**

<table>
<thead>
<tr>
<th>Drive</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toshiba Dual Speed</td>
<td>$639</td>
</tr>
</tbody>
</table>

**Optical Drives**

<table>
<thead>
<tr>
<th>Drive</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>230MB Cartridge</td>
<td>$1009</td>
<td>$59</td>
</tr>
</tbody>
</table>

**DAT Drives**

<table>
<thead>
<tr>
<th>Drive</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0GB DAT</td>
<td>$1099</td>
<td>$1159</td>
</tr>
<tr>
<td>8.0GB DAT</td>
<td>$1539</td>
<td>$1599</td>
</tr>
</tbody>
</table>

**Tape Drives**

<table>
<thead>
<tr>
<th>Drive</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>600MB</td>
<td>$729</td>
<td>$789</td>
</tr>
</tbody>
</table>

Each drive comes with Retrospect™ and one free SyQuest cartridge.

*Call for details on terms, conditions, limited money-back guarantee (shipping not included), warranty and free offers. Comparisons not applicable to all vendor products, check specifications. Prices do not include shipping and may only apply to products shipped within the continental United States. International customers must pay for all shipping charges. Add sales tax where applicable. Intel, ZFP, Tsunami, PocketDrive, PocketDock, Silverlining, Silverwood, Silverlining, La Cie and the La Cie logo are trademarks of La Cie Ltd., a Quantum Company. FORTUNE 500 is a registered trademark of the Time Inc. Magazine Company. Al other trademarks are the property of their respective companies. All prices, specifications, terms, warranties, descriptions, products and services herein are subject to change without notice or reason. © Copyright 1994 La Cie Ltd. 8700 SW Creekside Place, Beaverton, OR 97005. Phone: (503) 525-5900. Fax: (503) 525-9100. All rights reserved. Printed in U.S.A.
CLEARANCE SALE!

CLOSEOUTS!

HURRY! ACT NOW!

We are making room for the new releases by offering closeout prices on these popular hard drive models. These prices won't last long! Quantities are limited!

This first quality merchandise carries a ONE YEAR WARRANTY and includes SILVERLINING hard disk management software ($149.00 value).

Closeout External Hard Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>External</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>120MB</td>
<td></td>
<td>$199</td>
</tr>
<tr>
<td>170MB</td>
<td></td>
<td>$229</td>
</tr>
<tr>
<td>400MB</td>
<td></td>
<td>$369</td>
</tr>
<tr>
<td>1000MB</td>
<td></td>
<td>$799</td>
</tr>
<tr>
<td>1200MB</td>
<td></td>
<td>$929</td>
</tr>
</tbody>
</table>

*Drive enclosures vary. Every drive also includes owners manual, necessary cables, and a generous collection of shareware.

The La Cie Advantage

- Silverlining™ Disk Management Software
- Unlimited TOLL-FREE Technical Support
- 30 Day Money Back Guarantee
- All Drives Burned In and Tested
- Double Shielded SCSI Cables
- FCC, UL, TUV, VDE & CSA Approved
- Ready to Plug and Play
- Valuable Warranties

COLOR SCANNING SOLUTIONS

SILVERSCANNER II

As low as $1599

Silverscanner II makes scanning as quick, painless and productive as possible. With features like dynamic color preview (16 sec.), magnify in preview, proof in preview, savable scan settings, up to 400% scaling in 1% steps and up to 1600 dpi in 1 dpi steps—all in one pass. It's easy for the beginner and powerful for the advanced user. And it's Macworld's Editor's Choice.

To order or for more information, call toll-free:

800-999-3919
Mon.-Fri. 5 a.m.-7 p.m. & Sat. 8 a.m.-noon PST
International: 503-520-9000 Fax: 503-520-9100 (24 hrs.)
UK 0800-89-3025 Australia 001-4-800-123-007
VISA, MasterCard, C.O.D. and approved purchase orders accepted.

Circle 52 on reader service card
What Our Engineers Had in Mind When Working On Our Newest Scanner.

Introducing the Agfa StudioScan II.

Push a button, make a scan. Is it really that simple? With the new Agfa StudioScan II, it can be.

That's because StudioScan II was designed for simple operation. Two levels of scanning software are built in — easy-to-use Agfa FotoSnap and comprehensive Agfa FotoLook. Plus, our exclusive, 42-page Introduction to Digital Scanning will guide you through the scanning process.

What's more, every StudioScan II comes complete with Agfa FotoTune color management software and our IT-8 reference target, along with Adobe PhotoShop™ LE and OmniPage Direct™ OCR software. All in a 400 x 800 ppi, 30-bit, one-pass scanner. And all for about $1,000.

So if you want an easy way to bring a scanner into your office, all it takes is the new StudioScan II. And your finger. Call 1-800-685-4271 to find out more information on Agfa's new scanners.

AGFA
The complete picture.
Juggling Operating Systems

Will you work with multiple operating systems?

The most common debate among personal computer users centers around which is the best computer—a Mac, a PC, or a workstation. The debate usually assumes that the relative merits of a computing platform’s hardware aren’t fundamentally as important as its operating system. It is the OS—DOS, Windows, Macintosh, OS/2, Unix, and so on—that circumscribes the galaxy of activities associated with a specific computing platform and determines users’ loyalty to one type of computer over another.

Even so, some people now talk about the future of OS’s and about the OS’s association with different types of computers as if they were about to go to a buffet: “I’ll be able to do my desktop publishing under the Mac OS, run my company database in Windows, and switch to Unix for the specialized engineering package.” From this perspective, users will be able to choose among OS’s at will, unhindered by the limited choices each system offers.

Major developers like IBM and, to a lesser extent, Apple have raised the possibility of mix-and-match OS’s. IBM is developing Workplace OS for its forthcoming PowerPC computers, and Apple is involved with Taligent, the OS project once code-named Pink. But I doubt that this scenario will happen for a few years, and perhaps not even that soon. Most users won’t have cause to switch between OS’s and will habituate a single OS. I also suspect that, despite a range of choices, a single OS will still largely be associated with a given platform. So why worry about it? Because this whole topic of running multiple OS’s on a single hardware platform is causing a lot of confusion among users and developers, with many people believing in possibilities that appear problematic at best.

Changing Behavior

Why would anyone want to run more than one OS simultaneously on the same computer? The main reason would be to take advantage of each platform’s unique capabilities. For example, an in-house designer in the marketing department might work in the Mac environment to take advantage of its superior graphics and prepress capabilities but switch to Windows to update the custom database application that serves as the company’s accounting system. (For more detail on running Windows applications on a Mac, read our cover story this month.)

At first glance, this sounds pretty compelling. After all, most of us don’t object to having more choices and fewer restrictions. But I doubt that it will be practical to switch OS’s, or that most Macintosh users will even be inclined to do so. Most Mac owners are satisfied with the strong base of software available today. The most common exceptions are people who must use an application managing Windows you use the left. Imagine having to readjust your behavior constantly for such a basic operation.

My guess is that people will quickly settle down with one environment and avoid changing to another unless they absolutely have to. The fact is, it’s more efficient to stay with a single OS for the same reasons that most of us don’t become ambidextrous: habits aren’t easy to break, and we avoid learning redundant procedures for accomplishing the same work. In fact, you can see this in today’s only real dual-OS environment: few users switch freely between OS/2 and Windows. When they do, it’s because they prefer OS/2 but need to use a Windows program for which there is no native OS/2 counterpart. The same would be true for mixed Mac and Windows, or Mac and Taligent, or Mac and Unix. An OS’s operations become second nature, and it is irritating to have to continually work against habit.

The Hardware Marriage

Besides the behavioral barriers, several technical issues make it difficult to run multiple OS’s. A computer’s OS is closely married to the hardware it runs on. The OS must detect and manage numerous hardware configurations—such as memory settings, storage devices, and add-in cards—across a multitude of special circumstances. Integrating all the options and components in a computer system is not only important to maintaining a functional whole, but it is also a way to add special features. An example of this is the PowerBook Duo’s elegant docking solution.

As a hardware platform evolves, it is usually the OS that must knit together the differences between old and new machines, while also evolving to provide new system-level services (such as QuickTime continues
IN CONTROL BEATS JUST GETTING ORGANIZED!

No other calendar program compares to getting the all new IN CONTROL. That's because IN CONTROL 3.0 is no ordinary calendar. No way!

It combines the ease of the flexible, multi-column Action Outliner™ with bigtime database power. It simply helps you plan smarter. Only IN CONTROL works with FileMaker® Pro. (Look it up!) IN CONTROL 3.0 - the calendar to plan on!

---

VR, OLE, and AOCE). While all of this is going on, a system vendor such as Apple or Microsoft must try to maintain as much compatibility as possible between the OS and the existing base of applications software. If incompatibilities and limitations occur when there is a single OS wed to a hardware platform, imagine the challenge of trying to manage all these differences among multiple OS's. Microsoft's Windows NT - a version of Windows that runs on several hardware platforms, not just on Intel 80X86-based PCs - proves this point perfectly. NT has many incompatibilities with nonstandard hardware devices, and even resource-rich Microsoft can't revise NT any faster than about a year after it has revised standard Windows.

Even if these technical challenges could be overcome, there would still likely be a performance penalty somewhere in the system - witness the performance of Windows on a Power Mac. For the Power Mac to achieve any semblance of Windows' speed running on a comparable PC, specialized hardware is required, with significant added cost. Another current example is the slower speed associated with running emulated 680X0 applications on a Power Mac. Apple did a good job of minimizing the performance penalty, but even so, these applications run noticeably slower on a Power Mac than they do on the Quadra 650, the mainstay model superseded by the Power Macs.

IBM, which hopes to run Windows under emulation on its PowerPC computers, is counting on 100MHz or faster PowerPC CPUs to make the emulation acceptable, and is hedging its bet by developing a PowerPC variant that includes on-chip emulation hardware. This is true despite the design of Workplace OS, which is supposed to minimize the emulation penalty by separating the appearance part of the interface (which would run under emulation) from the functional part of the OS (which would run native).

Some current efforts to develop or reengineer OS's are partially focused on making it easier to adapt system software to different hardware platforms. Future iterations of the Mac OS and Taligent, for example, will be object-oriented, which should mean they will be more modular and therefore more easily customized than current OS's. This is what IBM is trying to achieve with its Workplace OS, which will run OS/2, AIX (IBM's Unix), Windows NT, and perhaps System 7 interfaces. The Taligent effort (a joint project of Apple, IBM, and Hewlett-Packard) has switched gears from providing a new OS to providing an operating environment that would essentially add a software layer to IBM PCs and workstations and to the Mac; this layer would run special collaboration-oriented software and services.

---

One OS at a Time

As a result of such efforts, it should be easier for software engineers to layer and separate different aspects of the system software, including the user interface, application services, and the management of the computer's hardware. While this approach might help system vendors run versions of their OS's on different hardware platforms, it isn't clear that it will facilitate the simultaneous operation of multiple OS's on the same machine. But even if it does, users still won't like becoming disoriented as they switch between different user interfaces.

Despite the energy being spent by some developers to make computers run several OS's at once, don't expect much to change on your desktop. Perhaps you'll run other OS's occasionally to access programs not available for the Mac, but you're likely to pick one core OS to do your daily work. There's just not much point in continually adapting to different OS's when the one you now use meets most of your needs.

To date, the much-touted information superhighway appears to rest on a foundation of confusion and hype. In "DreamNet," in this issue, Charles Piller outlines the facts and myths behind the information superhighway. An extensive public-opinion survey conducted by Macworld reveals some surprising truths about what people really want from the infamous infobahn.

Macworld is no stranger to online publishing. We've enjoyed a presence on America Online for several years and we recently introduced a forum on eWorld. Macworld also plans to offer readers access on a number of other services including our own Internet node. In these forays onto the Net, Macworld recognizes several key advantages: readers can search electronic archives for topics of interest; engage editors, authors, and other Macintosh users in dialogue; participate in spirited live online events; as well as download shareware files and information that supplements the print version of the magazine.

As we mirror each technological advance in online publishing, we want to be sure that we are meeting the needs of our readers. Let us know what you think via traditional SnailMail (the U.S. Postal Service) or E-mail us at macworld@macworld.com.
Before You Invest in a High-Resolution Laser Printer, Take a Closer Look.

Introducing XANTE’s NEW Accel-a-Writer 8200 Featuring Adobe PostScript Level 2.

By now, you realize there are other high-resolution laser printer manufacturers in the main stream, but chances are, you don’t know if they offer genuine Adobe PostScript®. Well, just for the record, Bo knows!

Only XANTE® offers Adobe PostScript on a large format, high-resolution laser printer. And, since true PostScript guarantees high performance, incredible print quality, and software compatibility—you know it’s the only choice!

You can purchase the Accel-a-Writer 8200 with 600 x 600, 800 x 800, or 1200 x 1200 dpi—it’s your call. Halftones, fine-line text, and graphics are phenomenal. And now, with oversized capabilities (up to 25’), you can print high-quality full-bleed newsletters, CAD drawings, spreadsheets, and more! XANTE’s Accel-a-Writer 8200 is the new leader in affordable high-resolution printing. Accept no substitutes.

- Adobe PostScript Level 2 Guarantees superior quality, performance, and compatibility.
- High Resolution
  600 x 600, 800 x 800, or 1200 x 1200 dpi.
  HP-GL®emulation offers up to 1200 x 1200 dpi.
- NEW Oversized Format
  Print full-bleed 11” x 17” pages and custom size output up to 11.75” x 25”.
- Simultaneous Macintosh®/PC Printing
  LocalTalk®, serial and parallel interfacing. Ethernet is available.
- Faster Printing
  Incredibly fast printing, up to 16 pages-per-minute.
  Faster processing with a 33 MHz AMD 29036 RISC Processor.
- Automatic Emulation Switching
  Selects printer language between Adobe PostScript and HP PCL®’s.

So, before you buy a high-resolution laser printer, look for the Adobe PostScript logo, then call XANTE.

1-800-926-8839 ext. 2110
Fax 205-476-9421
MasterCard/Visa/American Express/Discover Card accepted.
EVERYONE CAN USE A
THAT'S WHY WE BUILT ONE IN
You're never alone with the most popular spreadsheet for the Macintosh: new Microsoft Excel 5.0 for the Macintosh and Power Macintosh. Because inside every single box, you'll find an experienced guide. We call it IntelliSense technology. Simply put, IntelliSense senses what you want to accomplish, then helps you get it done.

All of a sudden, your everyday spreadsheet tasks become automatic. And complex tasks are a whole lot easier. For instance?

Say you're looking for a shortcut through a forest of data. The PivotTable Wizard comes to your rescue. It helps you assemble a clear summary table. From there, use PivotTable dynamic views to see data from any point of view you want. Whether by category, quarter or region, you decide.

You'll stay on the right path thanks to the TipWizard assistant. This handy IntelliSense feature observes how you work, then offers tips on quicker and easier ways to do things in the future.

Then consider the direct route to chart changes. Called Hands-on-Charts, it lets you instantly resize or reformat any part of your chart.

Noticing a trend? IntelliSense technology makes it easier for you to work on your spreadsheet. Period. Letting you focus on your analysis, not your data.

And while working inside Microsoft Excel is easy, working with other Microsoft Office programs is also a cinch. You'll drag and drop Microsoft Excel charts right into Word. You can even make changes to charts without leaving your Word document. OfficeLinks makes it all happen.

For friendly directions to a retailer located near you, just call (800) 871-3268, Department Y3N. Then upgrade to new Microsoft Excel 5.0. It's not only the leader among Macintosh spreadsheets, it even knows how to lead you.
EXPLORE the INTERNET!

FIVE HOUR FREE TRIAL!

Dial By Modem 1-800-365-4636, Press return until you get a prompt At Username, enter JOINDELPHI. At Password, Enter MCWC94

DELPHI is the only major online service to offer you full access to the Internet. And now you can explore this incredible resource with no risk. You get 5 hours of evening/weekend access to try it out for free!

Use DELPHI's Internet mail gateway to exchange messages with over 20 million people at universities, companies, and other online services such as CompuServe and MCI Mail. Download programs and files using FTP or connect in real-time to other networks using Telnet. You can also meet people on the Internet. Internet Relay Chat lets you "talk" with people all over the world and Usenet News is the world's largest bulletin board with over 4500 topics!

To help you find the information you want, you'll have access to powerful search utilities such as "Gopher," "Hytelnet" and "WAIS." If you aren't familiar with these terms, don't worry; DELPHI has hundreds of expert online assistants and a large collection of help files, books, programs, and other resources to help get you started.

Over 600 local access numbers are available across the country. Explore DELPHI and the Internet today. You'll be amazed by what you discover.

Attention Current Internet Users: See what DELPHI can offer you! Stock quotes, Gollner's Encyclopedia, newswires, and hundreds of other services are just a few keystrokes away. Telnet to delphi.com and enter the username and password above for a free trial.

Questions? Call 1-800-695-4005. Send e-mail to INFO@delphi.com

Circle 173 on reader service card
Net Result

STEVEN LEVY'S INSIGHTFUL CELEBRA-
TION of network culture (The Icono-
dclast, July 1994) contains some interesting
insights and a big blind spot. His won-
derful metaphor "the urbanization of
cyberspace" aptly describes the phenom-
enal explosion of Net activity. Cities have
always been communication centers, and
the Internet is like a system of cities, each
of which is an autonomous network of
machines controlled by both affiliated and
unaffiliated individuals.

But it is hard to accept Levy's assertion
that he "can't really think of an
antecedent for the Net." Earth to Levy:
the Net is as old as culture. Unlike tradi-
tional cultures, the Net is not a product
of a single society, like contemporary cul-
ture, it is not a product of any one place.
It did not suddenly land in our midst as
some alien vehicle for social intercourse,
but rather arose from a confluence of
information technology and existing pat-
terns of communication.

What amazes me is how Net culture
seems to coevolve with technology to
adapt to the size and diversity of the
whole enterprise, and how it really does
regulate itself without command and con-
trol. But what it's doing isn't new; human
and other animal societies have developed
this way for millennia.

We have met the Net, and it is us,
along with others less like us. Whatever
our differences may be, we Metropolitans
are evolving a culture together.

Geoffrey Dutton
Watertown, Massachusetts

Letters

If the NSA people monitor me, they are,
frankly, going to be a bit bored.

Another thought: What do most
computer users have to say online that is
of any interest to those in charge of
national security? Let them read what
we're saying. At least they will have no
cause for being out of touch!

Thank you for a thought-provoking
article.

Robert Whitman
via America Online

Learning to Fly

KUDOS TO GUY KAWASAKI FOR TELL-
ing it like it is in his July column,
"Potholes along the Information Super-
highway" (Wise Guy). While having good
typographical sense and being able to
convey ideas eloquently in text is elemen-
tal to creating multimedia kiosks and CD-
ROM projects, many developers miss the
point: multimedia is a different paradigm.

Developers need to take a closer look at
the ways that they can use a graphical
user interface in a multimedia envi-
ronment. Big blocks of text can be horren-
dously difficult to digest, as anyone

who has used a multimedia encyclopedia
on disc will attest.

Guy declares that there is very little
available that is worth buying. True, but
let us not decry the medium because of
bad marketing or bad development thus
far. Much like the first movie directors
and television producers, multimedia
developers must learn to crawl before
they can fly.

Peter A. Cohen
Watertown, Massachusetts

The idea of CEOs and government
officials mapping the information
highway frightens Guy Kawasaki, and it
scares me, too. I would rather the elec-
tronic information system evolve like the
sidewalks at Carroll College in Wau-
kesha, Wisconsin.

According to legend, Carroll College
was built and landscaped without side-
walks. Students crisscrossed the lawns
and created pathways along their favorite
routes. After two years, the administra-
tion ordered sidewalks built following
those eroded footpaths.

I hope we can stall the big corpora-
tions and the feds for a couple of years so
the information superhighway is mapped
after the fact, rather than before—in the
wrong place with the wrong road signs.

Jeanne Gomoll
Madison, Wisconsin

As you may have heard from
recent news reports, Virginia Tech
(Blacksburg, Virginia) is wired into our
local Bell Atlantic group in a project
called the Blacksburg Electronic Village.
The goal is to unite the town—students,
faculty, and all within Ethernet reach—on
the now infamous information super-
highway. For the most part the project is
pretty cool, but I have to admit that for a
town of 30,000 people and a downtown
area of 16 square blocks it doesn't make
much sense. Heck, I can walk from one
town to the other in less time than
continues

OCTOBER 1994

MACWORLD October 1994 25
A virus software's floppy disk scan speed is roughly proportional to its hard disk scan speed.—Ed.

After reading the article on antivirus programs, I thought about the people who write viruses. Who are they and why are they so bored? Luckily, I haven’t had any problems with these nasties. I would appreciate further information on Mac viruses.

Sabrina Overturf Savannah, Georgia

Watch our News section for the latest details on newly discovered viruses.—Ed.

Power to the People

I am genuinely surprised by Bruce MacLeod’s view that only those people who have “real” work to do should have access to the Internet (Letters, July 1994). Sounds rather elitist. Yes, we must not let the common Joes have access to all that information—it might give them ideas beyond their station. And I am sorry if these commoners have caused you inconvenience and delays, but isn’t that a rather small price to pay for increasing the accessibility of knowledge to the community as a whole and not to just the select few?

R. J. Thorsen
via America Online

Paying for the Revolution

I read Steven Levy’s April column with great amusement (The Iconoclast). It’s important to note that Apple’s greatest strength—innovation—is also its greatest weakness. Eric Martin and WORM make a number of good points, and I wholeheartedly approve of their efforts to have Apple bundle HyperCard, QuickTime, and especially PC Exchange. But Apple will always have to put up with complaints from customers whose hardware is constantly being surpassed by faster, bigger, more powerful new products. There will always be more forces supporting mediocrity than individuals who recognize ingenuity and support innovation—and are willing to pay for it occasionally.

I’ll just have to hang on to my IIsi a little longer and be a little annoyed (and envious) when the other guy with vision gets a Quadra 605 for $1000. Meanwhile, I’ll continue to look to the future, and I hope that Apple will, too.

Steven Vale
Ann Arbor, Michigan

Viral Comment

Bruce Schneier, the author of your article on computer viruses (“Virus Killers,” July 1994), spent quite a bit of time talking about scanning hard disks but very little (none, actually) on scanning floppy disks.

I scan every floppy, but I scan my hard disk only occasionally. All four packages Macworld Lab reviewed would serve my needs, so I would make a decision based almost entirely upon which product scans floppies the fastest.

The rest of the article was thorough and thoughtful, but I’m still no closer to a decision.

Vanna Lebigh
via America Online

continues
It seems impossible to find a hard drive that's large enough to fit your storage needs today. That XL hard drive you just bought is now full.

Introducing a solution that's large enough to solve any storage problem... the Sierra 1.3 Gigabyte rewritable magneto-optical hard drive. It has the speed of a hard drive with an infinite capacity. So every time you fill up an optical disk, just add another one.

You can store online data, secondary data or even backup your files on your Sierra optical drive. It will never let you down. Optical is the most reliable storage device available. You can erase and write over four million times on optical media that has a shelf life of over 30 years. Save XL amounts of money over magnetic media which costs about $1.50 per megabyte, as compared to optical which costs only 15¢ per megabyte. Perfect for applications that demand XL amounts of data such as graphics, prepress, imaging, networking, digital audio and video, multimedia, and any other data intensive applications.

So the next time you're shopping for that XL hard drive... just keep the one you have and buy something that you will never outgrow... the Sierra 1.3GB™. To order or for a local reseller call: 800-553-7070
AnthroCarts®!

AnthroCarts will knock your socks off! Imagine how great it'll be when you find the perfect furniture for your equipment — just the right size, tough as nails construction and dozens of accessories.

And you'll find our service so real and responsive, you'll get a kick out of ordering direct!

Call for a free catalog!

800-325-3841

10415 SW Tualatin-Sherwood Hwy.
Tualatin, OR 97062
Fax: (800)325-0045

GSA contract no. GS-00F-0040A. Available for OEM applications. Prices from $159.00
Anthro, AnthroCart and Technology Furniture are registered trademarks of Anthro.

LETTERS

Service Hero?

I WAS SADDENED BY THE “SERVICE HERO” sidebar in Deborah Branscum’s August column (Conspicuous Consumer). Why is a company that does what it should labeled a hero? You wrote, “Our reader was dazzled by the prompt replacement of a defective product.” Hub? Have we lowered our standards so much that we are “dazzled” when a company corrects a mistake?

Todd Merrill
via the Internet

Being a Service Hero isn’t just about trudging 30 miles through Arctic tundra to tighten a screw. It’s also about ordinary companies treating customers honestly and fairly in everyday situations. Replacing a product promptly and with no questions asked might not make for dramatic reading, but it still qualifies as meritorious service.—Ed.

Still Catching Up

I T ORGANIZES DIRECTORIES AND other objects as folders on the desktop,” the description reads. It says that “moving objects is as simple as clicking on them and dragging them from place to place.” And that “instead of launching your word processor and then opening a document, you’ll simply open a document, which will automatically call up the program that created it.”

What’s this? A primer written for first-time Macintosh users, perhaps? Or maybe it’s a 1983 preview of the first Macintosh Operating System? No, these words came from a July 1994 article in a Windows magazine, talking about the beta version of Microsoft Windows 4.0—coming to PC users’ screens sometime around the end of this year.

“It’ll be great!” my PC friends say about the new Windows OS, which reports say will feature built-in networking, background printing, and plug-and-play. To which I simply smile and reply, “It already is.”

Marc Nathanson
Boston, Massachusetts

Letters should be sent to Letters, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8378), America Online (Macworld), eWorld (Macworld), AppleLink (Macworld1), or via Internet (letters@macworld.com). Include return address and daytime phone number. Due to the high volume of mail received, we can’t respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld.
YOUR MAC WILL LOVE

COMPUSERVE, TOO.

Let CompuServe make your life more exciting, with more to do, try, learn, and be. It's just a mailbox away. For more information about CompuServe, just mail this card, or call 1 800 848-8199.

Name ____________________________
Company Name ____________________________

Address ____________________________

City, State __________________ Zip __________________

Day Phone __________________

Evening Phone __________________

Mac World/Oct.
It's because CompuServe makes John's life so much more exciting.

John talks with friends all over the world about everything from gardening to how to connect his printer. He meets far more, and far more interesting, people than he's ever met before. He shops for clothes, tries software demos, and checks the weather where his sister lives. He even learns new and better ways to use his Mac in CompuServe's Mac forums.

All this excitement makes John happy, and keeps John's Mac busy. Which is why you should contact CompuServe too, at 1 800 848-8199 (614 529-1349 for international inquiries). Because, as we all know, a busy Mac is a happy Mac.

CompuServe
The information service you won't outgrow.

Circle 66 on reader service card
The EPSON ActionScanning System gives you creative freedom without creative financing.
Everything you need to scan and edit text and graphics for under $899*

Easy and affordable scanning for the Macintosh is here. It's called the EPSON ActionScanning System. EPSON makes it simple to put text and images in your documents.

With 1200 dpi and 24-bit color, the ActionScanning System captures crisp, clear images. Great results are easy to achieve with EPSON's exclusive built-in controls.

The ActionScanning System comes complete with everything you need for productive scanning—including top-ranked image editing software Adobe Photoshop 2.5 LE, TextBridge OCR, ScanTastic plug-in module & desk accessory, Chromassage and SCSI system cable. All this makes the ActionScanning System ideal for your home or office.

Considering that the entire system is available under $899*, buying an ActionScanning System is as easy as using one.

To see how far your creativity can go, visit your local authorized dealer or call 1-800-BUY-EPSON.

*MSRP with $100 manufacturer's rebate from 9/1/94 to 12/31/94. ©1994 EPSON AMERICA, INC., 28770 Maddrona Ave., Torrance, CA 90503. For rebate coupon, dealer referral or warranty details, call 800-BUY-EPSON (800-289-3776). In Canada, call 800-GO-EPSON. In Latin America, 506-565-0092. EPSON, TextBridge, ScanTastic, Chromassage, and Adobe Photoshop are trademarks or registered trademarks of SEIKO EPSON CORP, Xerox Imaging Systems, Inc., Second Glance and Adobe Systems, respectively. Do not sell published material without permission of the copyright holder.
The only thing missing is the wait.

New SprintScan 35 Slide Scanner from Polaroid — Brilliant Scans in Under a Minute.

Think of how much more high-quality scanning you'll be able to do at your desk. Or how fast you'll respond to high-volume or last-minute projects. Or even how soon you'll get home.

At under a minute per scan, the SprintScan™ 35 is 5 to 15 times faster than other tested slide scanners, with no loss of quality.* Scanning at resolutions up to 2700 dpi, it samples 10 bits per color (RGB) to deliver the best 24 bits. Which gives you a broader range of colors and better shadow detail. And at only $2,495,† SprintScan 35 won't change the color balance on your bottom line.

Just drop in the slide (positive or negative), point and click. It's that easy. Automatic real-time color processing and image sharpening reduce the need for lengthy post-processing. And it's compatible with both Macintosh and Windows.

The SprintScan 35 Slide Scanner — part of an exciting new line-up of electronic imaging systems from Polaroid.

Don't waste another minute!
For more information call today,
1-800-816-2611 ext. 965.


Circle 295 on reader service card
12 Issues for $24!

When you subscribe today

☐ Send me 1 year (12 monthly issues) of Macworld for $24. Save 20% off the basic subscription rate. Please bill me later.

☐ SAVE EVEN MORE! 2 years (24 monthly issues) for $39.97. Please bill me later.

Basic subscription price is $30 for 12 issues. The annual cover price is $4.95 per issue. For Mexican and Canadian subscriptions, please add $18 per year for shipping; $70 for all other foreign countries.

Name

Company

Address

City/State/Zip

Macworld

50 Best Products

4CMP1
Apple Licensing Update  Apple president and CEO Michael Spindler reiterated at a recent briefing that Apple will license the Mac OS, although he would not comment on licenses rumored to be in the works with Acer, IBM, and Motorola. Spindler did say that Apple will not license the Macintosh name or industrial design. Apple recently gave the Mac OS its own logo, which Spindler said non-Apple Macs would display at start-up.

Apple Prepares PCI and AV for All  The Power Macs expected in spring 1995 will incorporate AV technology, said David Limp, product manager for the new Power Macs, at the August Macworld Expo in Boston. These Power Macs will use the high-speed PCI (Peripheral Component Interconnect) 2.0 bus and will include Apple's DAV (Digital Audio Video) bus. That will permit PCI cards to use both the PCI and DAV buses to move sound and video directly and quickly to the Power Mac's motherboard. Limp said that by 1996 all Macs will use the PCI bus, and by 1997 all Macs, including servers and notebooks, will include some form of AV technology.

Apple Financial Results Up  Despite the transition to PowerPC, Apple Computer turned in a solid third quarter, recording revenues of $2.15 billion, up 15 percent from the same quarter last year. Net quarterly income rose to $59.5 million from last year's $10.6 million—not including a revised estimate of the costs of last year's restructuring, which added another $126.9 million to this quarter's income.

QuarkXPress for Power Mac Ships  Quark shipped the eagerly awaited Power Mac version of QuarkXPress 3.3 in early August. The $995 program is distributed via CD-ROM or floppy disks and includes several utilities and XTensions not bundled for other platforms. Upgrades cost $195. Quark, 303/894-8888.

ARA Transitional Software  Apple Remote Access 1.0 users can now log on to ARA 2.01 servers, thanks to Apple software provided free to user groups and electronic bulletin boards, including eWorld. Once this software is installed on an ARA Personal Server 2.01 or ARA MultiPort Server 2.01 (U.S. version only), the server will accept client calls from ARA 1.0 clients but without the additional security and functions available to ARA 2.01 clients. The software lets users who have a mixture of ARA versions put off the $29 per user upgrade cost.

Speed Boosters  Newer Technology previewed its Power Clip and Mac Clip series of CPU boosters at the Macworld Expo in Boston. Expected to ship August 29, the user-installable clips attach to a motherboard's clock-crystal oscillator (which controls the CPU speed) and make the oscillator and the CPU run faster. Most CPUs can run faster than Apple or the chip maker warrants. Expected to cost between $200 and $230, the Power Clip speeds Power Macs by up to 33 percent, while the Mac Clip boosts Quadras by up to 40 percent. Newer Technology, 316/685-4904.

AppleSearch Revised for Internet  Version 1.5 of AppleSearch, Apple's text-archiving and -retrieval application, can access information on WAIS servers over the Internet and read their WAIS-format indexes. The AppleSearch server provides the Internet connection for local AppleSearch users; the administrator can designate which WAIS servers users can access. Apple has cut the product's price to $1799 for the server software and 50 clients.

Radius Acquires VideoFusion  With its acquisition of SuperMac Technologies pending, Radius is buying VideoFusion, a digital video-software/special-effects company, in a deal worth $5 million. *
QuickTime VR: A New Spin

Imagine that you're in the middle of a room. Now, smoothly look around—left, right, up, and down—at will. If you see something interesting, you can zoom in on it, pick it up, and examine it from all sides, turning it over in your hands. Stop. You've just experienced QuickTime VR.

Coming out of Apple's Advanced Technology Group, QuickTime VR expands the QuickTime data format to include non-time-based spatial information. In English, it's a startlingly realistic way to represent a three-dimensional space or object. Even better, QuickTime VR movies work on LC III-class Macs and can provide views of real environments. This is virtual reality without the helmets and goggles.

VR with the Gloves Off
Interacting with a QuickTime VR movie is like looking at a room through a camcorder's viewfinder. Clicking and dragging on the movie display causes your view to pan in that direction, and the speed of the movement is variable and easily controlled. For objects or places of interest in the room, developers can create "hot spots" in the movie. As you drag across a hot spot, your cursor changes to alert you to its presence, and you can click to zoom in on the object or move into the area. A QuickTime VR movie can just as easily represent an object as a space. In this case, clicking and dragging inside the movie frame causes the object to spin and tumble so that you can examine it from all sides.

To create a QuickTime VR movie, you first set a camera on a tripod and photograph the space you want represented. Depending on the camera and lens you use, it takes from 8 to 30 photographs to make up a single 360-degree view. After scanning the photos, a developer uses Apple's QuickTime VR tools to edit and merge the photographs and then turn the result into a movie. (The developer can apply a modified version of this process to rendered environments and objects.) A single panoramic view at 640-by-480-pixel (full-screen) image size with medium-high resolution takes up 800K. Since QuickTime VR is
an extension of the QuickTime architecture, developers can use QuickTime’s built-in functionality to juggle resolution, compression, image size, and file size.

**VR versus 3-D**
The result of these machinations is a little package that neatly solves some of the thorniest problems facing developers trying to realistically render a three-dimensional object or space in real time. As a user moves through a rendered “world,” the location of each object must be constantly recalculated, whether or not the user is looking directly at an object. As the number of objects mounts, these calculations rapidly overtake even the most powerful processors, so there’s little or no horsepower left over to create the kind of rich, textured environment that arises naturally from a photograph.

According to Eric Chen, inventor of the QuickTime VR architecture, playing back a VR movie is a simple matter (to anyone who understands image-interpolation theory) of pushing the user’s current view through a spatial-warping algorithm that corrects for the viewer’s perspective. All you need for a QuickTime VR experience is an LC III-class Mac or better and QuickTime 2.0 (or a 386SX PC and QuickTime 2.0 for Windows).

Developers of 3-D modeling, rendering, and animation programs retort that it’s possible to ease the computational load by precalculating much of a carefully designed world. Also, what QuickTime VR gains in photographic realism, it gives up in freedom of movement, limiting its usefulness. According to Frank Boosman, vice president of product marketing for Virtus VR, “You get semi-interactive 3-D on machines that aren’t capable of doing rendering. Forcing users of those machines to move along fixed paths is a reasonable tradeoff to make, but rendering scenes in real time is still preferable.”

**Coming Attractions**
Despite its elegant innards, QuickTime VR is a hammer waiting for someone to pick it up and go pound some nails. Apple envisions VR’s adoption in several fields: virtual museums, virtual travel for kids and adults, architectural and engineering applications, and, of course, entertainment. Simon & Schuster Interactive is champing at the bit with its Star Trek: The Next Generation Interactive Technical Manual, scheduled to be available in September. This CD-ROM is a tour of the starship Enterprise and its equipment, and it is intended to feel like a reference that Enterprise engineer Geordi LaForge would turn to in the 24th century. The disc covers the Enterprise both inside and out, and includes tours of the crew’s personal quarters, including Captain Picard’s. However, at press time Simon & Schuster was the only company with firm plans for the new technology.

Apple nurtured QuickTime VR in near-total secrecy—even top-drawer developers were surprised by the recent announcement. Entertainment and multimedia companies are cautiously optimistic; 3-D developers such as Specular and Ray Dream have responded positively to the idea of saving a three-dimensional model or scene as a VR movie but have indicated that adding such a feature would not be a priority.

As befits the technology, QuickTime is not static. Apple would like to bleed VR movie functions such as interactive hot spots into traditional QuickTime movies, while bringing such time-based data as animation and QuickTime movies into VR spaces. See you in the movies. Apple Computer, 408/996-1010.

—CAMERON CROTTY

**Arrays Built for Speed**

**RAID LEVELS 0 AND 1**

Some people just cannot get enough. Macintosh graphics, prepress, and digital-video professionals whose storage needs aren’t met by any one hard drive are turning to RAID levels 0 and 1 disk arrays that write to and read from two drives simultaneously. RAID level 0 arrays spread data across multiple drives, nearly doubling data throughput compared with single mechanisms. RAID level 1 arrays copy data to more than one drive at a time, providing real-time backup.

In digital video, image quality is largely determined by how much data the storage device captures every second. The higher the transfer rate, the better the video image. In response, vendors are offering disk arrays aimed not at networks but at high-end desktop users.

PLI’s $1895 QuickArray-Wide includes a NuBus SCSI controller and everything else you need for a level 0 or 1 array, except the drive mechanisms.

The PLI QuickArray-Wide comes with a NuBus SCSI controller: users add the drive mechanisms.

**In Brief**

**Focus Buys Inline**
Focus Enhancements has bought Inline Software, which sells utilities and games primarily to the Mac market. An Inline official said the company will operate as a separate division of Focus, and will continue to sell all of its current products. Inline had been growing rapidly but was hindered by undercapitalization, according to the company.

**Portable CD-ROM Drive**
Designed to travel with portable computers, Toshiba’s XM-4100A double-speed CD-ROM drive weighs under 1.2 pounds and needs no disc caddy. The drive has a data-transfer rate of 300 KBps and an average access time of 320ms. It supports multisession Photo CD format. Now shipping, the XM-4100A lists for $415. 714/457-0777.

**OpenDoc Alpha on Windows, OS/2**
OpenDoc, the document-centered operating environment invented by Apple, has been released in alpha versions for Windows and OS/2 machines. IBM shipped the OS/2 version, while WordPerfect shipped the Windows version. Apple began offering an alpha version of OpenDoc for the Mac in April. When developers finish building OpenDoc application components, the components will work with any of the various versions of OpenDoc (see “Apple Tells Its Software Future,” News, Macworld, June 1994).

**MicroNet Buys MacinStor Line**
MicroNet has announced that it intends to acquire SDIMensions’ MacinStor product line, including all technology and trademarks. MicroNet will continue to sell and support the MacinStor line, while Storage Dimensions says that it will focus on its core client/server networking business. MicroNet, 714/453-6070; Storage Dimensions, 408/954-0710.
around two 9GB Fast SCSI-2 drives, offers a 5ms average seek time with a sustained data-transfer rate of 6.3 MBps. The $14,199 array connects to the dual SCSI ports of the Quadra 900 and 950 and the Power Mac 8100. A $14,699 version includes a JackHammer NuBus SCSI controller to connect with other NuBus Macs.

The $6999 StudioArray from Radius, designed to work with the company’s VideoVision Studio digitizing board, is a 4.1GB level 0 array that includes either a NuBus SCSI card (to connect with the Macintosh Quadra 840AV and the Power Mac 8100) or a PDS SCSI card (to connect with other NuBus 040 Macs). Radius says the array yields a sustained throughput rate of 11.5 MBps with sustained QuickTime reads of 6.5 MBps on an 840AV and 6 MBps on an 8100. La Cie’s Joule RAID, which is available in capacities ranging from 2.1GB to 16.8GB, supports RAID levels 0, 1, 4, and 5. (Levels 4 and 5 add more- elaborate data redundancy and error correction than levels 0 and 1.) Priced from $1899 to $8999, La Cie’s arrays connect to the dual SCSI ports of the Quadra 900 and 950 and the Power Mac 8100; a third-party SCSI accelerator card is necessary to connect a Joule RAID with other 040 Macs. PLL, 510/657-2211; FWB, 415/474-8055; Radius, 408/434-1010; La Cie, 503/520-9000.

—JIM FEELEY

FWB Optical Focus

TWO REMOVABLE DRIVES

FWB has expanded its line of magneto-optical storage devices to include two removable-cartridge drives. The HammerDisk PE230 is a 3.5-inch, 230MB, SCSI-2 drive with a sustained data-transfer rate of 2.1 MBps and an average access time of 43.67ms. The drive is backward-compatible (read and write) with 128MB cartridges, and it lists for $1399. The double-sided, 5.25-inch cartridges of the HammerDisk PE1300 hold up to 1.3GB of data. The drive has a SCSI-2 interface, features a sustained data-transfer rate of 1.4 MBps and an average access time of 55ms, and it can read from and write to existing 600MB and 650MB formats. The PE1300 retails for $3449. FWB, 415/474-8055.

—CAMERON CROTTY

Stufflt Expander Enhanced

THE LEADER OF THE UNPACK

A laddin Systems has added the capability to unstuff more kinds of files in version 3.5 of Stufflt Expander, the leading freeware decompression utility. The company has also introduced a shareware program, DropStuff with Expander Enhancer. No, you don’t add a pound of hamburger, but when you install both new programs, the new Expander can decompress all leading compression formats for Macs, DOS machines, and Internet files. Supported formats include Stufflt, Compact Pro, AppleLink, ZIP, ARC, gzip, Unix Compress, UUencode, BINHEX, and MacBinary. When used with DropStuff, Expander 3.5 runs up to five times faster on a Power Macintosh, according to Aladdin. Stufflt Expander alone can decompress Stufflt SpaceSaver files or reconnect files that have been segmented by, for instance, Stufflt Deluxe or other Stufflt programs for storage on a floppy disk. DropStuff, which requires System 7, lets you drag and drop files onto its icon for automatic stuffing. The average gain in space is about 60 percent of a file’s original size when using Stufflt Lite, Stufflt Deluxe, DropStuff, Stufflt Expander with DropStuff, or SpaceSaver.

Public beta testing of the freeware Expander 3.5 and the shareware DropStuff with Expander Enhancer began in mid-June. Both beta versions are now available through online services and from the usual freeware and shareware
On-screen menus guide you that turns the QA-1500 into a Communications DOS control. The remote also controls your presentation and it can learn up to five functions from another infrared remote, so you can command a VCR or other device without juggling two controls. If you decide to connect the QA-1500 to your Macintosh and use it as a traditional projection panel, you can plug it into your Mac's ADB port with an included cable and then use the small joystick on the remote instead of a mouse.

The QA-1500 panel features an 8.4-inch-diagonal active matrix color display that's capable of showing 1.7 million colors at 640-by-480-pixel resolution. Even though it's intended as a stand-alone presentation device, the 13-by-10%-by-2-inch panel includes composite-video inputs (NTSC, PAL, and SECAM), built-in speakers, and line-level audio-input and -output jacks. The panel is currently available for $5795; an optional PCMCIA storage card is $500 for 40MB, $550 for 105MB. An optional backlight that turns the QA-1500 into a stand-alone color monitor is also available for $395. Sharp Electronics, 201/529-8731.
—CAMERON CROTTY

THE AmeCoEx INDEX OF USED MAC PRICES

<table>
<thead>
<tr>
<th>Machine/RAM/Hard Drive</th>
<th>Average Sale Price</th>
<th>Monthly Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerBook 100/4MB/20MB</td>
<td>$650</td>
<td>-$25</td>
</tr>
<tr>
<td>PowerBook 140/4MB/40MB</td>
<td>$850</td>
<td>-$50</td>
</tr>
<tr>
<td>PowerBook 180/4MB/80MB</td>
<td>$1675</td>
<td>-$25</td>
</tr>
<tr>
<td>PowerBook Duo 230/4MB/80MB</td>
<td>$1100</td>
<td>-$25</td>
</tr>
<tr>
<td>Mac Classic/2MB/4MB</td>
<td>$400</td>
<td>-$25</td>
</tr>
<tr>
<td>Mac LC II/4MB/40MB</td>
<td>$525</td>
<td>-50</td>
</tr>
<tr>
<td>Mac IIsi/3MB/4MB</td>
<td>$500</td>
<td>-$25</td>
</tr>
<tr>
<td>Mac IIf/4MB/80MB</td>
<td>$595</td>
<td>-$50</td>
</tr>
<tr>
<td>Mac IIfx/4MB/80MB</td>
<td>$1025</td>
<td>-$75</td>
</tr>
<tr>
<td>Centris 650/8MB/230MB</td>
<td>$1275</td>
<td>-$75</td>
</tr>
<tr>
<td>Quadra 900/8MB/160MB</td>
<td>$2000</td>
<td>-$100</td>
</tr>
</tbody>
</table>

Index provided by the American Computer Exchange of Atlanta, Georgia. (800/786-1077); it reflects sales during the week of July 23. Combinations include keyboard and exclude moniter and display board for noncompact models.

MAC WORLD October 1994 37

In Brief

SyQuest Settles with Iomega, Nomai
After a long disagreement over Iomega's marketing of replacement SyQuest cartridges made by Nomai, the three companies have settled pending litigation out of court. SyQuest said it will continue to offer 44MB and 88MB cartridges for SyQuest's 5¼-inch drives. Separately, Iomega said it has begun making its own versions of the affected cartridges.

Free Bernoulli Drive with Director 4.0
Iomega and Macromedia have begun bundling the Iomega MacTransportable Bernoulli MultiDisk 150 drive with Macromedia's Director 4.0, at the same street price as Director alone, according to Iomega. Beginning September 1, the $850 multimedia authoring software will come installed on an included removable cartridge for the drive. The two companies offer an equivalent bundle on the DOS side. Macromedia, 415/252-2118; Iomega, 801/778-1000.

Compton's Encyclopedia, Version 3.0
Compton's NewMedia is bringing out Compton's Interactive Encyclopedia, Version 3.0, with an improved interface and 256-color graphics. The interactive version includes all the same articles as the 26-volume print edition. The Mac version of the new electronic encyclopedia should ship in October at a list price of $149.95. 619/929-2500.

Low-Cost, Large Screens

H itachi America has unveiled a pair of high-resolution, multisyncing monitors with lowball prices. The Accuvue Galaxy GX-20 measures 20 inches diagonally and lists for $1749. The Accuvue continues

GALAXY-CLASS MONITORS

Less Money for Monitors
ViewSonic has reduced the prices on several of its color Mac monitors. The ViewSonic 15 now retails for $525, the ViewSonic 17 for $1045, the ViewSonic 17G for $945, and the ViewSonic 21 for $1995. 909/869-7976.
Galaxy GX-21 is a 21-inch display that goes for $2099. Intended for CAD/CAM, multimedia, desktop publishing, and other applications, both monitors offer resolutions up to 1600 by 1280 pixels at vertical refresh rates ranging from 50Hz to 152Hz (at 1280 by 1024 resolution, the refresh rate is an eye-pleasing 84Hz). The monitors' flat screens have a 0.28-mm dot pitch and an Invar shadow mask rather than the aperture grille found in a Sony Trinitron tube.

Both models comply with the EPA's Energy Star power-conservation guidelines and the Swedish MPR II standard for magnetic-field emissions. Both Accuvue Galaxy monitors have front-mounted controls. The monitors should be shipped by the time you read this. Hitachi America, 201/373-0774 (East Coast), 510/785-9770 (West Coast).—T.M.

**TREND**

**Modem Prices Drop**

**HIGH SPEED FOR LOW BUDGETS**

The cost of high-speed telecommunications just went down: four companies have announced price reductions for their 9600-bps, 14.4-Kbps, 19.2-Kbps, and 28.8-Kbps fax modems.

Practical Peripherals reduced the prices of 15 of its fax modems, including three models that come with Mac cables and data/fax communications software. The top-of-the-line, 28.8-Kbps MacClass MC288LCD V.FC model (with a three-line LCD display for status messages) lists for $429, and the compact, 28.8-Kbps MacClass MC288MT V.FC goes for $299—$110 less than before. The company's 14.4-Kbps MacClass MC144MT now goes for $159.

Global Village Communication's popular TelePort Gold 14.4-Kbps fax modem went down in list price from $349 to $279. The company's 19.2-Kbps V.32terbo TelePort Mercury fax modem, formerly $399, now lists for $349. And its new PowerPort Mercury 19.2-Kbps fax modem for PowerBook 500-series portables goes for $399. All the models come with GlobalFax software.

Hayes Microcomputer Products lowered the price of five models, including the 14.4-Kbps Accura 144 + Fax414 Mac. It now lists for $179, down from $199.

At the same time, U.S. Robotics announced suggested list prices for its Courier family of modems, which support V.32terbo 19.2-Kbps, V.FC 28.8-Kbps, and the forthcoming ITU-T V.34 28.8-Kbps standard for telecommunications. Prices for the ten external and internal models range from $435 to $745.

Global Village Communication, 415/390-8200; Hayes Microcomputer Products, 404/441-1617 (519/746-5000 in Canada); Practical Peripherals, 805/497-4774; U.S. Robotics, 708/982-5010.—NANCY E. DUNN

**A New Mac Pipeline to the Internet**

**ORDER OUT OF CHAOS**

James Gleick, author of the science best-seller Chaos, was frustrated by the inconvenience of most forms of Internet access. Unlike most of us, he had the resources to do something about it. He hired a programmer, outlined what he wanted in Internet access, and set the programmer to work creating a new type of service that offers full Internet access (E-mail, FTP, Telnet, WWW, WAIS, Gopher) with a graphical interface. The Macintosh version of the service is now being tested, and it offers unique features and a contrast to national online services.

Unlike America Online andProdigy, which offer a few Internet functions embedded in a larger world of interest-group bulletin boards and commercial services, Pipeline's only content is Internet-related, ranging from Internet Relay Chat to the ClariNet news services. Pipeline also provides some content itself, with an emphasis on New York places and activities, interactive Internet tutorials, and fairly serious topics (one popular discussion area is called Society, Law, and Politics). The Pipeline software package is transparently mul-titasking—multiple communications sessions can take place at the same time in different Pipeline windows. A Gopher search can take place in one window while you read your mail in a second window and download a file in a third, a great improvement over standard Internet access with a terminal program.

At press time, the Macintosh version was at the beta stage, with the final release expected before October. Pipeline's most popular access plans give you 20 hours of Internet access for $20 a month or unlimited access for $35 a month, and non-New Yorkers can reach Pipeline through local Sprint-Net numbers. Pipeline, 212/267-3636.—CHARLES SEITER

![The Global Village TelePort Gold (top) and Practical Peripherals’ MacClass MC144MT V.FC.](image)
Introducing a printer for those who have ideas bigger than this page.

The HP DesignJet 650C/PS printer. Large-format at a small price.

$9,995*

Go on. Give yourself room to think. With the HP DesignJet 650C/PS, you can now print in sizes up to 2' by 9' (up to 3' by 9' with our larger model†). Right in your office. Right away. No tiling. No hang-ups. No problem. Just clean, inkjet output with PANTONE*-licensed colors. Adobe® PostScript® Level 2 software and a built-in RIP are included. For an output sample, call 1-800-354-7622, Ext. 8277.
When it comes to performance, the sky should be the limit—not your equipment.

Introducing the Raven Pro disk array, our next-generation flying machine. Now you can open a 480 MB Photoshop file with lightning speed. Transfer dailies without losing a single frame. Gain access to mirrored business-critical data in less than 8 ms or mix and match RAID levels and partitions to meet your specific needs. With 17.2 MB/sec throughput and up to 52 GB on-line capacity, they're four times faster and have 104 times the capacity of the native 500 MB drive you're probably using now. To find out what Raven Pro can do for your company’s throughput, call 1-800-800-DISK. Then let your imagination and productivity take flight.

Raven’s flexible utility program allows you to optimize drive caching and each partition’s parameters, including location on disk and block size for maximum application performance.

Raven Pro disk arrays offer a flexible upgrade path for all high-powered Macintosh systems via PDS, NeBus or software. PDS and NeBus versions provide a 32-bit data path via Fast/Write SCSI-2.

MicroNet’s Raven Pro is the newest addition to our family of award winning storage solutions. Based on proven Raven technology, it takes the science of disk array engineering to an unprecedented level.
Power Mac
Sales on Target
DESPITE SLUMP, THEY OUTSELL PENTIUMPCS

Apple's first challenge with the Power Macs was to ensure high compatibility, and it succeeded. But an equally important concern was whether customers would accept the new machines. Initial reports show that, by and large, they have.

After high sales in the first two weeks of their release, Power Mac sales have flattened. But sales remain strong enough to stay in line with Apple's goal of selling one million Power Macs in the first 12 months after their March 14 introduction.

In those first two weeks—from March 14 to March 31—Apple shipped 145,000 Power Macs worldwide to resellers, with 65 percent placed in the United States. Shipments to resellers in the second quarter, ending June 30, are estimated to be another 200,000, and of those, about 150,000 have been sold to customers, according to Mike Murphy, a market analyst for the California Technology Stock Letter. Analysts and Apple expected some drop in sales once the first shipments filled reseller inventories. But the slowdown was greater than Apple had anticipated, analysts say, because of the initial lack of native Power Mac applications. Only recently have native versions been available for a variety of programs.

According to Computer InfoCorp Intelligence, the 6100 accounts for 65 percent of Power Mac sales, the 7100 for 20 percent, and the 8100 for 15 percent. The 7100's low sales rate is surprising, given its high performance and moderate price.

The dearth of native applications is slowing; on March 14, only 30 apps were available in Power Mac versions; by mid-July, the number had grown to over 100.

Reacting to the Power Mac sales slump, Wall Street financial analysts caused a minor panic in Apple's stock price in late spring by raising questions about the Power Mac's success. However, computer-industry analysts, including Murphy, attribute the jitters to unrealistic short-term expectations, especially when Apple remains on target with its goal of one million Power Mac sales.

In contrast, Intel predicted it would sell about five million Pentium-based PCs in 1994, but analysts report Pentium sales lagging behind those of the Power Mac. One reason, Murphy theorizes, is that many PC users recently switched to 66MHz 486DX-based systems (which outperform even Apple's top-ranked Quadras), so there was less need—or fewer funds—for another performance boost.

—Patrick McKenna

Power Watch
THE LATEST ON PRODUCTS FOR THE POWER MAC

More and more companies are offering native Power Mac versions of their software. Here's a list of the latest products (alphabetical by company name).

• Adobe Systems expects an August release of Adobe Type Manager 3.8, which runs in native Power Mac mode and supports the new QuickDraw GX font format used in System 7.5. The program will cost $60; upgrade prices vary. 415/962-2630.

• Aldus's CoSA division has released the $1995 After Effects 2.0.1 video-effects program; upgrades cost $99 ($25 for copies bought after March 14). Also available is the $495 After Effects Rendering Engine, which lets an unattended Mac render effects created on another Mac. 206/628-4526.

• Claris plans to release the $399 ClarisDraw 1.0 and the $249 MacWrite Pro 1.5 by September. Upgrades from MacWrite Pro 1.0 will cost $29. The $1499 FileMaker Pro Server shipped in July. 408/987-7000.

• Hash has released its $999 Animation Master. Upgrades cost $200. 206/750-0042.

• Kingston Technology offers 256K cache cards for the Power Mac 6100 and 7100; they cost $295. 714/435-2600.

• Knowledge Revolution has shipped its $1495 Working Model 2.0 mechanical-simulation software. 415/574-7777.

• Mainstay has released VIP-C 1.5, a visual C programming environment. It's priced at $495; upgrades cost $50. 805/484-9400.

• Microsoft plans a September release of Excel 5.0 and October releases of Word 6.0 and PowerPoint 4.0. Prices were not set at press time. 206/936-8661.

• Ray Dream has released the $349 Ray Dream Designer 3.1, a 3-D design program. Upgrades cost $29. 415/960-0768.

• Signal Analytics is shipping its $1200 IPLab Spectrum 2.5 image processing and analysis software. Upgrade prices vary. 703/281-3277.

• Vamp has released its McCad Trailblazer circuit-board autorouting software. Prices vary by configuration. 213/466-5533.—Galen Gruman
Unveiling QuickMail 3.0.
The Ultimate Delivery System.

NEW! Powerful Search capability lets you locate filed messages in seconds.

NEW! MailManager™ can automatically reply, forward, file, print and even delete messages for you.

NEW! Built-in Spell-Checker for error-free messages.

Easy-to-install server and administrative software gets you up and running fast.

Clients for Mac®, Windows® and DOS users, all with the same look and feel.

QM Focus™ an application to create your own custom electronic forms.

QM Remote™ for sending and receiving messages anywhere.

QuickConference™ for communicating in “real-time” on screen.

Gateways and bridges included FREE!

#1 choice. It was the first E-mail system specifically made for Mac networks. It's now being used by more than one million people and almost 50% of all Macintosh® users.

And even before this latest upgrade, QuickMail was also the choice of the experts. As Macworld proclaimed, “...with its combination of excellent user and administrator features, its ease of use in a mixed environment, and its improved remote access abilities, QuickMail retains its superiority in an increasingly competitive E-mail market.”

If you happen to be stuck using one of those other LAN-based systems QuickMail is superior to, now you can make the switch to QuickMail and save with our special $12 per user upgrade offer.

Because we think everyone should be able to have the best choice in E-mail: QuickMail.

---

This is how E-mail should be. Totally complete, ready to go, right out of the box. Chock full of everything you need to make the connection with virtually anyone, anywhere. And so intuitive, so highly automated, you won’t have to spend half of your life with a user’s manual.

New QuickMail™30 delivers everything you need to communicate across the hall and around the world. So you can exchange messages and files with co-workers, no matter what kind of computer they’re working on. With more than 150 third-party gateways and bridges, QuickMail connects you to pagers; Newtons®, fax systems and even other mail systems. And you can access AppleLink®, MCI Mail®, CompuServe®, the Internet and more.

QuickMail has always been the Mac user’s
New Products

THE LATEST MACINTOSH RELEASES

by Cameron Crotty

Adionlaser 1600
This 600-by-600-dpi true-resolution laser printer prints letter-size pages at up to 6 pages per minute. The printer automatically senses the protocol of an incoming job and, when combined with the Epson Talk interface kit for Macintosh compatibility (sold separately), emulates PCL 5 and PostScript Level 2. The ActionLaser 1600 has one parallel and one serial port (and a LocalTalk port). This 15-inch, multisolution color monitor automatically synchronizes to horizontal resolutions between 31.5kHz and 64kHz, which includes Macintosh resolutions from 640 by 480 pixels to 1024 by 768 pixels. The Diamond Pro 15FS's dot pitch is 0.28mm, and the monitor features on-screen controls for image centering, size, geometry, and color temperature. The Diamond Pro is MPR II-


GatorRoute ir
This four-port router comes configured with two Ethernet connections (user-selectable thick/thin Ethernet and 10BaseT) and two serial slots for attaching either two high-speed WAN connections or one WAN port and one LocalTalk port. The GatorRoute ir simultaneously routes TCP/IP, Netware, AppleTalk, and DECnet protocols, and it supports tunneling of IPX and AppleTalk over TCP/IP. Users can manage the router via SNMP, Telnet, or the company's GatorKeeper software (included). $3395. Cayman Systems, 617/932-1100; no fax.

Magic Spitfire
This hard drive features an average access time of 14ms and a sustained data-transfer rate up to 10.67MBps. The drive ships with cables and CharisMac's Anubis formatting software. $800. MacProducts USA, 512/ 476-5295, 800/622-3475; fax 512/499-0889.

GatorRoute iR

Magic 2GB Quarter-Inch Tape Drive
You can store up to 2GB of compressed data on one tape with this half-height, SCSI-2 tape drive. The Magic drive features a 1MB data buffer and sustained data-transfer rates up to 567KBps with uncompressed data and 1.13MBps with compressed data. A SCSI cable, a terminator, and Dantz's Retrospect backup software are all included. $599. MacProducts USA, 512/476-5295, 800/622-3475; fax 512/499-0889.

MRD 270
Based on the 3.5-inch SyQuest mechanism, this SCSI-2 removable-cartridge hard drive has an average access time of 21.8ms and a sustained data-transfer rate of 1.7MBps. The MRD 270 provides 256MB of formatted storage on one cartridge. The drive comes with cables and a single, formatted cartridge. $695. Procom Technology, 714/852-1000, 800/ 800-8600; fax 714/852-1221.

PanelBook 750
With this NuBus network interface card, you can run a high-speed FDDI network over Category 5 twisted-pair copper wire. The Stallion TP comes in two configurations: the Single Attached Station (SAS) has one 10-45 jack, and the Dual Attached Station (DAS) has two. SAS $1295; DAS $2095. Team ASA, 619/279-2316; fax 619/292-1377.

CameraMan 2.0
With this screen-recording software, it's "Lights, camera, action!" CameraMan continues...
records all screen activity—including pull-down menus, pop-up windows, and cursor movements—to a QuickTime movie. Version 2.0 of CameraMan simultaneously records screen activity, Macintosh sounds, and voice-overs. Users can also synchronize sounds to specific points in the QuickTime movie and can change the size of the screen to emulate smaller screen sizes. 2MB min. memory. $149. Motion Works, 415/541-9333; 800/800-8476; fax 415/541-0555.

Fables and Fiends: Legend of Kyrandia
There must be a rule that requires all rightful princes to go on a quest to restore their thrones. Your quest in this adventure game is to find the Kyragem—the source of all magical power. Along the way, you collect items, maps and images, stamps, and clip art for younger users. 4MB min. memory; requires Mac II, System 7. $29.95. MacPlay, 714/553-3522; 800/736-5738; fax 714/252-2820.

Maps in Minutes
If you don't know where you're going, how will you know when you've arrived? This package contains a world map and individual maps of North America, Europe, and the United Kingdom, all layered with details ranging from political boundaries to drainage to population densities. The maps come in Adobe Illustrator or Aldus FreeHand formats (specify when purchasing). Requires graphics software. $249. RH Publications, 206/774-1709; 800/713-5346; fax 206/774-0582.

Mathematica Finance Pack
The complex world of high finance demands as much mathematical analysis as any of the hard sciences. The Finance Pack is a collection of tools for Mathematica designed to solve problems in such areas as interest rates, bonds, cash flow, and stock options. With these tools, users can analyze data, build mathematical models, display data graphically in two or three dimensions, and create animations. Requires Mathematica 2.0. $395. Wolfram Research, 217/398-0700; 800/441-6284; fax 217/398-0747.

Medical House Call
What's up, doc? With this home medical-analysis tool and reference guide, your Macintosh can help you find out. As you respond to questions about your symptoms, the software responds with possible causes, helping you both organize the information you take to your doctor and understand your doctor's diagnosis. The software includes information on 1100 diseases, 515 common medical conditions.
IT’S GONE. AND YOU DIDN’T BACK IT UP.

FACE IT. YOU NEED to back up your files. Use Retrospect, the number one Macintosh backup software — backing up over one million Macs, at last count.

Dragging important files to floppy disks is not backing up. If you crash you’ll be retyping and trying to recover files for days. And then still searching for what’s missing months later. And what if there’s a fire, theft, flood, or equipment breakdown?

With Retrospect from Dantz you’ll be backing up to the storage device of your choice in seconds — including SyQuest, Optical, Bernoulli, floppies, and file servers. And just about any Macintosh tape drive you choose. Retrospect packs more power than all the others put together.

AUTOMATIC OPERATION. Simply point and click to create a script, then schedule it to run days, nights, or weekends.

WORLD CLASS RESTORING. Every preference file, document, application, control panel, extension and font is returned to its exact location. You won’t miss a beat.

SECURITY. Retrospect has security covered, with full password protection at every entry point. Even encrypt data passed over the network to prevent snooping.

SPEED. Retrospect’s customized drivers and interleaved data flow operate SCSI storage devices 20%-100% faster than any other backup software — guaranteed.

COMPRESSION. Retrospect’s built-in Less™ compression cuts backups down to size without compromising performance.

NETWORK OPERATION. Back up a network of Macintoshes as easily as you back up one. Just install a Remote INIT (available in Remote 10- or 50-Packs) on each of your networked Macintoshes and include them in your backup scripts.

TOP INDUSTRY AWARDS. Don’t just take our word for it. Listen to what experts say about Retrospect: “Retrospect has no equal.” MacWeek, Diamond Award. “For backing up and archiving, there’s nothing better.” Macworld. And Retrospect Remote is a MacUser 1993 Editor’s Choice Award winner.

The price for peace of mind? Well under $200 — backed by a 30 day money back guarantee. Don’t be caught off guard when disaster strikes, call your local dealer today.


©1994 Dantz Development Corp. Retrospect and Less are trademarks of Dantz Development Corp. Macintosh is a registered trademark, and Power Macintosh is a trademark, of Apple Computer, Inc. used under license.

Circle 26 on reader service card
medical tests, 2890 drugs (with interaction information), and 394 poisons (complete with antidotes and emergency procedures); it includes a 10,000-entry medical encyclopedia, 4MB min. memory; requires Mac IIci, 11MB of hard disk space. $99.95. Applied Medical Informatics, 801/464-6200; fax 801/464-6201.

PKZip Mac
One of the most popular compression packages for DOS and Windows is now available commercially for the Mac. PKZip Mac creates both data-only and self-expanding archives, and it compresses the Mac-specific information separately so that the archives are cross-platform-compatible. Similarly, PKZip Mac can open archives created on other platforms, and it lets users choose either quicker or tighter compression and manipulate compressed files within an archive. $115. Ascent Solutions, 513/885-2031; fax 513/885-2032.

Prince of Persia 2
Limb up your sword arm for this action-adventure game. Just when you thought you could settle down with the princess for a long life of leisure, fresh fruit, and cool marble palaces, the evil sorcerer Jaffar has returned. Disguised as you, he takes your place at the princess’s side. Once again you are on the run, dodging and fighting through 15 levels of palace rooftops, ancient ruins, and secret caves. 4MB min. memory; requires 8-bit color. Estimated street price $40. Broderbund Software, 415/382-4400, 800/521-6263; fax 415/382-4419.

QuickPrompt
Saying the right thing at the right time can be the result of luck, talent, or a well-written script. This telepromoting software displays scripts in any font and size and includes a built-in word processor for text changes on the fly. Operators can fine-tune the scrolling speed of the text and communicate with the reader using such nonverbal cues as flashing the screen or adjusting the background color. QuickPrompt is WorldScript-compatible. Requires Mac II, System 7, video card for second screen, 500MHz processor, 4MB min. memory; requires Mac II, System 7, video card for second screen. $295. Questar Systems, 404/956-0700; fax 404/956-8781.

ScriptWizard
They don’t call it programming, but writing scripts in AppleScript can be every bit as demanding if you don’t have the proper tools. The ScriptWizard scripting environment has full testing and debugging facilities, including a variable-watcher window that displays the changing contents of all variables while a script is executing. An event-logger tracks and displays each Apple event as it is sent or received by a script. Requires Mac II, FPU. Script 3D $2995; Scriptor $1995; Script 4D $3995. Byte by Byte Corp., 512/795-0150; fax 512/795-0021.

SmartVoice
Did you know that your Mac can speak? This collection of utilities uses Apple’s PlainTalk technology to give your machine a voice. The package includes Apple’s Speech Manager, MacinTalk II, MacinTalk Pro, and 14 voices, as well as Say It, a utility that adds speech capability to nearly any Mac application that can put text on the Clipboard. Just select a block of text, and Say It reads it aloud. SmartVoice also includes a talking scientific calculator; a talking clock; a utility that reads system messages aloud; and an application that customizes MacinTalk and saves spoken text as SND resource files. Requires System 7. $49.95. Quality Computers, 810/774-7200; fax 810/774-2698.

Star Wars Screen Entertainment
Don’t be surprised to find your monitor floating in the air after you install this collection of screen savers and screen posters. You’ll see Jawas, Sand People, R2D2, Han Solo taking the Millennium Falcon into hyperspace, and Obi-Wan Kenobi dueling it out with Darth Vader. The package also includes movie-poster and conceptual-character art, blueprints for all the Star Wars vehicles, and a hidden message from George Lucas. Requires Mac IIci. Estimated street price $35.95. LucasArts Entertainment, 415/721-3300, 800/782-7927; fax 415/721-3342.

Vistapro
Create just a corner of reality or entire worlds with this landscape-generation software. Given data from real or imagines...continues
MiniCad 5 offers all of the above and more. The award-winning software has been hailed as the “features champion” by Macworld Magazine (March, 1993). Further, Graphisoft is dedicated to aggressive investment in CAD R&D. Graphisoft customers stay more productive than their competitors because Graphisoft supports both the latest technology and evolving user needs. MiniCad has long been the price/performance leader in Macintosh CAD. Don’t be steered away from MiniCad by VARS who want you to buy high-priced CAD products that are hard to learn and only do a few things well. The VARS won’t tell you that MiniCad 5 ships with a multi-media training CD, or that you receive 18 months of free technical support with Graphisoft products or upgrades. In short, MiniCad keeps more of your money in your pocket. Buy MiniCad 5 and save!

MiniCad 5 also includes: speed increases up to 100% even on 68K-based Macintoshes, a Claris CAD conversion program including a $495 upgrade price, a Claris CAD translator, and a helpful conversion guide, translators for importing and exporting to the other major CAD products, an upcoming Windows version, multi-media training CD 18 months of free technical support and a no-hassles 30-day money-back guarantee through authorized dealers. Contact Graphisoft today for detailed literature. To order immediately, call MacWarehouse, MacConnection, or your local dealer. Demo: $19.00Buy MiniCad 5 and save!

Azimuth
The ultimate map creation tool, including nine cartographic projections and more! Used by US News & World Report. 4 mice

Blueprint
Full-featured 2D drafting. Experience ease of use, high precision and an affordable price. 4 mice. MacWorld Editor’s Choice!

Also from...

Diehl Graphisoft Inc.

10270 Old Columbia Road, Suite 100, Columbia Maryland 21046 Ph: 410-290-5114 Fax: 410-290-8050

Power Macintosh is a trademark of Apple Computer Inc. MiniCad, Blueprint, and Azimuth are trademarks of Diehl Graphisoft, Inc. Claris CAD is a trademark of Claris Corp.

Circle 46 on reader service card
inary locations, Vistapro generates textured 3-D landscapes in 24-bit color—complete with rocks, trees, grasses, shrubs, waterfalls, rivers, oceans, snow, buildings, and roads. The package includes pre-made landscapes based on data from the U.S. Geological Survey, including Yosemite National Park, the Matterhorn in Switzerland, and Mount Fuji in Japan. Additional landscapes are available: 4MB min. memory, $149.95. Virtual Reality Laboratories, 805/545-8515, 800/829-8754; fax 805/781-2259.

WorldLink
If you have neither the time nor the inclination to surf the Internet but you need an E-mail address and want to browse some newsgroups, this telecommunications software could be for you. WorldLink processes all of its services in batch mode: offline, you compose your E-mail, choose your newsgroups, and set up file transfers (send and receive). When you’re ready, you tell the software to connect—and stand back while it goes to work; it automatically disconnects when the tasks are complete. Up to 2400-bps access $9 per month; 9600-bps access $19 per month. InterCon Systems Corp., 703/709-9500, 800/468-7266; fax 703/709-5555.

Writing Coach
Battle writer’s block, clarify your thinking, and better understand your reader with this set of 62 worksheets for ClarisWorks, WordPerfect, and Microsoft Word. The package includes editing and proofreading guides; exercises to help you overcome creative blocks; and outlines for business, academic, and personal writing. There’s even a love letter template for prospective Romeo and Juliets with a bad case of blank-page syndrome. Requires word processing software. $89. WritePlace Software, 503/484-6380, 800/264-7936; fax 503/686-3562.

Stock Options
These royalty-free photo vignettes are saved as CMYK files and are ready to drop into page-layout software. Items have been photographed on seamless white backgrounds, with unsharp masking already applied and outline paths created and saved for most objects. $289. Digital Media, 714/362-5103, 800/786-2512; fax 714/643-2426.

U.S. Digital Topography
You may be lost, but you’ll know where you are if you consult this collection of maps of U.S. states east of the Mississippi, plus Texas, Louisiana, and Hawaii. The data comes from the U.S. Geological Survey and fills 567 individual 24-bit PICT files, each mapping a one-by-one-degree section of territory. $229. Chalk Butte, 307/537-5261; no fax.

Blackbird Tattoos
Apple’s new PowerBooks don’t have a trackball, so you can’t customize them, continues...
Joule™ Drives provide the powerful value and performance you need today.

There's a powerful difference in La Cie's Joule Drive that sets an unparalleled new storage standard.

Joule's stylish case won ID Magazine's silver medal design award, but inside is where the difference really counts. Here you have a choice of Quantum hard drives, SyQuest removable drives, or Optical drive mechanisms. All drives include the extra strength of up to 100 watt power supplies, built-in surge protection, digital active SCSI termination, 2 AC outlets, SCSI ID switching, up-front power switch and termination status LED, plus an exclusive built-in path to modular expansion!

Each Joule Drive is formatted and reliability tested, then shipped ready to plug and play including Silverlining disk management software (a $149 value), double shielded SCSI cable, power cable, and a superior warranty.

Joule Drives are only available factory direct from La Cie, a Quantum Company. When you get so many benefits and value in a Joule, along with Fortune 500® stability, the choice is simple.

Call our toll-free number today for more facts or to order now.

To order or for more information, call toll-free 800-999-3919

Mon.-Fri. 5AM-7PM & Sat. 8AM-NOON PST

International 503-520-9000 Fax 503-520-9100 (24 hrs.)

UK 0800-89-3025 Australia 0014-800-123-007

VISA, MasterCard, C.O.D. and approved purchase orders accepted.

Prices shown for units with 40 watt power supply. Prices do not include shipping and only apply to products shipped within the continental United States. Sales tax where applicable. All rights reserved.
right? Wrong. Blackbird Tattoos are Mylar overlays that fit on your new 500 series PowerBook's trackpad and stay put with nonpermanent, nonmarring adhesive. The tattoos come in sets of 20 with three-color designs that include a peace symbol, a panda, an eight ball, and a complete set of 1994-1995 calendars. $10. APS Technologies. 816/483-6100. 800/235-2752; fax 816/483-3077.

**Blackbird Tattoos**

**Charger 500**

Batteries for 500-series PowerBooks have energy-monitoring modules inside them, and the Charger 500 uses information obtained from these modules to adjust current flow. The charger holds batteries for 500-series PowerBooks and the other is on the side, underneath where your middle finger normally rests, and the other is on the side, under your thumb. A switch on the bottom of the mouse determines which button is active. $49.99. Assmann Data Products, 602/997-7001, 800/880-6601; fax 602/997-7295.

**Disk-O-Lok**

Here's a low-tech solution to a high-tech problem. To lock up the 3 1/2-inch floppy drive on your Quadra or PowerBook, slide this tough plastic insert into the drive and turn the key on the 7-pin tubular lock. A laptop version is available with a cable attachment that secures the entire machine. $19.95. Z-Lock Manufacturing, 310/316-7709; no fax.

**TL-50**

A set of powered external speakers can turn your Mac's squeak into a roar. This set is fully magnetically shielded and has bass and treble controls. The volume knob controls both speakers as well as an optional subwoofer (S8-8). $179.95; S8-8 $149.95. Labtec Enterprises, 206/896-2000; fax 206/896-2020.

**FileMaker Pro 2.1 for Macintosh**


**Pricing Guide for Desktop Publishing Services**

The first half of this book is a tutorial on the cost and pricing of desktop publishing services. The second half is a survey of business profiles and pricing in North America. The author, Robert Brenner, covers all aspects of desktop publishing, press, and printing—from generating copy to binding and shrink-wrapping. The book also profiles new and evolving services such as animation, modeling, desktop video, and image morphing. 512 pages. $14.95. Peachpit Press, 510/548-4393, 800/283-9444; fax 510/548-9991.

**QuarkXPress Unleashed**


To have your product considered for inclusion in New Products, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94017. Macworld reserves the right to edit all product announcements.

---

**Double your RAM.**

Just install RAM Doubler™ software in your Mac and it doubles your RAM. It's that easy. No more hassles, just more RAM.

RAM Doubler is an extension that works by reclaiming memory not being used. MacWEEK says "RAM Doubler couldn't be easier to use." It is the latest from Connectix, the Macintosh memory experts and makers of the award-winning CPU and MODE32.

RAM Doubler is affordable at $99 SRP with a 30-day money-back guarantee. Get RAM Doubler wherever great software is sold.

---

**New Products**
Joule™
cable-free
modular storage
systems offer
advantages that
tower above
the rest.

The Joule system was designed to meet a powerful combination of purposes. To provide system expandability, and module portability in a space saving tower that grows without desktop clutter, as easy as 1,2,3.

Step One:
Start with a Joule base drive. The base unit forms the foundation to future growth or functions Joule has simplified the path to future storage.

Step Two: To expand, simply stack extra storage modules one upon the other. Built-in connectors eliminate cables and hassles.

Step Three: To remove a module, simply unplug and play without cables, termination or SCSI ID trouble. It's that simple.

The Joule System offers a complete selection of storage modules and is only available direct from La Cie - owned by Quantum, a Fortune 500® company.

Joule has simplified the path to future storage.

It’s up to you to take the first step. Just call our toll-free number today for more facts or to order now.

To order or for more information, call toll-free Monday – Friday 5AM-7PM & Saturday 8AM-NOON PST
800-999-3919

Complete Storage Module Choices — Great Prices

| 85MB | 2.5” HD | $299 | Internal $199 | 230MB* | Optical | $1069 |
| 170MB | 2.5” HD | $299 | Internal $259 | 105MB | SyQuest | $419 |
| 285MB | 3.5” HD | $449 | Internal $349 | 270MB* | SyQuest | $509 |
| 170MB | 3.5” Half Ht | $259 | Internal $199 | 340MB* | SyQuest | $1159 |
| 270MB | 3.5” Half Ht | $329 | Internal $269 | 200MB* | DAT Drive | $1099 |
| 340MB* | 3.5” Half Ht | $329 | Internal $269 | 100MB* | Tape Drive | $786 |
| 400MB* | 3.5” Half Ht | $499 | Internal $399 | 165MB | DAT Drive | $2039 |
| 100MB* | 3.5” Half Ht | $499 | Internal $399 | 265MB | Internal | $2269 |
| 210MB* | 3.5” Half Ht | $1399 | Internal | $1399 |

* Available as a Base Drive, call for prices.

Prices do not include shipping and only apply to products shipped within the continental United States. All sales for where applicable. Joule, Silverlining, La Cie and the La Cie logo are trademarks of La Cie, Ltd., a Quantum Company. All other trademarks are the property of their respective companies. All prices, specifications, terms, warranties, descriptions, products and services herein are subject to change without notice or reverse. © Copyright 1994 La Cie, Ltd. All rights reserved.
There is nothing like the feeling of losing your data. There is nothing like booting up to find that your twenty-page conference report has burned to a crisp. Or watching a month’s worth of virus-infected spreadsheets go up in smoke right before your eyes.

When it happens, a rush of job-security panic begins in your legs and rapidly bolts all the way up to your cerebellum. And the impact of losing all of your hard work affects you in a way you’ll certainly never forget.

Data loss. It’s one fiery disaster that makes for an awfully bad day.

**Proactive Protection For Your Macintosh.**

This being the way things are, at Symantec we subscribe to the theory that the best way to deal with a disaster is, well, to prevent it in the first place. Which is the very reason for our newly updated Norton Utilities® and SAM®. In a word, they’re proactive. But to put it more poetically, this improved data-protection software actually snuffs out fires without so much as the stirring of your mouse.

**New Norton Utilities Detects Damage Before Disasters Happen.**

For starters, look at our new Norton Utilities 3.0. We’ve taken the industry’s most powerful data recovery and repair program and improved it to where it’s almost invisible. So that now you can virtually load it and forget it.

NEW NORTON UTILITIES DETECTS DAMAGE BEFORE DISASTERS HAPPEN.

- Prices may vary. Shipping, handling and tax extra. This offer not good with other promotional offers. Resellers not eligible. Offer expires 12/31/94. Symantec, Norton Utilities and SAM are U.S. registered trademarks.
The enhanced Speed Disk's unique customization feature lets you defragment everything from a whole volume to a selected file. And Norton Utilities 3.0 now also includes enhanced backup. Which creates self-extracting and self-restoring backups of your data. This improved capability makes it even easier for you to restore data during emergency situations. And our backup now also supports tape drives.

NEW SAM PROVIDES THE BEST PROTECTION AGAINST VIRUSES.

However, that's just the half of this proactive pair. We've also fully redesigned SAM 4.0 to provide the most complete and most effective virus protection, detection, and elimination of known and unknown viruses. So that what could turn your entire system into a towering inferno never even becomes a spark.

One of SAM's exclusive features is automatic virus updating. Through your modem, SAM automatically dials the Symantec BBS daily, weekly, or according to any schedule you tell it to follow. It then downloads the latest virus antidotes and updates your virus definition files. So you now no longer have to mess with manual updating. This assures you have the greatest level of protection against new viruses as they are discovered.

The new SAM also scans for and destroys viruses in more types of compressed files than any other antivirus software can. SAM covers DiskDoubler, Compact Pro, Stufflt, and Now Compress. This ensures your ability to detect and eliminate a virus in any compressed file.

And for all of you who have a healthy appreciation for speed, the improved SAM is also the faster SAM. The 4.0 version scans for viruses significantly faster than its predecessor. Which makes virus protection more seamless and less disruptive to your work flow.

Want more? Okay, SAM is also the only virus protection software that allows you to create a custom decontamination disk specific to your machine. This lets you reboot your Mac easily should your system crash from a virus.

The 4.0 version also simplifies the user interface by combining SAM Intercept and Virus Clinic into one easy-to-use component. This advancement allows you to configure more expert options from one convenient location.

POWER MAC NATIVE.

While these new versions will protect your original Mac, they are also Power Mac native. So those of you with a Power Macintosh can take full advantage of the increased processing power. Ultimately, that means accelerated scanning speed, greater productivity, along with even more transparent protection.

What it shakes out into is that improved Norton 3.0 and SAM 4.0 now provide your Mac with the ultimate available levels of proactive protection against data loss. It's all rather amazing.

Then again, maybe all of these advancements are not so amazing. After all, Symantec is, of course, the proven industry leader when it comes to Mac data repair and recovery and virus protection.

So, pick up the entirely new versions of Norton Utilities and SAM. And then, if you smell something burning at the office, you'll know it's either yesterday's coffee or that guy two cubes upwind who's trying to put out his fiery data disaster. That you well know could have been prevented in the first place.

CALL 1-800-628-4777.

To keep data loss from casting a glow on the office landscape, call 1-800-628-4777, ext. 9FFF. If you own Norton Utilities and SAM, you can order upgrades for $39.95 and $29.95 respectively. Or you can purchase the new versions at your software store.

CALL 1-800-628-4777.
**PowerBook 540c**

**Macintosh Computer**

**PROS:** User-expandable; holds two batteries; fast CPU; improved utilities; built-in speakers.

**CONS:** Middling display quality; nonstandard batteries, memory, and Ethernet ports; lack of page-movement keys; fairly expensive.

**COMPANY:** Apple Computer (408/996-1010).

**COMPANY’S ESTIMATED PRICE:** $4839; with 12MB of RAM and modem $5539.

**SLEEK, CURVY, FUTURISTIC. IT’S A notebook Lieutenant Commander Geordi LaForge might use on the Enterprise.**

The PowerBook 540c—the first all-new PowerBook design since the original PowerBooks of 1991—has a classic design that underscores Apple’s ability to go beyond the boxy, mundane look of so many computers. The 540c’s code name was Blackbird, and this PowerBook has a similar feel to the once-supersecret stealth spy jet.

Once you finish marveling over this nice-looking notebook, you may panic. I did. Just how do you turn it on—there’s no power button in the back, as the other PowerBook models have. It’s not on the sides, either. I actually had to look in the manual to find out how to turn it on. Apple has added a power-on key to the keyboard, like the one used in most desktop Macintoshes.

**Better Utilities**

Now the fun part: actually using the PowerBook 540c. Apple has greatly enhanced its PowerBook utilities. Particularly nice is the Control Strip that puts a lot of controls in one place—and that’s good, because there are now simply too many PowerBook-related control panels. I count six, excluding the one for the optional internal modem. Some of the PowerBook panels are better arranged than in previous models, but more consolidation is needed.

The 540c also comes with a utility called the Launcher, something introduced with the Performa Maes that lets you put commonly used programs and documents in a window and launch them with a single click. It’s basically the same idea as the Apple menu. As personal computing extends more and more to new users, these simple-use techniques are finding their way onto popular personal computers. But don’t dismiss this as a dummies’ option—it’s convenient for power users, too, if you have the space on your desktop to display it.

**A Trackball with No Ball**

In setting up the various options, you’re forced to quickly learn how to use Apple’s new trackpad pointing device, a touch-sensitive pad where the trackball used to be. I’m one of those people who dislikes trackballs, so I’m not sorry to see Apple abandon them. But the trackpad works just like a trackball, except that you move your finger along a pad rather than over a ball. The ballistics and motion patterns are essentially the same. So if you like the older PowerBooks’ trackball, you’ll like the trackpad. If not, go ahead and plug a mouse into the back.

The up-front, centered position of the trackball didn’t work for me on the older PowerBooks, and it doesn’t work for me on the 540c. When the keyboard is at a comfortable distance, the trackpad is too close, making me put my hand and forearm in an uncomfortable position. As someone recently recovered from a mild case of repetitive strain injury, I
am sensitive to body placement, and I would not use the trackpad for any extensive periods of time. As with all pointing devices, what is comfortable depends completely on your physique and working style, so try it yourself before reaching any conclusions.

One caveat: if your fingernails are medium-length or longer, you may have difficulty using the trackpad. The pad must sense live human tissue (it works with cat paws, too, and probably other animals)—it won’t work with fingernails. The tolerance seems pretty tight: I have very short nails but I could position my finger so the pad couldn’t sense my touch.

So-so Color Screen

The 540c’s screen—an active matrix, LCD panel—is a better version of what’s in the PowerBook 180c, thanks to its larger size (9.5 inches diagonally versus 8.4 inches). This makes the text more readable. Like the 165c and 180c, the PowerBook 540c’s screen can display 8-bit color in 640-by-480-pixel resolution and 16-bit color in 640-by-400-pixel resolution. Apple should drop the non-standard 640 by 400 resolution and find a way to deliver 16-bit color to the standard 640 by 480 resolution.

Apple should also support VGA monitors at an appropriate refresh rate; let its predecessors, the 540c uses the flicker, minimum-standard 60Hz rate for VGA displays. (A Macintosh display typically runs at 67Hz, and most VGA displays run at 72Hz.)

In bright daylight, I found the PowerBook 540c’s screen hard to read, even with optimal contrast and brightness settings. Forget using it outdoors. But even in a room with windows, with the shades drawn, you may have trouble. I did. In that case, use the bundled monitor cable to attach the 540c to a regular Mac monitor. However, in a windowless room, with standard fluorescent or incandescent lighting, the display was nice.

I do like the new dual switches on the LCD for brightness and contrast. Each push down increases or decreases (depending on which side of the switch you push) brightness or contrast. They’re easy to use, and you don’t have to fool around with a control panel to alter the brightness settings.

Expandable Notebook

The 540c is Apple’s first expandable PowerBook, and the company has made a good first step to making its notebooks user-upgradable. The easiest upgrades on the 540c are through an expansion compartment on the left side, where you can install a second battery or a PDS card. And if you’re willing to remove three screws, you can upgrade the memory yourself, add a modem card, and replace the hard disk with a bigger one (the 540c comes with a 320MB disk). This upgradeability is long overdue and most welcome. Most people will install a second battery. (Note that the batteries are a new type and have a unique shape, so make sure you get a spare.) The 540c should work for about three hours under normal conditions with moderately aggressive power-conservation options set.

Other uses for the compartment involve plugging something into the PDS. Don’t expect many products for this slot, though. The most likely ones will be PCMCIA cards, which are popular on PC notebooks. With a $200 adapter plugged into the PDS, you can theoretically use two Type II or one Type III PCMCIA card. (Type II’s are typically used for communications and networking add-ons, while Type III’s are typically used for plug-in hard drives.) Since networking (even Ethernet) is built into the 540c there’s an internal modem slot inside the case, the need for expansion is not that great. Cellular modems and hard drives are the best bets for PCMCIA add-ons, but developers will have to write Macintosh drivers to get these devices to work in a PowerBook 540c.

The 540c can accept up to 40MB of system RAM, but once again Apple has created a new spec for PowerBook memory cards. That means memory for one model won’t work in another, and the need for developers to produce multiple types of memory cards keeps the prices up. Apple also won’t commit to keeping the memory used in the 540c compatible with its promised PowerPC upgrade.

One day—probably in spring 1995—Apple will release a PowerPC upgrade for the 540c. Details are sketchy, however. It might use a PowerPC 601 CPU, or a low-power PowerPC 603 CPU.

Whatever CPU is used, the upgrade promises to be straightforward: just pull out the daughter card containing the 33MHz 68LC040 CPU and replace it with one holding a PowerPC CPU.

---

**PowerBook 540c and PowerBook Duo 280c: How Fast Are They?**

**Core-Performance Index**

<table>
<thead>
<tr>
<th>Product</th>
<th>Times as fast as a Classic (Classic = 1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerBook 540c</td>
<td>14.4</td>
</tr>
<tr>
<td>PowerBook Duo 280c</td>
<td>10.3</td>
</tr>
<tr>
<td>Powerbook 180c</td>
<td>6.6</td>
</tr>
<tr>
<td>Powerbook 165c</td>
<td>5.7</td>
</tr>
<tr>
<td>Powerbook 540c</td>
<td>10.9</td>
</tr>
<tr>
<td>Powerbook 180c</td>
<td>9.2</td>
</tr>
<tr>
<td>Powerbook 165c</td>
<td>9.9</td>
</tr>
</tbody>
</table>

*With cache running under emulation mode.*

**Scientific**

<table>
<thead>
<tr>
<th>Test</th>
<th>Times as fast as a Classic (Classic = 1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word</td>
<td>14</td>
</tr>
<tr>
<td>Excel</td>
<td>17</td>
</tr>
<tr>
<td>Photoshop</td>
<td>18</td>
</tr>
<tr>
<td>Scorecard</td>
<td>24</td>
</tr>
<tr>
<td>Math</td>
<td>25</td>
</tr>
</tbody>
</table>

**PowerBook-System Performance Times**

Times are in seconds. Shorter bars are better.

<table>
<thead>
<tr>
<th>Processor</th>
<th>Time (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powerbook 540c</td>
<td>12.2</td>
</tr>
<tr>
<td>Powerbook Duo 280c</td>
<td>15.3</td>
</tr>
<tr>
<td>Powerbook 180c</td>
<td>18.0</td>
</tr>
</tbody>
</table>

**Video Display**

Horizontal and vertical scrolling in Microsoft Excel and Word, and QuarkXPress.

<table>
<thead>
<tr>
<th>Time (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
</tr>
<tr>
<td>24</td>
</tr>
<tr>
<td>25</td>
</tr>
<tr>
<td>32</td>
</tr>
</tbody>
</table>

**Floating Point**

Scientific calculations: which use floating-point math in Microsoft Excel.

<table>
<thead>
<tr>
<th>Time (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>18</td>
</tr>
<tr>
<td>17</td>
</tr>
</tbody>
</table>

---

**Macworld** October 1994 55
Pluses and Minuses

Many people use notebooks to give presentations, and Apple has given the 540c stereo output jacks and stereo speakers so you can use the Mac as a presentation system, even if you connect to an LCD projector or large monitor. However, if you use this notebook as a multimedia Mac, avoid the built-in microphone. It records—faithfully—the internal fan noise, polluting any recording.

The keyboard sports standard-size keys, not the slightly reduced ones featured in previous PowerBook models. And Apple has added a row of half-size function keys, similar to those on most PC notebooks. That’s nice. But the 540c continues to have two keyboard deficiencies: no page-up, page-down, home, or end keys—frequently used in word processing—and no inverted-T cursor arrangement. The PowerBook keyboard should match the extended keyboard.

The 540c uses the LC040 CPU, which means there’s no math coprocessor (floating-point unit, or FPU). That saves some money and reduces some heat internally, but it also slows the Mac down a little. Apple sang the praises of FPUs for the PowerPC, which has an exceptionally fast one, but keeps delivering Macs without them.

The built-in Ethernet ports are a great idea, but you may not be able to use them, since they aren’t the standard size. Several network vendors are now offering adapters to solve Apple’s design flaw.

The Last Word

All this power and sleekness and expandability comes with a price: about $5200, based on street prices we’ve seen. For comparison, that’s about $700 more than it costs to get a fully configured Power Mac 7100/66. Or $1000 to $1200 more than a comparable PC notebook. (Yes, there are PC notebooks with stereo capabilities, active matrix color, dual-monitor support, and optional second batteries, although they give you the choice of swapping a floppy drive for the battery. However, I know of none that have these features plus built-in networking. Most don’t have PDs; instead they use a docking station for expansion.)

The 540c is the prestige PowerBook du jour. Don’t rush out and buy it. But if you need what it offers, it’d make a good Mac for both on-the-road and in-the-office use. If you think of it as a dual-purpose machine, it’s easier to justify the money, since even with a mouse, keyboard, and monitor at your desk, the total package costs less than having separate Macs for your desk and for your briefcase.—GALEN GRUMAN

PowerBook Duo 280c & Duo Dock II

There’s also a new battery—called Type III—that offers about 15 percent more power than the previous model (Type II). Fortunately, the 280c works with any of the Duo batteries.

The rest of the Duo 280c is old news to a 270c owner—it includes the standard Duo docking-station port, trackball, serial port, and optional internal modem. But the increased processing power makes it a prospect for a desktop replacement.

To encourage that, the PowerBook Duo Dock II’s main enhancement is the inclusion of an Ethernet port. (The new dock has an FPU and a 32K cache for use with the 030-based Duos. But the 280c can’t take advantage of these two features.)

The other notable enhancement is support for 21-inch monitors at 8-bit color depth. The previous model was limited to 16-inch and smaller monitors.

But Apple has done nothing to improve the installation of NuBus cards in the Duo Dock II. You still have to take off the cover, remove the motherboard’s restraining screws, pull the motherboard out of the way, align the cards against a bracket, and push the cards into the slot. While people don’t change NuBus cards every day, this process could inadvertently damage a motherboard or other component. Even installing the NuBus cards is tricky, because the cards install sideways and it’s easy to bend the guides as you align the cards. After the NuBus card is installed, you are likely to have more trouble putting the Duo Dock back together again. The Macworld Lab staff and I—all old hands at this sort of thing—looked more like the Marx brothers than professionals in our attempts.

The Duo Dock is your only option if you need to add cards. But if you don’t need NuBus expansion, look at an Apple MiniDock or similar hassle-free product from another company that offers the same ports.

The Last Word

If you want to use the 280c as a replacement for your desktop Macintosh, I’d recommend you buy a PowerBook 520c or 540c instead (even with their limitations), since they have all the connectivity you need built in. But if you’re a frequent traveler, you’ll want a lighter Duo—the two pounds make a real difference. No other Duo offers such high performance as the 280c, and the price is OK. If you travel a lot, the Duo 280c is hands down the best portable Mac to get.

—GALEN GRUMAN
YOU MAY NOT THINK OF A FONT editor as a gotta-have-it tool, but Fontographer could change your mind. Although you may never design a new typeface from scratch, Fontographer makes it easy to modify existing faces. You can create hybrid blends between two typefaces, or add new characters—your logo, perhaps—to a house font.

With Fontographer you can design new typefaces character by character and generate corresponding TrueType and PostScript fonts. There is no feature of these font technologies—hinting, kerning, Multiple Master variations—that Fontographer can’t handle with the elegance you’d expect of a professional’s tool. At the same time, the program is accessible and easy to use.

When starting a new font, Fontographer displays a grid with a box for each character. Click on a box, and a drawing window displays the boundaries of the em square on which your character will be based, as well as the baseline on which it will rest. The drawing tools resemble those used in Aldus FreeHand or Adobe Illustrator and, as with those programs, work with easy-to-use Bezier curves. Fontographer has made the Beziers even easier: you modify a curve by simply grabbing and dragging any part of it—you don’t have to wrestle with control points.

After you’ve finished one character, you move on to the other 255. To save effort, you can import scanned images of letters, and Fontographer will autotracing them accurately. You can also import EPS drawings, which is useful for adding logos or signatures.

Character-by-character design is time-consuming, but adjusting letter-spacing and adding kerning information can be even more tedious. Fontographer’s excellent push-button autospacing and autokerning features take the drudgery out of these tasks. Discerning professionals can still tinker by hand, but the program works so well, there’s little reason not to put it on autopilot.

For most people, Fontographer is especially useful for modifying existing fonts. The results won’t look as good as professionally designed typefaces, but in truth, few people would notice any typographic infelicities. You can blend fonts of the same family to create, say, Bookman Semibold, or you can build professional-looking fractions and add them to your font. You can also dump from a font characters you don’t use and replace them with characters from other fonts. Deleting unwanted characters can trim the size of your fonts—it’s like giving your laser printer a memory upgrade, because you can download more fonts to it.

The problem with modifying typefaces is that you end up with fonts no one else has. If you design faces from scratch, you can distribute them as you please. But if your new font is based on modifications to an existing font, then you’re still bound by that font’s software license.

Professional type designers will want to run Fontographer on the mightiest Mac possible. It ran well on my Mac, but I spent some time drumming my fingers during complex batch operations such as kern-list building. Still, the program runs adequately on almost any Macintosh with 4MB of RAM.

The Last Word
There are other font editors on the market, but none does more or works better than Fontographer. Letraset’s FontStudio hasn’t received the corporate support it needs to keep up with Fontographer, and programs such as Ares Software’s FontMonger and Type Solutions’ Incubator allow you to manipulate existing fonts but not create new ones.

Even if you never draw a single character, Fontographer can pay for itself just with the automatic transformations it enables you to perform on existing fonts. For the price of a few font families, Fontographer can give you a universe of unique faces.—JAMES FELICI
Five Graphics Cards

Apple Macintosh Display Card 24AC

**PROS:** Satisfactory price/performance ratio.
**CONS:** Can’t switch resolutions from the keyboard.
**COMPANY:** Apple Computer (408/996-1010).
**COMPANY’S ESTIMATED PRICE:** $1579.

**Radius LeMansGT**

**PROS:** Can switch resolutions on the fly via pop-up menu; automatic 30-bit CLUT calibration; fast.
**CONS:** Anticipated; 13-inch card format.
**COMPANY:** Apple Computer (408/996-1010). **LIST PRICE:** $2499.

**RasterOps Horizon 24**

**PROS:** Can upgrade ROM via software. **CONS:** Overpriced; no resolution switching; slower than anticipated; 13-inch card format. **COMPANY:** RasterOps (408/434-1010). **LIST PRICE:** $1999.

**SuperMac Spectrum Power•1152**

**PROS:** Relatively inexpensive; switch resolutions from the keyboard; fast; zoom and pan options. **CONS:** Have to cycle through resolution options. **COMPANY:** SuperMac Technology (408/541-6100). **LIST PRICE:** $1399.

**Tornado Graphics Card**

**PROS:** Least expensive of the five cards; zoom and pan options. **CONS:** Slowed card with some applications; changes bit depth after you reboot on Power Mac. **COMPANY:** Mirror Technologies (612/832-5622). **LIST PRICE:** $699.

A ccelerated graphics cards serve two functions. First, they display up to 16 million colors simultaneously on your computer screen, which is the standard for graphics and design professionals. Second, the cards speed up many QuickDraw routines, thus preventing any slowdown from using 24-bit color display. Since we last reviewed graphics cards several months ago (see “Fast Track to 24-Bit Color,” Macworld, April 1994), five new cards from an equal number of vendors—including one from Apple—have become available. All except the RasterOps Horizon 24 are the smaller, 7-inch variety; all five accelerate the display of 24-bit graphics on standardized Macintosh monitors; and all support 16 million colors on screens as small as 13 inches (640 by 480 pixels) and as large as 21 inches (1152 by 870 pixels).

As in our last video-card roundup, we found that accelerated video handling outpaces the 8/404's unaccelerated on-board video but that the subjective difference between one accelerated card and another that costs twice as much is only slight. In using the cards over a period of several months, for example, I was dissatisfied with the pace of only two cards, the $699 Mirror Tornado and the $1999 RasterOps Horizon 24. The other cards performed so similarly I could hardly tell them apart.

Macworld Lab evaluated the five cards based on their ability to accelerate key operations. Rather than relying on an automated utility to judge performance, we sat down with stopwatches in hand and timed specific everyday tasks on 16-inch monitors. (We've found that the fraction-of-a-second speed differences detected by Hydra and other automated-testing utilities are both insignificant and misleading.) Our findings show that, sure enough, the Tornado and Horizon are slower than the competition at some tasks and equally fast at others. On the Power Mac, for example, the SuperMac Spectrum Power•1152 scrolled a PageMaker document in about a quarter of the time it took the Tornado, but the Tornado's speed was approximately the same as the Spectrum Power•1152's when previewing and zooming in both Aldus FreeHand and Adobe Illustrator.

The Power Mac Factor

No matter how much emphasis you place on the occasional speed differences between the five cards, the equally fast performance of the PDS cards included with Apple's Power Mac 7100 and 8100 calls the entire category of accelerated graphics cards into question. The 7100 PDS card comes with 1MB of dedicated VRAM and can be upgraded to 2MB, thus supplying 24-bit color to 16-inch and smaller monitors. The 8100's PDS card ships with 2MB of VRAM and can be upgraded to 4MB, which accommodates screens as large as 21 inches. (The two Power Mac AV models also ship with a PDS card with 2MB of VRAM.) When using nonnative business applications such as Microsoft Word and Excel, I found the 7100's PDS card, equipped with 2MB of VRAM, to be slightly slower than the two fastest of the fifth-party boards—the $2499 Radius LeMans-GT and the $1399 SuperMac Spectrum Power•1152. Considering that the PDS card ships with all Power Mac 7100s and that it costs less than $100 to add 1MB of VRAM, you might be able to live with this slight speed difference. Meanwhile, Macworld Lab found that the PDS card actually performed faster than any third-party card tested when using native Power Mac graphics programs such as Aldus FreeHand 4.0 and Adobe Illustrator 5.5. (Previous Macworld Lab results show that the PDS video was slower when using prerelease native software.)

But speed is only part of the equation. A more important part is compatibility, and here, the PDS option fares poorly. Because the PDS card does not sync on the green signal, as was once the standard operating procedure, you need an adapter to accommodate many brands of monitors. Syncing on green ensures compatibility with several PC-style monitors. I'd have to purchase an extra cable to hook up my SuperMatch 20•T, for example. So while the PDS card may be fast, it's not particularly flexible.

The upshot is that if you own a Power Mac 7100 or 8100 and your current monitor works fine with the PDS card, there's no need to upgrade. But if you want a larger monitor or you want to take advantage of the special options offered by various cards, you have to look beyond the PDS solution. And if you own a non-AV Power Mac 6100, which neither ships with a PDS video card nor is compatible with one, you need a 7-inch third-party graphics card to access 24-bit color. (Since the 6100 lacks a NuBus slot, you also need a $99 PDS-to-NuBus adapter.)

A caveat for users of Quadras and other 680X0 machines. Don't expect an accelerated video card to turn your graphics applications into speed demons. Upgrading from a Quadra to a Power Mac, for example, will have a greater impact on the speed of native applications such as PageMaker and Adobe Photoshop than will adding on a new graphics card. So if you have $3000 burning a hole in your pocket and you can't decide whether to buy a Power Mac or an accelerated video card, the answer is obvious. Only upgrade your graphics card after the rest of your system is running at top speed.


**Compatibility and Resolution**

All of the video cards we tested fared well in the compatibility department. Each card worked with every monitor we tried. (The original release of the Apple Macintosh Display Card 24AC didn’t sync on green, but the revised ROM 1.1 has remedied this problem.) All boards provide safeguards so that your screen is readable. The first time you use the card, it automatically cycles through various configurations until it finds one compatible with your monitor. With the Radius card, you can force a cycle by pressing the T key (of all things). You have to hold the key down until you find the desired configuration, at which time you release it. While not an intuitive solution, it maintains a centered screen image by accounting for timing differences between monitors.

Apple as well as Radius and SuperMac let you switch the resolution of your monitor without restarting the Mac. Using version 7.1.3 of the Monitors control panel (which includes Apple’s new Display Enabler feature) you can switch resolutions via the Options button in the control panel. Only the Radius and SuperMac software, however, let you change resolutions from the keyboard. The Radius software lets you choose resolutions from a floating pop-up menu that appears at the touch of a key. The SuperMac solution is a bit more clumsy, requiring you to cycle through resolutions sequentially. However, the SuperMac software lets you pan and zoom in on a detail, as if the screen were only a control panel. Only the Radius and SuperMac software, howe ver, let you change resolutions from the keyboard. Using version 7.1.3 of the Monitors control panel (which includes Apple’s new Display Enabler feature) you can switch resolutions from the keyboard.

**The Last Word**

We had problems with only two boards—the Mirror Tornado and the RasterOps Horizon 24. The Power Mac version of the Tornado shipped with old software, necessitating our request for new software. The new software was incapable of remembering the bit-depth settings from one session to the next. Every time we rebooted the Power Mac, the screen appeared black and white.

The problems with the Horizon 24 are half, bad design and half, bad timing. Unlike the other cards in this review, much of the Horizon’s ROM is included on disk, making it easier to update the product. But despite this, RasterOps was slower in updating its ROM code than was the competition. So while we were able to experiment with a beta version of the new ROM 3.0, which delivered faster results on the Power Mac—along the lines of the Apple 24AC card’s results—our published tests reflect the speed of the sluggish but shipping ROM 2.0. Furthermore, the card includes 4MB of RAM, which is capable of drawing bitmapped images off-screen. But so few applications support GWorld—a prominent exception is Adobe Premiere—that I wonder whether RasterOps, like other vendors, may drop this feature. RasterOps’ 3.0 beta software has dropped GWorld altogether; instead, it automatically configures the RAM as a RAM disk. A RasterOps rep declined to share any future information about the card, but its present configuration makes it the poorest value of the five.

Of the five cards tested, the SuperMac Spectrum Power*1152 gets the highest recommendation, thanks to its relatively modest price and its quick performance (the fastest of the five cards tested). Certainly, the LeMansGT is every bit as good as the SuperMac card, and I even prefer many aspects of its software. But its high price makes it more attractive to graphics professionals who need sophisticated calibration options, and these options won’t be available until Radius ships new software for its Precision Color Calibrator sometime in late September.—Deke McCLELLAND
So you finally get your hands on the hottest new Mac and what happens?

Somebody insists that you run Microsoft Windows applications.

Don't despair. Just double click on SoftWindows and hang on tight.

You see, SoftWindows not only lets you use your Mac as a Mac, it also lets you run thousands of popular Windows programs—as fast as a 486SX.

You can run DOS programs, too. Not to mention PC network applications such as NetWare, LAN Manager and TCP/IP.

How can SoftWindows be so utterly compatible? Because it includes Windows 3.1 and MS-DOS 6.2, optimized to run at top speed.

And since both DOS and Windows are preinstalled, you don't have to put up with tedious installations.

With SoftWindows, you can copy and paste between PC and Mac applications. You can even use Macintosh peripherals—CD-ROMs, printers, modems and more—with PC programs.

Call us today at 800-848-7677 Dept. B. Or visit your dealer. What you discover will blow you away.
Power Macintosh Upgrade Card

Power Mac Upgrade

**PROS:** Inexpensive.  
**CONS:** Mediocre performance gain on some Macs; wastes a NuBus slot; uses the only PDS on the Centris and Quadra 610.  
**COMPANY:** Apple Computer (408/996-1010).  
**COMPANY'S ESTIMATED PRICE:** $699.

APPLE'S NEW POWER MACINTOSH Upgrade Card gives current owners of 040-based Macs a less expensive upgrade path than the standard motherboard replacement. But depending on the machine you have and how you use it, the Upgrade Card may or may not be for you.

The Power Macintosh Upgrade Card is a 7-inch Processor Direct Slot (PDS) card that works with any Centris or Quadra (except the 605, the 630, and the AV models). In addition to the PowerPC 601 CPU and the Power Macintosh ROM, the card comes with a 1MB cache of static RAM. (Power Macs address RAM 64 bits at a time, but Centris and Quadra Macs are designed for 32-bit access. The large cache lets the card minimize the slowdown caused by accessing smaller chunks of data from RAM.) The Upgrade Card also sports a large heat sink to dissipate the heat generated by the PowerPC processor. An adapter is included for installation on the Centris/Quadra 610. The Upgrade Card requires a minimum of 8MB of RAM, which will probably have to be increased when features such as QuickDraw GX and PowerTalk are implemented with System 7.5.

Most CPU upgrades use a standard clock frequency regardless of the platform. For example, the least expensive DayStar PowerPro 601 uses an asynchronous design that works at 66MHz no matter what Mac it is installed in. In order to achieve a smaller form factor for the Centris and Quadra 610, a shorter time to market, lower cost, and less design time, Apple decided that the clock frequency of the host CPU would govern the speed of the Upgrade Card. The card uses a circuit that doubles the CPU's clock frequency—for example, the card runs at 66MHz on 33MHz machines such as the Quadra 650, 800, and 950; but it achieves only 40MHz on the Centris 610, which normally runs at 20MHz.

To get a better feel for the Upgrade Card's performance, Macworld Lab tested all supported CPU speeds and compared the results with those of standard, nonupgraded Macs and Power Macs using both 680X0 and native applications.

Installing the card is straightforward—simply lift off the Mac's cover and insert the card into the PDS slot. To install it on a Centris/Quadra 610 requires a bit more work—you assemble the Upgrade Card onto the supplied adapter before inserting it into the PDS slot (it's only a few screws, though). The excellent, illustrated manual guides you step-by-step through the procedure.

To activate the Upgrade Card, your Mac must be running System 7.1.2. You use the Power Macintosh Card control panel to turn the card on and off. Other accelerator cards are activated by selecting Restart from the Special menu; the Upgrade Card needs to be turned off and on physically for the change to take effect.

The powerPC CPU has a different startup sound.

The ability to switch back and forth between a PowerPC and 68040 processor is definitely a good reason to recommend the Power Macintosh Upgrade Card. A prime example is running an 040-based 3-D package that requires the presence of the floating-point unit (FPU) found on 040 CPUs. To use the application on a real Power Mac, you would have to upgrade the package to a native Power Mac version or borrow an 040 machine, since there is no 040 FPU emulation on the Power Mac. With the Upgrade Card, you can keep your computer running with the 68040 processor and turn on the card when you need to run native Power Mac applications.

Unfortunately, the Upgrade Card takes up the only PDS slot, so you cannot use any other PDS card—for example, a DSP accelerator or cache card. Also, the Upgrade Card's length extends too close to the NuBus slot on most Macs, so you lose the use of that slot. With a Quadra 900 or 950, the loss of one slot might not be a problem, but for other NuBus-equipped Macs, it limits your expansibility. And on the Centris/Quadra 610, you lose your card-expansion capability altogether. A motherboard replacement, on the other hand, saves the slots and offers additional features such as 16-bit sound, GeoPort, and speech recognition, to name a few. (Of course, you can't switch back to the 040.)

Your buying decision depends on which Mac you currently own. If you have lots of 680X0 applications and intend to continue using them, the Upgrade Card may not be for you.
FIRST WE CHALLENGED 
THE COMPETITION. 
THEN WE CHALLENGED 
OURSelves.

Presenting the new Agfa Arcus II.

With all the praise the Arcus family has won, you'd think we'd rest on our laurels. Think again. The Agfa Arcus II is a completely new, 600 x 1200 ppi, 36-bit color scanner with an integrated Transparency module. It's also designed to be the best machine you can put on your desktop.

Compared to other "desktop" scanners, the new Arcus II can capture more highlights and shadows, thanks to its 3.0 dynamic range. That's the kind of image quality you used to have to send out for. Plus, no other top-of-the-line "desktop" scanner comes with Agfa FotoLook scanning software, Agfa FotoTune color management software, and full Adobe Photoshop software built in.

And no one else can offer you our new, 42-page Introduction to Digital Scanning, which takes you step by step through a variety of scanning situations.

Truth is, with everything we added to the Arcus II, we're expecting some more awards. But the real prize winner will still be you. Call 1-800-685-4271 to find out more information on Agfa's new scanners.
upgraded gradually to native Power Mac programs, the Upgrade Card is a logical choice. If you want the benefit of native software and can’t afford to lose a slot, a motherboard swap or trade-up is your only route. Otherwise, on a Mac-like-Mac basis, here’s what I recommend:

- On a Centris/Quadra 610, you’re better off with Apple’s 6100/60 motherboard swap ($399), since the price difference between a much faster 60MHz motherboard and the Upgrade Card is only $300. In addition to the free PDS slot, you get an extra 4MB of RAM soldered onto the motherboard, plus all of the regular Power Mac features.

- If you own a Quadra 700, 900, or 950, the Power Macintosh Upgrade Card is the only way to upgrade to Power Mac performance—there are no motherboard swap options for these Macs. The only alternative is to go with the much more expensive, but supposedly much faster, DayStar PowerPro 601 card.

- Unless you need the features of the Power Macintosh, the Upgrade Card is an excellent choice for the Quadra 650 or 800. You’ll get 7100/66 performance for about one-half to one-third the price of a new motherboard.

- Centris 650 owners are in a bind: a motherboard swap ($1499) or trading up to a 7100/66 can be pretty steep, and the Upgrade Card offers only mediocre speed improvement. If you don’t need the 7100 speed now, the Upgrade Card can save you several hundred dollars.

The Last Word

Apple’s choice of a clock-doubling strategy instead of an asynchronous approach definitely limits the Upgrade Card’s appeal. Current 33MHz machines will get the best bang for the buck, while other Macs won’t realize as much of a performance gain. Nevertheless, the card offers an inexpensive upgrade path for those who’ve decided to move up to the Power Mac market. —MARK HURLOW

### Alacrity PM 6100

**Power Mac Accelerator**

**PROS:** Gives good performance gain. **CONS:** Installation voids Apple’s warranty. **COMPANY:** KS Labs (614/374-5665) **LIST PRICE:** $165.

**MW**

A new computer seems to live up to its performance potential only when you first get it. As you take the power for granted, the system seems to slow down. The Power Macintosh 6100/60 is no exception.

The Alacrity PM 6100 is a simple upgrade that boosts the clock rate of the CPU. Unlike clock-crystal boosters for the Mac IIci that required modifying the motherboard, the Alacrity involves no modification at all—thanks to the design of the clock oscillator. KS Labs uses a chip-on assembly that essentially disables the motherboard’s clock crystal. The Alacrity’s crystal sends a faster clock pulse to the CPU, which makes the CPU run faster. The CPUs were designed to work faster than their rated speed—a 66MHz chip, for example, runs faster than 66MHz. KS Labs claims that over 98 percent of the 6100/60’s it tested ran at 80MHz without problems. If a 6100/60 doesn’t run with the 80MHz crystal, KS Labs will substitute a 78MHz crystal at no cost, or refund the purchase price.

The booster I tested had a 40MHz clock oscillator mounted on a test clip; a cooling fan for the PowerPC processor; a manual; and a disposable, grounding wrist strap to prevent static discharge to the motherboard during installation.

Installation is straightforward, and space clearance is not a problem. The Power Mac 6100’s clock oscillator is located around the center of the motherboard, away from the PDS adapter. (However, you must install the clip in the correct position—according to KS Labs, installing it in the wrong direction will permanently damage the new oscillator.) No special software is required, and the CPU is smart enough to identify itself as a 6100/80 instead of a 6100/60 in the About This Macintosh dialog box.

Since increasing the clock speed generates more heat and can shorten the life of the processor, KS Labs supplies a cooling fan to improve heat dissipation on the PowerPC processor. Macworld Lab measured and evaluated the temperature of the PowerPC processor and some of the ASICs (Application Specific Integrated Circuits) on the motherboard. After 24 hours of usage, we discovered subtle temperature variances before and after the Alacrity was installed.

When Macworld Lab tested KS Labs’ clock boosters for the Centris 610 and 650 for a March feature (“CPU Boosters”), we found they were not compatible with some networking devices. This time we found no problems in file sharing and network printing with either AppleTalk or EtherTalk. We had no problem with the 6100’s microphone, floppy drive, CD-ROM player, external hard disks, and SCSI-based scanner.

Since there are some applications (especially 3-D rendering and spreadsheet recalculation) that benefit more from a cache than a clock booster, I recommend installing a cache card with the Alacrity.

Note: Installing a clock booster voids your Power Mac’s warranty. (Apple does not endorse the use of clock boosters, but neither does it warn against them.)

### How Fast Is the Alacrity PM 6100?

**MW LAB**

**Fastest result in test.** Products are listed in decreasing order of overall performance. Times are in seconds. Shorter bars are better.

<table>
<thead>
<tr>
<th>Power Macintosh</th>
<th>Adobe Photoshop 2.5</th>
<th>Aldus FreeHand 4.0</th>
<th>Fractal Design Painter 2.0</th>
<th>Infral-D 2.6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gaussian Blur</td>
<td>Unsharp Mask</td>
<td>Magnify</td>
<td>Apply Surface Texture</td>
</tr>
<tr>
<td>6100/60</td>
<td>11.7</td>
<td>12.5</td>
<td>2.4</td>
<td>15.8</td>
</tr>
<tr>
<td>6100/60 with Alacrity &amp; cache</td>
<td>12.2</td>
<td>13.0</td>
<td>2.7</td>
<td>16.1</td>
</tr>
<tr>
<td>7100/66 with 512k cache</td>
<td>11.3</td>
<td>12.8</td>
<td>2.6</td>
<td>19.0</td>
</tr>
<tr>
<td>7100/66</td>
<td>12.5</td>
<td>13.4</td>
<td>4.7</td>
<td>16.8</td>
</tr>
<tr>
<td>6100/60 with Alacrity</td>
<td>14.1</td>
<td>15.3</td>
<td>4.9</td>
<td>19.3</td>
</tr>
<tr>
<td>7100/66*</td>
<td>14.5</td>
<td>15.5</td>
<td>5.0</td>
<td>21.1</td>
</tr>
<tr>
<td>6100/60 with cache</td>
<td>16.2</td>
<td>17.4</td>
<td>6.0</td>
<td>21.8</td>
</tr>
<tr>
<td>7100/66* stripped with 256k cache</td>
<td>16.2</td>
<td>17.4</td>
<td>6.0</td>
<td>21.8</td>
</tr>
</tbody>
</table>

*7100/66* indicates the use of Alacrity.

**BEHIND OUR TESTS**

To test the potential of these Power Macs, Macworld Lab used native Power Mac software. As shown in the benchmarks, the Alacrity PM 6100 accelerated most tasks. However, tasks like rendering in Infral-D and magnifying in FreeHand benefited more from the optional cache card than from a processor speedup. —Macworld Lab testing supervised by Mark Hurlow

**MACWORLD** October 1994 63
With LOGICODE's new QUICKTEL DATASAFE™ 28,800 fax/modem, you not only get the fastest available data transmission speeds, but you gain the added security of having total control over the use of your modem.

"Password Protection" hardware enabled to fend off data piracy.

"Call Back Security" will automatically reconnect with preapproved telephone numbers that you store in the NVRAM.

"Remote Configuration," with your hardware-stored Master Password, perform remote configuration tasks from anywhere in the world!

All QUICKTEL modems come equipped with these assurances:

- Made in the USA
- Lifetime warranty
- Easy upgrade program
- Free lifetime tech support
- 30-day money-back guarantee
- Free fax & communication software
- Caller ID in 28,800 and "voice" models

QUICKTEL DATASAFE
THE 28,800 FAX MODEM BY LOGICODE
BETTER PRODUCTS. LOWER PRICES.

TO ORDER OR FOR MORE INFORMATION, CALL TOLL FREE 1-800-735-6442
VISA AND MASTERCARD ACCEPTED

QUICKTEL and DATASAFE are registered trademarks of LOGICODE TECHNOLOGY INC.; all other trademarks are registered to their respective companies.

Circle 297 on reader service card
MicroPhone Pro 2.0

**Communications Software**

**PROS:** Multiple sessions; scriptable agents.

**CONS:** Poor installation instructions; weak fax and Internet tool integration. **COMPANY:** Software Ventures Corporation (510/644-3232). **LIST PRICE:** $295.

**MicroPhone Pro 2.0 adds a host of new features to the communications package: multiple sessions, fax send/receive, TCP/IP networking, Internet clients, and a graphical modem configuration. Not all of these enhancements integrate equally well with MicroPhone's existing suite of facilities, however.

The package consists of several program disks and five manuals of various sorts. The lack of a quick-start guide greatly complicates installation. You must first install the MicroPhone Pro program, then install the TCP/IP tools following instructions in the TCP/IP manual, then install the fax application using its manual. Aside from disjointed installation instructions, the manuals themselves are well written and easy to follow.

MicroPhone Pro already had a good set of built-in features: Xmodem, Ymodem, Zmodem, and Kermit file-transfer protocols; VT52 and VT320 terminal emulations; Watch Me automatic script recording; button and icon palettes; and an integrated text editor.

New built-in features include CompuServe B+ file transfer, Wyse 50 and color PC/ANSI terminal emulation, multiple-session support, keyboard remapping, new script commands for custom windows, and a graphical interface communications program called PowerDriver. The most significant feature is multiple-session support, which lets you use more than one communications service at a time. A Telnet connection tool for accessing Internet-based host systems is also included. Users of IBM, HP, VT100, and 3270 terminals will note the lack of emulators for their faves.

Those are the built-in features. Most of 2.0's features are add-on programs. Fax support comes from STF Technologies' Faxstar, a fax send/receive program with no connection to MicroPhone. Similarly, TCP/IP connectivity is via Hyde Park's MacSLIP. The Internet tools Fetch and TurboGopher are public domain programs developed by Dartmouth College and The University of Minnesota, respectively. Don't get me wrong, these are all great tools. But they aren't integrated with MicroPhone in any way. Other communications software vendors have integrated such features into their products, making them easier to learn and use than MicroPhone's collection.

If building custom communications front-ends is your forte, you'll find MicroPhone Pro's new windowing script commands useful. These commands let you build what Software Ventures calls **scriptable agents**. The new commands let you construct windows with embedded buttons, selectable item lists, icons, text fields, and multiple subpanes. A scriptable agent processes the communications data stream behind the scenes, presenting to the user a digested form of the online information. You can write agents to perform automatic online sessions or to help guide you through an online session interactively. MicroPhone Pro includes example scripts of each type: an Internet Mail script that logs on to a Unix host system to retrieve mail, and an Internet News script that lets you interactively access Usenet news from an Internet NNTP (Network News Transport Protocol) server. Most Internet providers offer these services over SLIP (serial-line Internet protocol), which the bundled MacSLIP package supports.

**The Last Word**

MicroPhone Pro's new feature set is a mixed bag. New features built into MicroPhone are genuine innovations that many users will be glad to have. But if you're looking for fax or Internet support, other packages such as Synergy's VersaTerm offer better integration and ease of use than MicroPhone Pro, and for considerably less money.—MEL BECKMAN

Animation Master

**Animation Software**

**PROS:** Affordable character-animation tools.

**CONS:** Un-Mac-like interface; hit-and-miss documentation. **COMPANY:** Hash Enterprises (206/750-0042). **LIST PRICE:** $699.

**Animation Master 2.0.5—**conceived as an in-house production tool by the creators of the California Raisins—specializes in character animation, and is priced reasonably enough to attract budding Disney. Although it packs extraordinary power, Animation Master is needlessly difficult to learn and prone to instability. Plus it's saddled with the look-and-feel of Windows.

Animation Master has seven modules—Sculpture, Character, Materials, Decal, Action, Direction, and Render—for building and texturing models, animating them, and rendering final images.

Sculpture, a spline-based modeler, can produce complex, organically shaped objects. In Sculpture you can extrude and lathe spline objects into more complex shapes, and a quick-shade button lets you preview contours. In the Character module, you can assemble separate elements, such as arms, torsos, and heads, into complete, hierarchically organized models. It also lets you apply surface attributes, such as transparency and specularity, and edit surfaces to produce bump and reflection effects. You create and edit procedural textures with the Materials module, and Decal lets you apply bitmapped images that stretch and flex with object motion.

The Action module is a key-frame animator that links objects with spline backbones to produce realistic, coordinated movement. It can also morph an object's surface mesh to create flexing-skin effects. Final scene construction takes place in Direction, where you can add lighting and determine camera angles. The Render module produces 24-bit ray-traced images in PICT, QuickTime, and TARGA formats.

Every object and texture can be associated with a channel for controlling the rate of motion or surface transformations. You can correlate channels to any part of a model, including individual surface points, to create subtle effects like a character's breathing or muscles rippling.

To produce an animation, you transfer models from one module to another. Given enough RAM, you can run all continues.
INTRODUCING THE NEW SYQUEST-COMPATIBLE CARTRIDGES FROM IOMEGA.

Only Iomega could make a more reliable SyQuest-replacement cartridge than SyQuest. It starts with the highest quality IBM media, reinforced with a diamond-like coating for greater resistance to head crash or shock. So important data is there when you need it. Plus, Iomega's new driver allows you to mount any cartridge without rebooting your system. And they're SyQuest licensed,* so you have no worries about compatibility or the warranty on your drive. Best of all, Iomega also delivers more affordable storage than SyQuest, complete with a 5-year "No Questions" limited warranty. So get SyQuest compatibility enhanced by Iomega reliability.

For product details, call Iomega directly at 1-800-967-0326.

©1994 Iomega Corporation. The Iomega logo is a registered trademark of Iomega Corporation. All other products and names mentioned are property of their respective holders. *Announced by SyQuest, 6/94.

Circle 273 on reader service card
seven modules simultaneously. However, Animation Master doesn’t support publish and subscribe, so you must push the models through the pipeline by saving them in each module and reopening them in the others after every edit.

To use Animation Master efficiently, you need to learn its interface and its unique keyboard commands. Instead of movable tool palettes, the modules have fixed palettes holding tools, buttons, and numeric-entry boxes—lots of functions right at hand, but visually cluttered. And tools are not always logically arranged.

Animation Master is not forgiving. Support for undo, for example, is spotty at best. And its file organization is pathname driven; this Windows holdover means the program does not recognize its own files if they are not in a project folder. Worse, if you rename any folder, the program makes you rebuild the path before it can recognize its files. All the error messages will remind you of why you bought a Mac in the first place.

I could go on, but you get the picture—Animation Master exhibits many of the shortcomings common to in-house applications. It takes perseverance to tackle the steep learning curve, and patience to put up with the system crashes.

Don’t expect help from the manual—it’s written for the Windows version but peppered with references to Macintosh, Amiga, and Silicon Graphics platforms. Mostly, you read the Windows sections and translate. Plus, it’s equally inadequate on topics both simple and sophisticated. A tutorial video is included, but it covers only basic functions; the optional five-volume video tutorial is better.

The Last Word
Animation Master offers powerful modeling and animation tools—to those who can negotiate its interface and steep learning curve.

In Control 3.0.4

**Personal Organizer**

**PROS:** Excellent outline and to-do list features.

**CONS:** Database Lookup doesn’t work well with some programs. **COMPANY:** Attain Corporation (617-776-1110). **COMPANY’S ESTIMATED PRICE:** $85.

In Control started life as a well-received outliner and to-do list manager that let you add multiple cells of data to each line in an outline. The cells allowed you to add dates, comments, or pop-up lists of data to each outline heading. In Control 2.0 added a calendar, but it was far less capable than competing calendar products. Version 3.0’s main enhancement is a greatly improved calendar.

In Control 3.0 gives you more ways to view your data. In addition to the outline and monthly calendar views, there is now a day view that shows a detailed breakdown of the day’s events and to-do’s. There’s also a new weekly view and a combo view, which lets you display the calendar in weekly or monthly view and outline in the same window. The calendar is now completely integrated with the outline, and you can enter and edit data in any view. You can also drag items from one view to another. When you update data in one view, the program updates the data in all other views. The program also lets you change the style and appearance of a view, including background colors and font size, style, and color.

Version 3.0 supports recurring events, banners to denote multiday events in the month and week views, and reminder alarms. Uncompleted to-do items carry forward automatically to the next day. In Control lets you check off events as completed, so you can search your calendar for upcoming appointments. And the program can dial telephone numbers using a separate small Apple events-controlled Dialer application. You simply highlight a phone number and click on the Dial button to dial the number through a modem or through the Mac speaker.

The calendar’s day view shows the day in configurable time slots (15 minutes, 30 minutes, or 1 hour). Scheduled events go into the time slots, and a busy bar next to the event indicates when you are busy. In Control displays a conflict bar next to the overlapping events (see “Too Much to Do”).

In Control’s new QuickStep feature lets you create macros for functions such as switching views, sorting, finding, and printing. You create a QuickStep by clicking on options in the QuickStep dialog box, or by having In Control watch and record as you perform a series of steps.

Another new feature is Database Lookup. This Apple events–based feature allows In Control to look up and copy data from Claris’s FileMaker Pro 2.1, Portfolio Software’s Dynodex 3.5, Now Software’s Now Contact 1.0, and Aldus Consumer Division’s TouchBase Pro 4.0 into an In Control cell. For example, you could select a name in an In Control view and have Database Lookup go to a contact file in FileMaker Pro, find that name, copy the phone number, and then paste the number into the phone cell in your In Control document. This feature worked well with FileMaker Pro and TouchBase Pro, but less well with Dynodex. Dynodex doesn’t implement support for Apple events as completely as FileMaker Pro, so fewer of Dynodex’s fields are accessible to In Control. You have to copy the whole Dynodex record, as opposed to a particular Dynodex field, thus making Database Lookup close to useless with Dynodex. I was not able to test In Control with Now Contact.

Too Much to Do

This look at In Control’s Combo view shows the to-do list, along with part of the daily schedule. You can see that there are overlapping events around lunch time, marked with a conflict bar.

In Control also has a few oddities. For example, you cannot duplicate events in the calendar while holding down a modifier key, a feature that is common in competing programs. You can drag and drop items between different views, but you cannot copy across views, even through the Clipboard.

The Last Word

Personal organizers are, above all, a personal choice. In Control is an excellent to-do list manager and outliner, coupled with a good calendar. If you live or die by a to-do list, I recommend In Control.

—TOM NEGRINO
In the cockpit of every Delta Air Lines jet you’ll find something absolutely critical to safe, legal, and efficient air travel: a FrameMaker® document. It’s called a Minimum Equipment list, and it’s also available on-line, for access via radio from dispatchers on the ground. It’s one of many operational, technical, and administrative manuals that Delta writes and publishes in FrameMaker. Because FrameMaker gives Delta the functionality and flexibility they need to create, update, and consolidate their extensive documentation. Particularly attractive were features like automatic indexing, superior graphics handling, multiplatform capabilities for file compatibility across PCs, Macintoshes, and UNIX systems. And of course, on-line document distribution, complete with automatic hypertext links, through FrameViewer. So don’t just settle for any old publisher — fly first class with FrameMaker 4. Call 1-800-U4-FRAME Ext. 022 today for our comprehensive Guide To Document Publishing. And watch your publishing department really take off with FrameMaker 4.
MusicTime 2.0

Music-Notation Program

PROS: Easy to enter, format, and manipulate notes; excellent MIDI control; accepts input from computer keyboard, MIDI instrument, and MIDI files. CONS: No easy way to extract parts; advanced manual costs extra. COMPANY: Passport Designs (415/726-0280). LIST PRICE: 8-staff version $149; 16-staff version $249.

PASSPORT DESIGNS' MUSICTIME shares much with its older sibling, Encore, a professional music-notation product, but is geared for hobbyists and students with less demanding notational needs. To produce complex scores and parts, you still need one of the professional products. But MusicTime lets you enter music a note at a time or capture performances on a MIDI keyboard, then render them into standard notation, manipulate the musical elements, play the music back to a MIDI instrument, and print the notation.

Once you've set up your staffs, keys, and clefs and selected track and patch assignments for MIDI playback, you have three ways to get music into MusicTime. MusicTime imports MIDI files—useful for people who are more comfortable with sequencers than with notation programs. Second, you can capture musical performance in real time or step time (a note or chord at a time) from a MIDI device. Finally, you can "play" music on your QWERTY computer keyboard, with the letters mapped to correspond to notes on a piano. Dragging an icon lets you change octaves. It's no substitute for a musical keyboard, but it'll do in a pinch.

Scores entered in MusicTime play back exceptionally well, and the program's track mapping supports most of the current MIDI keyboards.

Having entered the notes on the screen, you can begin entering lyrics and guitar tablature, assigning dynamic markings, fixing the odd accidental, inserting slurs, and so on. Much of this data is not captured in MIDI performance, but most of it comes through in MIDI playback. Adding lyrics is as easy as typing them. The tools for editing and manipulating musical data are well designed, intuitive, and easy to master. MusicTime supports basic quantizing, which yields a more human sound from digital music. Tuplets, "routed" notes such as an eighth-note triplet, are easy to enter and edit.

The program ships with TrueType and Type 1 fonts for both musical symbols and guitar chords, and MusicTime's printed output and on-screen notation rival anything on the market. You can write music in color, although I'm not sure why you'd want to. The musicians I used to test color output, from a 7-year-old beginning flutist to a symphonic tubaist, had trouble keeping the colors straight while trying to follow the individual parts in a score.

MusicTime's setup leaflet and User's Guide are both excellent, bringing you to the point where you can enter music and are acquainted with the tools' capabilities. To get beyond advanced-beginner level, however, you need the advanced guide, available from Passport Designs for $19.95 plus shipping and handling.

Although MusicTime touts its usefulness for producing music for choirs and marching bands, the program offers no easy way to extract parts. That's a problem because ensembles don't play from complete scores, they play from parts. You can open a series of subfiles based on the score and wipe out what's not needed, but no one who's ever selected the Extract Parts option of Encore or Coda's Finale will be satisfied by that workaround. If you need extraction and expansion beyond 8 staffs, you'll need to go elsewhere (Passport Designs sells a 16-staff version of MusicTime for $249).

MusicTime's only serious competitor in the price range is ConcertWare (recently purchased by Jump Software from Great Wave Software and undergoing modification).

The Last Word

If beautifully printed scores are your goal, or you need nothing more complex than lead sheets and counterpoint assignments, or if you aspire only to have notated music whizzing from Mac to MIDI device, MusicTime could fill the bill, and at a great price.—RICHARD FENNO

ZipZapp 1.0

Data Reference Utility

PROS: Inexpensive; small file size; intuitive interface; instantaneous response. CONS: Window can't be resized. COMPANY: True Basic (603/298-8517). LIST PRICE: $39.95.

ZIPZAPP CAN BE USED TO FIND A ZIP code if you have an incomplete address, to check the spelling of a city's name, to find the area code of a town, to determine someone's time zone, and to get a sense of a town's population size.

ZipZapp must be installed on a hard drive. The ZipZapp window consists of a single text field; a pop-up menu; and a scroll box listing more than 37,000 cities and towns in the United States (including overseas possessions), along with their corresponding states, zip codes, area codes, populations, and time zones.

ZipZapp lets you search by city name, area code, or zip code. As you type in each character, the program displays a list that matches your entries. For instance, when you enter the letter M, the first city starting with that letter—Mabank, Texas—appears at the top of the list. As you continue typing letters, the list scrolls to reflect the search string. ZipZapp instantly pops up with the information you need.

ZipZapp displays only a range of codes for cities with more than one zip code. To find an exact zip code, you'll have to consult United States Postal Service sources or one of the mail-list-management programs reviewed in the September 1994 issue of Macworld.

Fast Searches ZipZapp displays a wealth of information in the blink of an eye.

I found only one minor fault: there's no resize box, so you can't stretch or shrink the window. True Basic plans to offer annual updates to ZipZapp reflecting changes in zip codes, area codes, and populations. The $9.95 update price is reasonable and promises to make this program even more useful.—OWEN W. LINZMAYER

MACWORLD October 1994 69
Add flair to your word processing and presentations

10,000 MACINTOSH OR WINDOWS CLIPART IMAGES ON CD-ROM

TigerDirect
1-800-CD-TIGER
1-800-238-4437

Please mention code 890M

$49.99

U.S. Funds

Also available for Windows! Corel GALLERY also supports the Kodak Photo CD format.

FROM THE
CREATORS OF
CorelDRAW

Corel

Also found as insert flyers in CorelDRAW Land and Corel Ventura, A2

Circle 78 on reader service card
Conflict Catcher II 2.1.1

**Extension-Management Utility**

**PROS:** Solves extension conflicts, even three-way; identifies Power Mac-slowing extensions; extremely customizable; clean interface; balloon help.

**CONS:** None. **COMPANY:** Casady & Greene (408/484-9228). **LIST PRICE:** $79.95.

Here's a sobering thought: a full installation of System 7.5 puts 106 control panels and extensions into your System Folder. Trouble is, extension glut is one of the most common causes of Mac glitches, hangs, and crashes.

That's why, ironically, System 7.5's 106th extension is an extension manager, which lets you turn selected extensions on or off at start-up. That's somewhat useful when you're trying to figure out which extension is causing your crashes, but it's not good enough when you have 106 possible culprits and 11,236 possible pairs of culprits.

Conflict Catcher II is an extension manager, too. If you press the spacebar as your Mac starts up, you're shown a list of every extension and control panel in your Mac. At this pause in the Mac's start-up sequence, you can switch extensions on or off (by clicking); rearrange the loading order (by dragging); view them sorted by type, name, or loading order (using a popup menu); group them into mutually required, or mutually incompatible, clusters (by clicking on a Links button and working in a slightly confusing dialog box); or group them into named subsets.

Conflict Catcher II goes well beyond the basics. For example, if you're having some mysterious glitch or crash, you click on CC's Conflict Test button. It asks you to restart the Mac several times. Each time, CC turns off a mathematically calculated subset of extensions, then asks you if the conflict still exists. After a few restarts, CC triumphantly names the problem extension and even offers to turn it off for you. The entire process takes five minutes, and the peace of mind (and subsequent smooth Mac operation) it brings is priceless. CC can even tell you if your problem was caused by the interaction of multiple extensions.

For Power Mac users, CC has an added attraction. Unfortunately, pre-Power Mac, nonnative extensions exact a serious overall speed penalty on these machines. CC's Report function tells you which extensions aren't written in native code, and even hints at which ones will slow down your Power Mac the most. PowerBook RAM-disk users and network users will also appreciate CC's ability to load extensions represented on the start-up disk only by their aliases.

CC can also list your fonts and the contents of your Startup Items folder, treating them like extensions that can be switched on, added to groups, and so on.

CC is customizable, fast, and safe (it works by moving turned-off extensions into a Disabled folder, not by modifying them). There are few certainties in Mac computing, but one is that more extensions and control panels will walk the earth with every passing month. Conflict Catcher II is ready.

—David Pogue

Spyglass Plot 1.0

**Scientific Charting Software**

**PROS:** Handles huge data files; reads HDF files; most chart formats are publication-ready; extensive math capabilities, including FFT.

**CONS:** Limited chart assortment. **COMPANY:** Spyglass (217/355-6000). **LIST PRICE:** $295.

Spyglass, Inc., is the commercial manifestation of visualization work started at the supercomputer center associated with the University of Illinois. The company's products include Spyglass Dicer, which displays in vivid, false colors the kind of volumetric data associated with fluid-dynamics, meteorological, and astrophysical computation; and Spyglass Transform, which generates surface and vector plots from tables of two-dimensional data.

Spyglass Plot is the new one-dimensional partner of these flashy products. Few scientific journals support QuickTime data movies (most don't offer color), so there's a need for a product that makes journal-ready charts for traditional publishing.

Spyglass Plot has staked out a sharply defined area of the charting world that's of interest mainly to scientists (see "Graphing beyond Excel," *Macworld*, August 1994, for a charting-package roundup). In Plot, every graph is really either a line chart or a scatter-plot, although double-Y, number-scatter, and line charts with error bars are listed separately. Control over legends, labels, tick marks, error bars, increments, and grids is extremely simple, usually involving no more than double-clicking on the element to be edited and working through self-explanatory dialog boxes.

Ordinarily, these features would enable Spyglass Plot as a somewhat austere alternative to Igor or KaleidaGraph. But Plot has the ability to handle giant data files at a high speed. Like Dicer and Transform it reads Hierarchical Data Format (HDF) files, including the vertex set type (these are standard data-interchange formats for supercomputers). Plot handles tables of 32,000 columns by as many rows as your computer's memory will support. With a quick sampling scheme, it can call up a scatter-plot of 25,000 data points in just a few seconds on a Quadra 610; this task choked all other charting packages in comparative tests. Direct exchange of data between Plot and Transform also lets users explore practical publication alternatives.

Plot features Spyglass's macro language for math manipulations; however, a built-in menu or small library of macro scripts would be much more convenient for frequently used operations (for example, Fourier transform, autocorrelation, and data statistics). A superfant curve-fitting routine is built into Plot's Data menu, so perhaps Spyglass will add other popular routines in the next version. Plot's macros use the same language as those in other Spyglass products (graph formats are actually stored as macros). AppleScript is supported more as a necessity than a convenience.

If you're a Dicer or Dicer user, or if you just have more data than your present plotting program can handle, you need Spyglass Plot. It's not for everyone, but it's the first choice for serious large-set plot crunching.—Charles Seiter
Color is color, until you see the fine print.

Then you'll know it's Phaser Color: Eyeball it up close. Check out the spotless color of the new Phaser™ 440, the newest continuous tone color printer from Tektronix. It dots i's and crosses t's with the precision of TekColor™ Photofine™ and true Level 2 Adobe® PostScript™ Stunning overhead transparencies. Matchless pre-film proofs. All printed to Pantone® Color perfection. And it’s fast, processing images at RISC-speed, it snaps out 8½” x 11” full bleed prints. PCs, Macs, workstations, networks: it supports them all—simultaneously. And it’s from Tektronix, the Fortune 500 leader, where quality in workgroup color printers starts at only $2,995 and persists to the last detail.

Tektronix

Free output sample, call 800/835-6100, Ext. 100

Circle 143 on reader service card
Reviews

Maple V 3.0

Symbolic Computer Mathematics

**PROS:** Compact; efficient; now includes typeset math display and better color graphing.
**CONS:** Improved display is a bit slower; third-party support still lacking. **COMPANY:** Waterloo Maple Software (519/747-2373). LIST PRICE: $795.

I'm the esoteric realm, Wolfram Research's Mathematica and Waterloo Maple Software's Maple V contend for supremacy in symbolic math. (Symbolic math, roughly, means that this software can give answers as equations and relations rather than just numbers.)

Release 3.0 of Maple V contains nearly everything a working scientist could reasonably want. First, the company recently bought Exponentist (an equation-typesetting program) and Theorist (the friendliest symbolic-math program) from California-based Prescience. The acquisition of Exponentist resulted in on-screen real-math-notation equations as a replacement for the Courier-font kludge that characterized earlier versions (the equations are exportable to LaTeX). Maple's output now compares favorably with the output from specialized graphing and math-typesetting programs. EPS and color PostScript support, both long overdue, have been added since our last review of Maple V. A minor problem is that this new output takes longer to produce than that of earlier versions of Maple V, but it's generally worth the wait.

Also added are user-demanded features. Numeric functions can handle complex-value inputs and outputs, and minimax capabilities can be defined to work over finite ranges rather than the whole x-axis. More than a hundred new functions have been added to Maple V's libraries, and the handling of ordinary differential equations has been improved both algorithmically and in terms of solution representation. The statistics package now includes chi-square, t, and other distributions that were missing from earlier releases. Because of Maple's design, which uses a small kernel and libraries loaded only as needed, you can run Maple V on a 4MB PowerBook and use Microsoft Word at the same time—while the full version of Mathematica seems cramped running in 8MB of RAM.

The problem with Maple V, however, is that it hasn't garnered the level of external support that Mathematica has. Maple has libraries of functions contributed by users, but they are not comparable in scope to Wolfram Research's MathSource. The designers of Maple have licensed symbolic-computation capabilities into the numeric-math programs MathCAD and MatLab, but that still leaves Maple users typing in their own functions for a large assortment of common problems.

If you want access to a wider world of tutorials and preprogrammed solutions (and a bigger user group), Mathematica has a serious advantage over Maple. But if you prefer to do your own programming and function creation, you will benefit from Maple's efficient use of your Mac's resources, and version 3.0 hits most of the points on your symbolic-math wish list.

—Charles Seiter

Street Atlas USA 2.0

Geographical Information System

**PROS:** Fast searches and redraws; tremendous amount of data; fun. **CONS:** License limits practical applications; questionable accuracy; some interface foibles. **COMPANY:** DeLorme Mapping (207/865-1234). LIST PRICE: $169.

Street Atlas USA is a CD-ROM containing colorful, detailed maps of the entire United States. The maps not only label major highways, populated places, rivers, lakes, and mountains, but also show individual street names (with block numbers in large urban areas), airports, parks, and other points of interest. Using a variety of simple tools, you can explore the farthest reaches of the country while seated at your Macintosh.

When you launch Street Atlas USA, a map window and a floating toolbox fill the screen. The tools are self-explanatory, so there's little need to consult the 24-page User's Manual. You can begin by entering a telephone number, zip code, or city name to locate a particular section of the country. Thanks to efficient indexing, response time is phenomenal even on slower Macs. After you find a location of interest, clicking on a button displays it in the map window. If you already know the approximate geographic location, you can zoom in by selecting the area of the map you want to see in more detail. Either way, the map window updates in seconds.

The license specifically prohibits use for "navigation, tracking, or any other purpose requiring exact measurements," nor may you "copy any screen display or map printout for publication, outside distribution, or sale in any form." You are allowed to use Street Atlas USA as a "general visual reference" for planning trips, for example, but in my exploration of familiar areas I uncovered a number of inaccuracies, such as through-roads not connecting, railroads appearing where none exist, and towns missing or misplaced (Los Altos in Los Angeles County instead of Santa Clara County, for example). Other users have reported similar data-integrity problems.

Street Atlas USA is DeLorme's first Mac product, and it shows in the Windows-inspired user interface. As mentioned, you can zoom in by selecting an area of the map, but the initial mouse-click always defines the upper left corner of the marquee. Also, if the area of interest lies just beyond the visible area of the map, you can pan over with a hand cursor; instead you must click on a point where you want the map centered, or click on the appropriate button on the compass rose to jump a full screen in that direction.

It's hard not to like Street Atlas USA. For the most part, it delivers what it promises at a great price. Most troubling are the inaccuracies discovered in the data, but DeLorme pledges to fix all reported errors in subsequent annual updates. Despite its flaws, Street Atlas USA is a fun, relatively inexpensive, practical demonstration of the power of CD-ROM.

—Owen W. Linzmayer
EXPAND YOUR BUSINESS.
HARNESS THE SUN.
NAVIGATE AN OCEAN.
THEN BREAK FOR LUNCH.

INTRODUCING CLARISDRAW.

With this dramatic new upgrade of the best-selling MacDraw Pro, you're destined to create great things in a swift and painless fashion. Like maps, floor plans, flyers, free-form and technical drawings, to start. ClarisDraw brings you intelligent features like PointGuide and SmartConnectors, to save you time by reducing the number of steps needed to create graphics. There's also advanced text handling (like binding text to curves), sophisticated image editing and 24-bit color painting. The program translates popular industry-standard graphics formats. And it's accelerated for Apple's new Power Macintosh systems. With ClarisDraw, you'll produce professional-quality graphics in no time. (So you can take that extra hour for lunch.) For more info, call 1-800-544-8554, ext. 358.
**Reviews**

**Stop & Go 4.0**

**File-Protection/Relaunch Utility**

**PROS:** In the event of a crash, last restart or recovery of your Mac's desktop to resume work where you left off. **CONS:** Setup is unduly complicated; not compatible with Power Macintosh.

**COMPANY:** Engram International

**LIST PRICE:** $69.99.

Stop & Go from Engram International is designed to help prevent catastrophes caused by computer crashes—or just to allow you to quickly resume your work wherever you left off. It uses a portion of your hard disk to save a snapshot of the data in your Mac's RAM. This snapshot records loaded extensions, open applications, and all open disk and document windows. At preset times, Stop & Go updates the snapshot (somewhat like a program's autosave function, but in much more detail).

If your Mac crashes or shuts down (either because of power failure or because you've shut it down), Stop & Go uses the snapshot file to restore the Mac to the setup that was present when the snapshot was last updated. You set the updating (or marking) interval; in addition to a time interval, you can also have Stop & Go update the snapshot after a fixed number of keystrokes or when you use a keyboard command.

A keyboard command (or clicking on the Stop button in the control panel) updates the snapshot and shuts down the Mac. The next time you start up, Stop & Go launches your applications and restores documents to the condition they were in when the snapshot was updated. If you crash and aren't able to activate the Stop process, you can restore your Mac's desktop by selecting the Go-Back option in the Stop & Go Panel desk accessory.

But this isn't as transparent as I would like. I'd prefer to see the Stop function integrated into the Mac's shutdown process and supported by a normal restart. (You can also set the Stop function to activate after a preset amount of idle time or at a specific time of day, such as at the end of your workday.)

Using the program's TurboGo feature, the whole restart process takes much less time than a normal start-up, application- and document-launch routine. In my tests, starting up my PowerBook 540c took a little over two minutes from the start-up chorder until I launched my first application and document. With Stop & Go re-creating my desktop, the process took just 45 seconds. More important, my documents were in precisely the same form as they were when Stop & Go marked my system during the shutdown process.

Stop & Go does its stuff with little fuss, other than a short delay (about 15 to 30 seconds) during the updating operation. Its interface could be made more transparent, though, and its thick manual is unduly threatening for a program that should be easy to use.

Some of Stop & Go's features duplicate the automatic-saving functions of other programs, and there are some programs, such as Now Utilities' SuperBoomerang and Connectix's CDU, that allow you to relaunch all open applications and documents when you restart. But Stop & Go is fast, and it relaunches everything in a single, unified process. Despite its few shortcomings, Stop & Go is definitely worth your consideration.—**GENE STEINBERG**

---

**SuperScope II 1.25**

**Laboratory Data-Acquisition Software**

**PROS:** Convenient; easy to use; strong data-analysis capabilities. **CONS:** Relatively small instrument library.

**COMPANY:** GW Instruments

**LIST PRICE:** $1490.

GW Instruments' SuperScope II software is the natural partner of the company's MacADIOS II series of data-acquisition hardware. In case you're not a scientist, data acquisition means getting numbers (temperature, voltage, light intensity, and sound) from some outside source into a computer.

SuperScope II (which works with IEEE-488 and RS-232 devices, as well as GW Instruments' own boards) assumes that the instruments familiar to most working scientists are strip-chart recorders, X-Y recorders, and oscilloscopes (and with a spectrum analyzer available as a sort of oscilloscope special case). Once you've set up your physical device so it's ready to produce data, you simply pick one of these options as your virtual instrument for on-screen display—the instrument also gives you digital control of the acquisition hardware. Unlike National Instruments' LabView, for which a training course is a good idea (if not mandatory), SuperScope II can be set up in an afternoon by anyone who's ever used a storage scope—you simply follow the instructions in the manual.

Of course, the major advantage of on-screen instruments is that they display data that currently reside in your Mac's memory or on disk, so that postacquisition analysis is not just possible but easy. SuperScope II includes some basic, preprogrammed signal and waveform analysis. But its real analysis strength lies in an object library of functions for waveform math that includes windowing, filtering, convolution, arbitrary waveform generation, Fast Fourier transform, and more. Although it calls for a bit of icon-based programming on your part—SuperScope II Open also supports Symantec Think C source-code programming—you can set up your own virtual instrument that not only logs the input data stream but also performs real-time wave-manipulation functions on the stream in a separate window. On a Quadra 610, SuperScope II did this calculation on inputs running at thousands of sample points per second.

SuperScope II is less expensive than LabView, but it's a much smaller system: release 1.25 offers only 25 virtual instruments, while LabView offers nearly 500.

---

**Waves, Not Surf**

Once you catch an input wave with a data-acquisition board, SuperScope II lets you open it in a virtual waveform calculator that offers a wide range of calculation types.

And whereas LabView supports all sorts of hardware platforms (including Sun and Windows) as well as a variety of programming languages—and lets you use National Instruments' huge assortment of data-acquisition cards—SuperScope II is a Mac-only system. Nonetheless, SuperScope effectively covers a wide range of laboratory needs (the MacADIOS cards can run 100,000 points per second at 12-bit conversion), and learning to use it won't become your life's work. If you're daunted by LabView's answer-for-everything approach, you may find SuperScope II to be a better product for your lab's data-acquisition needs.—**CHARLES SEITER**
Macintosh Training
Pure.
Simple.
Effective.
Inexpensive.
Award Winning!

The Macworld Magazine WORLD CLASS AWARD for training sits in my office. The readers of Macworld voted for MacAcademy by a margin of 2 to 1 over audio training systems, disk based systems, and all other training companies and products. Simply, we won because our training works! It's affordable, it's flexible, it covers an incredible amount of programs, it's simple to use and it's guaranteed! We won the award because over 250,000 satisfied customers are proof that MacAcademy training programs will work for you. Below please find a current listing of the MacAcademy Video Training Library. Each video is approximately two hours in length and costs only $49. Each video carries a complete money-back guarantee if not totally satisfied and can be upgraded when software is upgraded for only $14.95.

| MacAcademy Video Training Library | No. of Videos | Price
|-----------------------------------|--------------|-------|
| 4th Dimension                    | 6            | $49
| Canvas                            | 5            | $49
| ClarisWorks                       | 6            | $49
| Design & Layout                   | 1            | $49
| Desktop/PrePress                  | 2            | $49
| Director                          | 4            | $49
| Excel                             | 5            | $49
| FileMaker Pro                     | 4            | $49
| Mac Fonts                         | 1            | $49
| FreeHand                          | 4            | $49
| HyperCard                         | 3            | $49
| Illustrator                       | 4            | $49
| Infini-D                          | 2            | $49
| Integrate Programs                | 1            | $49
| Lotus 1-2-3                       | 3            | $49
| Macintosh 7.X                     | 4            | $49
| MacDraw Pro                       | 2            | $49
| Mac P & L                         | 3            | $49
| MacProject Pro                   | 4            | $49
| MacWrite Pro                     | 3            | $49
| MS Works                          | 4            | $49
| Networking                        | 1            | $49
| Now Contact/                      |              | $49
| Now Up-To-Date                   | 1            | $49
| PageMaker                         | 6            | $49
| Peachtree Accntg.3                 | 3            | $49
| Persuasion                        | 2            | $49
| Photoshop                         | 6            | $49
| PowerBooks                        | 2            | $49
| Powerpoint                        | 2            | $49
| Premiere                          | 3            | $49
| QuarkXPress                       | 3            | $49

Live Training Workshops Available in 32 major cities throughout the United States. Please call for complete schedule and/or on-site corporate training.

Please add $3 per order along with $1 per video for shipping and handling.

TOLL FREE ORDER LINE: 800-527-1914
ORDER FAX LINE: 904-677-6717
Checks, PO's, Credit Cards Accepted  48 Hour Delivery
100 E. Granada Blvd., Dept.MW1094, Ormond Beach, FL 32176

MacAcademy®
"Where the world learns the Macintosh"
Circle 106 on reader service card
**IDL 3.5**

**Image Processing System**

**PROS:** Unique mapping and map-distortion options; tool kit for easy application-interface building.  
**CONS:** Some non-Mac quirks.  
**COMPANY:** Research Systems (303/786-9900).  
**LIST PRICE:** $1500.

ABOUT ONCE A YEAR, A MACINTOSH application appears that’s shockingly powerful. IDL (Interactive Data Language) is a prime example. Using IDL on a not particularly energetic Friday afternoon, I managed to replicate the results of two years of programming that went into my Ph.D. thesis after spending less than a week exploring IDL’s capabilities.

The developers had grappled with image-manipulation problems in geology, astronomy, and other sciences, before the Mac was a glimmer, so they were able to produce a compact, graphics-oriented, interpreted language in which a single command is worth a page of C-language code.

IDL assumes that you want to display two- or three-dimensional data and that a passive display of the data will fail to extract the information you need. Thus IDL contains single commands that are the equivalent of Adobe Photoshop filters, commands for assessing image statistics, and commands for complex parameterization or reduction of images. Programs in IDL are usually concise enough that the program editor isn’t a problem.

Two features of IDL speed custom application development. First, the function library is huge, allowing you to invoke most common statistical, matrix, convolution, color-table—graphics, geometry-warping, and image-processing functions as basic commands. But Research Systems has also bundled the window-handling and interface elements (such as sliders, buttons, and scrolling lists) into a “widgets” package, so producing a real Mac application with a menu of image-manipulation functions, however specialized, is almost as easy as doing a “hello, world” program in MacApp.

Second, your application automatically ports to all Microsoft Windows and Digital Equipment VMS platforms, as well as to most Unix systems; however, some windowing operations seem to follow the Unix X-Windows model rather than the Macintosh custom. The set of programming examples is large enough to give IDL beginners (at least those at home in FORTRAN or C) a convenient place to start.

While IDL’s ability to solve equations and shade 3-D graphics is merely remarkable, the global mapping features are almost difficult to fathom. Because IDL has long been used to analyze satellite-collected data, it’s uniquely suited to producing transformationally suggestive displays of the whole world. If, for example, you want a global map in which countries’ sizes are expanded or shrunk according to GNP-per-capita data, you can do it easily in IDL.

IDL can also generate special-purpose programs to deal with medical images from different sources. That’s the generous scope of this product. If you’re an image processing professional, whatever your specialty, you should consider adding IDL to your tool kit.—CHARLES SEITER

**Spectra-Com P192mx**

**Pocket Data/Fax Modem**

**PROS:** Easy setup; decent performance; good telecommunications software.  
**CONS:** Unable to achieve 19.2-Kbps connections; poor status displays; so-so manual.  
**COMPANY:** Bay Connection (408/270-8070).  
**LIST PRICE:** $199.95.

THE SPECTRA-COM P192MX FAX modem is a nice idea that could have been better executed. It was conceived to be used with a Mac notebook when no AC outlet is at hand. Designed for easy portability (if you have a large pocket), the modem weighs just over 5 ounces and comes with a handy carrying case. The Spectra-Com uses a 9-volt battery that provides up to two hours of power, and it comes with a regular 7V power supply for more conventional use.

The modem offers data-transfer speeds of up to 19.2 Kbps using V.32 turbo (a subset of the V.32bis 14.4-Kbps protocol), as well as 14.4-Kbps faxing capability. It comes with Software Ventures’ MicroPhone LT 2.0.1, which handles telecommunications chores, and STF Technology’s Faxstf 2.2.3 is included to send and receive faxes.

Setup is simple. Just plug your telephone cable into the Spectra-Com, connect the supplied hardware-handshake modem cable to your Mac, and turn on the modem. An LED flashes three times to indicate that the modem is working. (If the light continues to flash, it means you need to replace the battery.) If you expect to use the modem for more than two hours at a time, or you don’t want to keep changing batteries, you should use the AC power supply instead.

Both the fax and telecommunications software use one-button installers and are easy to configure. MicroPhone LT offers a set of connection profiles for online services such as CompuServe and GEnie. It also reads scripts created with one of the high-end versions of MicroPhone, but you cannot create your own scripts with this version. If a script isn’t available, you must log on to a service manually. You also have the option of upgrading to either MicroPhone II or MicroPhone Pro.

The Faxstf software can handle most of your faxing chores, and it has a decent address-book feature. It’s relatively transparent in most applications and quite easy to use. But it’s not the latest version of the program; my Power Macintosh crashed when I tried to use it. (STF Technologies claims that the free 2.6.2 update of Faxstf works with Power Macs; you can also upgrade to version 3.0, for an extra charge.)

The Spectra-Com modem was a decent performer but seemed to make connections a bit slowly. When I tried logging on to a BBS that supports 19.2 Kbps, I never got more than 12 Kbps. But 14.4-Kbps connections were not difficult to achieve. Besides the battery light, there are three LEDs that indicate normal modem activity, but the lights for sending and receiving are hard to see in a normally lit room.

The portable carrying case fits the modem just fine but provides no pouches for the cables. I got them in there, but I was unable to squeeze in a spare battery.

Technical support requires a toll call, but response was swift and well informed. The manual could use a little help, though; it lacked useful tips on setting up the Spectra-Com for best performance when logging on to an online service or BBS.

If you must have absolute portability, and AC power isn’t available, the Spectra-Com P192mx pocket data/fax modem can do the job. My regular desktop modem, a Supra, is only a few inches longer and nearly as easy to transport (although it does require a nearby AC outlet).—GEORGE STEINBERG
Reviews

FontMixer 1.0

Font Utility

**Pros:** Provides an easy way to add characters to a font or change a keyboard layout.

**Cons:** Manual could use more detail; at small sizes, screen fonts not as legible as original.

**Company:** Monotype Typography (312/895-1440). **List Price:** $79.

---

Someday, a single font will be able to contain thousands of characters. (See "Inside QuickDraw GX Fonts," in this issue.) Meanwhile, a typical Macintosh font includes around 230 characters—not nearly enough for professional typographers. The FontMixer makes typesetting easier by letting you mix characters from different fonts to create a composite font.

Let's say you want to add fractions to a font. You first open the font with FontMixer, creating a base font. You then open a font collection with numerators and denominators for fractions. Now comes the hard part: you must find 20 expendable characters in the original font to replace with the numerators and denominators. Depending on your needs, you may be able to substitute fractions for a row of shifted option-accented characters or other characters you rarely use. To place all the new characters together, you can use FontMixer to change the keyboard locations of any existing characters that are in the way; an on-screen keyboard shows the keyboard layout as you add, move, or remove characters. If you have more expendable characters in the base font, you can add more characters or open another font and add characters from that. This system isn't perfect—you'll run out of replaceable characters sooner or later—but consolidating several fonts beats opening two or more fonts to type a limited set of special characters.

When you finish mixing your font, you select Make Font to create screen and printer versions of the new font. You must type in font and family names for the printer fonts (PostScript is very finicky about naming conventions, but the manual does a good job of explaining what is required) and ID numbers for the screen fonts. The naming-and-numbering procedure is a little scary for novices, but it's doable.

FontMixer then builds a new PostScript Type 1 font, which you install and use like any other PostScript font. I found FontMixer's screen fonts inferior to the original font and family names for the printer fonts (PostScript is very finicky about naming conventions, but the manual does a good job of explaining what is required) and ID numbers for the screen fonts. The naming-and-numbering procedure is a little scary for novices, but it's doable.

FontMixer is a straightforward, relatively painless way to do it.—Erfert Fenton

---

Extend+BPR 3.0

Business-Modeling Software

**Pros:** Superior set of templates for business-process reengineering; Extend engine fast at simulation.

**Cons:** Difficult to implement without training; requires more than icon-based programming knowledge.

**Company:** Imagine That (408/365-0305). **List Price:** $990.

---

REENGINEERING IS NOT JUST A business buzzword of the nineties; it's a shorthand designation for a process that should probably be going on all the time in all businesses. Simply put, it means examining day-to-day operations to find out how a business can deliver more of what its customers want, instead of delivering more of what a company's internal regulations demand. Extend+BPR (Business Process Reengineering) combines the popular Extend simulation software with a predesigned set of reengineering examples to cover a spectrum of business functions. It provides templates corresponding to an assortment of business models; the models are easy enough to understand but often require considerable background data.

For example, you construct a model in Extend+BPR by connecting icons that represent steps in a business process. In the activity-costing template you decide on a schedule of tasks (the program assumes that tasks arrive randomly—you pick a rate) and follow them through all stages to compute the cost equation to determine how many employee hours are involved in accomplishing the tasks and what the internal accounting charge for the tasks should be. You can assign different categories of cost (materials, labor, overhead) and open the Extend+BPR icons to assign times for standard tasks. This model is sufficiently general to accommodate not just business-as-usual processes, but random tasks that logjam all the normal task-handling channels.

Extend+BPR also includes templates for strategic planning, production, invoicing/approval scheduling, finance, process and workflow routing, and activity costing, plus it offers lots of advice on customizing the templates. In theory you could take this package and design a set of realistic business models to guide a firm in process reengineering. In fact, however, there's no point in attempting it unless you understand the characteristics of different distributions of random variables and are familiar enough with C or Pascal to deal with the data structures (sets of variables, input tables, output graphs) behind the Extend icons.

A more substantial obstacle to the effective use of Extend+BPR is the daunting amount of business data you must gather. Still, just collecting the data to make a realistic model frequently highlights inefficient processes, whether or not the data is used in a proper Extend business simulation.

The templates in Extend+BPR can help a company decide which processes absolutely must be carried out sequentially and which can be handled concurrently for better results in less time. That alone helps this package pay for itself. The only caveat is that a company attempting to reengineer via Extend needs a dedicated team of workers who have some background in programming and who have unlimited access to operational data.—Charles Seiter
THOUSANDS OF PRODUCTS TO CHOOSE FROM.

Celebrate MacConnection's 10th anniversary with $10 off any order of $250 or more. You'll find a brief product listing on the following pages, but we carry over 3,500 products in all. So if you don't see it, just ask. Remember, no matter how much you order or what it weighs, we'll ship it overnight for just $3...TOTAL!

Since 1984, we've offered the best combination of prices, shipping, and service in the business. Says who? Says the Boston Computer Society's 25,000 members who just voted us "Best All-Around Company." And the Berkeley Mac Users Group who just described MacConnection as "still the best all-around mail-order company."

HELP CELEBRATE MACCONNECTION'S 10TH!

JUST MENTION THIS AD AND GET

$10 OFF

ANY ORDER OF $250 OR MORE

800-800-3333

MacConnection

14 Mill Street, Marlow, NH 03456  603-446-3333  FAX 603-446-7791

OFFER GOOD THROUGH 10/31/94

Turn the page for the 1994 MACWORLD World Class Award Winners!
### MacDraft

Innovative Data Design's MacDraft provides a full-scale, multi-layered drafting environment with a complete set of easy-to-use drawing tools. Integrated database lets you assign data to objects.

**1994 Macworld World Class Award Winner**

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>9912</td>
<td>MacDraft 4.0 (8/94)</td>
<td>$349.95</td>
</tr>
</tbody>
</table>

### Quark and Aldus

**1994 Macworld World Class Award Winners**

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>11548</td>
<td>Aldus PageMaker</td>
<td>$549.95</td>
</tr>
<tr>
<td>7612</td>
<td>QuarkXPress</td>
<td>$599.95</td>
</tr>
</tbody>
</table>

### Adobe Illustrator

**1994 Macworld World Class Award Winner**

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1736</td>
<td>Adobe Illustrator</td>
<td>$389.95</td>
</tr>
</tbody>
</table>

### Berkeley

New After Dark 3.0 is wacker than ever, with more than 30 dazzling screen-saving displays. New Simpsons Screen Saver gives you 16 hilarious, animated displays with Homer, Bart, Marge, Lisa, and all the rest!

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5737</td>
<td>After Dark for Mac 3.0</td>
<td>$295</td>
</tr>
<tr>
<td>16318</td>
<td>Simpsons Screen Saver for Mac</td>
<td>$29.5</td>
</tr>
</tbody>
</table>

### EDUTAINMENT/GAMES

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>13600</td>
<td>Tortoise</td>
<td>$37.95</td>
</tr>
<tr>
<td>13601</td>
<td>New Kid on the Block</td>
<td>$37.95</td>
</tr>
<tr>
<td>13602</td>
<td>Just Grandma</td>
<td>$37.95</td>
</tr>
<tr>
<td>13603</td>
<td>KidPix</td>
<td>$37.95</td>
</tr>
</tbody>
</table>

### Microsoft Word

**1994 Macworld World Class Award Winner**

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4902</td>
<td>Microsoft Word 6.0</td>
<td>$239.75</td>
</tr>
</tbody>
</table>

### POWERBOOK/NEWTON

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>9545</td>
<td>IN CONTROL 3.0</td>
<td>$199.95</td>
</tr>
</tbody>
</table>

### BUSINESS

<table>
<thead>
<tr>
<th>Code</th>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>11530</td>
<td>TouchDesk 3.0</td>
<td>$239.75</td>
</tr>
<tr>
<td>13602</td>
<td>Just Grandma</td>
<td>$37.95</td>
</tr>
</tbody>
</table>
ReadySetGo 6.0.2

Desktop Publishing Software

**PROS:** High-end features; low price. **CONS:** Awkward interface. **COMPANY:** Manhattan Graphics Corporation (914/725-2048). **LIST PRICE:** $395.

**T'S BACK—AFTER SEVERAL YEARS OF languishing with Letraset USA, ReadySetGo's original developer, Manhattan Graphics, has regained control over its page-layout program and given it a major revision, to boot.**

So who in the world needs an alternative to Aldus PageMaker and QuarkXPress? Not a lot of entrenched publishers, but ReadySetGo's $395 list price will no doubt make it attractive to Macintosh newcomers who think the competitors' $895 price is too steep.

Is the low price going to be enough to give ReadySetGo a chance to reenter the market in a big way? Perhaps. The product itself falls midway between PageMaker and QuarkXPress, offering the manual approach of PageMaker and the precise controls of QuarkXPress. For example, creating multiple-column documents means laying out each column and then flowing the text between them. That's similar to PageMaker. On the other hand, you can have ReadySetGo format fractions and automatically create a non-rectangular wrap that fits an image's shape. That's similar to QuarkXPress.

All in all, ReadySetGo offers a strong set of tools for color publishing (trapping and multiple color models) and for typography (fine levels of control over tracking, character styling, and hyphenation). Its layout features are weakened by its inability to link multiple columns, but there are many tools for creating objects of various shapes and creatively mixing text and graphics. If you're producing manuals or technical documents, you'll be disappointed; there are no indexing or table-of-contents tools, and page-numbering options are limited (no footers or headers).

Despite its well-rounded set of features and its low price, I can't really warm up to ReadySetGo. What makes me keep my distance is the interface. It's clunky and unintuitive. You must constantly switch between tools—the one that selects a text box won't let you import text into the box, for example. The mouse never rests. The menus are also oddly organized, and I don't think it's a question of just being different from PageMaker or QuarkXPress—it's a question of being jumbled.

I also find the palettes to be too large and their text too small—they're hard to read, and there's no standard Macintosh feedback when you try to select a setting to change it. (The text doesn't get highlighted so you can replace it; instead, you must pick an insert point and delete or add to the text-size values.) The manual likewise has a thrown-together feel.

There's no strong reason not to use ReadySetGo if its tools match your needs. But there's really no compelling reason to choose it over the competition, either. A low price is nice, but it's not enough.

—GALEN GRUMAN

---

**If you want to see a full 8½"x11" spending a lot of money, only**

<table>
<thead>
<tr>
<th>Monitor Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical 17&quot; monitor</td>
<td>$1,100</td>
</tr>
<tr>
<td>Portrait 15 Pivot</td>
<td>$799</td>
</tr>
<tr>
<td>Typical 20&quot; monitor</td>
<td>$2,100</td>
</tr>
</tbody>
</table>
One major problem with spreadsheets is that they encourage users to forget that the numbers they display, particularly in projections of sales or budgetary numbers, represent hopes and dreams or just plain wishful thinking. Crystal Ball plays, particularly in projections of sales or forward. You assemble your model in traditional style, connecting cells with Excel formulas. You then define assumption cells in the model by attaching distributions to single numbers with a click on the distribution icon in the new tool bar. For forecast cells, Crystal Ball presents output graphs giving forecast distributions, crunched through your formulas by Monte Carlo simulation of the assumption distributions. Even simple business models, when studied correctly with a simulation, turn out to be full of surprises. Businesses frequently find that potential cash-flow problems are easier to anticipate in a distribution-based model than in a standard spreadsheet.

Crystal Ball 3.0 adds sensitivity charts, which let you pick the most significant variables from a complex model—once your model contains more than a half-dozen assumption distributions, you really need this feature. New distributions in version 3.0 include Pareto, logistic, extreme-value, and gamma; since the gamma distribution can model a wide variety of other distributions as limiting cases, its addition is a major extension. The new distributions, chart types, and views simply appear as icons on the tool bar or as choices in dialog boxes. In fact, the only downside of the new interface and feature set is that small models (10K to 30K) now labor under the massive overhead of Excel itself. For large models this overhead won't be noticed, as the computation time itself dominates; for small models there's a burst-mode option that ameliorates the speed problem somewhat.

Crystal Ball's only real competitor is Palisade Corporation's (607/277-8000) $395 @Risk, which offers a few more probability distributions than Crystal Ball but has a less intuitive interface. For most purposes, business analysts will find Crystal Ball more convenient to use—directing all the action from the Crystal Ball tool bar makes the statistical approach to calculations a natural extension of spreadsheet use. At this point Crystal Ball works only with Excel. Crystal Ball is compact, it's fast enough for complex projects, and it can pay for itself in disaster-avoidance in a large variety of common business tasks. —Charles Seiter

Looking Ahead  This Crystal Ball simulation estimates possible profits from a research project, showing distributions to model the success rate in the project and the number of possible customers.
<table>
<thead>
<tr>
<th>Component</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerWave Broth 2400 Int.</td>
<td>$87.50</td>
</tr>
<tr>
<td>PowerWave Silver 6600 Int.</td>
<td>$272.74</td>
</tr>
<tr>
<td>PowerWave Mercury 1920 Int.</td>
<td>$72.38</td>
</tr>
<tr>
<td>Teletron Silver 2400 Ext.</td>
<td>$83.94</td>
</tr>
<tr>
<td>Teletron Silver 6500 Ext.</td>
<td>$217.51</td>
</tr>
<tr>
<td>Teletron Gold 1440 Ext.</td>
<td>$78.39</td>
</tr>
<tr>
<td>Hayes ACCURUS 1320</td>
<td>$58.20</td>
</tr>
<tr>
<td>Mac ACCURUS 6600/FAX</td>
<td>$41.50</td>
</tr>
<tr>
<td>Mac ACCURUS 144/FAX 4</td>
<td>$118.34</td>
</tr>
<tr>
<td>Mac OPTIMA 5300/FAX</td>
<td>$135.54</td>
</tr>
<tr>
<td>Mac OPTIMA 144/FAX 4 (Packet)</td>
<td>$434.30</td>
</tr>
<tr>
<td>14.4 ± external mini phone with 14.4 ± 9600/FAX</td>
<td></td>
</tr>
<tr>
<td>28.8 ± external mini phone with 28.8 ± 14400/FAX</td>
<td></td>
</tr>
<tr>
<td>Supra 4.4 kW/DCD</td>
<td>$183.42</td>
</tr>
<tr>
<td>Supra 14.4 k/DCD</td>
<td>$207.34</td>
</tr>
<tr>
<td>Mac &amp; 6 Spotters 14.4</td>
<td>$147.31</td>
</tr>
<tr>
<td>Mac WorkPort 14.4 Packet</td>
<td>$255.14</td>
</tr>
<tr>
<td>Mac &amp; 6 Spotters 28.4 V/FAX</td>
<td>$326.90</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

**MultiSync 4FG e 15" monitor**

- 15" flat square CRT, 28mm
- Digital controls
- Accu/Color color matching
- 75Hz refresh @ 1024 x 768

ONLY! $617.19 CDW 33238

**Facallon Etherwave**

EtherWave is the award-winning first family of easy-to-use, easy-to-manage network Macintosh and PC computers and printers with Etherwave technology.

- PN971 Etherwave transceiver (AU) $97.87 CDW 36947
- PN970 Etherwave transceiver (AU) $95.28 CDW 36948
- Etherwave Nullus adapter $172.40 CDW 36940
- Etherwave LC adapter $171.34 CDW 36941
- Etherwave ISA (PC) adapter $175.59 CDW 33820
- Etherwave printer adapter $262.03 CDW 36941
- Etherwave Powerwave adapter $262.02 CDW 36949

**ACCURA 14.4k bps Modem**

ACCURA modem offers genuine Hayes quality and performance at a great price. Everything you need to start communicating is included in one box: Smartcom™ for the Mac and SmartFax for the Mac with a Mini-DIN-8 Mac-to-modem cable and phone line.

- ACCURA 144/FAX144 $135.54 CDW 36379
- ACCURA 144/FAX144 $249.80 CDW 38179

**Magnavox CM2080 14" 28mm Monitor**

ONLY! $135.54 CDW 36379

**DeskWriter 560C Color InkJet Printer**

- 600 x 300 dpi with Resolution Enhancement
- 24-bit (16.7 million) color support
- Up to 3 ppm print speed
- 3 year limited warranty
- TrueType scalable fonts
- AppleTalk and serial interfaces
- Prints on plain or glossy paper, transparencies, and envelopes

ONLY! $555.47 CDW 39509

**FREE MACINTOSH CATALOG.**

CALL TODAY FOR OUR CURRENT PRICING.
YOUR COMPANY HAS JUST STANDARDIZED on a database program that's available only for Windows PCs, and you're now being forced to part with your Mac because it's not compatible. Or you're a Mac-based service bureau that would like to tap into the Windows market while retaining Macs as your primary workstations. Or you use a Mac at the office and you'd like to bring work home, but your spouse already uses a Windows PC at home and you don't have the room or money for two computers.

If any of these scenarios describe your situation, take heart. While you've had the ability to run Windows applications from a Macintosh for a few years now, for the most part it's been an awkward, slow, and expensive compromise. Finally, you've got several choices for having your Macintosh and running Windows, too.

- Orange Micro's OrangePC Model 200 series of cards (714/779-2772) let you run Windows via an add-on NuBus card that contains a miniaturized PC motherboard. (Apple Computer discontinued a similar product, its DOS Compatible Card for Quadra/Centris 610, only two and a half months after it began shipping in early April. Apple says it may have similar products in the future for other Macs, however, and has recently demonstrated a 50MHz 80486DX2-based prototype card for Power Macs. See Reviews, Macworld, June 1994, for a comparative review of Apple's card.)

- Insignia Solutions' SoftWindows 1.0 (415/694-7600) provides Windows on a Power Mac via emulation. (Its SoftPC 3.1 program for 040-based Macs does, too,
WHAT'S THE BEST WAY TO TURN YOUR MAC INTO A PC? FIND OUT IN THIS MACWORLD LAB REPORT

but it's much too slow to consider.

• Farallon Computing's Timbuktu Pro 1.0.3 for Macintosh and Timbuktu 1.1 for Windows (510/814+5000) let you run a Windows PC over the network from your Mac. (We tested Timbuktu Pro 1.0 for the Mac, but Farallon says there is no performance difference.)

Each approach has its pros and cons, as this article shows. To help you decide which is right for you, Macworld Lab tested all the Windows options against a range of standard business Windows PCs based on 80486 and Pentium CPUs to show you exactly what kind of performance you can expect running Windows on your Mac. The results appear in the benchmarks "Are Windows Macs Good Enough?" We also gauge how interoperable each Windows option is with other PCs and the Mac.

Which Will Work on Your Mac?
The first question to ask yourself is which Windows options are available for your Mac. Some Mac owners have only one choice if they want to run Windows, since not all of the products that offer Windows on a Macintosh work on every Mac.

• The OrangePC cards work on any Mac with a 12-inch NuBus slot: all the Macs in the II series (except the IIsi); the Centris 650; the Performa 600; the Power Mac 7100 and 8100; the Quadra 650, 700, 800, 840AV, 900, and 950; and the Workgroup Server 80, 8150, and 9150. The Orange PC software works in native mode on both 680X0 and PowerPC Macs.

• SoftWindows works only on a Power Mac, and Insignia recommends that a 256K or larger cache card be installed. (A 256K card's price ranges from $199 to $299, depending on vendor. A Power Mac 8100 includes a 512K cache card.)

• Timbuktu Pro works on any Mac that's linked to PCs via a LocalTalk or Ethernet network. It's the one surefire way to get Windows on any Mac, although it does require having a PC in the office.

How Much Speed Do You Need?
The second question you should ask yourself is how much Windows performance you require.

If you need Windows to run, say, Microsoft Access to get employee payroll information for a report you do once a week, you don't need to spend a lot on performance. A product that offers the speed of a slow 80486SX-based PC (equivalent to a Quadra 605) or of a fast 80386DX PC (equivalent to a IIfx) is enough for occasional use. To get this level of performance, any of the products reviewed in this article will suffice. But note that these speeds are bottom-of-the-line for business PCs, and software will continue to demand more speed as new versions are released.

If you need to run specialized Windows programs—such as scientific-analysis, relational-database, accounting, or in-house custom software—look for an option that provides high performance,
THE MAC DOES WINDOWS

486DX2 PC. And it’s actually slower than a 33MHz 486DX PC—80 percent the speed—when tested with Windows-only programs. (A 66MHz 486DX2 system should be about 150 percent as fast as a 33MHz 486DX system.) Overall, an OrangePC card performs about the same as the next-slowest equivalent PC: a 100MHz card’s performance is similar to a 66MHz PC’s, a 66MHz card is equivalent to a 33MHz PC, and a 33MHz card is like a 25MHz PC.

The slowdown is due in part to the overhead that Orange Micro’s scheme for shared video, disk access, and input devices requires. In addition, the OrangePC cards’ VGA video-controller chip is only a middling performer, and when running in 256 colors, this chip affects the video component of overall performance. (The Model 210 runs only in 16 colors.)

For the Model 210 and 250, a big part of the slowdown is the lack of an on-board cache, which almost every desktop PC includes to boost performance. You can see the difference this makes by comparing our results for the Model 220 and the cacheless Model 250 when using the same 60MHz 486DX CPU.

On Power Macintoshes, we noticed a slight performance drag—just a few percentage points—even though the OrangePC software contains both 680X0 and PowerPC code. Because you can upgrade the CPU on the OrangePC cards simply by removing the current one, adding a faster one, and changing some jumpers, the OrangePC cards give you the option of increasing your Mac’s Windows performance later. But expect to wait a year before you’ll find 486DX2 or IntelDX4 CPUs on sale without a PC motherboard attached. And don’t expect to be able to plug in a Pentium.

SoftWindows On a Power Mac 7100/66 with a 256K cache card, you’ll get the performance of only a 40MHz 386DX-based PC (120 percent as fast as a 10MHz, or about 75 percent as fast as a 25MHz 486SX-based PC or a Quadra 605). Note the inclusion of a cache on the 7100. Insignia recommends a cache for good reason—Macworld Lab tests show that the cache lets SoftWindows run a little faster than SoftWindows on a 7100 without. (100 percent as fast).

Still, even on an 8100/80 (which comes with a 512K cache), SoftWindows is slower than any other option, maxing out at about the speed of a 25MHz 486SX (or Centris 610). Performance on a 6100/60 (with no cache) is equivalent to a 33MHz 386DX (or IXs).

Although SoftWindows has huge memory requirements—you need a system with 16MB of RAM—adding more memory won’t speed up SoftWindows’ performance noticeably, according to Macworld Lab tests. As with the Mac, Windows performance levels off after a certain RAM level; extra RAM doesn’t boost speed but does let you run more applications simultaneously. Having 16MB of Mac system memory leaves just 6MB for Windows, with the SoftWindows software itself taking another 9MB to run its emulation code. (That leaves 2MB for the Finder.) The 6MB for Windows gives you enough room to run a couple of modest Windows programs (such as Lotus 1-2-3 and Borland International’s Paradox) simultaneously.

The key to good SoftWindows performance is to configure the DeltaCache for at least 2MB of RAM when setting up your PC Memory in the Setup menu. This cache resides in your Mac’s memory and helps SoftWindows keep common Windows functions readily available.

Aside from its performance issues, SoftWindows also has a significant functional limitation: it runs only in Windows Standard Mode, not in Enhanced Mode. (Enhanced Mode lets programs take advantage of features in the 80386 and later Intel CPUs, and thus requires such a CPU; Standard Mode requires only a 286 CPU and exists for backward compatibility with the fast-diminishing pool of 286-based PCs. Because SoftWindows’ emulation is based on the 286 CPU, it supports only Standard Mode.) Windows programs designed to run in Windows Enhanced Mode (for example, Frame Technology’s FrameMaker 4.0, Borland’s Paradox 4.5, Adobe Photoshop 2.5.1, and Novell’s WordPerfect 6.0) won’t run under SoftWindows. And you can expect more and more applications in the coming months to require Enhanced Mode. Without Enhanced Mode, SoftWindows can’t run multiple DOS sessions.

Insignia promises to revise SoftWindows by the end of the year with at least some enhanced mode capabilities—a four-month delay from its original plans. That’s pretty late to be offering this capability, especially when Microsoft is likely to ship its forthcoming new version 4.0.

Calculating the Real Cost of Windows

All prices reflect direct prices or street prices and may vary by region. Configurations assume 8MB of RAM and 240MB hard drives each for the Mac and Windows environments.

<table>
<thead>
<tr>
<th>OrangePC Model 210</th>
<th>OrangePC Model 250</th>
<th>OrangePC Model 290</th>
<th>SoftWindows</th>
<th>Timbuktu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Setup</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product cost</td>
<td>$1139 (33MHz 486SX),</td>
<td>$1669 (33MHz 486SX),</td>
<td>$2403 (66MHz 486DX2),</td>
<td>$350</td>
</tr>
<tr>
<td>Windows 3.1</td>
<td>$79</td>
<td>$72</td>
<td>$79</td>
<td>included</td>
</tr>
<tr>
<td>Extra RAM</td>
<td>$175 (4MB)</td>
<td>$0 (none needed)</td>
<td>$0 (none needed)</td>
<td>$600 (8MB of RAM + 256K cach)</td>
</tr>
<tr>
<td>240MB hard drive</td>
<td>$300</td>
<td>$305</td>
<td>$300</td>
<td>$300</td>
</tr>
<tr>
<td>Network card</td>
<td>$200</td>
<td>$200</td>
<td>$200</td>
<td>$200 (Mac transceiver plus PC card)</td>
</tr>
<tr>
<td>Total</td>
<td>$1889 to $2033</td>
<td>$2338 to $2482</td>
<td>$3079 to $3912</td>
<td>$1290</td>
</tr>
<tr>
<td>Complete System</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic setup costs</td>
<td>$1889 to $2033</td>
<td>$2338 to $2482</td>
<td>$3079 to $3912</td>
<td>$1290</td>
</tr>
<tr>
<td>Macintosh</td>
<td>$1300 (Power Mac 7100)</td>
<td>$1300 (Power Mac 7100)</td>
<td>$1300 (Power Mac 7100)</td>
<td>$1300 (Power Mac 7100)</td>
</tr>
<tr>
<td>Windows PC</td>
<td>$0 (not applicable)</td>
<td>$0 (not applicable)</td>
<td>$0 (not applicable)</td>
<td>$0 (not applicable)</td>
</tr>
<tr>
<td>Total</td>
<td>$1589 to $1533</td>
<td>$1638 to $1782</td>
<td>$1678 to $1722</td>
<td>$1470</td>
</tr>
</tbody>
</table>

* Runs in native mode on a Power Macintosh. * Includes 16MB of RAM. * For one Mac and one PC. * Add $150 for Ethernet. Add $175 for Personal MacLAN Connect. * $2500 for a Quadra 650.
Windows may look superficially like the Macintosh interface, but there are a number of differences that can throw a veteran Macintosh user working for the first time in a cross-platform environment. If you are puzzled by how Windows works, use this guide to translate common Mac operations to their Windows counterparts. In the accompanying screen images, common interface elements that differ significantly between the Mac (top) and Windows (bottom) are highlighted and numberd to match the text here.

I also recommend a good book to ease the pain: Steve Lipson's *Windows as a Second Language* (Sybex, 1994, $17.99). It does a great job explaining Windows concepts from a Macintosh point of view.

1. Windows menus work like Mac menus, except that you don't have to hold the mouse down to keep the menu visible. Just click on a Windows pull-down menu and the menu remains on screen until you click on something else.

2. Windows has two types of close boxes, called close handles. They look similar to file-drawer handles. The wider one exits a program; the narrower one closes the current document.

3. To resize a Windows window, select any part of the window border and hold down the mouse while dragging. At the corners, you can resize the window horizontally and vertically at the same time. There are more controls in the upper right corner, similar to the Mac window's single control to toggle between full size and the last user-defined size. Clicking on the up-triangle icon (called Maximize) causes the Windows window to fill the screen; the dual-triangle icon (Restore) makes the window the last user-defined size; and the down-triangle icon (Minimize) reduces the window to an icon. A minimized program is still running, but in the background. If you minimize a document, its icon usually appears at the bottom of the program window.

4. The Mac's folder structure lets you place documents, programs, and folders inside folders. The placement of these elements in folders matches the physical location in the Mac's internal disk map. Windows uses DOS's disk map, which is a hierarchy similar to the Mac's but is unlike the flat Windows structure. Use the File Manager program as you would the Mac's Finder to manipulate the hierarchy of files and folders. In the Program Manager (the Windows interface), you have windows called program groups. Unlike Mac folders, they can't contain other folders. And they can only contain documents if you drag them from the File Manager into the group. The icons in groups are like aliases on the Mac—they aren't the actual files, just references to them. Thus, deleting, copying, or moving an item in a group does not delete, copy, or move it from the disk—you need to use the File Manager (or DOS) for that.

5. Windows displays all volumes in the File Manager, with different icons for hard drives, removable media (including floppy drives), network drives (servers), and CD-ROM drives. You use network-management software to connect to a server; there's no equivalent to the Chooser for this (although Farallon Computing uses the name Chooser for its Windows LocalTalk network manager).

6. Windows doesn't use a mechanism like the Chooser to change printers. Instead, you change the printer from a program's Print dialog box or from a separate Printer Setup dialog box (some programs support both methods). (You set the default printer via a control panel.) As on the Mac, you can drag and drop files onto an icon (in Windows, it's the Print Manager icon; on the Mac, it's your printer's icon) to initiate printing.

7. To delete an icon in the Program Manager or a file or folder in the File Manager, press the delete key. Windows has no Trash Can, except in third-party interface-enhancement software (the equivalent of system extensions).

8. Windows uses something called a Task Manager, which you access via Ctrl-Esc, to switch among open programs—similar to the Mac's program pull-down menu. You can also simply double-click on minimized programs from the bottom of the screen.
Are Windows Macs Good Enough?

Windows Application Index

<table>
<thead>
<tr>
<th>Product</th>
<th>Overall</th>
<th>Aldus Info Publisher 2.0</th>
<th>Lotus Ami Pro 3.01</th>
<th>Lotus 1-2-3 4.01</th>
<th>Microsoft Access 1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best result for a Mac product in each test suite. Products are grouped by vendor (and arranged in that group in order of overall Windows performance), followed by a group of PCs to be used as points of comparison.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Apple</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classic Mac</td>
<td>0.5</td>
<td>0.6</td>
<td>0.7</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Power Mac 8000/80 (includes 512K cache)</td>
<td>0.6</td>
<td>0.7</td>
<td>0.5</td>
<td>0.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Power Mac 7100/66</td>
<td>0.5</td>
<td>0.6</td>
<td>0.5</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Power Mac 6100/60 with 256K cache</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Power Mac 6100/60</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>SoftPC 3.1 on Centris 650</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Insignia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SoftWindows 1.0</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Orange Micro</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OrangePC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 250 (66MHz 486DX2) on Power Mac 7100/66</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Core-Performance Index

Times as fast as a Classic (Classic = 1.0).

<table>
<thead>
<tr>
<th>Common</th>
<th>Scientific</th>
</tr>
</thead>
<tbody>
<tr>
<td>A series of business tasks in Microsoft Word and Excel that test processor, video-display, and disk-access operations.</td>
<td></td>
</tr>
</tbody>
</table>

Macworld Lab compared Windows performance in two ways: (1) For the standard Core-Performance Index, we performed identical tests in two programs available for both Windows and the Mac (Microsoft Word and Microsoft Excel). This method lets you compare the performance of any Mac and any Windows PC. (2) We performed tests using popular Windows programs that have no Macintosh equivalent; this lets you directly compare the Windows performance of the products we tested.

Both sets of tests exercise components of PC performance: integer (standard) computation, disk access and system overhead, video display, and floating-point computation. The results give a balanced view of overall performance. All systems were tested with 16MB of total RAM and in 256-color, 640-by-480-pixel resolutions—except for the OrangePC Model 210 card, which supports only 16 colors.Macworld Lab testing supervised by Danny Lee and Galen Gruman

Mac to increase the GDI-to-QuickDraw translation. However, our testing found that using a Quadra 650 (which uses a 33MHz 486DX CPU) rather than a Centris 610 (which uses a 20MHz 486CX) made almost no difference in video performance on a LocalTalk network. But changing from a 33MHz 486DX PC to a 66MHz 486DX PC made a dramatic difference: video-processing speed increased 50 percent. Clearly, it’s Timbuktu for Windows that’s responsible for most of the GDI-to-QuickDraw processing.

Farallon recommends using a fast Mac to increase the GDI-to-QuickDraw translation. However, our testing found that using a Quadra 650 (which uses a 33MHz 486DX CPU) rather than a Centris 610 (which uses a 20MHz 486CX) made almost no difference in video performance on a LocalTalk network. But changing from a 33MHz 486DX PC to a 66MHz 486DX PC made a dramatic difference: video-processing speed increased 50 percent. Clearly, it’s Timbuktu for Windows that’s responsible for most of the GDI-to-QuickDraw processing.

Don’t assume you can get better performance by using a Power Mac: running in 680X0 emulation, the speed for GDI-

of Windows (code-named Chicago) late this year or in early 1995. (Insigilia has promised a Chicago version of SoftWindows within a few months of the Chicago release. I think that’s optimistic, based on past ship dates and Chicago’s complexity.)

Timbuktu Pro In Macworld Lab tests, Timbuktu running on two midlevel computers—a 33MHz 486DX-based PC and a 20MHz 40-based Centris 610—performed at about 25MHz 486SX PC (or Quadra 605) levels.

The faster your PC-based Windows server, the faster the performance you’ll get for calculations and disk access. But video performance—everything from scrolling to window display—will seem very slow, even on the fastest PC. That’s because Timbuktu needs to translate the Windows GDI display language to the Mac’s QuickDraw language for all video operations. Macworld Lab found that GDI translation slows Timbuktu so much that it takes four to five times as long to do an operation as the PC alone would.

Having a high-performance video card on the PC won’t increase video-display speed from the Macintosh user’s perspective—the Mac still has to wait for the GDI information to be translated to QuickDraw. As a result, the more video-oriented your work, the slower Timbuktu is. Conversely, the less video-oriented your work, the faster Timbuktu is.

Farallon recommends using a fast Mac to increase the GDI-to-QuickDraw translation. However, our testing found that using a Quadra 650 (which uses a 33MHz 486DX CPU) rather than a Centris 610 (which uses a 20MHz 486CX) made almost no difference in video performance on a LocalTalk network. But changing from a 33MHz 486DX PC to a 66MHz 486DX PC made a dramatic difference: video-processing speed increased 50 percent. Clearly, it’s Timbuktu for Windows that’s responsible for most of the GDI-to-QuickDraw processing.

Don’t assume you can get better performance by using a Power Mac: running in 680X0 emulation, the speed for GDI-

of Windows (code-named Chicago) late this year or in early 1995. (Insigilia has promised a Chicago version of SoftWindows within a few months of the Chicago release. I think that’s optimistic, based on past ship dates and Chicago’s complexity.)

Timbuktu Pro In Macworld Lab tests, Timbuktu running on two midlevel computers—a 33MHz 486DX-based PC and a 20MHz 40-based Centris 610—performed at about 25MHz 486SX PC (or Quadra 605) levels.

The faster your PC-based Windows server, the faster the performance you’ll get for calculations and disk access. But video performance—everything from scrolling to window display—will seem very slow, even on the fastest PC. That’s because Timbuktu needs to translate the Windows GDI display language to the Mac’s QuickDraw language for all video operations. Macworld Lab found that GDI translation slows Timbuktu so much that it takes four to five times as long to do an operation as the PC alone would.

Having a high-performance video card on the PC won’t increase video-display speed from the Macintosh user’s perspective—the Mac still has to wait for the GDI information to be translated to QuickDraw. As a result, the more video-oriented your work, the slower Timbuktu is. Conversely, the less video-oriented your work, the faster Timbuktu is.

Farallon recommends using a fast Mac to increase the GDI-to-QuickDraw translation. However, our testing found that using a Quadra 650 (which uses a 33MHz 486DX CPU) rather than a Centris 610 (which uses a 20MHz 486CX) made almost no difference in video performance on a LocalTalk network. But changing from a 33MHz 486DX PC to a 66MHz 486DX PC made a dramatic difference: video-processing speed increased 50 percent. Clearly, it’s Timbuktu for Windows that’s responsible for most of the GDI-to-QuickDraw processing.

Don’t assume you can get better performance by using a Power Mac: running in 680X0 emulation, the speed for GDI-
to-QuickDraw translation is about the same as on a 040 Mac. (Make sure you use Timbuktu Pro 1.03, since version 1.0 did slow down Windows performance noticeably on Power Macs.) Farallon plans to include native Power Mac code in the next major release of Timbuktu Pro, expected later this year.

You might think that the network you use would make a performance difference, prices, because list prices don't account for the price of RAM requirements and other components. The table "Calculating the Real Cost of Windows" shows the actual costs of a typical business setup; use this table to calculate your own expenses.

Clearly, Timbuktu Pro is the least expensive option—if you already have a PC to network to your Mac. SoftWindows follows closely—if you happen to own a Power Mac. The OrangePC cards are the most expensive options—they cost several hundred dollars more than a complete Windows PC—but you get a full-fledged PC integrated into your Mac. (Orange Micro does offer discounts of about 10 to 15 percent for volume purchases.)

But the whole-system costs don't show such dramatic differences: the SoftWindows, Timbuktu, and OrangePC Model 210 systems all cost within a few hundred dollars of each other.

How Interoperable Are They?
The fourth question to ask—whether you work alone or in a networked office—is how well your Macintosh and the Windows option you choose will work together. At the least, you'll want to import data from a Windows application into a Mac program, or vice versa. In a networked environment, you'll want access to E-mail, file sharing, and servers from the environment you're currently working in. You might be happy with having your E-mail consolidated so it appears in only one environment, but you'll still want access to servers.

No matter which Windows option you choose, get a program to mount your PC disks on a Mac and a program to mount your Mac disks on a PC; the total cost of the two will be about $325.

A Power Mac includes Apple's Macintosh PC Exchange PC-disk-mounting utility, so owners of these Macs need only get a Mac-disk mounter for their PC colleagues. (System 7.5 also comes with PC Exchange.) You'll also want the convenience of sharing disks freely rather than relying on just network transfer. (For details on disk-mounting software, see "Cross-Platform File Transfer," Macworld, December 1993; and a review of three recently updated file-transfer and translation utilities, Reviews, April 1994.)

All the products reviewed here support PC CD-ROMs, although you usually need to install the (supplied) driver in DOS. All support printing to PostScript and non-PostScript printers, although the Mac will need the appropriate driver for non-PostScript printers.

OrangePC The OrangePC software lets you establish a shared drive or folder for exchanging data between Mac and Windows programs. OrangePC can also read SoftWindows virtual drives, but it can't start up from them. It also has trouble copying large groups of files from SoftWindows drives, reporting disk errors intermittently.

The OrangePC setup supports the use of external SCSI PC drives as shared volumes (you'll need Apple's Macintosh PC exchange 2.0 software to mount them on the Mac desktop). In our initial tests, however, we couldn't use either Mac or PC SCSI drives as a shared volume. As it turned out, OrangePC doesn't automatically install the utility necessary for sharing in your start-up PC drive. Once installed, drive sharing worked fine with both drives. But you'll experience a slowdown in drive-access speed if you share PC drives as Mac volumes, because of how the data moves between the Mac and the OrangePC board. If you need fast access to an external PC drive, use a PCMCIA-based hard drive or a SCSI drive connected to the OrangePC card via a PCMCIA SCSI adapter. Both the Model 250 and 290 support PCMCIA.

The OrangePC software provides limited copying and pasting of unformatted text between Mac and DOS programs and from Mac to Windows applications. It copies graphics only from Windows programs to Mac programs, and then only as bitmaps. Text copied from a Windows program is converted to a bitmap graphic when pasted into a Mac program. Because of these limitations, don't try to copy information via the Clipboard. Instead, save the file in a common file format—such as RTF for formatted text, TIFF for bitmaps, or EPS for drawings—and transfer it via network, floppy, or shared volume.

Through optional PCMCIA network cards, you can connect a Model 250 or 290 OrangePC card to a PC Ethernet or Token Ring network. Another option for any of the OrangePC cards is to use a par-
allel-to-Ethernet adapter card. Either way, you'll need the appropriate PC networking software, too.

**SoftWindows** With SoftWindows, moving files between Windows and the Mac is easy. Because the program lets you set up shared drives that are accessible to both environments, you can just use each environment's file-management capabilities, such as dragging files into a folder.

We couldn't access a PC SCSI drive attached to the Mac, though, even with Macintosh PC Exchange 2.0 installed. The Mac recognizes the PC drive, but SoftWindows can only recognize PC hard drives connected via a network; you cannot set the software to recognize PC hard drives connected directly to the Mac via SCSI.

SoftWindows also has a function, called SmartCopy, that lets you transfer unformatted text and bitmapped graphics between Mac and Windows programs. The function is rudimentary, but it does let you quickly move pieces of text and graphics between programs.

SoftWindows lets you install standard PC networking software—such as Novell NetWare or Microsoft Windows for Workgroups—and transform your Mac into another PC on the network. SoftWindows uses whatever network the Mac has: LocalTalk, Ethernet, or TCP/IP. If your PCs are networked via Ethernet but your Macs are connected via LocalTalk, you can use the SoftNode gateway feature to connect them. With SoftNode, another Mac that's connected to both the PC Ethernet network and the Mac LocalTalk network acts as the router for the Mac using SoftWindows.

**Timbuktu** The Timbuktu software includes options to transfer files between Macs and PCs. You can edit the PC's Windows configuration file so that the Mac can recognize, say, a PC file with the QXD extension as a QuarkXPress file. That way, you simply double-click on the QXD file to open it after it's been transferred to the Mac. The Timbuktu for Windows setup includes most common file-type maps, such as XLS (Microsoft Excel), PM4 and PM5 (Aldus PageMaker), and DOC (Microsoft Word). Unfortunately, the configuration process is obscure—even to many Windows users—and Farallon should include a utility that simplifies the process.

Like most of the other products, Timbuktu allows basic cutting and pasting of unformatted text and bitmapped graphics. And because you're controlling a Windows PC from your Mac, you have access to any network services available from that PC. The PC users won't see the Mac or its services, though, unless you use a program such as Miramar Sys-Windows subsystem. The cards could use better documentation, and I wish they were less expensive and performed closer to their CPUs' rated speed. But the OrangePC cards are still the most versatile and best-performing options.

Finally, it looks as if we can start laying to rest the old Macintosh-versus- Windows debate. Earlier this year, the Power Mac introduction showed that the Macintosh could compete quite well on a price/performance basis with PCs. And now that you can efficiently run Mac and PC software from the same machine, you can have the best of both worlds. How long will it be before your coworkers with PCs come to the same realization? If not now, when?

GALEN GRUMAN is a senior associate features editor at Macworld and a longtime reviewer of PC software for InfoWorld.

---

**I wish they were less expensive, but the OrangePC cards are the best options**

The Last Word

Sometimes the best option is to get a PC in addition to your Mac. However, that's not the best option most of the time (if for no other reason than limited desk space).

Insignia's SoftWindows works with only a select few Macs, and its performance is at the low end of business-PC performance. SoftWindows is best suited for home and small-office users, given its relatively low cost. Even with its higher price, though, a low-end OrangePC card may be a better deal in the long run, depending on the degree of Windows performance you need. That's because OrangePC cards are compatible with all Windows programs and are all but certain to be immediately compatible with the next version of Windows.

Timbuktu is a great solution for many Mac owners because it lets you use existing PC resources and can run from any Mac. It does require a separate PC—not a problem for most companies, although a potentially big burden for small offices and home users.

For most Macintosh users who also need regular access to PC software, though, Orange Micro's cards are the best bet. They come in a range of configurations and prices, so you can buy the amount of power you need. All models are expandable, so you can add peripherals. And all the cards let you replace the CPU, so you can increase your performance as needed without replacing your entire Mac. The cards also use better documentation, and I wish they were less expensive and performed closer to their CPUs' rated speed. But the OrangePC cards are still the most versatile and best-performing options.

Finally, it looks as if we can start laying to rest the old Macintosh-versus- Windows debate. Earlier this year, the Power Mac introduction showed that the Macintosh could compete quite well on a price/performance basis with PCs. And now that you can efficiently run Mac and PC software from the same machine, you can have the best of both worlds. How long will it be before your coworkers with PCs come to the same realization? If not now, when?

GALEN GRUMAN is a senior associate features editor at Macworld and a longtime reviewer of PC software for InfoWorld.

---

**PC Coprocessing**

**Editors' Choice** Performance and long-term viability are the key considerations when choosing the best options for running Windows on Macs. Some users can live with slow performance if they need Windows applications only occasionally.

**OrangePC Model 210** With a 33MHz 486DX CPU, this should satisfy most business and home users. You'll likely want to increase the 4MB of on-board RAM to 8MB, and you'll have to buy Windows separately, but the OrangePC card offers the best long-term solution and the best performance. Company: Orange Micro. Direct price: $1283.

**Timbuktu Pro 1.0.3** for Macintosh and Timbuktu 1.1 for Windows. For a networked environment, Timbuktu provides the most cost-effective solution to running Windows from a Mac. It also provides good performance if used with a 66MHz 486DX2-based PC or better and with at least a 20MHz 040-based Mac. Company: Farallon Computing. List price: $199 each.
AGFA. FOTO TUNE. RED.
There’s RED and there’s RED. We see redheads and red fire engines and we paint the town red. And while a rose may be a rose, a red is not always a red. In the world of electronic publishing, this is doubly true. Scanners, monitors, and output devices define color in their own particular “languages” (called color spaces).

FotoTune is the solution. FotoTune, the Color Management System (CMS) from Agfa, takes those different color spaces and creates a “common language” called ColorTag. FotoTune insures color consistency throughout the workflow, from scanner to monitor to output device.

FotoTune. For all the ways of seeing red.

Find out how FotoTune can help you. Call 1.800.685.4271, extension Tune.
Not everything in Texas comes easy.

microWriter™ PS23 Printer
Under $750.

An entry-level, laser-quality printer for small businesses and home users. 300 dpi, 5 pages per minute, 23 scalable fonts, Mac/Windows/DOS compatible. Adobe® PostScript®/PCL 5 emulations.

microLaser™ Pro 600 Printer
Under $1,350.*

The easy solution for users looking for a feature packed, high performance 600 dpi printer. It comes standard with a printing speed of 8 pages per minute, 6 MB memory, two 250 sheet paper trays. Mac/Windows/DOS compatible. Adobe PostScript 2/PCL 5 emulations.

microLaser PowerPro Printer
Under $1,750.

Easily one of the fastest 600 dpi printers for the price, and ideal for heavy graphics printing. Start with the Pro 600 and add a blazing 12 pages per minute, a turbo charged processor, and more scalable fonts. Mac/Windows/DOS compatible.

- EtherTalk now available on optional multi-network interface.
- Adobe PostScript
- Adobe PostScript 2/PCL 5 emulations
- Under $1,350
- Under $1,750
- Under $750

microLaser Pro 600 a winner of these fine awards.
But our printers do.

You won't get thrown by a TI printer. You'll find 20 years of experience designed into a line of printers that redefines easy. A family of friendly printers that extend your reach — without extending your budget.

Easy to use. As you have come to expect with a Mac, our printers are designed to be plug and run. Just open the box¹, load the software, pop in the consumables and you're ready.

Easy to maintain. You'll find our printers virtually trouble-free. From printheads to toner cartridges to imaging units, our long-life consumables can be dropped into place in seconds — and they're economical enough to give you a very low cost per page. We have even eliminated the need for special tools to upgrade your printer. To add more memory to our microWriter or microLaser printers, simply remove two thumbscrews, pop in the board and you're done.

Easy to service. We've built our printers to be trouble-free, complete with a one-year limited warranty and a toll-free technical support line. So if you do have a question, you get live, friendly assistance from professionally trained technicians.

Easy to own. Our printers have the friendliest prices around. And we're so sure you'll like them, we offer a 30-day risk-free trial¹ to make sure you're perfectly satisfied.

Easy to buy. Just call 1-800-TI-TEXAS (1-800-848-3927). Ask us anything you want. We'll send you literature and competitive comparisons within 24 hours with all the details you'll need to find the TI printer that's just right for you.

TEXAS INSTRUMENTS

*Offer applies to all new microWriter and microLaser printers if returned in good condition.

Circle 266 on reader service card
Five hundred television channels. Picture, data, and video links between nearly every person in the country—eventually the planet. The ultimate triumph of Marshall McLuhan’s global village. The greatest technological marvel of the modern era. These are the promises of the computer and television networks of the future.

But what do people really want on the emerging “information superhighway”? And will they really get what they want? A *Macworld* public-opinion survey, one of the most extensive benchmarks of consumer demand for interactive services yet conducted, begins to answer those questions. And the information superhighway industry, primarily telecommunications, cable, and computer companies—rapidly rolling out high-tech entertainment and shopping services—may be in for a shock.
The industry sees video-on-demand—the ability to select from among movies and television shows at will—as the fountain of revenues to develop other services. Yet according to our national survey of 600 adults, consumers are much more interested in using emerging networks for information access, community involvement, self-improvement, and communication, than for entertainment (see "Macworld Poll: What Consumers Want on the Infobahn"). Respondents rated video-on-demand just 10th among 26 possible online capabilities. Only 28 percent of consumers considered video-on-demand highly desirable.

Moreover, industry executives are risking billions of dollars on the assumption that the more familiar consumers become with interactive electronics, the more products and services they will buy online. Yet our survey shows that today's most sophisticated consumers—current users of the Internet and commercial online services who rank themselves as moderately to highly knowledgeable about computers—have the same tepid interest in entertainment services that most other consumers have. That calls into question the media conglomerates' information superhighway strategy.

Will the public get a diverse, fully interactive platform for communications, with expert filters for directing a traffic jam of useful information? Or will it get, as David Letterman once quipped about his TV show, "an information highway without the information"?

What the Net Builders Envision
Based on what key players in building giant interactive networks say, the Letterman scenario seems probable. When telecommunications executives attend high-profile technology summit meetings with politicians, they speak eloquently about Vice President Al Gore's far-reaching vision of a fully wired society. The information superhighway will become a dynamic force for social good, they say, improving communication, education, medical care, and political participation.

But when they talk business, the emphasis shifts. After all, cost estimates for building the kind of network needed to deliver Gore's vision for the entire nation run upwards of $400 billion. This would create a network that is fully switched (supporting real-time, many-to-many communications) and broadband (supporting, at a minimum, two-way, full-motion video communications). While major cable and phone companies have announced plans to spend tens of billions of dollars on the new networks, their financial commitments over and above routine infrastructure maintenance and upgrading amount to only a tiny fraction of the tens of billions. The extra money has to come from somewhere.

That somewhere is "killer applications"—video-on-demand, home shopping, interactive games, and direct-response advertising—says Raymond Smith, a key industry leader who is chairman of Bell Atlantic, one of the seven regional telephone monopolies (known as the Baby Bells) formed after the AT&T breakup in 1984. Smith told an industry conference that ultimately the system could include "society-transforming applications like telemedicine, telelearning, and telecommuting." He didn't say when such applications might be widely available, nor did he mention communication between users or civic involvement. And neither do most other industry execs. Instead, they concentrate on the near-term moneymaking opportunities.

Brendan Clouston, chief operating officer of Telecommunications, Inc. (TCI), the largest cable-TV provider, predicts that information superhighway providers will soon create hundreds of lifestyle niche shows on specialized subjects, from cars to health care, built around name brands such as General Motors and Johnson & Johnson. Clouston says such networks might include "long-form commercial messages—15, 30, and 60 minutes—to fit with these lifestyles." In a recent appeal to advertisers, he proposed networks that become, "in effect, 24-hour infomercials."

Paul Shumate, Jr., executive director of Access Network Technology Research at Bellcore (a research consortium for the Baby Bells), sees video games as a lucrative market because of their addictive quality. "You try to suck 'em in cheap," Shumate told Macworld, "then, as they get to higher and higher [game] levels, increase the rate per minute."

Public-interest groups shudder at the thought of applying this approach to another service that the industry expects to become a killer app: online gambling. But it's hardly surprising. At-home betting is already legal in several states, and in these days of shrinking tax revenues, local and state governments increasingly turn to gambling as a hedge against insolvency.

Industry rejects concerns that the mix of services to be offered gives short shrift to the social good. If people want entertainment, shopping, games, and gambling, then industry serves the public well by providing those capabilities, industry argues. Most providers seem to agree with Richard McCormick, chairman of US West, another Baby Bell, who recently told a U.S. Senate hearing, "The market is the public interest." This reasoning may become a self-fulfilled prophecy, however. In practice, the market is whatever the phone and cable companies offer.
What Consumers Want

Are industry leaders misjudging the nature of the emerging electronic marketplace? The Macworld poll suggests that the public may be on a very different wavelength. Voting in elections was the most desired online capability, highly coveted by fully half of our sample. Sixty percent of respondents expressed a moderate-to-strong interest in being a part of civic affairs; and 46 percent want to send video or text E-mail to elected representatives.

These are poignant findings in a nation where anemic voting totals are the norm and many citizens typically view civic affairs with the same enthusiasm they reserve for a trip to the dentist. Respondents also want the following potential online capabilities more than video-on-demand: on demand access to reference materials; educational courses or how-to programs that allow interaction with a class or instructor (distance learning); interactive reports on local schools; and access to information about government services and training. And respondents say they would vote with their pocketbook for such self-improvement services. Thirty-four percent of the sample would pay $10 or more a month for distance learning. Yet only 19 percent of our sample would pay $10 or more per month for video-on-demand or other entertainment services.

And customers of commercial online systems and the Internet—which is now growing by an estimated 100,000 or more users per month—have demonstrated a large market for online communication and interactive information services, as well as a hunger for all manner of educational resources.

No Back Talk

The industry certainly agrees with the concept of enhanced communication and elaborate interactivity—indeed, these are the Holy Grail in superhighway advertising imagery. But what is the industry really doing to find that Holy Grail?

So far, not much for the near future. In the video world, sophisticated interactivity requires high two-way bandwidth (the capacity of data pipelines) to transmit the massive digital streams generated by video images. Video-on-demand and home shopping require extremely high downstream bandwidth (from service provider to user) but only a trickle of upstream capacity (to relay simple commands from users back to the giant servers that will deliver movies and L. L. Bean catalogs).

Industry will build these highly asymmetrical systems because they are vastly cheaper and easier to create and manage.

DELIVER THOSE NEW CAPABILITIES.”
Industry's Blueprint: Grand Vision or Distant Dream?

What are the net builders building? Their construction plan is where the future takes shape. And it's a future that diverges fundamentally from the idea that communication and information access should be top goals of the information superhighway.

Most phone and cable companies have adopted a hybrid fiber-optic/coaxial approach for the networks' physical structure. Fiber-optic cables—the highest-bandwidth transmission medium—that can carry a few hundred "channels" of broadcast-quality video would be linked to coaxial cable (the standard for cable-TV transmission) connected directly to users' equipment. Typically, coaxial from some 500 households would feed into a single fiber-optic cable.

High bandwidth doesn't necessarily make for a diverse net, however. In most cases, about 80 percent of the channels would be reserved for the one-way broadcast of movies and other entertainment services—the standard cable-TV model.

Nor will most systems be particularly interactive. The term video-on-demand suggests an immediacy and range of options that won't exist in most systems for many years.

Less than Meets the Eye In a typical example, Ameritech, the midwestern Bell operating company, has proposed to roll out a $4.4 billion network consisting of 390 channels. But don't worry about the challenge of surfing 390 channels. It would take up to 6 channels to broadcast, for example, a single feature film.

Seventy channels would be assigned for one-way, analog broadcast of entertainment programming, akin to today's cable systems. Those channels would probably be used to transmit major TV network choices. Another 240 channels would be reserved for digital multicast services. Those would also provide one-way broadcast, similar to today's cable TV, and would likely be filled with a variety of pay-per-view offerings.

How would most channels be allocated? At first, expect the week's top hit movies to run every 5 to 30 minutes.

Customers could pause movies. Well, not actually pause like a VCR. They could stop the movie, then pick it up at a later transmission slot. For example, if you pause for two minutes to grab a snack, you might be queried, "resume at three minutes before paused scene, or eight minutes before paused scene?" This is not pure on-demand, but it's better than today's pay-per-view. The system would offer more choices than conventional cable, although nothing like the mind-boggling variety of a video store.

"If you're going to offer 50 movies, you'd better set aside 300 channels," says U.S. Representative Rick Boucher (D-Va.), a proponent of a rapid deployment of broadband networks. "That gives you a more sobering picture of how the information infrastructure may be used for these video-on-demand applications."

Wiring the Infobahn

Most telecommunication companies plan to build interactive TV systems over the next decade based on a super-cable TV model—one fiber-optic cable connected to 500 or more homes via coaxial lines. Super-cable TV would offer efficient delivery of video entertainment and shopping services but would not permit communication or elaborate interactivity. Only a few consumers at a time could obtain video or information on-demand.

Advocates of the Internet model—which emphasizes communication over the purchase of video services—wants to add Integrated Services Digital Network (ISDN) technology to standard phone lines. ISDN systems could get the public up and running on switched networks offering high-speed data, sound, and low-quality video within five years, for a fraction of the cost of the supercable TV systems. ISDN cannot handle broadcast-quality video, however.

Some experts want to use fiber-coaxial networks and ISDN over phone lines simultaneously. This dual-system approach would offer communication and information services, as well as the video services the industry believes will finance more-advanced future networks.

Eventually, high-speed networks based on one fiber-optic cable for every six homes could supply enough upstream bandwidth to support interactive TV, elaborate information-on-demand services, high-speed transfer of massive data files, and switched video communications on a single system. No companies plan to build such costly systems anytime soon, however.

Finally, Ameritech would reserve 80 channels for higher-priced, switched-digital service. This would also involve one-way transport of video signals, but the consumer could command services such as ordering merchandise or movies (perhaps with a short delay), pausing movies, or placing bets. This approaches true video-on-demand, although futuristic virtual-VCR abilities and custom profiles of viewer interests would not be available for some time. Programmers would lease those 80 channels from Ameritech, then offer any service they think would sell. Some information or education options might be attempted at the margins.

Unfortunately, the 80 channels would be shared by 500 homes; once 80 consumers (or, realistically, far fewer requesting high-bandwidth video services) plug in, successive customers would be blocked out. "When you've got 500 homes and [80] channels, damn few people can get video-on-demand," says Timothy Regan, a public-policy vice president with Corning, a fiber-optic supplier.

Higher-level interactivity will be hamstrung by a highly asymmetrical design. The system would supply massive bandwidth downstream to consumers—about 750MHz to each user—but reserve almost nothing for the up? "Originally the fiber-to-the-curb model was favored," explains Paul Shumate, Jr., a network-technology executive at Bellcore. Such a system would have provided one fiber-optic cable for about every six homes.

"That would have permitted very respectable upstream services. You'd have been able to send compressed digital video with no trouble. But those kinds of platforms were perceived as too expensive and as having too many technical problems. [The salable services] that they could identify in the near future were much more video- and cable-like." Like reasonable upstream bandwidth, fully switched (many-to-many), real-time communication abilities would have to be added in the undefined future.

When will a panoply of broadband services on switched networks—the essence of Vice President Al Gore's vision—become widely available? "They won't be ubiquitous until 2015 or later," says Shumate. "[Most] models predict that the number of users will be about 10 percent of the nation by the turn of the century. And that's aggressive."

If the demand for high levels of interactivity, and ultimately for fully switched digital services, exceeds the capacity of planned systems, the phone companies could upgrade.
They could decrease the number of homes that would share a single fiber cable to, say, 125. But some industry executives consider this approach shortsighted.

"Bandwidth is like money. The more you have, the more you want," says Corning's Regan. "You'll always be constrained by your coax cable." Despite Corning's evident self-interest, Regan is hardly a voice in the wilderness when he suggests that the industry should simply swallow hard and make the investment that seems to be required by the inevitable march of technology.

It's not just a matter of bandwidth, however. Cable-TV companies suggest that their systems can be converted from one-way, analog broadcast to interactive, fully switched digital communication virtually overnight. This is far from certain. "The feasibility of two-way communications using existing coaxial networks is unproved and years away from widespread commercial availability," Alex Manil, executive vice president of AT&T Communications Services Group, told a congressional subcommittee in February.

Meanwhile, asynchronous transfer mode, or ATM, a data-transfer method that more effectively uses available bandwidth and supports a wide range of telecommunications services (such as voice, broadcast-quality video, and videoconferencing over phone lines, coaxial cables, or optical fiber) costs about $10,000 per connection. Prices should eventually come down significantly but not until after the turn of the century.

And even if we had a system of switched, high-bandwidth nets connecting every building in the country, many multimedia and on-demand services would still be a long way off. Data-compression techniques, video servers to stream different signals to tens of thousands of consumers simultaneously, set-top boxes, and distribution and interface software—not to mention interoperability standards between TVs, set-top boxes, and computers; billing systems; copyright-protection and privacy-protection schemes—are all remote.

How fast will the technology mature? Estimates vary, but just about everything in the interactive-TV realm is running way behind schedules anticipated just last year.

than fully interactive systems (see the sidebar "Industry's Blueprint: Grand Vision or Distant Dream?).

High-bandwidth interactivity—needed for some distance learning, long-distance medical consultations, two-way visual participation in electronic town halls, or merely for transferring large data files quickly, for example—won't happen on a large scale anytime soon. People will be able to view or download video and data, but they'll be able to return little or no data to the source.

Information-on-demand and distance-learning—both among the top-rated services in our survey—won't be available for mass consumption until interactive TV takes off, says Woody Kerkelsager, vice president for technology and infrastructure at AT&T. "The companies don't have the knowledge base or the platform or applications to deliver those new capabilities. The logical way to start is by incrementally adding to something the consumers know well, which is television."

Some segments of the industry find this approach to be discouragingly cautious and say that it will not be easy or cheap to upgrade. "The nature of the architecture that's being deployed is not what we all think about when we talk about the information highway," says Timothy Regan, a public-policy vice president with Corning, a leading supplier of optical fiber. "For all intents and purposes, these are advanced cable-TV systems. [The Baby Bells] say that someday we will have high-bandwidth upstream systems." But that day is a long way off.

No Personal Connections

At first, large-scale interactive-video systems will not support user-to-user contact (beyond the plain old telephone service that could be integrated in some networks). "This shows the gap between the information superhighway rhetoric and reality," says Daniel Weitzner of the Electronic Frontier Foundation, a Washington, D.C., nonprofit group that supports switched, interactive networks. The EFF argues that communication should be the essence of the emerging networks from the beginning.

Weitzner agrees with Corning's Regan that industry plans do not reflect the public interest, but for different reasons. The EFF believes average consumers need and have the right to what the foundation calls open platforms—affordable, narrow-band, switched-digital services with modest two-way video capabilities—as a digital bridge to eventual broadband communications.

The Macworld survey seems to validate the EFF's views. Broadband systems are hardly necessary to achieve many of the civic involvement, communication, and information services our respondents desire. (Indeed, modest versions of these capabilities are already in place on the Internet; commercial online services; and local community, school, and business-based nets scattered around the nation.)

Integrated Services Digital Network (ISDN) technology, a widely available method of transmitting digital data that can be used over phone lines, could get the public up and running on interactive digital nets before the year 2000. With a mass base of consumers, the argument goes, entrepreneurs and developers would quickly create applications and services that could serve as the basis of the broadband interactive future.

Unfortunately, a catch-22 holds back ISDN: until it is produced for a mass market, ISDN will be too costly for the vast majority of consumers, and prices will remain high until many more customers demand the service. More important, some phone and cable companies do not see ISDN as a major long-term profit center because it can't be used for video-on-demand or sophisticated home shopping. And they argue that ISDN-type schemes will ultimately be supplanted by broadband nets anyway—a transition that telecommunications giants believe they must make as quickly as possible to survive in an increasingly competitive marketplace.

The decision to go directly to broadband with a limited range of initial services could have far-reaching, unanticipated consequences, however. If industry defines shopping, gambling, advertising, and entertainment as the primary purpose of interactive networks, communication and community may not grow as naturally as people seem to expect. "They're not just building networks," says Andrew Blau, a superhighway expert with the Washington, D.C.-based Benton Foundation. "They're building expectations of what the networks are for."

And those expectations might be narrowly defined by the affluent, predominately white consumers who will get interactive video ahead of the rest of the nation (see the sidebar "Gerrymandering the Electronic Future?")

If You Build It, Will They Come?

Still, maybe the industry deserves the benefit of the doubt. After all, the phone and cable companies say that they identify their ultimate self-interest with the fully switched, diverse, broadband nets of the future. And computer makers and con-
tent providers want to equip and enlighten information-hungry consumers.

The net builders claim to have a business model that will deliver this dream. That model is based on two major factors: consumer response to earlier technologies, and tests of interactive services. The industry looks first at the precedent of our high-quality, near-universal, affordable telephone service. It took about 70 years for 50 percent of Americans to obtain phones, but consumers adopt new technologies much faster now. Nearly all U.S. households had TVs within 34 years of its introduction, and VCRs rocketed to 65 percent market penetration in just 13 years. Some 30 percent of households now own personal computers, 20 years after they became mass-market products.

But do buying trends for consumer electronic devices make for a good information superhighway comparison? The biggest expenses will go toward creating and running the massive networks. The telecommunications industry will never recoup such expenses selling the set-top boxes consumers will use to interact with the networks. So where will the money come from? Raiding other industries. Consumers rent videocassettes to the tune of $3.99 a pop, it hardly seems like an engine to drive the network of the future.

“Tent providers want to equip and enlighten information-hungry consumers.”

Interactive TV Tests Flop
The results? So far they don't suggest a winning formula. For example, TCI's flagship test program is an interactive-TV system for about 300 customers in the Denver area. TCI boasts that buy-rates in that test run about 12 times as high as for typical cable pay-per-view. That sounds impressive until you learn that this translates into about one movie per household every two weeks. At $2.99 to $3.99 a pop, it hardly seems like an engine to drive the network of the future.

“If you're betting the farm on every person using your service four times a week, unless you're offering food, you're making a big mistake,” says the Benton Foundation's Blau.

In fairness, “some of the greatest products we have today started out very slowly,” AT&T's Kerkeslager points out. “If you're looking for a killer app that will emerge in the space of a year or two, you won't see it. But there is a market here, and I expect that we will find it.”

Still, it's far from certain that these systems will pay their keep anytime soon. “The fact is, every interactive cable experiment so far has failed,” Ted Turner, creator of Cable News Network, told Business Week last year. “Maybe in another generation it will work.”

And remember, broadcast and standard cable networks are not going away. It will be hard for any single industry to gain a commanding share of viewers. For example, the Baby Bells' planned interactive-video systems will have to capture some 15 percent of current cable-TV customers to turn a profit. And those customers would have to pay at least $40 to $55 a month for new video services, according to industry estimates.

No one knows whether consumer demand will make interactive TV profitable, but the stakes are high for the first services. If consumers don't buy in big-time, infobahn construction could stagnate or even reverse direction.

“If we find that the demand is not there, we won't hesitate to slow down” the expansion of services to all areas, says Larry Plumb, a spokesman for Bell Atlantic, which has aggressive video-network plans. “No one wants to build something that no one wants,” he adds. “But you have to start somewhere.”

Changing the Rules
Sometime this fall, that starting point may shift dramatically. Two bills that have recently passed in the U.S. House of Representatives could soon make debates about the industry's current strategies “seem like listening to a Frankie Avalon record,” according to Representative Edward Markey (D-Mass.), one prime mover of the legislation.
Under current law, nearly all local phone connections are provided by the seven Baby Bell companies, which are prohibited from offering long-distance services. The Baby Bells can build and operate video networks, but they cannot offer more than a small interest in the content of their transmissions. Long-distance carriers are prohibited from competing for local phone service. Cable TV may be offered in either a monopoly or competitive situation, depending on local regulations, and cable providers can own substantial portions of their content.

In general, the three industries have kept to their separate realms. But in the rush to provide sophisticated online services, they are jealously eyeing each other’s markets. They all argue that the increasing convergence of computing, telecommunications, television, and information services has rendered distinctions between these realms obsolete.

Many legislators agree. The House legislation would massively deregulate telecommunications and cable, leading to something close to free-for-all competition between cable, local phone, and long-distance companies. In principle, competition increases risk-taking that stimulates the creation of affordable, diverse services. In short, the legislation is intended to encourage the development of a superhighway that can handle communications and information services, and enable civic involvement as well as video-on-demand and home shopping.

If the legislation becomes law, the Federal Communications Commission (which regulates telecommunications) would define “universal service” in the age of interactive digital communications and try to ensure that schools, hospitals, and other public services, as well as the poor, don’t get left behind. The FCC would work to avoid what Markey calls “information apartheid.”

Some public-interest groups decry the legislation’s lack of subsidies for non-commercial programming. Simply wiring up schools and hospitals “is an insufficient quid pro quo for our democracy,” says Jeffrey Chester, director of the Center for Media Education. “We need a new public-interest standard to be sure that there is a greater diversity of voices.”

Recognizing the kinds of challenges Chester describes, Senator Daniel Inouye (D-Hawaii) recently introduced a bill that would reserve up to 20 percent of the capacity of emerging telecommunications networks for free use by nonprofit and public agencies. It would also tax the industry to support nonprofit groups’ exploitation of the new networks.

And Markey integrated the Electronic Frontier Foundation’s concept of open platforms into one of the recently passed House bills. If that bill becomes law, the FCC would probably force phone companies to reduce tariffs on ISDN or a comparable service. This could cause relatively low-bandwidth digital communications networks to arise side by side with one-way, broadband entertainment and advertising.

Markey believes this approach would lead to a network that supports broad participation in civic affairs. “We will probably have a situation where every citizen could have, as a matter of public policy, access to public-based decision-making [materials],” he says. “I think that is right over the horizon for every American.”

THE NETWORKS ARE FOR.”
A Slow Road After All?
Notwithstanding Markey's confidence, the chances for telecommunications reform this year are dicey at best. The wealthy and powerful Baby Bell companies argue that the U.S. Senate counterpart to the House legislation preserves far too many constraints on competition and that it is larded with unfair regulations. But this resistance could backfire. "Congress is not going to have the stomach to do this again," says Ronald Plesser, a leading Washington attorney who represents a consortium of major wireless-communications and cable companies. "If the Bell companies walk away from this, they might not see the welcome mat out for another five years."

In May, the Center for Media Education, the Consumer Federation of America, the United Church of Christ, and the National Association for the Advancement of Colored People filed a joint complaint to the Federal Communications Commission (FCC), which approves Baby Bell companies' applications to build advanced networks offering video services—known as "video dial-tone." The coalition accused four Baby Bells of trying to engage in "electronic redlining"—bypassing "lower-income and/or racially or ethnically diverse communities in their initial deployment."

Even if the federal reforms go through, however, advanced nets are a long way off for much of society. While the proposed laws would mandate network wiring at a reasonable cost to consumers, they do not specify when such wires must be connected. And even if the financially strapped schools, hospitals, libraries, and other public-benefit institutions enjoy favorable rates, they'll have a hard time navigating cyberspace without equipment, training, and support. Few classrooms even have phone lines or the budgets to install them. What are they going to do with coaxial cabling or even fiber-optic connections?

What's the Rush?
In the information superhighway feeding frenzy, sorting out competing legal issues, technologies, and business plans is a daunting task. But behind these disputes lies the more basic problem of how to reconcile competing values: building communication and community on the net versus earning large profits. Blending those two values effectively may prove to be the hardest challenge.

Advocates of telecommunications networks designed to serve social goals point to the burgeoning Internet as a model. "It's large, heterogeneous; it carries data, sound, and images; it's a multimedia network—all the things we hope the information superhighway will be," says Laura Breeden, a top infobahn infrastructure planner in the U.S. Department of Commerce.

The Internet is all about communication; bandwidth is secondary. Higher bandwidth would be welcome, but the Internet has transformed the digital universe at a plodding 9600 bps or slower for the vast majority of users. This bandwidth can fully support 20 of the 26 services or capabilities covered in the Macworld survey, and 8 of the top 10 most desired, including information-on-demand, communication, interactive reports from schools, and some forms of distance.
learning—albeit slowly and without elaborate multimedia features (see “Infobahn Services: What Wiring System Do You Need?”). ISDN over phone lines fully supports 21 of the 26 survey items, including 9 in the survey respondents’ top 10. What doesn’t it support? Primarily video-on-demand and video games.

Breeden’s agency disburses millions of dollars for projects that demonstrate how networking can strengthen education and health services and build a sense of community. The program was inspired by examples from the Internet.

But the Internet’s social impact may be irrelevant if no one makes big money from it (no one does yet). And despite the phenomenal growth of the Internet, most people lack the interest, knowledge, or inclination to join that particular digital world. (If they did join, increased demand would quickly bring the Internet to its knees anyway.) So telecommunications companies watch the Internet as a potential market, not a model to emulate.

Instead, the industry plans to exploit the possibility that many people, regardless of their interests and inclinations, will take whatever is offered—the “if you build it, they will buy” theory. Online gambling strongly attracted only 6 percent of our survey sample—the second weakest response among 26 options—while 81 percent found the idea totally without appeal. But if a poker game popped up on their TV screens, how many self-described abstainers would succumb to temptation?

The information superhighway—as envisioned by the giant corporations that will define it as they build it—is the opposite of the Internet. It’s all about delivering video services; high bandwidth is critical. But for the time being—and it could be a long time—forget interaction more complex than pausing a movie, shooting down a space creature in a video game, or providing your credit card number.

The industry’s information superhighway is a huge gamble. After a few years and a few billion dollars, telecommunications executives may conclude that profit margins don’t support their model. That would be quite a setback.

Then again, maybe a slower process wouldn’t be all bad. After all, right now commercial online services, the Internet, and ISDN—the real research labs of the digital future—are at the threshold of delivering a lot more of what people say they want than what the phone and cable companies are proposing. But today’s services need more time to develop in ways that are socially valuable, profitable, and accessible enough for our entire society to relate to them.

If those laboratories aren’t brushed aside in the race to broadband interactivity, we might actually see the most ambitious dreams of the information age realized—someday.
Remote Access Arrives

Macworld Lab tests show why ARA servers are essential network tools

Not long ago remote computing was difficult at best. With modem speeds topping out at 2400 bps, Federal Express arguably offered faster, more reliable data transfer than telephone wires. The combination of cheap, fast modems and enhanced remote-communication schemes has made remote computing both convenient and easy.

One such scheme, Apple Remote Access (ARA), provides a stable, easy-to-use connection to network resources via the Chooser—exactly the way users in the office operate.

A single ARA connection can be established with software alone. A remote user with the ARA client dials in to a Mac at the office that is outfitted with the ARA server software. An ARA server increases the ARA advantage by providing multiple dial-in lines. It also provides management options that accommodate multiple users with different network-access privileges—a welcome relief for overburdened IS managers.

Macworld Lab evaluated seven remote-access servers. Four of those—Apple’s ARA Multiport Server, APT Communications’ Multiport APT Dial Server, Global Village Communication’s OneWorld Communications Server, and Webster Computer’s MultiPort/LT Router—are designed primarily for Macintosh networks. Shiva’s LanRover/E, Novell’s Netware Connect, and Asante Technologies’ NetConnect Remote Access Server can switch-hit on a mixed network requiring PC and Mac remote connectivity. Shiva’s LanRover/E also works with Unix workstations. (Cayman Systems declined to have its GatorLink server evaluated, as the company is currently reassessing its product line.)

Most ARA servers are stand-alone devices that include a single processing unit, two or more serial ports, and a network-connection option (such as 10BaseT). Apple’s server is a NuBus card that contains four ARA serial ports. These cards can be dropped into any Macintosh that supports 12-inch NuBus cards (the Macintosh II series, all Centris and Quadra Macintoshes but the 610 and 660AV, and all Power Macintoshes but the 6100). Novell’s product is a software
Netware Loadable Module (NLM) that must be loaded on an existing Netware file server that must be (that must be running version 3.11, 3.12, or 4.01 of Netware). The products vary in the number of ports (offering from two to eight ports in base units), ease of configuration, special features, and, of course, the speed they provide for text or graphics file transfers.

### Top ARA Servers

Among a good crop of servers, Asante’s NetConnect Remote Access Server (left) stood out for its strong performance and mixed network capabilities. Apple’s easily expandable ARA Multiport Server (middle) represents a fine choice for AppleTalk-only networks. Shiva’s LanRover/E (right) offers the easiest-to-use management software.

### Server Performance

We looked at the two key aspects of server performance: the rate at which a highly compressible 1MB text file and a less-compressible 1MB EPS graphics file are transferred from an ARA client to an AppleShare file server on an AppleTalk network.

The key performance factor in ARA servers is the rate at which the server compresses or decompresses data. ARA works by compressing data at the CPU level, transferring it via modem over phone lines, and then decompressing it at its final destination—the remote user or a server. Text files are easy to compress, leading to shorter transfer times but requiring more CPU horsepower.

Performance is always important, but it becomes critical when remote users access all server ports simultaneously. Therefore we tested the servers configured for a single-port connection, as well as in two-to-four-port and, where applicable, eight-port configurations to determine data-transfer rates at various levels of CPU usage. (The APT and Global Village units were tested at their capacity—three ports and two ports, respectively.) We found that at maximum port usage some servers’ performance suffered drastically, while others maintained a throughput rate similar to that of the single-port test (see “How Fast Are the ARA Servers?”).

In the single-port EPS tests, all servers performed similarly, with only a slight difference separating the fastest and slowest units. In the single-port text trials, however, Novell’s Netware Connect joined Asante’s NetConnect in the lead, and this time they completed the task in about two-thirds the time needed by the slowest performer, the Global Village server.

For the four-port test text, Novell, Asante, and Apple came close to their single-port performance. Shiva drops down in performance, taking a little more than twice the amount of time of the best performer, Novell. Webster was well behind the pack. The four-port EPS trials yielded similar results, except that Shiva held up much better, finishing within a few seconds of the leader, Novell, as did Asante and Apple.

The most telling test involves measuring data throughput when all server ports are accessed simultaneously. This measures how proficient the processor is at juggling data across many remote connections and how fast the processor can decompress large streams of data.

Comparing performance on the EPS file test, and using the maximum number of ports for each server, Apple and Novell, each with eight ports, came out on top, separated by just three seconds. The Global Village unit, with only two ports, Asante’s eight-port device, and APT, at three ports, finished in a pack just below the leaders. The Shiva finished far behind. In the text-file test, Novell finished ahead again, this time shaving about 15 percent off the time of the next finisher, the Apple unit.

Performance differences are due to the different processors used in each server as well as the firmware that controls the processor. Asante’s stellar performance, by far the best among the stand-alone units, derives from its fast RISC processor. In contrast the Webster MultiPort/LT Router relies on a slower Motorola 68331 processor.

Both Novell and Apple use the CPU of the host computer to do most of the work. A dramatically faster host will boost performance dramatically. With Novell’s Netware Connect these processors can range from a 386 on up to the fastest Pentium; we used a 66MHz Gateway 2000 486DX2. The ARA Multiport Server can be plugged into any Mac that can handle 12-inch NuBus cards. For our test we used a 25MHz 040 Centris 650. So in a head-to-head comparison, the significantly faster Gateway host certainly accounts for the slight performance superiority of the Novell server. Faster Macs would undoubtedly raise the Apple unit’s performance above Novell’s.

What represents satisfactory performance for your network? Consider how often all ports will be accessed simultaneously and just what kind of data will be passed through them. If your needs are primarily for E-mail, slower servers will be far less noticeable than if you must constantly transfer massive graphics files.

### Hidden Costs

Fortunately, you do not have to sacrifice speed to save money: the top performers are also competitively priced. But you should look beyond mere price and performance in choosing the server that best fits your needs.

First determine how many users will require remote access and how often they’ll need it. This should suggest how many ports you’ll want to purchase. Next determine the per-port cost of your ARA solution. Start with the ARA Server as your base, then add on any elements needed to bring your server to life, such as modems, ARA client software, and peripheral equipment such as expansion cards and cables. See “ARA Features at Your Service” to determine who offers what. A 14.4-Kbps V.32bis modem will cost between $150 and $300. The ARA 2.0 client software has a street price of $55.

The stand-alone products from Asante, Shiva, APT, and Webster fall within $100 per port of each other—at a little over $500 per port on average. The only additional hardware required for these servers are the modems. Only Shiva pro-
vides ARA client software (version 1.0). The Global Village $950-per-port cost includes modems but requires the additional $55 per port for client software.

Three units add particularly valuable features. Asanté offers PC connectivity; Webster includes router capability; and Shiva bundles dial-out access in addition to Unix connectivity, and boasts a great interface. In contrast, APT doesn't provide much in the way of extras, and its mediocre performance certainly doesn't merit the $565-per-port price tag.

The Apple and Novell products require a host computer, making per-port price calculations tricky. These units are cost-effective only when integrated into new or existing file or mail servers; if you must purchase a dedicated computer the per-port cost jumps well beyond any other product in this feature. In that case you'd be better off selecting one of the stand-alone units.

The Apple ARA Multiport Server starts out at $1799 for four ports. This includes the NuBus card as well as software for four ARA 2.0 clients. Additional four-port expansion cards can be ordered for $1499. Each expansion kit comes with four 2.0 clients.

Configuring a PC for Novell's Netware Connect requires the purchase of a serial communication card and cable in addition to the modems. This expansion card increases the number of serial ports on the PC running Netware. (Most PCs come with two serial ports.) The serial card and cable will set you back between $300 and $900, depending on how many ports you buy. (We used an eight-port model from Digiboard in our tests.)

Configuring the Connection

After speed and cost per port, ease of use should be your next buying concern. Compared with most networking products ARA servers are easy to configure and manage. Just plug in and configure some modems, hook up your network, and add clients. ARA can only use a modem's straight-through data rate, so you'll need to shop wisely to find a product that doesn't use data compression to achieve a higher transfer rate. Considering the current prices of modems, a 14.4 V.32bis modem should be your bottom-line selection for the server.

To make sure your modem vendor provides a CCL (Communication Control Language) file to configure the ARA server. If the modem includes no CCL file, contact the vendor's technical-support department to order one.

The easiest ARA server to install was Global Village's OneWorld. It has Global Village PowerPort Mercury modems built in (19.2 Kbps). Just plug in the phone lines, the power cord, and the network connection; you're ready to go. (This all-in-one approach is also offered by Shiva, with its recently released LanRover/Plus; and by the time you read this, Dayna should be shipping a similar product that also includes Mac-to-PC connectivity.)

The Global Village administration software provides an intuitive interface for setting up users and configuring the server. Excellent documentation offers step-by-step instructions. In a welcome convenience, OneWorld allows administrators to import user names from AppleShare users-and-groups files, Shiva Net Manager configuration documents, or preexisting OneWorld configuration files.

The Shiva, APT, and Webster servers require external modems, so you must configure the server with the correct CCL file. Shiva's configuration and management interface, Shiva Net Manager, is far easier to use than the others. I configured the ports and users in a matter of minutes without looking at the manual.

Installing Apple's ARA Multiport server involved plugging in two NuBus (four ports each) cards and installing management and administration software on the host Mac. Users can be imported from existing AppleShare Users and Groups files as well. One problem: the Multiport server cannot be configured over the net-

**ARA Extras**

Apple Remote Access is a simple product designed to maintain easy and secure remote connections to a network. Several companies offer products that complement the ARA environment, both on the client and server side. These are among the most important add-on products.

**Timbuktu Pro** From those pioneers in remote connectivity, Farallon Computing (514/814-5000), comes Timbuktu Pro ($199). This application takes ARA all the way by providing screen-sharing capabilities as well as file-transfer options not available with ARA alone.

In addition, Timbuktu Pro can save your ARA-Timbuktu connection as a Timbuktu Pro connection document, which can be launched from the Finder for easier access to your network.

**ARACommander 2.0** This powerful control panel, $35 from Trilobyte Software (513/777-6641), builds on the functions of the ARA client. Its main selling point is the ability to create automated network-connection sequences that appear as desktop icons. ARACommander works with both ARA 1.0 and 2.0 clients.

ARACommander can also dismount volumes and sever the ARA connection after a specific task, such as a large file transfer—saving on phone bills. Other features include automatic launching of applications at the remote network volume, redialing, phone books, and scheduled connections.

ARACommander includes ARAScripter—a utility for programming ARACommander features. In addition, it fully supports AppleScript.

**SecureID** Security Dynamics (617/547-7820) elevates server security to a higher plane. SecureID, a hardware device, works in conjunction with your ARA server to screen remote clients.

When remote users dial in, SecureID prompts them for a personal identification number (PIN). Remote users then use a credit card-size SecureID card with an LCD display to generate an additional number that must also be logged in. This number changes at preset intervals and corresponds to an algorithm located on the server.

SecureID's only drawback is its price. Setting up a server with access for ten users costs $1950 if purchased for the Shiva LanRover/E and the Apple ARA Multiport Server. With other servers, you must purchase a special hardware device that sells for $650 for 1 port, $3800 for 4 ports, or $12,520 for 16 ports. In all cases, each user needs a SecureID card ($62).
REMOTE ACCESS ARRIVES

somewhat onerous. But to AsantC's cred-

interface to configure the server. It also
cannot import user lists, so the task of
entering users for a large site becomes

worth buying Asante View for ARA serv-

ers. Asante has chosen to write proprietary

words; plus it gives administrators the

option to force users to change passwords
at preset intervals to ensure better security.
In addition, the ARA 2.0 protocol can be
used with third-party security products
(see "ARA Extras"). ARA 2.0 also provides
MNP 10 error correction (if it's available
in the modem) for use over noisy phone
lines, most commonly found with cellular
modems.

There are other reasons to go with
2.0: the ARA 1.0 client complies only with
the 1.0 protocol and cannot be used with
a 2.0-only server, while the 2.0 ARA client

be used with a server that accepts
either protocol.

The Apple Remote Access 2.0 client
also includes new features such as Dial
Assist, which makes international and
credit card dialing easier by preconfigur-
ing your connection document.

At press time Apple's server is com-
patible only with the 2.0 protocol; this
means that if you purchase the Apple
product you must upgrade all clients to
2.0. The Webster, Global Village, and
Shiva products work with either protocol
so that remote users don't need to worry
about which client they're using. All other
servers can accept only the 1.0 protocol,
though most have announced plans to
upgrade in the near future to include 2.0
compatibility, so this shouldn't be a major
buying factor.

Remote Access version number. The two
ARA protocols, 1.0 and 2.0, are incompat-
ible; and each comes with its own
client version. The ARA 1.0 client comes
bundled with the Shiva LanRover/E, while
Apple bundles the ARA 2.0 client with its
ARA Multiport Server. All other vendors
make you purchase the client software
separately.

ARA 2.0 is worth insisting on, what-
ever server you buy. The ARA 2.0 proto-
collates allows remote users to change pass-
words; plus it gives administrators the

option to force users to change passwords
at preset intervals to ensure better security.
In addition, the ARA 2.0 protocol can be
used with third-party security products
(see "ARA Extras"). ARA 2.0 also provides
MNP 10 error correction (if it's available
in the modem) for use over noisy phone
lines, most commonly found with cellular
modems.

There are other reasons to go with
2.0: the ARA 1.0 client complies only with
the 1.0 protocol and cannot be used with
a 2.0-only server, while the 2.0 ARA client

be used with a server that accepts
either protocol.

The Apple Remote Access 2.0 client
also includes new features such as Dial
Assist, which makes international and
credit card dialing easier by preconfigur-
ing your connection document.

At press time Apple's server is com-
patible only with the 2.0 protocol; this
means that if you purchase the Apple
product you must upgrade all clients to
2.0. The Webster, Global Village, and
Shiva products work with either protocol
so that remote users don't need to worry
about which client they're using. All other
servers can accept only the 1.0 protocol,
though most have announced plans to
upgrade in the near future to include 2.0
compatibility, so this shouldn't be a major
buying factor.

Remote Access version number. The two
ARA protocols, 1.0 and 2.0, are incompat-
ible; and each comes with its own
client version. The ARA 1.0 client comes
bundled with the Shiva LanRover/E, while
Apple bundles the ARA 2.0 client with its
ARA Multiport Server. All other vendors
make you purchase the client software
separately.

ARA 2.0 is worth insisting on, what-
ever server you buy. The ARA 2.0 proto-
collates allows remote users to change pass-
words; plus it gives administrators the

Most ARA vendors provide additional products—but can’t perform both services simultaneously.

Asante, Novell, and Shiva all provide PC connectivity capability for Novell networks. They also allow Macs to dial in to those networks, but you must still have the Mac Netware Loadable Module running on your Netware file server for remote Macs to see them. All of these products provide the dial-in client for PCs. The Shiva LanRover/E also accepts remote connections from Unix machines dialing in and an IP package.

Beyond ARA

Most ARA vendors provide additional features to complement ARA’s basic capabilities. The most critical extra: the ability to use different protocols on your ARA server, such as IPX and TCP/IP. This facilitates remote access to mainframe, Unix workstation, and DEC servers. All servers accept the AppleTalk protocol, which in itself can tunnel (or encapsulate one type of data packet within another) to other protocols such as TCP/IP and DECnet. This requires additional software and sometimes hardware at both ends of the connection. Shiva beats all others by a wide margin by providing native access to seven protocols running across Mac, PC, and Unix platforms.

Another outstanding benefit provided only by Shiva: it permits Macs to dial out from the network on the ARA server. This gives users the ability to select the ARA server in the Chooser and use the modems attached to dial online services. Dial-out access is configurable on an individual port basis to minimize conflicts that may arise when remote users can’t access the server because of an outgoing call.

The Webster MultiPort/LT Router can function as a LocalTalk-to-Ethernet router in addition to providing ARA access. Each of its four ports can be individually configured for routing or ARA duties—but can’t perform both services simultaneously.

Asante, Novell, and Shiva all provide PC connectivity capability for Novell networks. They also allow Macs to dial in to those networks, but you must still have the Mac Netware Loadable Module running on your Netware file server for remote Macs to see them. All of these products provide the dial-in client for PCs. The Shiva LanRover/E also accepts remote connections from Unix machines dialing in and an IP package.

The Last Word

Among the servers we tested, each has its redeeming aspects. If you’re thinking of expanding your existing network hardware infrastructure, both the Apple ARA Multiport Server and Novell’s Netware Connect offer outstanding performance while integrating well into existing server CPUs. For AppleTalk network administrators, the Apple server holds a clear advantage due to its easy installation and superior interface.

For servers with four or fewer ports, the Webster MultiPort/LT Router provides versatility to small networks requiring both an AppleTalk router and ARA access; you can dedicate two ports to ARA and two to LocalTalk routing. The OneWorld is a good choice for first timers needing a small port count and easy installation.

For the eight-port, stand-alone models, Shiva’s LanRover/E and Asante’s NetConnect Remote Access Server offer similar value. Asante’s performance gives it the nod, but Shiva’s management software can’t be beat. If your business environment calls for routine remote exchange of large files, then the Asante server is the one to get. If ease of use and an ultraconvenient management interface is top priority, strongly consider Shiva.

Whatever your selection, as your administrative headaches and user complaints begin to fade away, you’ll be glad you made the move to an ARA server.

Assistant editor MATT CLARK has been testing and working with networking and communications equipment for more than five years.

### ARA SERVERS

**Editors’ Choice**

Among closely matched products, two servers stood out with a superior price/performance ratio for their respective specialties.

**Mixed Networks**

**NetConnect Remote Access Server**

For mixed networks requiring PC and Mac connectivity this product offers a superb modular design and outstanding performance, and is easy to configure and use when paired with Asante’s optional $225 interface. Company: Asante Technologies. List price: $3899 for eight ports.

**AppleTalk Networks**

**ARA Multiport Server**

For AppleTalk-only networks this unit makes a great addition to an existing AppleShare file server. The ARA Multiport’s expandability, performance, and easy-to-use, multifaceted management interface combine to create an outstanding remote-access tool. Company: Apple Computer. List price: Four ports $1799; eight ports $3298.

### Selected ARA Multiport Models

<table>
<thead>
<tr>
<th>APT Communications</th>
<th>Asante Technologies</th>
<th>Global Village Communication</th>
<th>Novell</th>
<th>Shiva Corporation</th>
<th>Webster Computer Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiport APT</td>
<td>NetConnect Remote Access Server</td>
<td>OneWorld Communications Server</td>
<td>Netware Connect</td>
<td>LanRover/E</td>
<td>MultiPort/LT Router</td>
</tr>
<tr>
<td>Dial Server</td>
<td>408/435-8401</td>
<td>415/350-8200</td>
<td>801/429-5588</td>
<td>617/270-8300</td>
<td>808/954-8054</td>
</tr>
<tr>
<td>301/874-3305</td>
<td>408/427-2683</td>
<td>800/736-9273</td>
<td>800/458-3550</td>
<td>800/497-0933</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1.0</td>
<td>1.0, 2.0</td>
<td>1.0, 2.0</td>
<td>1.0, 2.0</td>
<td></td>
</tr>
<tr>
<td>AppleTalk</td>
<td>AppleTalk, IPX, PPP</td>
<td>AppleTalk, IPX, NASI, TCP/IP</td>
<td>AppleTalk, IPX, LLC, NetBEUI, PPP, SLIP, TCP/IP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80BaseT, thick, thin</td>
<td>10BaseT, LocalTalk</td>
<td>10BaseT, Ethernet, thick, thin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1695</td>
<td>$1399</td>
<td>$199, 2 ports $1899</td>
<td>$595</td>
<td>4 ports $2899, 8 ports $3399</td>
<td>$1995</td>
</tr>
<tr>
<td>Mac</td>
<td>Mac, PC</td>
<td>Mac, PC</td>
<td>Mac, PC, Unix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>no</td>
<td>Mac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in or out of band</td>
<td>in or out of band</td>
<td>in or out of band</td>
<td>in or out of band</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* A 4-port expansion kit costs $1499. *1 Upgrade costs: 8 ports $2175; 16 ports $6175. AsanteView Management software is $250 extra. *2 $199 for single line. LocalTalk-only version (includes one PowerPort Mercury modem); $1899 for 2-port Ethernet/LocalTalk version (includes two PowerPort Mercury modems). *3 Also requires $300 to $500 serial-port card. Upgrade costs: 8 ports $2195; 12 ports $5995. *4 Achieved with off-the-shelf terminal-emulation/communication program via the NASI protocol.
NOW AVAILABLE IN
For those of you who ever wished that a computer could do more to make your work easier, we have some refreshing news: Your wish has been granted.

Introducing new Microsoft Word 6.0 for the Macintosh and Power Macintosh.

While it would certainly be much easier to explain our improvements as some kind of magical hoo-ha, in truth it's merely superior technology at work.

We refer to it as IntelliSense technology. Built-in intelligence that automates routine tasks and makes complex tasks simple.

For instance, who amongst us doesn't invariably mis-type certain words? Now, our AutoCorrect feature can correct common mistakes automatically as you type. That goes for those pesky capitalization errors too.

But that's just the beginning. AutoFormat lets you instantly apply a variety of formatting options to your documents with a mouse click. Want to make it a memo? A letter? A newsletter? Your wish is our command. Just click on a new style from our Style Gallery.

This technological wizardry is also evident in something we call Table AutoFormat. To format tables, just point and click on any of the 34 different styles.

But what's truly magical about new Microsoft Word 6.0 is how it works with other Office programs. It's never been easier to exchange text, data and graphics between programs. All you have to do is just drag it and drop it into place.

As if that weren't the epitome of sharing, you can share Word files between Macintosh and Windows without conversion.

To find out more, just visit your retailer or call (800) 871-3273, Department RU.

Either that, or start searching for a lamp inhabited by one of those subservient spirits in a fez.

Microsoft Word 6.0 is the latest version of the world's most popular word processor for the Macintosh. It's also part of Microsoft Office family.
Brushing Up Painter

AS THE FEATURE BATTLE between Painter and Photoshop heats up, Fractal Design is adding an arsenal of features to Painter 3.0, including multiple floating selections, powerful new brushes, color-masking and -adjustment tools, a redesigned interface using Dabller's drawer metaphor (reducing 14 palettes to 6), and optimized PowerPC support.

Folded into 3.0 are all the compositing tools that made Painter X2 so appealing—including the ability to work with multiple floating objects, color sets, and masking brushes.

New brush technologies enable you to capture any shape or profile as a bristle pattern and save it as a new brush; physical bristle modeling gives artists control over the striation, number, and attributes of bristles. Also user-definable are thickness, dumpiness, hair scale, and scale size.

A new tool, Image Hose, lets you transform multiple objects into a brush, so you can paint directly with a series of images. You can generate random textures and tiled patterns—or turn a QuickTime movie into a pattern brush, with frames spewing out of the brush.

With full QuickTime support, Painter 3.0 lets you import and export movies. You'll be able to create frame stacks—sets of images you can either batch-process or manipulate individually with Painter's tools and then play back. A five-layer onionskin feature lets animators see multiple frames simultaneously.

Artists can make color-based selections and masks and adjust those selections based on hue, saturation, or value. Spot-color separations allow you to reduce a 24-bit image to one based on a limited color set.

xRes Challenges Imaging Leaders

xRes, an image processing and paint program developed by Fauve Software for both Power Macs and 680X0 machines, combines a wide range of editing effects and highly customizable brushes with the ability to work quickly on large files in multiple layers with unlimited undos.

Because xRes splits images into smaller pieces—storing them mathematically as a network that contains both image and operational data—it will render parts of an image as you work, rather than storing all the manipulation commands and executing them only when the image is finished. This lets you work quickly on large, high-resolution images (several hundred megabytes or more) with a minimum of RAM. Once an area is rendered, that part is done; the program doesn't have to waste time recomputing previously applied manipulations if, for example, you zoom in or do additional editing.

An xRes image can contain any number of objects, each on a separate layer with up to 32 sublayers, or channels. The Channels palette provides four modes: view, edit, alpha (masking), and clip (loading a selection).

Other palettes include Objects, Paper, and Filter, plus four brush palettes: Brushes, Brush Shape, Brush Options (opacity, spacing, smoothing, bleed, occlusion, and layer blending), and a new palette called Textures.
**Radius Revs the Photoshop Engine**

If Adobe Photoshop 3.0 running native on a Power Mac still isn’t fast enough for you, there’s hope. Radius has announced PhotoEngine, a 7-inch NuBus card containing four digital signal processors (DSPs) that accelerate selected Photoshop operations on a Power Mac by up to four times (the board also improves Photoshop performance on any Mac with a NuBus slot).

PhotoEngine, which is due to ship in late August with an expected retail price of $1099, offloads the processing of approximately 25 Photoshop operations from the Macintosh’s CPU and splits the processing between four 66MHz AT&T DSP3210 chips. By comparison, the majority of current DSP products, including Radius’s PhotoBooster ($999), divide the processing of common Photoshop operations between two DSP chips (PhotoEngine will eventually replace PhotoBooster).

PhotoEngine accelerates such operations as RGB-to-CMYK conversion, on-screen CMYK display, and Scale and Skew, as well as Blur, Gaussian Blur, Sharpen, Unsharp Mask, Emboss, and Despeckle filters. PhotoEngine also includes 128K of static RAM, which improves DSP processing efficiency. Radius, 408/954-6403.—J.A.M.

---

**XRes Continued**

xRes includes a wide variety of tools and filters—such as resizing, rotating, skewing, cloning, and selecting by color—and the usual compositing modes, including Normal, Darker, and Lighter. Filters include Curves, Levels, Find Edges, Emboss, Motion Blur, Glowing Edge, and an interactive gradient picker. You can also apply filters from a series of presets, customizable macros.

You can work in RGB, CMYK, or gray-scale mode; the program lets you calibrate CMYK-to-RGB conversions and make color separations.

Supported file formats include TIFF, PICT, JPEG, TGA, GIF, EPS-DCS (for output to QuarkXPress), and Photo CD. Version 1.0 doesn’t support direct scanning or printing, but expect the next version (due within six months of 1.0) to do both. xRes requires at least 8MB of RAM; 16MB is recommended. Retailing for $799, xRes is due to ship in mid-August. Fauve Software, 919/380-9933.—CATHY ABES

---

**Full-Bleed Printing for Less**

Graphics professionals looking for a high-end color printer at a reasonable price may find it in Tektronix’s Phaser 440, a letter-size dye-sublimation printer that—with a memory upgrade—can accommodate oversize sheets for full-bleed printing.

The Phaser 440 supports PostScript Level 2 and turns out 2 pages per minute. Fully networkable, the printer comes with parallel, serial, and AppleTalk ports (an Ethernet option is also available); all ports and Ethernet protocols are active simultaneously to handle cross-platform environments. Like other Tektronix printers, the Phaser 440 includes TekColor Photofine, which enhances the rendering of fine lines and text; and TekColor Dynamic Correction, a color-matching system for simulating color produced on different color-output devices.

The Phaser 440 ships with 16MB of RAM—enough for letter- and A4-size image processing and three-pass printing—and is expandable to 64MB. (Full-bleed and four-pass printing require an additional 16MB of RAM.)

The Phaser 440 is due to ship in early August with a base price of $7995; the 16MB memory upgrade is $1595. Tektronix, 503/682-7377.—CATHY ABES

---

**IN BRIEF**

- Your Own Private Utah
  HSC Software’s KPT Bryce 1.0 ($199), named for Bryce Canyon, Utah, allows you to generate 3-D landscapes and sky patterns and edit the program’s dozens of preset patterns. With the Sky & Fog palette, for instance, you can create photo-realistic cumulus-cloud textures. 310/392-8441.

- Power Tools for Power Macs
  HSC Software is shipping KPT 2.1 with Color It ($199). This native Power Mac version of Kai’s Power Tools includes four new filters: Vortex Tiler, Gaussian Glow, Gaussian Electrify, and Gaussian Weave. 310/392-8441.

- PhotoFlash News Flash
  Version 1.1 of Apple PhotoFlash ($279), currently shipping, is now optimized for Power Macs and directly supports images captured with the Apple QuickTake 100 digital camera. Upgrades are $10. 408/996-1010.
Let's talk scanners.

Whatever you buy a scanner for — document management, desktop publishing, high-end graphic arts — you want the best scanned image possible, the most advanced features and the highest value for your hard-earned dollar.

That's why people who know, pass up the "Johnny-come-latelys" in the scanner business and go straight for the first name in scanners: Microtek.

A REPUTATION FOR INNOVATION.
While many of the names in today's scanner market were still making computers, laser printers...or even radios, of all things, Microtek was racking up an impressive array of firsts in scanners.

Microtek brought the first halftone desktop scanner to market in 1984. Microtek was also responsible for the first 256-tone grayscale scanner, the first affordable desktop color scanner and the first affordable 35mm slide scanner. With the recent introduction of Dynamic Color Rendition (DCR), Microtek produced the first automated color calibration and correction system. And now, with the ScanMaker III and ScanMaker 45t, we're the first to market with honest 36-bit desktop color scanners.

AFFORDABLE QUALITY.
Don't need color scanning capabilities? Then don't buy them. The Microtek ScanMaker II is a great 300 x 600 gray-scale scanner with a street price starting around $400.

Want color but still don't want to spend big bucks? Look into the ScanMaker II - you get 24-bit color flatbed scanning and Adobe Photoshop LE for around $550.

Looking for a fast, single-pass scanner for office and graphic applications? The ScanMaker II is the winner of two important Editors' Choice Awards from PC Magazine and from Imaging magazine. It has software enhanced resolution of up to 1200 x 1200 and a street price of around $750.

For more sophisticated applications, there's the ScanMaker IIHR.

You'll get software enhanced resolution up to 2400 dpi — which makes it very popular with...
Before you buy a scanner, let’s talk. 800 654-4160

MICROTEK
Better Images Through Innovation.
by Cathy Abes

**Artist:** Wendy Grossman is an illustrator and fine artist based in New York City, where she teaches computer art at The School of Visual Arts. Her work has appeared in *Computer Artist* and *Computer Pictures*, and will be in a future issue of *Step-by-Step Electronic Design.*

**How It Was Done:** This image, titled *Egypt*, was done as a promotional piece for the artist's portfolio. Grossman began with a pencil sketch, which she used as a template in Adobe Illustrator. In Adobe Photoshop, she drew clipping paths for some of the graphic elements—such as the hieroglyphics, the Egyptian gods, and the other figures—and exported them to Illustrator as separate files to colorize and add to the final Illustrator file.

After finishing the Illustrator drawing and bringing it into Photoshop, Grossman created the scarab beetle and the palm trees in Ray Dream Designer. She used Ray Dream's Checkerboard shader for the tree trunks, and the Cactus shader for the leaves; for the scarab texture, she used Blue Marble. To make the sky textures—behind the pyramids and the sphinxes—she used a texture generator called TextureSynth.

Back in Photoshop, Grossman began to assemble all the elements. The mummy was a scanned stock photo to which she applied the Dry Brush filter from Aldus Gallery Effects. After pasting the mummy into the main image, she brightened it with Levels. Next she "inversed" the selection and used the paintbrush to clean up the edges around the mummy. She created the dark edges along the right side and the triangular area above the feet using the airbrush.

For the columns, she used Gallery Effects' Bas Relief filter. To lighten the white areas and darken the shadow areas, she used the Dodge/Burn tool.

Grossman copied the blue hieroglyphic panel and applied Photoshop's Emboss filter to the copy; she then composited the copy with the original.

The final image was printed on authentic Egyptian papyrus.

---

**THE TOOLS**

**Hardware:** Quadra 700 with 20MB of RAM and 520MB internal hard drive; Seagate 1.5GB external drive; APS 44MB SyQuest removable-cartridge drive; NTR laser printer; Apple 14-inch color monitor.

**Software:** Adobe Illustrator 5.0; Adobe Photoshop 2.5.1; Aldus Gallery Effects filters Volumes 1 to 3; Kal's Power Tools 2.0; Ray Dream Designer 2.0; TextureSynth (by Joshua Jeffe, Pantechnicom, P.O. Box 738, Santa Cruz, CA 95061).
For the columns, she used Gallery Effects' Bas Relief filter with the following settings: Detail 12, Light Position left, and Smoothness 3.

The columns after the filter was applied. To ensure uniform shading on both columns, she applied the filter separately to each column.

After copying the panel to the Clipboard, she applied the Emboss filter (Stylize submenu), setting Angle to -131 degrees, Height to 5 pixels, and Amount to 100 percent.

The blue hieroglyphic panel was part of the original Illustrator file that the artist brought into Photoshop; she copied it to the Clipboard.

After applying the Emboss filter to the copy, and with the copied selection still active, Grossman pasted the original blue panel into the copy using Composite Controls in Color mode at 100 percent opacity.
A moveable FEAST.

Adobe Photoshop™ 3.0

Adobe Photoshop, the world's leading photo design and production tool, now offers what everyone has been craving: a banquet of unlimited creative possibilities and remarkable production control. With support for multiple layers, Version 3.0 gives you the freedom to compose and experiment with ease. Add graphics, text and special effects to any layer without altering images on other layers. A redesigned interface with totally customizable floating palettes puts just what you want where you want it. New Lighting Effects, Dust and Scratch removal filters, and Color Range masking are only the beginning of the latest offerings. Improved color production control includes CMYK preview, Gamut Warning, Selective Color Correction and a Sponge Tool that saturates or desaturates color areas. This latest version supports your current operating system on Macintosh™ or Windows™ and even takes advantage of Power Macintosh™ and Windows NT™. A Deluxe CD-ROM is also included.


If you can dream it, you can do it.
Inside QuickDraw GX Fonts

Automatic glyph substitution is here! Thrilled, aren't you? Well, if you aren't, you will be: QuickDraw GX, Apple's long-awaited graphical extension to the Macintosh Operating System, supports an enhanced font architecture that infuses typefaces with a host of new capabilities. So read on: the following description of QuickDraw GX fonts—what they are, how they work, and what you can do with them—is certain to quicken the pulse of any digital-type aficionado.

(At press time, Apple was expected to ship System 7.5, which includes QuickDraw GX, in September for about $150. For more information on System 7.5, see “System 7.5,” Macworld, September 1994. For a look at the other graphics capabilities QuickDraw GX offers—such as color matching, printing, and document portability—see “A Quick Look at QuickDraw GX,” Graphics news, September 1994.)

A QuickDraw GX font is an outline font that takes advantage of Apple's QuickDraw GX imaging model, which provides new routines for manipulating graphics and type. Don't worry: GX is not a new font format—a GX font can be in either TrueType or PostScript Type 1 format—but rather a new technology that lets type developers add functionality to fonts. Your old PostScript and TrueType fonts will still work when the QuickDraw GX extension is installed; for a look at the mechanics of installing GX fonts, see the sidebar "How to Install GX Fonts."

The beauty of GX fonts is that typographic intelligence can be built into the font itself, rather than provided by the application in which the font is used. This technique allows even applications such as word processors and databases to offer advanced typographic features—if the application has been revised to make it GX-savvy (more on this later).

Before QuickDraw GX
In the current scheme of things, fonts are pretty much just collections of characters; what you do with them depends on the application you're using. With a word processor, you can specify type size, justification, leading, and so on. A page-layout program gives you precise control over typographic features such as kerning and tracking, while a graphics program might let you skew or rotate text, shade a letter, thicken an outline, and so on. If you're a sophisticated type user, you might augment a typeface with an expert set, a companion face that provides additional char-
APPLE'S OPERATING-SYSTEM EXTENSION PROMISES A WEALTH OF EXCITING NEW FONT CAPABILITIES

by Bertram Fenton

characters, such as small caps and fractions. If you want to customize such features as character width, weight, or optical scaling, you can buy a typeface that employs Adobe's Multiple Master technology.

On the other hand, QuickDraw GX lets font developers add typographic instructions that perform many of the functions just described, without the need for specialized applications or supplementary fonts. A GX font can contain information about such features as tracking, kerning, justification, and weight or width variations. In addition, the font can include thousands of additional characters, such as accents, symbols, ornaments, small caps, old-style numerals, ligatures, and more.

Wait a minute, you say, my keyboard doesn't have enough keystroke combinations to let me type thousands of characters. That's part of a GX font's charm: you don't have to use keystroke combinations to type special characters such as fractions or ligatures. Instead, you can turn typographic variations on and off as needed in a menu or dialog box.

For example, say you're typing the following sentence in your word processor, using the Adobe Garamond font: "To add flavor to grilled chicken, add 1/4 cup chopped garlic to the barbecue sauce and marinate for 30 to 45 minutes." If you work with type, you'll be familiar with the following problems and workarounds.

• The T and the o in To should be closer together. Too bad; your word processor doesn't support kerning.
• You'd like to use a ligature in flavor. You either type the ligature with the shift-option-5 keystroke combination (if you can remember it) or use the program's Change command to convert every fl letter combination to a ligature when the document is finished.
• You want to type 1/4 as a fraction. You mess around with superscript numbers, different type sizes, and the shift-option-1 keystroke combination, which produces a slash that's suitable for fractions. Or you create custom fractions in Altsys Corporation's Fontographer font-manipulation program. Or you buy the Adobe Garamond Expert Collection font, which includes fractions.
• You'd prefer to use old-style numerals for the 30 and 45, since they're more pleasing to the eye than numerals that don't fall below the baseline. You buy the Adobe Garamond Expert Collection, which includes old-style numerals.

With the QuickDraw GX version of Adobe Garamond (which is under development) and a word processor that supports GX fonts, you could type the above...
sentence much more easily. You'd simply pull down a menu for Adobe Garamond and select Ligatures, Fractions, and Old Style Numerals. As you typed f, then l, the fl ligature would automatically appear. As you typed 1, a slash, and 4, the font would automatically generate a fraction. Old-style numerals would appear as well. If the font designer built a T-o kerning pair into the font, QuickDraw GX's type engine would apply the specified kerning, even in a lowly word processor. As another plus, because the f and l in the ligature are entered by typing f and l rather than shift-option-s, the word flavor will be recognized by spelling checkers. In addition, the word flavor will be intact—as opposed to flavor—if you change your text to a font that doesn't have the fl ligature. (See "The List Goes On," for an example of QuickDraw GX font capabilities.)

**Feature-Rich Fonts**

GX font designers have the tools to add a broad range of typographic enhancements to their fonts. Here’s an overview of the features that a GX font can include:

- **Thousands of characters per font**
  Unlike today’s fonts, which can include a maximum of 256 characters, a GX font can contain up to 65,000 characters. To be more precise, a GX font can include up to 65,000 glyphs, or character representations. While you might think of the letter s as a single character, that s can be represented by any number of glyphs. Depending on what options are selected, pressing the S key on your keyboard could produce a lowercase letter, an uppercase one, a swash, or a small cap. In each case, a different glyph is invoked for the letter s.

  While a GX font can include 65,000 glyphs, 400 to 1000 glyphs is a more typical range for roman faces. Of course, there’s more to typography than the Latin alphabet. The ability to place thousands of glyphs in a single font is a plus for creators of fonts for non-Latin character sets such as kanji, which consists of several thousand symbols.

- **Automatic glyph substitution**
  GX fonts go further than just adding alternate letter styles; the characters in GX fonts can be context-sensitive. An s at the end of a word could have a calligraphic flourish, for example, while an s in the middle of a word would not. Typing an s followed by a t could produce a ligature. As another example, with a font’s Fraction option turned on, typing a number, then a slash, then another number would automatically generate a fraction.

  Automatic glyph substitution can also be applied to non-Latin text systems such as Arabic, in which the appearance of a character changes depending on its position with respect to other characters.

- **Kerning and tracking**
  A type designer can place kerning and tracking instructions in a GX font. Since QuickDraw GX instructions operate at the System level, rather than the application level, kerning and tracking can occur in any GX-savvy application, rather than exclusively in high-end page-layout programs.

- **Optical alignment**
  Lines of text can be vertically aligned along a margin but appear crooked to the reader. A letter with a rounded edge, such as C, might be touching the same margin as a letter with a straight edge, such as R. Optical alignment moves the letters slightly so they appear to be aligned. A GX font can support optical alignment based on instructions included in the font. Similarly, punctuation that falls at the end of a line, including hyphens, leaves a visual gap along the right margin. GX fonts can incorporate hanging punctuation, in which punctuation protrudes a minute distance over the margin, making the margin appear more even.

- **Live text as graphics**
  In illustration programs such as Adobe Illustrator or Aldus FreeHand, you can stretch, slant, rotate, and skew text. Once the text is manipulated in this way, however, you can’t correct a typo or delete a word in a line without negating the effect that was applied. With QuickDraw GX fonts, you can apply effects to text while maintaining full text-editing functionality.

- **Variable style options**
  QuickDraw GX fonts can support style variations similar to those of Adobe’s Multiple Master fonts. For example, a GX font might allow the user to adjust style axes for width, weight, or optical scaling.
What are QuickDraw GX fonts? QuickDraw GX fonts are outline fonts—in either TrueType or PostScript Type 1 format—that can include typographic functions such as automatic fractions and ligatures, alternate character styles, optical alignment, and variable width and weight. Because a GX font can have as many as 65,000 characters, a single font can include characters formerly available only through an additional expert set. This expanded character set is also a plus for non-Latin fonts that include large numbers of glyphs.

Where can I get them? System 7.5 includes five GX fonts. Adobe, Bitstream, Linotype-Hell, and Monotype also plan to offer them. (The word Plus after a font name indicates it is a GX font.)

What software and hardware is required? To use a QuickDraw GX font, you need a Mac with at least a 68020 processor; 5MB of RAM with System 7.1, 8MB of RAM with System 7.5, and 16MB of RAM with System 7.5 on a Power Mac; and Apple’s QuickDraw GX extension (included with System 7.5 and also available from vendors who license the extension for inclusion with their products). GX fonts will work in a limited capacity with current applications, but to take advantage of alternate characters and other GX font functions, you’ll need applications that are GX-savvy. Therein lies the rub. At press time, only two applications that fully support GX fonts—ReadySetGo and Pixel Typer—had been announced.

Guidelines for GX Fonts
Not every font will include all of the features just described. In some cases a font’s design will dictate which features it includes. For example, a decorative face might not contain fi and fl ligatures, which are often found in traditional serif faces. Similarly, a modern sans serif design would probably have no call for swash characters, but might contain a set of alternate capitals or other letter variations.

In addition to practical and aesthetic concerns, grim realities such as time and budget constraints might shape a GX font’s feature set, as GX font development is much more labor-intensive than development of traditional fonts. But what’s to stop a designer from using GX development tools to create a font, then adding a couple of alternate characters and marketing it as a QuickDraw GX font?

With any luck, a group of font and application developers called the Font Consortium will prevent such an occurrence by defining what constitutes a GX font. Representatives from Aldus, International Typeface Corporation (ITC), Linotype-Hell, and around 20 other companies held their first meeting in the spring of 1994. (While Apple is not directly involved in the Font Consortium’s decision-making process, an Apple representative did attend the initial meeting, and Apple supports the consortium’s efforts to set guidelines for GX font character sets and features.)

According to Allan Haley, who chaired that meeting, developers were concerned that “nobody really knew what a GX font was; theoretically, you could make a font, put one ligature in it, and say ‘Gee, I’ve got a GX font.’

“Meanwhile, companies like ITC, Bistream, and Linotype were investing tens of thousands of dollars to develop full-blown, rich GX fonts,” Haley added. “[With this situation] customers wouldn’t know what they were getting. We weren’t attempting to create a gestapo standard that developers have to meet, but to establish a baseline character and feature set that all GX fonts probably ought to have. We’re not trying to constrain anybody, because GX fonts are about letting designers be creative.”

The Font Consortium is seeking input from concerned developers and hopes to publish a set of guidelines this fall. Meanwhile, designers at Linotype-Hell are working on a set of symbols to identify GX font features (small caps, swashes, variable weights, and so on). These symbols could be placed on font packages to let buyers know which features were supported by a given font.

Defining the characteristics of a GX font is only one of the Font Consortium’s concerns. The other is cross-platform compatibility. While TrueType fonts are currently supported by the Macintosh and Windows operating systems, no such cross-platform capability exists for QuickDraw GX fonts, since QuickDraw is an imaging architecture particular to the Mac. Although the Font Consortium members have made it clear to Apple that they want cross-platform compatibility, it’s unclear at this point what—if anything—can be done to accomplish that. Microsoft has shown no inclination to support GX font technology, and is reportedly considering creating its own extended character set for Windows.

What If They Gave a Font Technology and Nobody Came?
The lack of cross-platform compatibility, Apple’s long delay in releasing QuickDraw GX, and an ever-present undercurrent of politics (primarily between Apple and Microsoft) seem to have made application developers, at least for now, less than eager to support GX fonts. By late July, only one page-layout application—Manhattan Graphics’ ReadySetGo—was slated to fully support QuickDraw GX fonts. Likewise, if you wanted to create some graphics or animations that took advantage of GX fonts, your buying decision would be easy: Pixel Typer 2 is the only one that exists.

Quark, for example, has no plans to support QuickDraw GX. “Most of the functionality that QuickDraw GX offers is already built into XPress,” according to Quark representative Peter Warren. “If you want to adjust kerning or rotate a word, you can do that in XPress.”

According to Barbara Burke, PR program manager at Aldus, “We have not made any announcements or any commitment to support GX fonts” in PageMaker—a curious statement from a company that’s actively involved in the Font Consortium.

And while several font companies have put considerable time and resources into developing GX fonts, others have some concerns about the new technology. “We’ve made a few GX fonts and think the technology is interesting,” says Cynthia Hollandsworth, Agfa’s type marketing manager. “But there are questions about the commercial viability of GX fonts. They offer a lot of potential for the informed user, but it’s hard to get people to learn about type—it’s difficult enough to explain Multiple Masters to customers. The type intelligentsia will love GX fonts, but we have to consider the broad market; there’s such a thing as overengineering.”

Hollandsworth has a point. One has only to look at the number of ads, book jackets, and other items that display straight quotes and other typographic faux pas to realize that the general user may not yet be ready for more features.
Font Pioneers

Despite some well-founded skepticism in the industry, several digital-type foundries have been hard at work creating GX fonts. According to an Apple representative, 60 to 75 GX fonts should be available when System 7.5 and QuickDraw GX debut. Apple's System 7.5 package will include the following faces:

- **Hoefler** Designed by Jonathan Hoefler, this family includes Hoefler Regular, Black, Italic, and Black Italic, as well as Hoefler Ornaments. The fonts include old-style numerals, inferior and superior numbers and letters, fractions, ligatures, engraved characters, small caps, and ornaments.

- **Apple Chancery** Designed by Charles Bigelow and Kris Holmes, this lovely font is based on handwriting scripts developed during the Renaissance. The font has four design levels featuring different serif, ascenders, descendents, and swashes. It includes old-style numerals, inferior and superior numbers and letters, fractions, ligatures, and flourishes.

- **Skia** This stylish sans serif face by Matthew Carter offers variable weight and width axes. It includes old-style numerals, inferior and superior numbers and letters, fractions, and ligatures.

- **Tekton Plus** A PostScript Type 1 GX font from Adobe, Tekton Plus includes accented characters, small caps, ligatures, superior and inferior numbers, fractions, swashes, additional alternate characters, and ornaments. Caflisch includes swashes, ligatures, and old-style numerals.

- **Bitstream** (617/497-6222) and ITC, in conjunction with Galapagos Design Group, will release a number of GX fonts that consist of text, decorative, and script designs. The fonts take advantage of various QuickDraw GX features and character sets. The fonts include various weights and styles of Bitstream Amerigo, ITC Anna, Bernhard Modern, Bernhard Tango, ITC Charter, Bitstream Chianti, ITC Highlander, Bitstream Mr. Earl with Snowcaps, ITC Newtext, Bitstream Oranda, and ITC Studio Script.

- **The Font Bureau** (617/742-9070) is experimenting with GX fonts, but none had been released at press time.

- **Linotype-Hell** (516/434-2000) has created GX versions of the 35 standard Macintosh fonts, including Helvetica, Times, Palatino, New Century Schoolbook, ITC Avant Garde Gothic, ITC Bookman, ITC Zapf Chancery, and ITC Zapf Dingbats. Other GX fonts are in the works, including Electra, which has axes for optical scaling, and Botteglas, a whimsical decorative face.

- **Monotype Typography** (312/835-1440) has a number of GX fonts under development. No specifics were available at publication time.

- **Ares Software Corporation** (415/378-9090) has announced that users will be able to manipulate the master fonts in their FontChameleon program ($295) in applications that have QuickDraw GX sliders for weight, height, and width (for a review of FontChameleon, see Macworld, September 1994).

The Last Word

As you can see, there are plenty of QuickDraw GX fonts waiting in the wings. If only the same could be said for QuickDraw GX-savvy applications.

Meanwhile, what's a font connoisseur to do? For now, you can install the GX fonts that come with System 7.5 and get a glimpse of them in your current applications, but you'll only be able to use the standard 256 characters that are found in today's fonts (the fonts' QuickDraw GX features will be unavailable to applications that are not GX-savvy). Or, you can purchase Manhattan Graphics' ReadySetGo GX ($395; 914/725-2048) or Pixar's Typestry 2 ($299; $10/236-4000) when they're available later this year.

QuickDraw GX fonts offer an array of amazing typographic capabilities for sophisticated type users. In addition, the technology simplifies mundane type chores like setting fractions or adding ornaments—something almost any font user could appreciate. If I were you, I'd contact the developers of my favorite applications and ask them when they plan to support QuickDraw GX fonts. It would be a shame to see the promise of GX technology wither into an ex-technology simply because of a lack of applications that take advantage of it.

Contributing editor ERNFERT FENTON regularly covers type for Macworld. Among her past articles are "The Right Font," a buyer's guide to fonts (March 1994), and "Understanding Multiple Masters," a look at Adobe's type technology (September 1992).
Organizing files is easier than ever—just click on a folder and hierarchical menus appear so you can just drag and drop.

Anything can be improved upon. Even that paragon of smart design and intuitive use, the Macintosh® computer. So, to make your Mac quicker, simpler and more efficient, upgrade it to Now Utilities 5.0.”

The new version sports a time-saving interface that makes features more accessible. You can create custom menus, jump directly to applications, or locate any misplaced files lickety-split.

Hate to waste time? Tasks that once took twenty keystrokes now take only one. With just one click you can move, copy, delete or alias items.

Precious disk space is saved with full archiving and transparent compression options. Software scuffles are all but eliminated with new conflict isolation. And auto-Save backs up every keystroke, so you’re always safe.

The original version won countless awards and praise from the experts. Not ones to rest on our laurels, we’ve spent the last year rethinking, refining and adding major features as well as subtle enhancements. New Now Utilities 5.0. Accelerated for Power Macintosh.” Introductory street price under $70, after that $89. Upgrades available for just $39.95 until November 15, 1994. Call 1-800-689-9423 today, or see your dealer.
There are three types of computer users: those who have lost data due to a power problem, those who are going to, and those who have protected themselves against the inevitable surge, blackout or brownout with the most reliable UPS they can buy: Back-UPS by APC. In fact, editors and users alike agree that if your system demands absolute reliability, you can depend on APC Back-UPS.

According to a study by Bell Labs, undervoltages represent the overwhelming majority of power problems likely to hit your computer. The question is not if failure will occur, but when. Whether due to construction, wiring, weather, other office equipment, or accidents, power problems are as inevitable as death and taxes. That's why you need instantaneous battery backup power from the Back-UPS to prevent data loss, hard disk crashes, and hardware damage.

If you're concerned about lightning, rest assured that when measured using the ANSI/IEEE 587 Category A test wave, Back-UPS are superior to industry standards.
"All other brands of UPS die regularly in this lightning prone environment. My APC won't die!" said Paul Sisi/li, Systems Analyst, City of Port St. Lucie. "With other brands, users don't find out until it is too late. The power interruptions here are very hard to live with. The other brands are dying off. Typically they last just beyond their warranty period. My Back-UPS is going on three years... no other brand is as reliable."

virtually all separate surge suppressors. Surge performance is even backed by a $25,000 Lifetime Equipment Protection Guarantee.

If you're protecting a network server, a communications interface port (on models Back-UPS 400 and higher) provides the security of an automatic shutdown to all major OS including NetWare, Windows, Windows NT, LAN Server, LAN Manager, LANTastic, SCO Unix, OS/2, Banyan Vines, AppleShare/System7 and more, so your data is safe whether the system is attended or not. (PowerChute software and interface kits sold separately.)

And since data processed on networked clients needs protection too, the $139 Back-UPS 250 provides an economical solution for all your LAN workstations.

Discovering how essential Back-UPS protection is can be hard... if you wait for the next storm to roll through. But discovering how affordable it has become is easy...

Call today and find out (the easy way) why more than 1,000,000 satisfied users bank on Back-UPS from APC. With more awards than all other brands combined, field-proven reliability, and a two year warranty, Back-UPS are power protection you can purchase with confidence.

<table>
<thead>
<tr>
<th>Back-UPS (R to L)</th>
<th>Application</th>
<th>Sugg. List</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>LAN nodes, internet hardware, POS</td>
<td>$139</td>
</tr>
<tr>
<td>400</td>
<td>Desktop 486, 386 systems, servers</td>
<td>$229</td>
</tr>
<tr>
<td>450</td>
<td>Tower 486, 386 systems, servers</td>
<td>$279</td>
</tr>
<tr>
<td>600</td>
<td>Heavily configured systems, CAD/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAM workstations</td>
<td>$399</td>
</tr>
<tr>
<td>900</td>
<td>Multiple systems, longer runtime</td>
<td>$599</td>
</tr>
<tr>
<td></td>
<td>applications</td>
<td></td>
</tr>
<tr>
<td>1250</td>
<td>Multiple systems, LAN hubs, small mins, telecom</td>
<td>$799</td>
</tr>
<tr>
<td></td>
<td>equipment</td>
<td></td>
</tr>
</tbody>
</table>

More than...

1,000,000 Satisfied Users

APC has won more awards for performance and reliability than all other UPS vendors combined... including four consecutive LAN Times Readers Choice awards...

AWARD-WINNING FEATURES

- Instantaneous backup power beats blackouts and brownouts
- Unmatched lightning (tested to UL1449) and surge protection for maximum hardware safety
- Network-grade line conditioning and EMI/RFI filters prevent glitches
- LAN Interface (on Back-UPS 400 and up) provides automatic shutdown to all major OS: Windows, NT, NetWare, LAN Server, LAN Manager, LANTastic, Unix, OS/2, Vines, AppleShare/System7 and more.
- Site diagnostics automatically spot missing ground and reversed polarity, two common miswirings which usually require an electrician's visit to diagnose.
- Option switches allow you to customize transfer voltage and alarm settings.
- Test Switch for ongoing peace of mind
- 2 year warranty and full safety approvals
- $25,000 Lifetime Equipment Protection

Circle 72 on reader service card
WordPerfect's Groupwise: Beyond E-Mail

While upgrading WordPerfect Office, Novell subsidiary WordPerfect Corporation renamed the office-automation package Novell Groupwise to distinguish it from the Word/Excel/PowerPoint bundle known as Microsoft Office.

Novell Groupwise provides calendaring and meeting scheduling, to-do list management, and other capabilities, but the real news in the new version, 4.1, is its extensive E-mail features. It provides BBS-like capability with forums that can thread messages and responses from many participants. E-mail can be routed to a series of recipients, with instructions on what each recipient is supposed to do before the message moves to the next person on the list. Also, Groupwise's E-mail can be controlled with a system of rules: for example, before going out of town you might set it up to forward messages from your supervisor to a colleague, and to send a response to all other messages with information about where you can be reached. For remote access, WordPerfect provides gateways to various portable, wireless delivery systems such as pagers; if you're caught somewhere without a portable anything, you can retrieve or send E-mail with voice annotations by telephone, similar to a voice-mail system, or even command a voice-synthesizer to read your text messages to you over the telephone. Groupwise is the platform for other WordPerfect workgroup applications: for example, requests for scheduling meetings, and electronic forms created and distributed with WordPerfect's InForms package, appear in the Groupwise in-box.

Groupwise was designed for mixed environments, and there is no Mac version of the Groupwise server. The Mac client, which should be available now in 680X0 and native Power Mac versions, provides the same functionality as all other clients and costs $695 for five users; pricing per user drops to $95 for volume purchases. Gateways, voice synthesis, and other special features are extra. WordPerfect, 801/225-5000.—D.L.

The Svelte FullWrite Unveiled

When the religiously awaited Microsoft Word-killer FullWrite Professional finally shipped way back in 1988, about two years behind schedule, the faithful tolerated its many bugs but were scandalized by its outrageous hardware profile: FullWrite demanded at least a megabyte of RAM to run. The program was soon lost in the morass leading to Ashton-Tate's demise, but now FullWrite has been resurrected by a new company and, at 1.5MB to 2MB of RAM, version 2.0 is almost PowerBook material for the 1990s.

Version 2.0 is a complete rewrite but retains beloved features from earlier versions, including "sidebars" (separate minwindows that sit on a regular document and contain text or graphics), cross-referencing, and bookmarks (a way to create a list of places in a document you want to return to later). Big changes include an extensible architecture for third-party developers to add new features (and for users to strip them out—many standard features are extensions,
Simultaneous Interpreters

For U.S. businesses that need to correspond and conduct transactions in languages other than English, there have been only two alternatives for translating documents: send them out to a big-dollar hourly service, or keep people on staff with native command of the foreign languages needed. Computer translation technology is finally getting to the point where off-the-shelf software can take over at least some of the burden.

MicroTak Software is developing four low-cost packages for translation of English to and from French, German, Italian, or Spanish. MicroTak says that the $99.95 Language Assistants perform reasonably well on clearly written, unambiguous text and are useful mostly for quickly converting foreign E-mail and business documents. They can translate a whole document at once, or go sentence by sentence flagging uncertain words or phrases for a person to correct; they cannot batch-process a series of documents.

The programs can open and save in Microsoft Word, MacWrite, WordPerfect, and ClarisWorks formats. MicroTak Software, 619/272-5700.—D.L.

OCR Goes Gray-Scale

Version 5.0 of Caere’s flagship optical character recognition package, OmniPage Professional, applies several new techniques to extracting text from paper documents, including using the gray-scale information collected by most scanners. This technique, which Caere calls 3-D OCR, analyzes not only the location but also the darkness of pixels to help determine which belong to a character and which belong to a blob of correction fluid, a coffee stain, or other artifact.

Version 3.0 uses a set of interlocking neural networks that each specialize in a particular problem—small type sizes, faxes, and so on—and pass the analysis chores back and forth as different problems are encountered. The system also analyzes recognized text for linguistic or grammatical clues to apply to unrecognized portions of a document.

Caere has built its image-manipulation program, Image Assistant, into OmniPage Pro 5.0, so images that are scanned and saved with a document can be color-corrected or otherwise modified during the recognition process. The new version also sports a simplified interface.

OmniPage Professional version 5.0 should be shipping now with an installer that distinguishes between 808X0 and Power Macintosh systems and installs the right version. It lists for $695. Caere, 408/354-7000.—D.L.
**"The Best On-Line Trading Software I've Seen."**

— Walter Mossberg,
in *SmartMoney* magazine
February 1994

---

**For a Limited Time, STREETSMART Can Be Yours FREE.**

SmartMoney and other leading financial journals have acclaimed STREETSMART as a breakthrough in personal investment software. And now we've extended our special free offer.

Just move $15,000 or more into a Schwab account between May 2 and the end of October, and you'll get this powerful program—*free of charge*.

**Manage your portfolio like a Wall Street broker.**

With STREETSMART, you can research investments, place your own orders and monitor your accounts right from your computer—anytime day or night. Plus, you'll save an additional 10% on commissions.*

---

**Trade up to Schwab today.**

To help make more of your investment dollar work for you, trade up to Schwab where you can save up to 76%** on stock commissions.

And remember, to get today's “best on-line trading software” for free, open your account or transfer additional funds to Schwab before October 31, 1994.

For help, stop by one of our 200 offices or call:

1-800-442-5111 ext. 86A

**Charles Schwab**
Helping Investors Help Themselves®

---

Offer available for individual investors only. Limit one per customer. *StreetSmart's 10% discount is based on Schwab's current commission schedule and may be used with other offers at Schwab's discretion. **Based on a 6/94 survey conducted by Schwab, available upon request. $39 minimum commission. Full-commission brokers may provide different services, including personalized securities recommendations. Commission rates surveyed are for stocks and may vary for other products. © 1994 Charles Schwab & Co., Inc. Member SIPC/NYSE. All rights reserved. (8/94)
Is Your Mac Secure?

Over time, your Mac becomes a very personal thing, and I don’t mean because of your Energizer bunny screen saver and Bullwinkle Trash icon. Your Mac is a personal thing because of the personal data it contains: financial records, business plans, lesson plans, résumés, love letters, hate letters.

These documents lie around on your hard disk for any passing colleague to read. Oh, you’ve buried them several folders deep, have you? Nice try, but all a snooper needs is a program that can search inside files for words like budget, confidential, or romantic—Microsoft Word’s Find File command can do this, as can such utilities as Claris’s Retrieve It.

In short, you need to know how to protect your data. A security program isn’t a fail-safe guarantee against silicon spying but, like a burglar alarm, it can stop an amateur and slow down a pro.

Application Security Features

A few programs have built-in password protection, which may be all the security you need. With the latest versions of two Microsoft programs, Word 6.0 and Excel 5.0, you can password-protect a document to prevent anyone from opening it or to let people read but not alter it; you’ll find the option in the Save dialog box. When you specify a password, both Word and Excel encrypt—that is, scramble—the file so it can’t be read with a disk editor such as Norton Utilities.

To password-protect a Word or Excel file you’ve already created, you must use the Save As command to duplicate it. And don’t forget to throw away the original, unprotected version.

WordPerfect for Macintosh 3.0 also provides password protection, and it offers a Preference setting (in the Preferences dialog box under Environment) to protect new documents automatically.

Most databases, such as ACI US’s 4th Dimension and Claris’s FileMaker Pro, let you set up individual and group access privileges for viewing or modifying files, layouts, and even specific fields. (There are, however, some potential holes in FileMaker Pro’s security scheme—see Conspicuous Consumer in this issue.)

Finally, some backup utilities, such as Dantz Development’s Retrospect and Symantec’s FastBack for Macintosh, can encrypt backup and archive files. Consider doing this if your backup media is stored away from your desk or off-site, as it should be.

Password-Protecting Partitions

One problem with application-specific security is that it’s application-specific: WordPerfect can password-protect your business proposal, but not the electronic mail you exchange with colleagues about it. Application programs also tend to use encryption routines that work quickly but are easily cracked. As evidence, at least two companies sell utilities that extract passwords. AccessData Corporation’s Wrpass ($185; 801/224-6970, 800/658-5199) retrieves WordPerfect passwords, while the company’s Xpass ($185) does the same for Excel. New Visions’ MasterKey ($185; 214/734-2524) works with both Excel and WordPerfect. These products were developed with good intentions, of course—to rescue files when people forget their passwords—but, like all technology, they’re neutral about how we use them.

Guarding entire folders or disks is more secure. All hard drives include drive/formatter software, such as FWB’s Hard Disk Toolkit ($199.95; 415/474-8055), that can divide a drive into numerous volumes, or partitions, each of which appears on the desktop as a separate drive. Most of these utilities let you password-control mounting partitions. A password-protected partition is an ideal place to store sensitive files—if you remember to drag the partition to the Trash when you’re finished with it or step away from your desk. This is inconvenient. Worse, an experienced disk hacker can use a disk-editing utility to locate the password.

Locking Folders

There are many security utilities that lock individual folders. One such program, Kent Marsh’s FolderBolt ($129.95; 713/522-5625, 800/325-3587), isn’t a kitchen-sink security package. It simply provides three options to control access to folders: keep people out entirely, restrict them to read-only access, or let them add files but not open the folder. The good news about FolderBolt is that, unlike many security packages, it requires only minor adaptations to your work routine. To lock a folder, for instance, you just press the shift key while clicking on the folder window’s close box, and a dialog box appears to assign a password (see “Under Lock and Key”).

The bad news about FolderBolt and many other security packages is that they continue
make minor alterations to a disk’s directory, the file that acts like a table of contents to the files on the drive. Disk-repair packages such as Symantec’s Norton Utilities for Macintosh, or NUM ($149; 503/334-6054, 800/441-7234), will detect these alterations and report them as flaws requiring repair, so you must disable the security program before running a disk-diagnostic utility.

**Deleting and Shredding Files**

Hey, Ollie North, listen up. When you throw a file in the Trash, it isn’t really deleted—only its directory entry is removed, and anyone with a file-recovery program can restore it in a flash. To prevent this from happening, run the file through a shredder program, available in such utilities as Datawatch Corporation’s Citadel with Shredder 1.2 ($99.95; 919/549-0711), usrEZ Software’s ultraSecure 3.0 ($239; 714/756-5140), and Kent Marsh’s CryptoMactic 1.01 ($99). Some disk-optimizing utilities, including NUM, also provide this feature. Because shredding obliterates the original data by overwriting the deleted file with random data, be absolutely sure you don’t want a file before shredding it—there’s no Undo in this game.

**Locking the Mac**

Several programs provide access control for your whole system. Symantec’s DiskLock ($129); usrEZ’s ultraSecure and ultraShield ($149); Casady & Greene’s A.M.E. 2.1.9, or Access Managed Environment ($159 for one user; network versions available; 408/484-9228, 800/359-4920); and Kent Marsh’s NightWatch II 2.5 ($159.95) all provide a screen-locking feature: when your screen saver kicks in or you trigger it, the regular screen won’t come back without a password. Many screen savers, including After Dark, provide screen locking, but real security programs go much further. For example, DiskLock, ultraSecure and ultraShield, A.M.E., and NightWatch II let you disable the Mac’s floppy drive or restrict what kinds of files users can copy. You can also specify multiple security levels—for instance, a school computer lab could prevent students from copying applications into a Mac with the brute-force method—overwriting the deleted file with random data, be absolutely sure you don’t want a file before shredding it—there’s no Undo in this game.

**Scrambling Files with Encryption**

Screen, folder, and disk locks can be broken. If you’re serious about security, encrypt sensitive files so that even if someone can access your files, they will be unreadable.

Most security programs provide a relatively fast, light-duty encryption option as well as a slow, heavy-duty one. The heavy-duty option is usually the National Institute of Standards and Technology’s Data Encryption Standard (DES), developed in part at the National Security Agency. DES encryption can be slow—it might take an hour to encrypt a 1MB file—so a Power Mac could help dramatically here,usrEZ says its DES encryption runs five times faster on a Power Mac than on a Quadra 950; so far, only its ultraSecure and ultraShield products are available in native Power Mac versions.

Other programs that should be Power Mac-native by the time you read this include FolderBolt and NUM. A.M.E. is incompatible with Power Macs. The other security programs I’ve mentioned run only under 680X0 emulation.

**Protection for the Road**

The nomadic lifestyle of many PowerBook owners incurs unique security risks. All of the programs discussed here are compatible with PowerBooks, but if you don’t need disk locking, consider a PowerBook utility package such as VST Power Systems’ PBTools ($99.95; 508/287-4600) or Connectix PowerBook Utilities ($99; 415/571-5100, 800/950-5880), both of which include rudimentary security features. For example, both can intercept a sleeping PowerBook’s wake-up routine and display a dialog box requiring a password. The PBTools manual also contains a great section with tips on security strategies.

Here’s one more PowerBook security tip, gleaned from personal experience: Don’t store telephone credit-card numbers and passwords on your PowerBook, or you may find yourself spending half a business trip canceling phone cards and changing passwords.

**Protecting Your Hardware**

Many thieves are more interested in your Mac itself than the data it contains. For...
Any Questions?

If so, just call 1-800-327-4622. We’ll tell you all about FARGO’s incredible new PrimeraPro® Color Printer. If you’re really into graphics, electronic photography or digital imaging, you’ll want to check out these specs:

- 600 x 300 dpi resolution – an industry first!
- Apple® LocalTalk® or parallel interface
- Optional Adobe® Postscript® Level 2
- Dual Dye-Sublimation/Wax Thermal Transfer

PrimeraPro is the perfect color printer for all of your comps, proofs, layouts, photos, illustrations, scientific and architectural renderings, 3D models, video captures, and final artwork. Print on plain laser paper, transparency film— even T-shirt and mug transfers!

For more information and FREE sample output, call 1-800-327-4622.

FARGO® ELECTRONICS, INCORPORATED
7901 Flying Cloud Drive
Eden Prairie, MN 55344 U.S.A.
1-800-327-4622
612-941-5470
FAX: 612-941-7836

Adobe Postscript

PrimeraPro and Primera are trademarks and FARGO is a registered trademark of FARGO Electronics, Incorporated. All other trademarks and registered trademarks are the property of their respective companies. *Manufacturer's Suggested Retail Price. Dealer price may vary.

Circle 172 on reader service card
that kind of theft, there are hardware devices that let you lock the Mac down to something solid.

A few years ago, Kensington Micro­
ware worked with several hardware makers to devise the MicroSaver ($59.95; 415/572-2700, 800/535-4242). Some manufacturers, including Apple, build a simple slot into their products to accom­mo­date Kensington's thick, 6-foot galva­nized steel cable with a loop at one end and a cylinder lock at the other. Apple has put MicroSaver slots on the Cen­
tris/Quadra 610 and 660AV, the Quadra 800 and 840AV, and the Power Macs; on the PowerBook 160, 165c, 180, 180c, and 500-series models; and on the Duo Dock, the Duo MiniDock, and the Duo floppy adapter. Yes, a thief could wrench the lock out of the Mac (breaking its case and making it harder to sell) or cut the cable, but the MicroSaver will definitely dis­
courage them.

For PowerBook 100-series models (but not the 100 itself), an alternative is APS Tech­nolo­gies' PowerBook Security Handle ($89; 816/483-6100, 800/846­
9948). It attaches to the bottom of the PowerBook and includes a cable that you can bolt down. It also gives the Power­Book a carrying handle. Another such device is the Kablit from Secure­It ($34.95 or $49.95; 413/525-7039, 800/451-7592), a lock-and-cable system that installs in the PowerBook's floppy drive (also blocking access to the drive).

Security's Drawbacks
Security programs impinge on your nor­mal work routine and the way some pro­grams alter a hard drive can cause prob­lems with file-recovery utilities.

Another drawback surfaces at backup time. You must unlock protected files, folders, and disks before a backup pro­gram can copy them. Backing up is enough of a chore in itself; if you also face a multistep process to disable and reenable security software, the tendency not to back up becomes stronger.

Then there's the human factor: writ­ing down a password or E-mailing it to a colleague often compromises security. And a security program could be used against you—just imagine a disgruntled employee encrypting all your file servers.

The best security advice is a variation of “don't leave your valuables in the car.” Use removable media, and lock up the media or take it with you when you aren't using it.

Contributing editor JIM HEID is the author and producer of Macworld Complete Mac Handbook Plus Interactive CD, the third edition of which was just published by IDG Books Worldwide.
How to get the best color in publishing
Wired Slashes Lead Time

Wired magazine is one hot property. It has quickly grown to a circulation of 150,000 copies and earned a reputation for thought-provoking technology articles delivered in a cutting-edge design. Its often mind-bending look and feel is developed on Apple® Macintosh® systems incorporating Radius display calibration and video-capture technology.

The desktop system at Wired puts its users in control, says Production Art Director Eugene Mosier. “We rely less on traditional systems and outsourcing. We can therefore almost eliminate the need for outside vendors.”

A well-known problem in magazine publishing is long lead times. But Wired magazine, fueled by hardware and software technology from Radius and Aldus, runs on deadlines resembling those of a daily newspaper. Desktop color technology provides on-site, real-time experimentation. Radius PrecisionColor® Calibrators provide consistent and accurate on-screen color management, as the Wired staff develops layouts.

Aldus® Fetch® is the key to collective creativity at Wired. Its powerful cataloging capability puts multiple sources at staff members’ fingertips: digitized photographs, Apple QuickTime® video, even images located in Wired’s sister office in Japan. Aldus Fetch serves as a visual cataloging tool, empowering Production Art Director Eugene Mosier and the Wired staff to choose, use, and reuse images in each issue quickly and effectively.

Major productivity leaps have resulted at Wired. Mosier says that the design, type specification, pasteup, prepress, and other functions that normally require nine or ten people are now handled by three or four. To cap it off, the Radius Worry-Free Warranty® keeps Wired wired in a business where system uptime is mission-critical.

All this translates to astonishing cuts in lead time. For a recent issue, the design and editorial teams were still tweaking the cover story a day and a half before deadline. With conventional systems, such down-to-the-wire performance would have been unthinkable.
High volume is a constant companion to the color separation business, according to American Color's Greg Hoaglin. The company is one of an increasing number of traditional color preparation houses integrating digital color publishing technology into its business.

With more than 750 employees, American Color relies heavily on the latest technologies. Enhancing the company's fleet of high-end Macintosh computers are Radius 24-bit graphics accelerator cards, Aldus software, and Agfa scanners. American Color clients such as Walgreen Co., Service Merchandise, and the Revco drugstore chain demand large volumes of high-quality, high-resolution color print materials. And they want their materials quickly.

So in Hoaglin's world, high-volume page scanning is a key concern. Systems such as the Agfa® Horizon Plus® scanner enhance productivity by enabling Hoaglin to scan everything from 35mm positive or negative filmstrips to slides to large photos. The Agfa Horizon Plus maintains traditional color quality, yet places material in a digital format for added benefits in image manipulation and processing. For example, the system's variable unsharp masking (USM) capability adjusts scanning resolution, contrast levels, and image density in cases where sharpness is lacking in the original material.

Radius StageTwo Rockets perform dual processing on a single Macintosh computer. Incorporating Aldus® TrapWise® and Aldus® PressWise® has allowed American Color to reduce the number of manual stripping tables from sixteen to four.

"Because we need to provide a variety of services to our customers, we ourselves need to be well versed in the latest technology," Hoaglin explains. "Using the latest Macintosh computers and top-notch products from companies like Radius, Aldus, Agfa, and others allows us to be so. As a result, we're 99 percent digital today."
CKS Partners Takes Off

CKS Partners is a full-service, one-stop communications company that depends on Macintosh computers and other desktop color publishing technology to provide integrated marketing solutions for its clients.

"We have at least one of every desktop color peripheral and application," says Mark Loncar, CKS Vice President and Director of Information Technology. That technology allowed a redesign for United Airlines to be completed in 5 months, rather than the 12 to 18 months that would have been required otherwise.

When companies such as United Airlines need to redesign their corporate look, they turn to CKS Partners for fast, creative response to their needs. CKS integrates Radius LeMans GT graphics accelerator cards, Radius PrecisionColor Calibrators, and a Seiko Instruments Professional ColorPoint 2 printer into its network of Apple Macintosh Quadra®, Power Macintosh", and PowerBook® systems. This allows CKS to generate concepts quickly, with accurate color.

Clients can view designs on a Radius display or printed out from color printers such as the Seiko Instruments Professional ColorPoint 2. The printer's dual print capabilities allow efficient use of the latest technologies. For example, CKS counts on the Seiko Instruments printer to produce economical drafts in thermal transfer mode, then print final designs using top-quality dye sublimation technology. And the printer's Adobe® PostScript® Level 2 software guarantees cross-application compatibility.

For United Airlines, CKS's skillful use of technology came through with flying colors. CKS developed more than 300 design alternatives for this project using color printing technology. Another presentation involved a full-size representation of an aircraft tail section which came straight off the Macintosh. In the field, painters use portable Apple PowerBook systems to visualize their work and provide feedback to CKS.

Mark Loncar, CKS Vice President and Director of Information Technology, looks forward to even greater gains as Power Macintosh systems are fully integrated. "We're very supportive of the PowerPC® platform and plan to move to it," he says. "The Macintosh platform is simply the best for what we do."

The Apple PowerBook was instrumental in executing the new book developed by CKS Partners for United Airlines. Apple Power Macintosh systems bring new levels of price/performance to the market while maintaining the industry-standard Macintosh interface and top-notch applications support.

Today's powerful Macintosh-based solutions provide tremendous performance and value, and continue to let
Students in the Graphic Communication department at the California Polytechnic State University, San Luis Obispo (Cal Poly) are learning how to be color publishing professionals. Using products such as Aldus™ PageMaker™, Aldus FreeHand™, Aldus Fetch™, Aldus TrapWise™, and Aldus PressWise™, they capture and develop specific pieces of art, render individual pages, and create complete publication layouts. The Aldus products offer a complete solution from design to layout to prepress. Not only is it easier to teach with a powerful array of professional tools, but also students can receive in-depth training on specific tasks. They can become experts in any specific application, each of which by itself is important in the professional publishing world.

Aldus TrapWise is used to instruct students in the use of professional electronic trapping, to create pages and spreads that meet or surpass traditional, nondigital stripping standards. Aldus PressWise is used in the development of advanced electronic page imposition, and to train students how to create precise, “plate-ready” signatures of multipage documents for use on commercial presses.

The real world is also present in the budgetary sphere, according to Professor Michael Blum, who runs the electronic prepress lab. For example, the lab cannot afford all the workstations it needs for all the jobs that need to be done. So Blum installed Radius StageTwo Rockets to boost the power of the lab’s Macintosh computers. “The StageTwo Rockets handle functions in the background without taking a performance hit,” he notes. Students can now render images in the background while laying out pages on the screen, in essence doubling their efficiency.

Overall, the plug-and-play world of the Macintosh and Radius graphics cards facilitates teaching and learning, according to Blum. “The technology in our lab is a pleasure to work with,” he says. “We just plug everything in and teach classes.”

---

cal poly turns
students into
young pros

For Harvey Levenson and Michael Blum at Cal Poly, color desktop publishing technology is crucial to their mission of preparing students to manage technology in the graphic communication industry.

“Change used to be the exception in this industry; now it’s the rule,” says Professor Levenson. “We are preparing students so they can help lead this change.”
Cronan Catches Creativity and Bottles It


“Desktop technology gives us a much more compact way of organizing our production processes,” says Cronan designer Lisa Van Zandt. “Everything is digitized on the computer, so we have faster access, and there are no superfluous things floating around the office. And, it’s easy for us to hold onto files as long as necessary and go back into them quickly when a client needs to make a change.”

“Through the use of Radius technology, we truly bring the worlds of print and video together,” says Michael Cronan of San Francisco-based Cronan Design. The company incorporates Macintosh-based systems outfitted with Radius graphics accelerators and Radius VideoVision* Studio to digitize everything in all of its projects from start to finish.

In designing annual reports for major companies, Cronan Design captures graphics and video from multiple sources. “Using Radius VideoVision Studio to capture existing video material, we are able to work with corporate resources that we simply couldn’t touch before,” says Cronan. “It’s now easy for us to take extremely precise screen grabs of video and use that digitized material exactly as we and our clients envision it.”

In its corporate identity and packaging design projects, Cronan Design works on everything from formal presentations to consumer items such as bottle labels. Digitizing these jobs from start to finish also means no large paper files, notes designer Lisa Van Zandt. The system saves time in other ways: for example, creating comps and presentations is much faster and easier. Cronan designers can make client change requests on the fly, down to the pixel level, and immediately demonstrate the results.

The firm saves its clients time and money by enabling them to exercise on-the-spot control over the decisions that affect their projects. Those time savings in turn translate into greater creative freedom. Designer Van Zandt benefits from the considerable contribution by Radius graphics accelerators. Notes Van Zandt, “By using Radius graphics accelerators, we get the top-quality graphics we want, running at the high speed we need.”

The team at Cronan Design is delighted with its ability to maintain creative control while minimizing mechanical tasks in implementing its designs.
When the San Francisco Examiner decided to add color, it found that traditional methods consume vast amounts of time, money, and resources. What may seem an obvious point is not so easily solved in an operation the size and scope of a major newspaper. But Chris Gulker was determined. “Very few push the envelope as far as we have,” Gulker says.

The Macintosh-based color publishing system empowers the Examiner’s editorial personnel to handle color production work themselves. Tools such as Radius graphics accelerators, Seiko Instruments printers, and MicroNet storage systems have turned the system into an in-house digital color shop. Stories are written, laid out, proofed, and stored in this new, all-digital world.

The Radius Stage Two Rockets keep the Macintosh computers running full tilt toward deadlines, while VideoVision Studio cards capture and reproduce video or television images from all over the world. Printers such as the Seiko Instruments Professional ColorPoint 2 color printer provide full-color, accurate previews of pages and layouts.

Pushing the envelope also meant developing a “digital darkroom,” in which wire-service photos are archived and continually updated onto highly reliable MicroNet disk arrays. Thus, Examiner editors store and quickly retrieve hundreds of full-color photos on file two to four times faster than with other computerized systems. Large image files can be retrieved quickly, reliving network bottlenecks and increasing productivity. This is a major advantage over the slow, tedious process involved in retrieving items from the enormous “morgues” common to newspapers.

In short, Gulker says, “Without a Macintosh-based platform and the publishing technology from Radius, MicroNet, Seiko Instruments, and others, we wouldn’t have a color paper.”

S.F. Examiner “Pushes the Envelope”

The old San Francisco Examiner Magazine was a victim of the high cost of traditional color publishing methods. But the new, full-color Sunday magazine is produced entirely on Macintosh computers, incorporating Radius technology. By taking the color publishing processes digital, time- and labor-intensive stripping costs were eliminated. Produced in a “virtual newsroom,” the 64-page San Francisco Examiner Magazine links the service bureau, printer, remote editors, and others. “The system allows us to operate with a thinner staff and reduces the amount of handling,” says Director of Development Chris Gulker.
Want to know more?

We've presented an overview of only a handful of color publishing companies. Each relies on publishing tools and solutions that facilitate creativity, top-quality production, flexibility, productivity, and quick turnaround. They're also concerned about managing their budgets. Companies such as Radius, Apple, Seiko Instruments, Aldus, Agfa, and MicroNet together provide color publishing tools and solutions that enhance creativity in the real world of budgets and deadlines.

If you'd like to learn more about how you can benefit from digital color publishing solutions, please call Radius at 1-800-227-2795. (If you are calling from outside the U.S. please call 408-434-1010.) To have information sent directly to your fax machine, please call 1-800-966-7360.

©1994 Radius, Inc. Radius and the Radius logo are registered trademarks and all Radius product names are trademarks of Radius, Inc. Other brand and product names are trademarks of their respective holders.
October 31 - November 2, 1994
The World Trade Center
Boston
Agfa invites you to its first-ever Agfa Technology Exposition, a major graphic arts and publishing event that lets you see the state of the art — and the future of the art — in one place. If you’re a designer, photographer, printer, or publisher, this event is for you.

See the latest in technology.
See the most advanced equipment and breakthrough technologies from Agfa, a worldwide leader in imaging technology, film products — and now four-color digital printing. Joined by a select group of companies such as Apple, Adobe, Aldus, Sun, Silicon Graphics, and IBM, Agfa will show you the latest in computer platforms, digital photography, imagesetting, CreoRester™ screening, scanning, image manipulation, animation, digital printing, and more.

Test the limits in Design Lab.
For designers and photographers, the Exposition features Design Lab — a hands-on lab staffed with a team of designers and specialists from leading companies. It’s a great chance to test the latest page layout, imaging, and digital darkroom software available.

A three-track seminar program.
A comprehensive seminar program with business, design and photography, and technology tracks will give you the chance to hear and participate in discussions on the ideas driving technological change in the graphic arts.

Take the next step.
Call 800.367.9822 in North America to register for the conference or receive more information. Outside North America, contact your local Agfa office or Agfa dealer. Call 800.221.3531 for more information about travel and hotels (in New York, 212.532.1600). Outside North America, contact your local Agfa office, or call 1.617.439.5001, for all information.
FOR CREATING A START-UP'S business plan or managing a corporation's multimegabuck budget, a spreadsheet is the indispensable financial workhorse—and we Macintosh users live in a one-horse town called Microsoft Excel. While Excel can do wondrous things with your numbers, using it requires a great deal of time: time to enter all your data, and time to ferret out Excel's many power features and learn its shortcuts. Excel 5.0, the program's latest incarnation, goes a long way toward making routine tasks painless and making arcane features accessible. Whether you're an experienced numbers-navigator or just getting started with spreadsheets, this
article will help you get the most from Excel 5.0. Note that this article is not a critique: it is based on a prerelease version of the program, and Macworld does not evaluate prerelease products. For a critical evaluation of the new Excel, watch our Reviews section. (Excel 5.0, Microsoft Corporation, 206/882-8080, 800/426-9400. Microsoft no longer issues list prices, but the street price should be about $325.)

Data Entry

Before you can put Excel to work calculating and analyzing your numbers, you have to enter the raw data into a worksheet. Version 5.0 adds some special features to simplify that task and alleviate some of its monotony and drudgery.

World Series

Entering a series of values such as months, serial numbers, and so on is time-consuming, boring—and inescapable. In Excel 4.0, the AutoFill feature partly automated the process, and in Excel 5.0 AutoFill has been extended to give you a consistent and easy way to enter not only standard series (such as Monday, Tuesday, Wednesday, Thursday, Friday) but also custom series that you create.

Excel can recognize and complete many common series. For example, to enter the months of a year, type January in the first cell. Then grab the cross-shaped
Every time a new version of a major application ships, you have to ask yourself, Should I upgrade? The answer isn’t always simple. It invariably takes time to learn how to use the new version, and the software industry has an often-well-deserved reputation for shipping products before they’re thoroughly debugged.

Excel 5.0 is a major upgrade, but even the prerelease version we tested for this article was largely bug-free, and the transition to the new version is actually a minor one because virtually everything you do in Excel 4.0 can be done the same way in Excel 5.0, often with fewer keystrokes, and you can use your current worksheets without modification. If anything, Excel 5.0’s Wizards make your work easier.

If you’re an Excel power user, the question of macro compatibility is important. Microsoft says that all macros written for previous versions of Excel run in Excel 5.0 and that you can still write macros in the version 4.0 macro language; if you record macros instead of coding them, you can choose between the old language and VBA (Visual Basic for Applications), the new programming language that Microsoft is integrating into all of its major applications.

The bottom line is that it would be difficult not to recommend upgrading to Excel 5.0. It will cost you $129 direct from Microsoft (or $99 through the end of this year). We’ve covered a lot of the newest and improved features in the main section of the article; here are some additional new and updated features in Excel 5.0.

- **Tip Wizards** Pop-up productivity suggestions based on observing the way you work. They’re smart enough to leave you alone once Excel 5.0 “sees” the way you like to do things.
- **ToolTipz** Context-sensitive help without balloon help. If you don’t remember what an icon means, point to it for a couple of seconds and a tip screen pops up.
- **Workbook Tabs** Navigating multiple-page worksheets is a breeze, like thumbing through a notebook.
- **In-Cell Editing** You can manipulate data or formulas in the cell. Now there’s no need to enter the formula bar.
- **Rich Text in Cells** Support for multiple fonts, formats, and colors in a single cell. Any character can have any formatting.
- **Format Painter** An icon that lets you drag and drop the format from one cell into any other cell on your worksheet.
- **Enhanced Auditing** A new tool bar for easy access to visual auditing tools, which show relationships between cells or worksheets. Clicking on the head or tail of graphical arrows lets you navigate among related cells.
- **Messaging and Routing** Excel 5.0 supports ACE (Apple Open Collaboration Environment) for direct links to E-mail, and it has a routing-slip option that tracks a worksheet’s path through a workgroup.
- **Menu Editor** This lets you customize the Excel menu structure—particularly useful if you’re creating custom worksheets or applications for your colleagues.

Finding the Function As with lists and series, you could build complex functions, such as BINOMDIST and CUMIPMT, every time you needed them by combining long strings of Excel’s basic operators. But why do that when you have one-click access to prebuilt functions, a key benefit of spreadsheets over pencil and paper? Excel 5.0 has more than 220 built-in functions, and when you need to find exactly the right one for a new or unusual situation, the Function Wizard helps you pick an appropriate function, assemble its arguments, and insert it in your formula.

Here’s an example. You’ve set up your growing company’s finances in a worksheet and need to know how purchasing a small office building will affect your monthly bottom line. The place your real estate agent showed you costs a mere $180,000, and you can afford to put $50,000 down. Today’s 30-year mortgage rates are a flat 8 percent. What’s the monthly payment?

First, make sure the cursor is in the cell where you want the monthly payment to show up. To use the Function Wizard, click on its button on the standard tool bar or choose Function from the Insert menu. The first screen groups functions into logical categories, including your ten most recently used choices (see “Finding Your Function”). Obviously, you’re looking for a financial function, so click on that category. As you scroll down the list of functions, you’ll see a short description of each with its arguments. PMT (payment) looks like the right choice, so select it and click on the Next button. (If you know which function you need but don’t remember its arguments, type control-A to go directly to the argument dialog box.)

To set up your formula (see “Function Arguments”), enter the interest rate (8%/12 calculates the monthly rate), the period (C8 points to a cell in an existing worksheet), and the present value ($130,000—that’s the price minus the down payment). The monthly payment appears immediately in the Value box in the upper right corner. You can play with different rates, periods, and payments before clicking on the Finish button to place the monthly payment in your worksheet. For complex formulas, buttons to the left of each argument let you include additional functions in your arguments.

Data from Databases Do you need access to an external source of data, either a database on your Mac or a centralized corporate database on the network? Getting external data into Excel in a usable form has always been an involved multistep process, but Excel 5.0’s new query tool uses Microsoft’s data-retrieval technology to find exactly the right one for a new or unusual situation, the Function Wizard helps you pick an appropriate function, assemble its arguments, and insert it in your formula.
**Find Functions Fast**

Excel 5.0's Function Wizard helps you figure out which of the 220-plus built-in functions are exactly right for your formula.

**Function Arguments**

Enter the data for the arguments (1) directly or as cell references. The calculated value appears immediately (2). To include functions within arguments, click on the buttons next to each argument (3). Click on Finish (4) to place the value in your worksheet.

**Navigating Your Data**

**Organizing with Outlines**

While you may need to include a lot of detail in your worksheet, finding the essential summary information can sometimes be a chore for the harried folks (such as your boss) who look at your work. Excel's outline lets you set up worksheets so that they display only summary information, while the detail information remains in the worksheet. For example, a sales summary might outline only the yearly totals, but details on monthly sales or sales by product are only a click away.

Excel 5.0's new Automatic Outline command outlines a worksheet on its own, but to use this feature, you must organize your data in predictable rows and columns of detail and summary, with formulas referring to data above or to the left. (That's the way most people set up worksheets—if you crunch numbers to a different drummer, outlining may give you interesting results.) To outline a range, just select it; to outline the entire worksheet, choose any cell. Then from the Data menu, choose Group and Outline/Auto Outline. Excel creates Show Detail and Hide Detail buttons on the edges of the worksheet for collapsing and expanding the outline levels. Note that before you use Auto Outline, you need to turn on the Automatic Styles option. You'll find it under Date/Group and Outline/Settings.

**The Name Game**

The larger and more complex your worksheets, the more difficult it can be to navigate the hills and valleys of data. Want to find first-quarter sales for the regional offices? You know the information is there somewhere because you entered it yourself—six months ago. If you don't remember which cells it's in, you can wander around the worksheet looking for it; next time, you'll remember to give it a plain-English name. (You can also name individual cells and formulas.) Previous versions of Excel had naming, but version 5.0 provides a pull-down Name Box that makes creating and using names a breeze (see "List of Names").

First, find the cell or cell range you want to name and select it. Then either choose Name/Define from the Insert menu or click on the Name Box at the left end of the formula bar that contains the reference to what you've selected. All you need to do is type in the name you want to use (for example, Q1.Columbus; no spaces allowed). Do this with important cells, ranges, and formulas, and soon you'll have them all in a handy list. You can select any name from the list to jump to its location or use it to enter a reference to the cell or range in a formula or array.
Data Analysis

Filtering Your Data  According to Microsoft, 70 percent of Excel users manage lists of data with worksheets. If that 70 percent includes you, you probably need to see subsets of your lists from time to time. In prior versions of Excel that was a multistep process, but Excel 5.0's AutoFilter option makes the process almost effortless.

Suppose you have a huge worksheet showing sales information for all of your products by sales office by week. If you want to look at the performance of the Twentynine Palms office last year or a particular product by region, you can use AutoFilter to extract the information you need.

From the Data menu, choose Filter/AutoFilter. Excel automatically places drop-down arrows on each column label. Click on the arrow for a list of all unique items in the column. When you select an item, all rows that don't contain that item are hidden. For example, with two mouse-clicks you could see how many widgets the Secaucus office sold last Thursday. To sort on multiple criteria, click on a column arrow and choose Custom. Up pops a dialog box that lets you designate more columns or rows as filters, and apply AND and OR operators.

Slicing and Dicing  One of the biggest challenges of working with all the raw data in a typical worksheet is figuring out how to analyze it. New and unique in Excel 5.0 is an easy way to do that: the PivotTable Wizard. A PivotTable lets you divide and summarize data in almost limitless ways. For example, you can take a year's worth of weekly sales worksheets and summarize them by region by product. The four-step PivotTable Wizard provides a graphical drag-and-drop process to walk you though organizing and aggregating your data.

Choose PivotTable from the Data menu, and then enter the range or range name containing the data you want to use, or select it with the mouse. The third and crucial step in the PivotTable Wizard is choosing what data to summarize or break out, and by which categories. Buttons bearing the names of your data fields appear on the right side of the screen (see "Prepare to Pivot"). Drag and drop them...
What happens to the bottom line if sales are up you create and save multiple scenarios is to create multiple scenarios that make up spreadsheet is "what-if" analysis: a summary value to reveal the individual records or cells that make up that summary.

**Scenes from a Spreadsheet**

Computerized spreadsheets have come a long way since the dim and distant days of VisiCalc, but no matter how many bells and whistles they take on, one of the basic goals of a spreadsheet is "what-if" analysis: What happens to the bottom line if sales are up X percent? If Product Y ships three months late? If your company wins its suit against Supplier Z? A common way to compare projections is to create multiple scenarios, such as best case, worst case, and most likely.

Excel's Scenario Manager lets you create and save multiple scenarios. Let's say one of your product lines is hot but you expect a serious competitor to enter the market this quarter. The worksheet you've created shows your best guess for this quarter's sales, but you need to know what will happen if the competition's product succeeds or bombs.

Choose the cell that contains the estimated sales figure, then pick Scenarios from the Tool menu. Click on the Add button in the first screen and give the scenario a name that makes sense, such as Product Y Best Case. In the next screen, enter a best-case value and click on OK. Scenario Manager takes you back to enter another scenario, such as Product Y Worst Case. (You can add as many scenarios as you need.) Then click on the Merge button on the Scenario Manager screen. You'll see another screen that gives you the option of creating a basic summary or a PivotTable from the summary.

Excel 5.0's Scenario Manager automatically tracks changes and records who on the network has modified the scenarios and when, which makes it particularly useful for batting around guesstimates with your colleagues.

**Beyond Worksheets**

**Spreadsheet Solutions** To make using and interpreting a worksheet easier for you, Microsoft Excel 5.0 includes tools for turning your garden-variety worksheets into interactive applications with graphics and notes, as well as controls and commands such as dialog boxes, radio buttons, check boxes, and scroll bars—not to mention the ubiquitous OK and Cancel buttons.

Excel solutions can be simple or complex. For example, if you have a workgroup collaborating on a budget worksheet, dialog boxes attached to cells can remind members to enter only the most current and accurate information. To set one up, select the cell you want to attach a dialog box to and choose Macro/Dialog from the Insert menu. A ready-to-use dialog box, complete with OK and Cancel buttons, appears on the screen, along with a Forms tool bar that lets you choose on-screen controls. Click on the first button, Label, on the tool bar; drag the crosshairs to the dialog box; draw a box; click on it; and enter the text you want to appear in the dialog box. From here, you can assign a new or existing macro with responses that vary depending on what the user enters, or be content with closing the dialog box after the user clicks on OK. If your programming skills are up to it, or if you have an in-house programmer or consultant, you can use Excel's macro language and its new programming language, Visual Basic for Applications (VBA), to create full-featured applications that can take advantage of Excel's calculation engine for more kinds of uses than planning finances.

**Prepare to Pivot**

The PivotTable Wizard displays the field names from your data (9). To set up your PivotTable, drag and drop the field-name buttons onto the row (2), column (3), and data (4) areas.

**A Pivoted Table** This completed PivotTable shows sales of musical instruments summarized by week and broken out by instrument and country.

**Slicing and Dicing**

Excel 5.0's new PivotTables let you view and cross-tabulate multidimensional data by simply dragging data headings into place. The PivotTable Wizard leads you step-by-step through the process of setting up a PivotTable.
Suggested retail price. Reseller prices may vary. You must own a competing word processor with a suggested retail price of $299 or more.

Offer good in the United States and Canada only. All trademarks are property of their holders. ©1994 WordPerfect Corporation. All rights reserved.
Click the button. It's so simple. Click. It's the easiest way to get things done. Which is why new WordPerfect® 3.0 for the Mac® puts all the things you want from your interface in your face.

Giving you more buttons to click than any other word processor. So features are easy to find. And use. Want to change your text formatting? Click. Apply a style? Click. Create a table? Click. Then you can bring up a different bar with all the table functions you want. Borders, editing—even math functions—it's all right there. Click. Our customizable button bars put your favorite tools right there, too. Like spell checking.

Grammar checking. Our integrated drawing program. Whatever you want. There's even buttons for common tasks like bulleted indents. So you'll seldom have to do anything. Besides click. (And type, duh. This is a word processor.) But you can do other cool stuff, too, like run QuickTime™ Or WordPerfect native on the Power Macintosh®. So visit your local reseller or call us at (800) 526-7820 for our $99® competitive upgrade. If the number was nine buttons shorter, it'd be as easy as our interface. Click.
What Makes A Desktop Projector™

Lift-up cover and optics

Cyclops cordless mouse capability

Stereo speakers that face the audience

ACE controller system for superb computer and video images

Compact, low profile and lightweight

Easy to use, intuitive controls

A Desktop Projector?

It's not just the innovative, lightweight design. Or the remarkably easy-to-use controls. It's not even the brilliantly vivid computer and video images it so effortlessly projects—even in well-lit meeting rooms.

It's all of this and more.

In fact, one look at Proxima's Desktop Projector series of LCD projectors and you'll know that a new breed of computer peripheral has arrived. It's the ultimate way to present information and share data.

Look better, work smarter

Now you can use the same computing tools you already use at your desk to enhance the productivity of your meetings. With Proxima's Desktop Projectors, everyone can see, share, and shape information together. That's what we call Desktop Projection. It helps build consensus in meetings, lets workgroups create project schedules, budgets and other documents more quickly, and leads to faster, smarter decisions. And that saves you time and money.

Of course, you can also project brilliant presentations that captivate your audience. Not only do Desktop Projectors let you incorporate sound, motion, and our amazing Cyclops' cordless mouse, but they eliminate the need for slides, flip charts, and transparencies.

Any computer, any application

Proxima's Desktop Projectors connect just like a monitor to any PC or Mac and work with your favorite productivity-enhancing software. Starting as low as $4,995, there's a model for almost any budget or application—from high-performance color to multimedia projection.

So whether it's a sales presentation, management discussion, or training session, Proxima's Desktop Projector series lets you project the power of your computer in the meeting room.

For more information or the dealer nearest you, call us today.

1-800-447-7694

PROXIMA®

Projecting the power of your computer in the meeting room™

Circle 47 on reader service card
Tips, Tricks, and Shortcuts

YOU IMPORT AN EPS FILE INTO MICROSOFT WORD, AND IT LOOKS FINE ON SCREEN. BUT WHEN YOU TRY TO PRINT THE DOCUMENT, WORD SUBSTITUTES ALL THE FONTS OF THE IMPORTED IMAGE WITH COURIER. TO FIX THE PROBLEM, YOU OPEN THE IMPORTED IMAGE IN WORD 5.1'S PICTURE EDITOR. THERE YOU ADD A FEW CHARACTERS, EACH ONE SET TO A FONT THAT DIDN'T PRINT. AFTER YOU CLOSE THE PICTURE EDITOR, YOU CROP THE EXTRA CHARACTERS OUT OF VISIBILITY. EVEN THOUGH THESE EXTRA CHARACTERS ARE NOT VISIBLE, THEY TRICK WORD INTO DOWNLOADING THE FONTS NEEDED TO PRINT THE IMPORTED IMAGE CORRECTLY. VOILA . . . OR DO YOU THINK.

It turns out this trick works only with the LaserWriter 8 driver. The LaserWriter 7 driver substitutes fonts in an imported graphic even if the identical fonts are used elsewhere in the Word document. The correct fonts are used in the text of the Word document, but the same fonts are still replaced with Courier in the imported graphic.

Easy Rebuilding Update

Like Martha Fullmer of Waupaca, Wisconsin, you may get a message saying the name Desktop is already taken when you try to rebuild the desktop of your hard drive by creating a folder named Desktop at the root level of the hard drive (as a tip last May suggested). This means your hard drive contains an invisible file named Desktop, in which the System 6 Finder keeps desktop information (System 7 keeps desktop information for hard drives in two other invisible files, Desktop DB and Desktop DF). The invisible Desktop file exists on every floppy disk and on any hard drive that has ever been used with System 6 and has not been initialized since then. Also, System 7 sometimes appears to create the invisible Desktop file on hard drives, although I haven't been able to prove this.

You can work around the invisible Desktop file by making it visible with a utility program, or by replacing the invisible file with a visible document saved by Microsoft Word or some other commonly used programs. Use the Save As command to save any document with the name Desktop at the root level of the hard drive. Leaving a replacement Desktop file visible in the disk window (or discarding it and creating a folder named Desktop) causes the Finder to rebuild the hard drive's desktop automatically when you restart the Mac.

RAM Speed and Composite SIMMs

All Macs can use 80ns RAM, even the Power Macs, with the following exceptions: the Centris and Quadra 660AV require 70ns minimum; the Quadra 800 and 840AV require 60ns minimum. Some Macs can use slower RAM: the Classic II, Color Classic, LC, LC II, and IIsi can use 100ns RAM; the Classic, SE/30, IIcx, II, and IIX can use 120ns; and the Plus and SE can use 150ns. You can always install faster RAM (for example, 60ns or 70ns instead of 80ns), although it does not make the computer operate faster and it may cost more.

Because they have more RAM chips than conventional SIMMs (for example, 32, 4Mbit chips instead of 8, 16Mbit chips on a 16MB SIMM), composite SIMMs are too big for some Macs. Where they fit, composite SIMMs may work under some conditions, but the extra circuitry required for their low-capacity RAM chips can cause random memory failures by delaying memory access, increasing signal noise, and drawing more electrical current than conventional SIMMs. Mac models optimized for maximum RAM performance, such as the 660AV, 840AV, and Quadra 800, are particularly sensitive to these random variations. Typical symptoms include unpredictable start-up failures, system errors, and crashes. Composite SIMMs with signal buffering sometimes cause problems mounting floppy disks on 660AVs and 840AVs. Problems may occur with one composite SIMM but not another, and two composite SIMMs may work together but four may not. One computer may continue
tolerate them while another of the same model does not. Some SIMM makers claim to have solved these problems, but Apple says it has not verified any composite SIMMs and does not recommend using them in any Macintosh.

**3K-Key Symbol**

Q. Is there a common font that has a key combination that produces the squiggly symbol on the command key?

John Browner
Durham, North Carolina

A. Select the Chicago font and press control-Q. Pressing control with P, R, S, or T generates other little-known symbols, and the TrueType version of Chicago has a total of 21 symbols you get by pressing control with other keys (see “Chicago Symbols”). However, you probably won’t see any of the new special symbols if you set the font size to 12 points or any other size for which a fixed-size (bitmapped) Chicago is installed in your System file. (Chicago 12 and Monaco 9 are in the ROM of all Mac models except those older than a Plus.) Fixed-size versions of Chicago don’t include the new symbols, and most applications use fixed-size fonts wherever possible. Some programs ignore keystrokes that involve the control key, but you can always copy from the Key Caps desk accessory, paste to another program, and change the pasted character to Chicago 13 (a size that forces use of TrueType).

**Missing AOL Localities**

TIP To use America Online 2.1’s new Locality feature (very useful for travelers), you must create and save connection settings for each place you go. The on-screen help tells you how to do this but doesn’t mention that the connection settings files must be saved in the Online Files folder (which is in the same folder as the AOL application). That’s the only place the application looks for Locality files. AOL tries to open the correct folder when you save a Locality file, but a system extension such as Directory Assistance (part of Norton Utilities for Macintosh) may route you to a different folder.

The Locality menu only lists places with files in the Online Files folder. That same folder contains configuration files for more than 30 modems, and each file uses 3K to 5K of hard drive space. You probably only use one or two different modems. By deleting the configuration files for the modems you never use, you recover 100K to 130K of disk space without harming the AOL program.

David Wegener
Jacksonville, Florida

**Curve Fitting Made Easy**

Fitting a curve to a scatterplot of experimental data using the principle of least squares is easy using Microsoft Excel 4 with Solver. To employ this method, from Jay B. Winderman of Claremont, California, you must be able to determine the general form of an equation that will fit the overall shape of the scatterplot produced by charting your experimental data. For example, data that trends along a straight line would fit an equation of the form $y = Kx$, where $K$ is a constant.

1. Enter the $x$ and $y$ coordinates of your experimental data in columns A and B of the spreadsheet, and create a scatterplot with the Chart Wizard tool. Inspect the scatterplot and decide the form of the equation that will best represent the data. In this example, the data could be approximated by an equation of the form $y = H(1-\exp(-Kx))$, where $H$ and $K$ are constants to be determined ($x$ is a value from column A, and $y$ is the corresponding value from column B).

2. Guess values for the constants in your equations and enter them into two adjacent cells, such as B25 and B26, in one of the columns. Enter your curve-fit equation into cell C2, and fill down to the last row that’s not empty in columns A and B. For example, the equation from step 1 would be the formula $=5B25*(1-\exp(-5B26*A2))$.

3. Enter the formula for the square of the difference between the values in cells B2 and C2, which is $=(B2-C2)^2$, into cell D2, and fill down to the last row that’s not empty in columns A and B. In a vacant cell (such as D25), sum the values in column D. In this example, the summation formula is $=SUM(D2:D21)$.

4. You now want to choose values for the constants in your equations to minimize this sum. This is where you use Solver. From the Formula menu, choose Solver. In the dialog box that appears put the cell location of the sum ($=SUM(D2:D25$ in this example) into the Set Cell box. Set the Equal To option to Min. Enter the cell locations of the equation constants ($=SUM(D2:D21$) into the By Changing Cells box. Click the Solve button and await the outcome.

5. Eventually the values of the constants (cells B25 and B26) change, and the curve-fitting equation that incorporates these constants is the best fit to your experimental data: $y = 103.37(1-\exp(-0.2737x))$.

**Collapse While Opening**

TIP Some of my fellow students like to expand all the folders on a hard drive using the 3K-option–right arrow key combination, causing a lengthy wait while opening a folder. I avoid the wait by having the Finder collapse the outline of a folder’s contents when it opens the folder. Pressing the shift key while choosing Open from the Finder’s File command (or pressing 3K-shift-O) does the trick. So does pressing shift at just the right time after (not before) double-clicking the folder.

Clint Beilman
Kissimmee, Florida

Just as you can fully expand selected folders and all their subfolders by pressing 3K-option–right arrow, you can fully collapse selected folders by pressing 3K-option–left arrow. Similarly, pressing option while clicking the triangle next to a folder fully expands or fully collapses it. To avoid affecting subfolders, omit option from these combinations.—L.P.

continues
THE MORE, THE MERRIER.

(THAT'S THE PHILOSOPHY BEHIND NEW FILEMAKER PRO SERVER.)

It may sound like a party; but the benefits are far more substantial. You see, FileMaker® Pro Server lets you and your entire workgroup do more, more quickly. (Come to think of it, not a bad thing to celebrate.)

FileMaker Pro Server is a high performance database engine, designed to dramatically accelerate multi-user file sharing over your network. In fact, its sophisticated client/server technology can speed database performance by up to 100 percent over FileMaker Pro 2.1, and increase multi-user file access from 25 to 100 users per file.

Connecting FileMaker Pro Server to your existing network is simple. It supports both Macintosh and Windows users. And while it's compatible with standard Mac systems, including Centris and Quadra, it's accelerated (native) for Apple's new Power Macintosh systems.

With its simple plug and play design, the Server can be run by just about anyone in your organization, not only network administrators or those with database experience.

In short, FileMaker Pro Server can help you get more out of your workgroup. Even as more people get into your workgroup. For the name and address of the dealer nearest you, call Claris Customer Assistance at 1-800-3CLARIS.

Simply powerful software."
you can reverse type on a color image in Adobe Photoshop 2.5 by following this simple procedure from Noah T. Winer of Burkettville, Maine.

Using the type tool, place type in your document (Photoshop makes the type a floating selection). While the type is still floating, choose Composite Controls from the Edit menu. In the dialog box that appears, set the opacity to 1%, making the type transparent, and click OK to dismiss the dialog box. Next drop the selection into the image by choosing

Save Selection (or Defloat Selection) from the Select menu. Press return to reverse the colors in the selected area. If you wish, you can stroke the selection's edges to further highlight the type: set the foreground color in the tool palette to the stroke color you want, and use the Stroke command in the Edit menu. In 3.0 (which should be out by the time you read this), the procedure is the same, except that you set the opacity on the Layers palette (the Composite Controls command is gone).

Sort by Column in Word

Microsoft Word 5.0 and 5.1 can sort the rows in a table in either ascending or descending order by any column without using another application. First you must select the column by which you wish to sort. If the table was created using Word's Table command (not simply with tabs), you can select an entire column by option-clicking it. If the table was created with tabs (not with Word's Table command), you can select a column by clicking at its upper-right corner, pressing option, and dragging to the lower-left corner of the column. To select a column in a long table that requires scrolling to get from top to bottom, click at one corner of the column, scroll to the other end of the column, hold down shift and option, and then click at the opposite corner. You do not have to select all the rows in the column; only the rows you select will be sorted. In a table made with Word's Table command, simply drag across the rows you want to select in the table. In a table made with tabs, use the option-click method described above.

With the selection made, choose Sort or Sort Descending from Word's Tools menu—or you can access them by choosing Commands from the Tools menu. In the dialog box that appears, select Sort or Sort Descending from the scrollable list at the upper-left corner, and click the Do It button to execute the command or click the Add button to add the command to a menu.

You can use the option key to select part of a column in a table made with tabs (not with Word's Table command), or to select any rectangular area of text that's narrower than the full width of the document. Then you can apply normal editing methods to the selection, such as delete, cut, copy, paste, replace, or change font. 

Charles E. Carter
Atlanta, Georgia

SimCity 2000 Update

Though the cheat “porttipszuzzardo” works only in SimCity 2000 version 1.0 (as described in a July tip), a similar trick works in version 1.1. First you click the map tool and type pirn. Then you click the status indicator (which shows the weather if no disasters are in effect) and type toppszuzzardo. This trick, like its 1.0 counterpart, adds $500,000 to the city's funds and allows access to rewards and inventions. However, if you use this cheat in a city before it reaches a population of 60,000, you will be unable to build a military base there. Again, as in 1.0, you need only type ardo to repeat the cheat. You must have the caps lock key off when you type the cheat, unlike the original SimCity “FUND” cheat.

Matt Maier
Santa Rosa, California

We pay from $25 to $100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to Quick Tips, Lon Poole, at the address listed in How to Contact Macworld at the front of the magazine (include your address and phone number). All published submissions become the property of Macworld. Due to the high volume of mail received, we’re unable to provide personal responses.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is Macworld System 7.5 Bible (IDG Books Worldwide, 1994).
Announcing OCR that's so accurate, anything else is simply pointless.

Introducing OmniPage® Professional 5.0 from Caere, the leader in OCR.

We'd like to make our point perfectly clear. OmniPage Professional sets the standard in OCR. Offering more accuracy, more power, and more flexibility than ever before.

In fact, it offers the most advanced OCR technologies in the industry—technologies that Caere has pioneered.

Only Professional helps you spend more time using scanned information instead of correcting it. Its breakthrough 3D OCR™ feature recognizes grayscale information during document scanning to greatly improve recognition of poor quality documents.

That's not all. Professional recognizes a broader range of documents, reading the most difficult characters and symbols with ease. A feat made possible thanks to its exclusive Language Analyst™ neural network and fax recognition capabilities.

Professional also allows you to easily edit both text and graphics with its new Text Editor and 24-bit color image editor. And for maximum ease of use and flexibility, there's a new click-and-choose interface, too.

So get OmniPage Professional 5.0 for your Mac today. See your local Caere dealer or call for more information on the complete family of OmniPage products at 1-800-535-SCAN. If you own a competitive product, ask about our “Step up to OmniPage” program.

For superior performance, it's your best shot.

OmniPage Professional
OmniPage
OmniPage

For Your Information.

Caere and OmniPage are registered trademarks of Caere Corporation. The Caere logo, True Page, and Language Analyst are trademarks of Caere Corporation. Power Macintosh is a trademark of Apple Computer Inc. All other trademarks are of their respective companies. © 1994. All rights reserved.

Circle 69 on reader service card
After This, You'll Think Of Remote Access Servers In One Of Two Ways.

DaynaLINK for ARA is a mobile networking platform built on Dayna's multi-tasking MobiOS operating system, allowing all industry protocols and services to be added with PCMCIA-based software modules. Each module can be independently managed via SNMP, and SecuriKey security software lets you control access to available services.

State Of The Art.

DAYNALINK’S ADVANTAGES: PCMCIA Type II and Type III compatibility, hot swappable data links, high performance RISC-based processing, trouble-shooting light panel and Dayna’s Lifetime Warranty and 24-Hour Replacement Program.
Introducing DaynaLINK™
The First PCMCIA-Based Mobile Access Server.

A remote access server that uses PCMCIA technology is a pretty startling innovation. Especially when you realize it helps you avoid the rat’s nest of cords that come with external modem servers. Not to mention the inflexibility of those with proprietary internal modems.

But if you think simplifying dial-in remote access is all there is to DaynaLINK for ARA, you’re in for a bigger surprise. This patented technological breakthrough utilizes the multi-tasking MobiOS™ operating system, which will soon let you add such protocols as TCP/IP, IPX and NetBEUI, as well as services like dial out, fax in, fax out, paging, and both local and wide area wireless access. All as easily as popping in a PCMCIA card.

Which is precisely why we call DaynaLINK a Mobile Access Server. Any remote access server can give you dial-up network access once your mobile users finally find a place to connect. But only DaynaLINK is designed to cover you down the road by supporting cordless and cellular wireless networking. Now that’s what we call mobile access.

Consider the added value SecuriKey’s security software provides, and the new DaynaLINK Mobile Access Server will leave you feeling rather comfortable about your network’s future. Instead of shocked.

For a free guide to Mobile Access Communications, call 800-443-2962, ext.552
FAX Response: 801-269-7340, Doc.#3000

State Of Shock.
Mail Call: QuickMail 3.0

Your Macintosh still won't make coffee, but it will sort your electronic mail: CE Software has added rules-based mail-management to QuickMail in its latest version, 3.0.

Under this system, the mail client uses a set of user-defined rules to automatically sort and respond to mail. Users can base rules on several criteria, including the sender, priority, message subject, and message content. An urgent message from a specific person, for instance, could receive an automated reply, while normal-priority messages could be filed automatically. QuickMail 3.0's MailManager files, forwards, prints, deletes, or replies to messages as they arrive in the user's mailbox.

QuickMail 3.0 now sports a search engine—users can search message text, author, or just about any other field in messages that are filed in their personal folders. The client now supports up to 250 personal folders, with up to 250 messages per folder.

Other improvements in version 3.0 include a built-in spelling checker, the ability to import and export address lists, and a handy way to add items to your address book from incoming mail without retyping.

QuickMail holds the largest chunk of the Macintosh E-mail market, and CE Software is looking to hang on to it with this long-awaited update. QuickMail 3.0 is a client-only upgrade that, according to the company, peacefully coexists with earlier clients.

The company says that the next upgrade, which will revise only the QuickMail server, is not expected until the summer of 1995. QuickMail 3.0 is available for $649 for a ten-user pack; current customers can upgrade for $12 per user. CE Software, 515/221-1801.

—Cameron Crotty

Remote Access: The Next Wave

The introduction of Tribe Computer Works' remote-access computer signals a trend among server makers toward giving remote users more flexible access to resources in multiple-protocol networks. Tribe's server supports AppleTalk over point-to-point protocol (PPP) instead of Apple Remote Access Protocol (ARAP).

The server, named TribeLink, boasts eight ports that support 57.6-Kbps or faster data transfer, as well as one AUI Ethernet connector. In addition to AppleTalk, the server can handle TCP/IP. The TribeLink will be priced at less than $2000, with external modems priced separately.

By the end of the year Cayman Systems plans to add support for AppleTalk over PPP to its new GatorAccess MP remote server, which currently supports only TCP/IP and IPX.

Mac users ARAP to establish serial connections between remote computers and remote-access servers. PPP is a de facto standard used in the rest of the industry for handling serial communications over telephone lines. Easy-to-use ARAP works very well for those who need only to reach a Mac server or pick up E-mail from an AppleTalk network. For users who must access non-Mac host computers—for example, to look up sales or inventory data from afar—PPP may be a better choice because it can handle more than one network protocol at once.

Apple will support PPP in the future as well, although not necessarily in a new version of ARAP, as announced.
last November. Meanwhile, Mac users can log on to a PPP server with InterCon’s InterPPP remote-access client software ($99.95) or a noncommercial equivalent.

Other server manufacturers have satisfied the varied needs of remote users by designing servers that support ARAP and other protocols in the same box, although not necessarily on the same phone line. By September, Asante Technologies plans to release a $99 upgrade to its Net-Connect Remote Access Server that supports both Apple Remote Access 2.0 and TCP/IP. The new version will add zone-filtering security for AppleTalk users. The server, which comes in 8-port ($4299) and 16-port versions ($5999), already supports IPX and other protocols in the same box, although designing servers that support ARAP 1.0 and incorporate an auto-detect ($99.95) or a non-commercial equivalent.

The server, which comes in 8-port ($4299) and 16-port versions ($5999), already supports IPX and other protocols in the same box, although designing servers that support ARAP 1.0 and incorporate an auto-detect ($99.95) or a non-commercial equivalent.

By the time you read this, 3Com Corporation expects to have available release 5.0 of its AccessBuilder family of multi-protocol remote-access servers (called Centrum Remote 3000 before 3Com acquired Centrum Communications and its products earlier this year). The upgrade ($500) will provide support for ARAP 2.0 and incorporate an autodetect feature that lets Mac, PC, and Unix users call in to an AccessBuilder server by dialing a single phone number.

Telebit Corporation is already shipping a software release for its NetBlazer product family that includes TCP/IP access for Macintosh users.Mac users can run ARAP and MacTCP over the same connection, and the software translates ARAP data into TCP/IP datagrams so that users can transparently connect to the Internet or to Unix-based host computers. Release 2.3 ($249 to $499) also includes new customized billing and security features.

LanRover 3.0 ($250 to $849) from Shiva Corporation, planned for summer 1994 release, also supports multiple protocols in a single remote-access server, so Mac, PC, and Unix users can dial in to the same LanRover server. It can be managed from either a Mac or a PC, regardless of server configuration.

(For more on ARAP servers, see the feature “Remote Access Arrives,” which reports Macworld Lab test results for seven ARAP servers.)

3Com Corporation, 408/764-8000; Asante Technologies, 408/435-8388; Cayman Systems, 617/932-1100; InterCon, 703/709-5500; Shiva Corporation, 617/270-8300; Telebit Corporation, 508/441-2181; Tribe Computer Works, 510/814-3900.—MARTHA STRIZICH

Building Bigger, Faster LANs

F HU G E FILE TRANSFERS ARE SLOWING your network to a crawl, you may want to consider the new FastSwitch 10/100 AG, a combination Ethernet and Fast Ethernet switch that Grand Junction Networks released this summer.

You can use the FastSwitch 10/100 AG instead of 10BaseT hubs to build high-performance networks on top of existing Ethernet infrastructures. The switch uses 10-Mbps switching and Fast Ethernet (100BaseTX) technologies to deliver 10 Mbps of dedicated bandwidth to each user on an Ethernet network and 100 Mbps of dedicated bandwidth to each server. A single FastSwitch 10/100 AG supports up to 25 users, a dedicated 100-Mbps server, and 4 shared 100-Mbps servers or 100BaseTX hubs. You can also chain multiple FastSwitch 10/100 AG’s together with Grand Junction’s earlier FastSwitch 10/100 to construct a high-speed LAN of up to 200 users.

Fast Ethernet is an emerging standard that combines the FDDI (Fiber Distributed Data Interface) signaling scheme with standard Ethernet protocols to achieve lightning speeds of 100 Mbps. Switched Ethernet is a switching method that guarantees 10 Mbps of dedicated bandwidth to each desktop or device on an Ethernet network. Hub-based Ethernet networks provide users a shared network bandwidth of 10 Mbps.

Apple is developing a Fast Ethernet adapter card for the PCI-bus Power Macs that are expected to ship by mid-1995. In the meantime, Macintosh LAN managers considering a FastSwitch solution must use Sun workstations or EISA-bus machines with Fast Ethernet adapter cards as servers. The FastSwitch 10/100 AG costs $8950, or $298 per port. Grand Junction Networks, 510/252-0726.—MARTHA STRIZICH

Recording CD-ROMs over the Net

M AC, DOS, AND WINDOWS COMPUTERS on Ethernet-based NetWare networks can share costly CD-ROM recorders with Meridian Data’s Netscribe 2000 controller. The system can create two types of CDs: discs with up to 99 tracks in ISO 9660 format, and discs with hundreds of tracks in a proprietary Meridian Data format. Users record to the CD as they would to any hard drive. The Netscribe’s 215MB cache ensures that data is sent to the drive in the steady, uninterrupted flow CD-ROM requires.

The Netscribe 2000 ($2495) includes server software, hardware, power cable, and access software for five clients. The Netscribe 2020 ($8995) also includes a double-speed CD-ROM recorder. Meridian Data, 408/438-3100.

—JIM FEELEY
NOW YOUR PRESENTATION AND EFFECTIVE AS
Remember when presentations were no big deal? Organizing your material was a cinch. You always made an impact on the crowd.

Welcome back to simpler days, with new Microsoft PowerPoint presentation graphics program 4.0 for the Macintosh and Power Macintosh. The easy way to create powerful, convincing presentations.

Getting started is always the hard part, right? Not anymore.

With AutoContent Wizard, select a presentation type, then enter your content in the outline provided.

Using an innovative feature called AutoContent Wizard, pick a presentation type. Then, the Wizard helps you quickly turn your ideas into a fully formatted presentation.

It's all part of IntelliSense technology, built-in intelligence that makes routine tasks automatic and complex tasks a whole lot easier.

Need more help? AutoLayout makes it easy to add slides, with 21 ready-to-use formats. And thanks to Apple QuickTime support, you can dress up your presentations with QuickTime movies.

We also have slides that fit in your back pocket. Called Hidden Slides, you pull them out only if you need them. Perfect for tough questions.

Finally, use Rehearsal to practice your presentation against the clock. So you're sure to cover your points in the allotted time.

The fact is, PowerPoint 4.0 is so easy to use, you may already know how. Why? Over 100 PowerPoint tasks are done exactly the same way in Microsoft Excel and Word. And now with OfficeLinks, you can turn a Word 6.0 document into a presentation in PowerPoint with a click.

All told, new PowerPoint 4.0 makes presenting effectively a snap.

So visit a retailer, or to find one near you, call (800) 871-3267, Department 6HA. And you'll once again master the art of show-and-tell.
Welcome to the monitor capital of the world. Where just the right CRT or LCD display is waiting for you.

Take our new high-resolution, flicker-free, 17-inch Super VGA “green” monitors. A low 0.26mm dot pitch makes images crystal clear. And viewing is easier on your eyes and body thanks to a special flat, square, anti-glare, anti-reflection, anti-static screen; low MPR II radiation standards and handsome ergonomic design.

Their larger size and controllability make them ideal for complex Windows®, Mac® and SPARC® applications.

They’re easy on your pocketbook too. And not just because of their low initial price and two-year warranty. When “on” but inactive, power consumption goes down from 130 watts to less than 5 watts. Imagine the cost savings if you had ten monitors. Or a thousand.

For full-time low power, no radiation and even more versatility, check out our handsome, new LCD monitors.

Their active-matrix displays provide bright, sparkling color (and b/w) even when viewed from wide angles. They weigh less than six lb. and can even be wall mounted.

For even bigger shows, our low-cost LCD projection panel can turn your whole wall into a computer monitor. It’s flicker-free, shows millions of colors and comes complete with on-screen menus, freeze frame and enlargement capability, a patented overhead projector light blocker, wireless remote control and its own rugged carrying case.

More than one million CTX monitors were purchased by computer professionals in the U.S.A. last year.

Call us today and find out why.

We just make great monitors.

For more information, contact the CTX regional office nearest you: USA Headquarters 36208 Earlgate Street, Walnut, CA 91789, 909.594.6146, Fax 909.594.6293 Technical Support 1-800-888-2612 BBS 909.594.8825 Southern Region 6634 Jimmy Carter Blvd., Norcross, GA 30071, 404.729.8825 Eastern Region 481 Edmond Drive, Hanwood, NJ 07556, 201.646.0700, Fax 201.646.0700 Midwest Region 560 Park Blvd., Ste. 1200, Lasica, IL 6043, 708.265.0202, Fax 708.265.0212 Southwestern Region 2325 E. Crosby Rd., Ste. 211, Carrollton, TX 75006, 214.616.9610, Fax 214.245.7447. ©1994 CTX International, Inc. All brand names are trademarks or registered trademarks of their respective owners.

Circle 38 on reader service card
Portable Storage

SOONER OR LATER YOU WILL RUN OUT OF storage space on your hard drive. You may think you can put off the day of reckoning by deleting files, but if you regularly fill more than 80 percent of your hard disk, it's time to start shopping.

Compression Schemes

The cheapest way to get more storage space is through software compression. Typically, that reduces document size an average of 30 percent; savings are somewhat less for programs and system files. Thus an 80MB hard drive might store 145MB compressed. The compression/expansion process takes time; the faster your computer, the lower the time penalty (working with highly compressible files is actually faster than with uncompressed files since less of the disk must be read or written). All compression schemes create some potential problems. I prefer compressing the entire disk to compressing selected files because a compressed disk behaves just like an ordinary disk as far as applications are concerned. I recommend Times Two for disk compression; 2.02 (the current version) is a vast improvement over version 1 ($59 from Golden Triangle Computers, 619/587-0110).

All compression schemes have some problems, real or potential. The Read Me file for Connectix RAM Doubler reports incompatibility with TimesTwo based on two unconfirmed reports. In separate tests, both Connectix and Golden Triangle have reported no problems in running RAM Doubler and TimesTwo together. Connectix reports no problems with Stacker for Macintosh, another disk compression program ($99.95 from Stac Electronics, 619/431-7474, 800/522-7822).

Replacing the Hard Drive

The best way to get more storage is to replace your internal drive with a higher-capacity model. The PowerBook takes 2.5-inch drives instead of the 3.5-inch drives of desktop Macs. By the time you read this, 1-gigabyte (1000-megabyte) drives should be available in the 2.5 inch size. You can easily find 500MB drives for about $600 and 256MB drives for less than $300. Aside from storage capacity and cost, what considerations can help you choose? The power consumption does not change in a simple way as the storage capacity goes up; some higher-capacity drives may consume less power simply because of their more recent design; others need more power because they have a second platter and more heads to move. The tighter tolerances in higher-capacity drives make them slightly less shock resistant than lower-capacity models.

Should you install a hard drive yourself? Only if you really know what you are doing; many parts are small and the connectors delicate. Opening a PowerBook (or another computer) and installing standard components does not void the warranty, contrary to the commonly held myth, but if you do any damage, you are responsible. When you buy a new drive, make sure that you get any necessary shims or brackets. The position of a hard drive's mounting screws is not standard, although many brackets can be modified with suitable tools.

A new class of 2.5-inch hard drives measure 12.5mm high; they weigh about 2 ounces less and consume about 10 percent less power than the older 17/19mm-high drives. Because 12.5mm drives are just entering volume production, prices are higher and the capacities available are not as high as in 17/19mm-high drives.

What to Do with the Old Drive

If you replace the hard drive in your PowerBook, what should you do with the old drive? You can install it in a desktop Mac with the S29 Hard Drive Adapter Kit, a 2.5-to-3.5-inch adapter bracket and cables from MacUpgrade Specialists (714/362-5429, 800/266-3622). But chances are that if the drive is too small for your PowerBook, it's also too small to be a primary drive for your desktop Mac. In some desktop Macs you can install it as a second hard drive if you can improvise a way to mount it (Velcro works great). A 2.5-inch drive can also be installed to store PostScript fonts inside a LaserWriter Pro 630 with the LaserWriter Pro 2.5" Drive Kit, a $26 bracket-and-cable kit from ProLine Distribution (415/461-2227). ProLine supplies no instructions with its kit; installation isn't

NOTES
difficult provided you know how to open the printer and plug in the cable correctly. APS Technologies (816/483-6100, 800/233-7550) has a $69 kit that does come with instructions, the LaserWriter Pro 630 Bracket Kit. One quirk: the Conner 20MB and 40MB drives, very common in early PowerBooks, rarely work in a LaserWriter Pro.

The modified SCSI termination used in internal 2.5-inch hard drives can cause some difficulty; keep any SCSI cabling as short as possible and review the PowerBook manual carefully for information on external termination.

External Drives
An old or new hard drive can be operated as an external drive on a PowerBook or desktop Mac (the Conners have been troublesome here also). One common case style is just big enough for the hard drive and pass-through DB-25 SCSI connectors; this type of case can get power from either an AC adapter or the ADB port. The ADB port in a PowerBook does not provide sufficient power for hard drives (and a desktop Mac with an ADB accessory or two may not provide enough power either). ProLine sells such a case with a zippered pouch for $109. Several companies sell external hard drives mounted in the case; for all these drives, you must use the AC adapter, so the drives aren't as portable as a PowerBook.

Other drives come in cases with an internal battery pack. Liberty Systems (408/983-1127) has the smallest of such cases, which include not only a battery but also an AC power supply/charger so you don't have to carry a separate AC adapter. For a 2.5-inch hard drive, the case takes up only 30 cubic inches; for 3.5-inch drives, 52 cubic inches. The elegant packaging comes at a price, however; Liberty charges up to twice as much as competitors for the same storage capacity. The competitors include APS, whose SR-1000 Drive Enclosure takes up 94.5 cubic inches and needs an external AC power brick (the case is sold separately for $89 in an AC-only version, $139 with a rechargeable battery inside).

Liberty says its external hard disk drives will run up to four hours under battery power; APS claims three to five hours for its models. If you buy a battery-operated external drive, make sure you get driver software that allows the drive to sleep. (If you buy a Liberty drive, ask for Casa Blanca Works Drive7 software.) If you travel internationally, look for 100- to 240-volt power supplies.

**Comparing External Storage Devices**

<table>
<thead>
<tr>
<th>External drive type</th>
<th>2.5-inch hard drive</th>
<th>3.5-inch hard drive</th>
<th>230MB MO drive</th>
<th>270MB SyQuest drive</th>
<th>200MB SyQuest drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight in Liberty case</td>
<td>0.6 pounds</td>
<td>2 pounds</td>
<td>2 pounds</td>
<td>2 pounds</td>
<td>4.5 pounds</td>
</tr>
<tr>
<td>Mean time before failure *</td>
<td>150,000 hours</td>
<td>250,000 hours</td>
<td>30,000 hours</td>
<td>100,000 hours</td>
<td>60,000 hours</td>
</tr>
<tr>
<td>Shock rating (nonoperational) *</td>
<td>110 g</td>
<td>76 g**</td>
<td>50 g</td>
<td>80 g</td>
<td>45 g</td>
</tr>
</tbody>
</table>

* g = gravity. * Typical figures quoted by manufacturer. ** 50 g for 1-gigabyte and larger drives.

magnetic 3.5-inch 270MB cartridge competes with the 230MB magneto-optical (MO) drives made by several companies. (The now-obsolete SyQuest 105MB and MO 128MB cartridge drives are still on the market.) The MO drives cost several hundred dollars more, but the MO disks are $10 to $20 cheaper than SyQuest cartridges. The price difference is partially offset by the greater capacity of the SyQuest cartridges; the bulk matters only if you carry a lot of data.

The SyQuest drive is putting up a surprisingly strong fight against the new magneto-optical technology. The SyQuest drives are faster, and the company claims higher shock resistance and longer rated life. The real question, though, is cartridge reliability. SyQuest claims that the improved design of its 3.5-inch cartridge has overcome the problems of its larger, 5.25-inch cousins. The magneto-optical drive vendors claim a 30-year data lifetime for their cartridges based on accelerated aging tests, but no one really knows how long they will last. Neither MO nor SyQuest has a perfect record for storing data.

Both the SyQuest and the magneto-optical drives run continuously; neither drive sleeps. Liberty Systems is apparently the only company that offers both SyQuest and MO drives with optional battery operation.

CD-ROM Drives
For software or data that comes on a CD-ROM, you need an external CD-ROM drive. You can use any CD-ROM drive with a SCSI interface, as long as you have the appropriate software drivers and cables. Two companies sell portable CD-ROM drives for PowerBooks that weigh in at 2 to 3 pounds with batteries, cable, and AC adapter. MediaVision (510/770-8600, 800/845-5870) uses a Matsushita CD-ROM drive in its Reno; the $349 price includes a rechargeable NiCad battery. CD Technology (408/752-8500) uses a more robust Toshiba mechanism in its CD Porta-Drive T4100; the street price is $360, and a NiCd battery pack is another $100. Both drives can play audio CDs on their own without connection to a computer. The Reno
Hitch a **Free** ride on our information superhighway.

Enjoy 10 FREE hours exploring America Online's incredible array of electronic magazines, news services, information resources...and hundreds of other exciting features!

- **YES! I'd like to try 10 FREE hours of America Online.**
  - Please send me my free trial kit. There's no risk, and if not completely satisfied, I may cancel without further obligation.

  **Select type, size and density of diskette required:**
  - Windows:*  
    - 3.5
    - 5.25  |  3.5
  - DOS:
    - High Density
    - Low Density
  - Apple®:
    - Macintosh®

*To use America Online for Windows, you must have a 386 PC, 4 MB of RAM, a VGA monitor, a mouse, a modem, and a working copy of Windows 3.1.

Use of America Online requires a major credit card or checking account. Limit one free trial per household. America Online is a registered service mark of America Online, Inc. Other names are service marks or trademarks of their respective holders.

1-800-827-6364
EXT. 4220
Get 10 informative hours of America Online.

On us.

America Online offers easy access to the vast resources of the Internet.

Our simple graphic interface makes Online exploring fast and easy.

Get all of these popular services...and many more!
- The Internet Center
- The Atlantic Monthly
- Homework Help
- Consumer Reports
- C-Span Online
- Disney Adventures
- National Geographic Online
- New Republic
- Parents Information Network
- Sci-Fi Channel
- SportsLink

Try it free!
To receive your free America Online software, simply complete and mail the card or fax it to:

1-800-827-4595
or call
1-800-827-6364, EXT. 4220 to order now.

Now, for a limited time, our acclaimed information superhighway is a freeway! We’re awarding you 10 free hours to see for yourself how America Online’s vast array of information and entertainment services is revolutionizing the way we communicate. All you need is a computer and a modem.

Accomplish so much, so easily, so fast!
Explore the Internet at no charge, including newsgroups, databases and more. Monitor your investments and the latest financial news. Write to the editors of magazines like Macworld, TIME, and The New York Times Online. Download your choice from over 100,000 software and shareware programs. Get advice quickly and easily from more than 400 hardware and software companies. Book the lowest airfares. Talk to friends and share ideas in realtime.

Explore Macworld and read about upcoming articles and events before the next issue hits the newsstands.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

8619 Westwood Center Drive
Vienna, VA 22182-9806
An Intersection of Hells

Is decent fax software too much to ask for?

C can’t anybody say anything nice about fax software? Apple’s Express Modem software gets almost no respect. QuickLink II and BackFax were quietly hustled off the market. STF Technologies’ lack of response to tech-support pleas—be they by phone, fax, or skywriting—has generated enough customer venom to poison the Pacific.

Actually, it’s partly a public perception problem. We clamor for just one really solid, well-designed fax program, but we don’t grasp the difficulty of the challenge. See, when programmers write a screen saver, it has to be compatible with merely 90 Mac models. When they write fax software, though, it has to work with 90 Mac models, and the 200 fax-modem models that might be attached, and the thousands of quirky, aging fax machines they’re supposed to dial, and the billions of software programs you might be using. No wonder one harried product manager calls fax software “the intersection of a lot of hells.”

Giant disclaimer: no matter which fax software you wind up with, the following Bitter Truths will haunt you. One, you will not be able to fax PostScript graphics. Got that, QuarkXPress fans? Unless you buy add-on interpreter software (expensive and slow), your PostScript and EPS artwork will become only a blank spot, a blotch, or a system crash. Two, every fax-modem program conflicts with one system extension or another. And three, there will be a fax machine, somewhere, that can’t talk to your fax modem at all.

Now that I’ve sufficiently got your spirits up, let’s dig in.

**Faxstf 3.0**

For years, dozens of manufacturers have included Faxstf software with their fax modems. Then came 3.0, the first version that STF Technologies has sold directly to individuals. It works with more than 150 modem models, and it’s dirt cheap ($59; 816/463-7972).

Without question, this software sends better-looking faxes than any other program. Photos arrive in stunning shades of gray, hairlines are hairlines; rotated text is easy to read. Faxstf includes features 1, 7, 8, 10, and 11 (see “Fax Features,” which I’ll use to conserve verbiage). With the optional $89 AutoPak, you also gain feature 9, which sends incoming faxes to your printer automatically. It’s like having a real fax machine, but with nicer paper and darker ink.

The AutoPak also gives you feature 4, optical character recognition, but don’t get excited. Few incoming faxes have the clarity and perfect alignment required for decent accuracy (that goes for all programs reviewed here). Another caveat: Faxstf’s Line Manager purports to distinguish between remote-access and fax calls, but it works only with certain modems—ten models, at this writing.

Now the bad news. I’ll forgive, for the moment, Faxstf’s window-mad interface, its reckless clutter (two desk accessories, two applications, two extensions), and its surprising lack of feature 2.

The real problem is getting help (beyond the grammatically appalling manual). Fax software is a technical trauma to confront one dialog box, not two, before a fax gets sent; the Comments blank has no business hiding out on the recipient’s fax-number screen; and, exactly as with Faxstf, there are so many components, you don’t know where to look for a certain setting or feature.

But otherwise, Delrina FaxPro is a class act (Delrina Corporation, 800/268-6082; $129). The Installer is a prime example: it even tells you precisely which components it put where. Furthermore, if you do run into trouble, Delrina’s phone-help staff is jaw-droppingly good. And you can reach them.

Bottom line: you have two months to discover whether or not your particular wacky Mac-and-modem setup likes Delrina. If not, you get your money back—a no-lemon pledge.

**Delrina FaxPro for Macintosh 1.5.1**

This software, too, works with hundreds of modem models (including Global Village modems and even GeoPort pods), and it offers features 1 to 12, making it the only other fax software (along with Faxstf) that can send gray-scale faxes.

There are nits to pick: I’d rather confront one dialog box, not two, before a fax gets sent; the Comments blank has no business hiding out on the recipient’s fax-number screen; and, exactly as with Faxstf, there are so many components, you don’t know where to look for a certain setting or feature.

But otherwise, Delrina FaxPro is a class act (Delrina Corporation, 800/268-6082; $129). The Installer is a prime example: it even tells you precisely which components it put where. Furthermore, if you do run into trouble, Delrina’s phone-help staff is jaw-droppingly good. And you can reach them.

Bottom line: you have two months to discover whether or not your particular wacky Mac-and-modem setup likes Delrina. If not, you get your money back—a no-lemon pledge.

**Global Fax 2.0.8**

I’ve always wondered why people call some software elegant. I mean, does it put on pearls and go to the opera?

This software works only with PowerBook, Duo, and Global Village (GV) modems. When I tried it, I learned that elegant, in large part, means simple. The only GV software you encounter, for example, is one desk accessory and a control panel. Viewing received faxes (in gorgeous gray scale) is easier and faster than in any other program; you do it in a single, well-organized window. When you continue...
want to send a fax, you encounter only one dialog box, complete with your phone list.

Despite its sleek frame, Global Fax ($129 for the Duo software only; Global Village Communication, 415/390-8200) packs all features except 1, 5, and 6. (Only Gold and Mercury models offer OCR.) Feature 1 is the only one to worry about, really; when you send a photo, your recipient gets a blobbly black smudge. Another drag: GV tech support is great, but tough to reach and slow to respond.

But more than any other fax software, the GV stuff feels solid and integrated. You don't get the uncomfortable feeling that you've just installed an archipelago of software pieces all over your Mac. When faxing, for example, you don't have to open a window just to see what's going on—instead, a progress graph appears on your menu bar, clear but out of the way. If all programs were this elegant, they'd raise their champagne glasses.

Express Modem 1.5

Apple's own efforts with writing fax software had a reputation for unreliability. However, through a parade of software updates, Express Modem finally approaches respectability. Note well: you must acquire the correct strain of this software; there are separate versions for PowerBooks, Quadra AV GeoPort pods, and Power Mac GeoPort pods (Apple Computer, 408/996-1010; $129 for a GeoPort pod with software).

And how is it? Clean and simple. Fax Terminal lists all faxes, Fax Viewer displays them, and Fax Cover makes cover pages. The only other interface element is the dialog box you see before sending a fax, a simple phone-book list.

Alas, Express Modem is too clean and simple. Sure, I can live without automatic printing and OCR. But you can't send gray-scale images; Express Modem doesn't omit the local area code when dialing; and the credit card dialing option is super awkward. What's left are features 2, 5, 6, 8, and 12. Worse, unless you're actually running the Fax Terminal application, you have absolutely no indication (audio or visual) that fax activity is even taking place.

MacComCenter Plus 1.02

Ever heard of QuickLink? It came bundled with certain modem brands, and it was pretty lousy. Its heir, still available only with specific modem brands (such as Practical Peripherals), is called MacComCenter, cleverly abbreviated MC2, and it's a thousand times better (Smith Micro Software, 714/362-5800). Nice touches instead of making you press certain keys to make your Print command say Fax, MC2 can append the Fax command to the bottom of your File menu. And when you send a fax, you type in the name and number—and click on the Add to Phone List button only if you expect you'll ever dial that person again. That's backward from other fax programs—and better.

Unfortunately, MC2 is feature-poor, faxually speaking: no grays, either on screen or transmitted; no autoprint; no credit card or smart area-code dialing; no customized cover sheets; no phone-list import or export. You do get features 6, 8, and 11 (and 4, if you upgrade to the $69.95 Plus edition), but MC2 still misses too many important boats.

Faxcilitate 1.6

It's a crying shame that Faxcilitate only comes with Supra and PSI modems (PSI, a division of Supra Corporation, 503/967-2410). Where most fax packages scatter their components to the four corners of your hard drive, Faxcilitate adds a simple Fax menu to your menu bar. Its commands access everything you'll need: the Fax command itself, cover-sheet maker, In and Out boxes, and all. While it may be a mainly cosmetic overhaul (and it is); the underlying software is actually Faxstf 2.23, the psychological sense of control it offers is tremendous. You know where everything is, and you can forget about holding down certain keys to fax.

The rest of the package is equally well done—particularly the manual. Version 1.6 includes features 2 to 7, 10, and 11 (key missing feature: gray-scale faxing).

The Upshot

Which do you prize most—features or clarity? If you already own a modem, Delrina FaxPro fairly sneaks with features, and buying into Delrina's tech support and guarantee is confidence-inspiring. On the other hand, if you haven't yet bought a fax modem, you wouldn't be crazy to consider a Global Village or PSI/Supra model for the crystal-clear software alone. Life won't be an effortless romp, per se, but at least you'll get your fax straight.

Thanks to Atlantic Computer Systems for the GeoPort pod.

Contributing editor DAVID POGUE is coauthor of the best-selling, 1,100-page Macworld Mac & Power Mac Secrets, second edition (IDG Books Worldwide, 1994), which would take 47 consecutive days to fax.
STATISTICA/W™ (for Windows) Complete Statistical System with thousands of on-screen customizable, presentation-quality graphs fully integrated with all procedures: Complete Windows 3.1 support, DDE, OLE, TT-fons, multiple toolbars, right mouse button support. Unlimited numbers of data-, results-, and graph-windows. Inter-window integration: data, results, and graphs can be treated as objects and converted into one another in a number of ways. The largest selection of statistics and graphs in a single system: comprehensive implementations of: Exploratory techniques; multiway tables with banners (presentation-quality reports); nonparametrics; distribution fitting; multiple regression; general nonlinear estimation; stepwise logit/probit; general ANOVA/ANCOVA; stepwise discriminant analysis; log-linear analysis; factor analysis; cluster analysis; multidimensional scaling; canonical correlation; item analysis/reliability; survival analysis; time series modeling; forecasting; lags analysis; quality control; process analysis; experimental design (with Taguchi); and much more. Manuals with comprehensive introductions to each procedure and examples. Hypertext-based Stats Advisor expert system. Extensive data management facilities (spreadsheet with long formulas, block operations, advanced Clipboard support, DDE hot links, relational merge, data verification, powerful programming language) Batch command language and macros also supported, "turn-key system" options. All output displayed in Scrollsheets™ (dynamic, customizable, presentation-quality tables with toolbars, pop-up windows, and instant 2D, 3D and multiple graphs). Extremely large analysis designs (e.g., correlation matrices up to 32,000x32,000, unlimited ANOVA designs) Megafile Manager with up to 32,000 variables (8 Mb) per record. Unlimited size of files; extended ("quadruple") precision; unmatched speed. Exchanges data and graphs with other applications via DDE; or an extensive selection of file import/export facilities. Hundreds of types of graphs, including categorized multiple 2D and 3D graphs, matrix plots, icons, and unique multivariate (e.g., 4D) graphs. Facilities to custom design new graphs and add them permanently to menu. On-screen graph customization with advanced drawing tools, interactive stretching and resizing of complex objects, interactive embedding of graphs and artwork, special effects, icons, maps, multi-graphics management, page layout control for slides and printouts; unmatched speed of graph redraw. Interactive rotation, perspective and cross-sections of all 3D and 4D graphs. Extensive selection of tools for graphical exploration of data: fitting, smoothing, overlaying, spectral planes, projections, layered compressions, marked subsets. Price $995.

Quick STATISTICA/W™ (for Windows) A comprehensive selection of basic statistics and the full graphics capabilities of STATISTICA/W™. Price $495.

STATISTICA/DOS™ (for DOS) A STATISTICA/w-compatible data analysis system. Price $795.


Domestic sh/h $10 per product; 14-day money back guarantee.

Circle 99 on reader service card

StatSoft, Inc.
2235 E. 13th St. • Tulsa, OK 74104 • (918) 583-4149
Fax: (918) 583-4376


STATISTICA/Mac™ (for Macintosh) A STATISTICA/W-compatible, comprehensive, data analysis and graphics system designed for the Macintosh™. Large selection of statistical methods fully integrated with presentation-quality graphs (incl. EDA, multiplots, a wide selection of interactively rotatable 3D graphs; MacDraw-style tools). Unlimited size of files. Full support for System 7, incl. "Publish and Subscribe". Price $695.

Quick STATISTICA/Mac™ (for Macintosh) A subset of STATISTICA/Mac™ a comprehensive selection of basic statistics and the full graphics capabilities of STATISTICA/Mac™. Price $395.
How can you maximize the potential of the Macintosh?

See the latest and best Macintosh products and services all under one roof? Learn how to put the Macintosh to work for you? Discover all this and more at Macworld Expo/Toronto.

Become part of the Canadian Macintosh Revolution

With companies presenting hundreds of the latest products in Macintosh technology, Macworld Expo/Toronto is the single best resource for learning how to harness the power of the Macintosh. Visit exhibits from the leading Macintosh vendors. Make practical decisions on how to configure your Macintosh system to meet your business or personal needs. Envision tomorrow's technology, under development today. At Macworld Expo/Toronto, the world of Macintosh comes into view.

Discover the Creative Possibilities

At Macworld Expo/Toronto, make side by side comparisons of hundreds of Macintosh hardware, software, peripheral and service products. Have a question? Need an expert opinion? Our on-site Macintosh professionals lend their expertise to help you choose the products just right for your individual needs. We'll help you take your Macintosh to the max!

MACWORLD Expo/Toronto: October 18-20, 1994

The Macintosh is taking the Canadian market by storm! Isn't it time you became a part of the excitement? Join us at Macworld Expo/Toronto as we take over 130,000 square feet of exhibit space at the Metro Toronto Convention Centre. When you come to MACWORLD Expo/Toronto, you'll see uses and applications for the Macintosh in a variety of areas including: Networking, Spreadsheet Analysis, Databases, Education, Research, Word Processing, Accounting, Law, CAD/CAM, Forecasting, Design, Publishing, Illustration, Animation, Music, Programming, Entertainment and Multimedia. So plan to be in Toronto from October 18-20, and experience the Macintosh at its absolute best!

Pre-Registration Savings!

Now is the time to pre-register for MACWORLD Expo/Toronto. Return the following pre-registration form with your payment by September 7 and save $15 on all conference sessions and exhibits ($75 now vs. $90 cash only at the door). An Exhibits-only admission saves you $10 ($15 now vs. $25 cash only at the door).

Pre-recorded Information

Any questions? Listen to pre-recorded information about MACWORLD Expo/Toronto 24-hours, seven days a week. Call the MACWORLD Expo Information Hotline at 905-566-5733.

Fly Air Canada and Save

Substantial savings are available when you fly Air Canada to MACWORLD Expo. As the official airline of MACWORLD Expo/Toronto, Air Canada is again pleased to offer discounts of 15% to 50% on certain fares.* * Dial 1-800-361-7585 and ask for Event #CV 947390. (*Subject to applicable fare restrictions.)

Car Rental Discounts from Hertz

If you're planning to rent a car, you'll get a great rate from Hertz. Call 1-800-654-2240, ask for Convention #13628 and tell the reservations operator you're attending MACWORLD Expo.

Services for the Physically Challenged

We're committed to ensuring our physically challenged attendees receive all the services they need to make their show visit enjoyable. Call us at 800-265-3585 for details.

Hotel Accommodations

Participating hotels in the Toronto area are offering MACWORLD Expo discounts. To receive the preferred rate, call one of the hotels listed on the next page and mention you'll be attending MACWORLD Expo. There are a limited number of rooms at the preferred rates and they sell-out quickly. Make your reservations now for the best selections. Prices reflect single and double occupancy. If you are reserving 10 or more rooms, you must supply the hotel with a rooming list and a non-refundable deposit for the first night, no later than September 5, 1994.

Conference Hours

October 18: 10:30 a.m. - 7:00 p.m.
October 19: 11:00 a.m. - 5:00 p.m.
October 20: 11:00 a.m. - 5:00 p.m.
a. The PowerPC Stream
Hailed as the next generation of computing, the PowerPC — a hundred times more powerful than the original 128K Macintosh — promises to provide a panorama of solutions and virtually untold computing capability.
- What Power Macs Deliver
- Navigating the PowerPC Upgrade Path
- Managing the Power Mac
- How Can Developers Take Full Advantage of PowerPC?

b. The Publishing Stream
A rich collection of intensely useful Macintosh design, prepress, and publishing tips, plus discussions and demonstrations of creative and technological breakthroughs — presented by some of the most respected figures in the industry.
- Creative Imaging with the Mac
- Digital Photography with the Mac
- High-End Colour Prepress
- Images to Film
- Short-Run On-Demand Colour Publishing
- A Practical Guide to Trapping
- Frequency-Modulated Screening

c. The Multimedia Stream
Invaluable how-to's, tips, and guidelines on using your Mac to create exceptional-quality productions and presentations with both high-end and low-end multimedia tools.
- A Beginner's Guide to Publishing a CD-ROM
- An Overview of Authoring Tools
- Developing Interactive Titles
- Multimedia in Training
- Non-Linear Editing
- Intro to High-End Interactive Multimedia
- Intro to Professional Desktop Video
- Mastering Animation

d. The Networking/Connectivity Stream
How users are enhancing communications and maximizing the efficiency of their networks, plus insights on what lies ahead in Macintosh connectivity.
- The Future of Connectivity
- Integrating Macs Into Multiplatform Networks
- Client/Server in a Multivendor Environment
- PowerTalk/PowerShare
- The TCP/IP Report
- Maximizing the Internet

e. The Getting-Started Stream
Practical, focused, step-by-step approaches and guidelines for those who need a concentrated course of beginner's how-to's on Mac technologies and techniques.
- Beginning Mac: Visual Clues
- Beginner's Guide to Multimedia
- Beginner's Guide to the Internet
- Getting Started with Telecommunications
- Getting Started with Font Technology
- CD-ROM for Users: Beginner's Guide

f. The Advanced User Stream
Veteran users share their expertise and insider's tricks for getting absolutely the most productivity and power from your Macintosh.
- Font Management
- Power User's Guide to the PowerBook
- Customizing Your Mac
- Resolving System Conflicts

g. The Education Stream
An excellent opportunity for educators, administrators, and students to show and be shown new and classic examples of how the Macintosh positively shines as a teaching tool.
- The Mac in Math and Science Classes
- Maximizing CD-ROM in Education
- Multimedia in Education
- QuickTime for Teachers
- The Internet for Educators
- HyperCard in the Classroom

h. The Programmer/Developer Stream
For in-house developers, veteran independents, and novice Mac techies alike: the hottest breakthroughs and innovations, plus solid advice from reliable sources.
- OpenDoc
- Programming the Newton
- AppleScript

i. The Advanced User Stream
Whether you're operating a smaller-size company — or running a business out of your home — or doubling the power of your work environment with a remote office in your home — your needs are different than organizations with hundreds or thousands of employees!
- How to Set Up a Home Office
- Starting Your Own Successful Desktop Publishing Business
- Making the Most of PIMS

j. The Special Interest Group Stream
Sessions for "birds of a feather" looking to compare Mac notes with others in a similar setting — to solve special problems, to see how colleagues across the continent are getting more mileage out of the Mac, and to develop an invaluable "user network."
- The User Group Forum
- The Mac in IS
- The Mac in Government
- The Mac in Science/Technoloy

k. The Application Workshop Stream
Intensive training sessions on some of the most popular Macintosh applications.
- Microsoft Word
- QuickTime
- HyperCard
- Aldus PageMaker
- Adobe Photoshop
- Advanced Macintosh
- Microsoft Excel
- Claris FileMaker Pro
- Adobe Photoshop

Special Added Attractions at MACWORLD Expo/Toronto:
- MacIS/Pacific Resource Centre
- MacSciTech Resource Centre
- UGWUMP: User Group Welcoming Unwinding Meeting Place
# Registration Form

## Participating Hotels

<table>
<thead>
<tr>
<th>Hotel Name</th>
<th>Price</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowne Plaza Toronto Centre</td>
<td>$120</td>
<td>(416) 597-1400</td>
</tr>
<tr>
<td>Holiday Inn on King</td>
<td>$109</td>
<td>(416) 599-4000</td>
</tr>
<tr>
<td>Royal York</td>
<td>$119</td>
<td>(416) 368-2511</td>
</tr>
<tr>
<td>Sheraton Centre Toronto</td>
<td>$118</td>
<td>(416) 361-1000</td>
</tr>
<tr>
<td>Toronto Hilton</td>
<td>$110</td>
<td>(416) 869-3456</td>
</tr>
<tr>
<td>Toronto Marriott</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holiday Inn Toronto</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Please register me for:

- **Package One $75.** Conference sessions* and exhibits. Pre-register by September 7 ($90 cash only at the door). Includes GST $4.91.
- **Package Two $15.** Admission to exhibits only. Pre-register by September 7 ($25 cash only at the door). Includes GST $0.84.

## Please send my registration badge and further information to:

- **First Name**
- **Last Name**
- **Company Address**
- **Home Address**
- **Account Number**
- **Expiration Date**
- **Card Holder Signature**

## Please check one:

- **Home Address**
- **Company Address**

## Cheque enclosed (make payable to MACWORLD Exposition)

**Amount** $_____

## Master Card  
**Amount** $_____

## Visa  
**Amount** $_____

## American Express  
**Amount** $_____

## Credit Card Information

- **Card Number**
- **Expiration Date**
- **Card Type**
- **Security Code**

## Package Information

- **Cheque enclosed (make payable to MACWORLD Exposition)**
- **Amount** $_____

- **Master Card**
- **Amount** $_____

- **Visa**
- **Amount** $_____

- **American Express**
- **Amount** $_____

## Hotel Information

<table>
<thead>
<tr>
<th>Hotel Name</th>
<th>Price</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheraton Centre Toronto</td>
<td>$118</td>
<td>(416) 361-1000</td>
</tr>
<tr>
<td>Toronto Hilton</td>
<td>$110</td>
<td>(416) 869-3456</td>
</tr>
<tr>
<td>Toronto Marriott</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holiday Inn Toronto</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Participating Hotels Information

- **City**
- **Province**
- **Postal Code**

## Card Holder Signature

**Signature**

## Additional Information

- **Cash only at the door. After September 7, you must register at the show.**

## Please check the appropriate information:

- **YOUR INDUSTRY OR PROFESSION**
  - (Choose only one)
  - 1. D Accounting/Finance
  - 2. O Architecture/Construction
  - 3. O Art/Design/Creative Services
  - 4. O Arts & Entertainment
  - 5. O Communications/Printing/Publishing
  - 6. O Computer Reseller/VAX/VAX
  - 7. O Consulting
  - 8. O Corporate/General Management
  - 9. O Distributor/Seller/Reseller/Service
  - 10. O Engineering/R&D
  - 11. O Government/Military
  - 12. O Health/Medical Services
  - 13. O College/University
  - 14. O Elementary/High School
  - 15. O Legal Services
  - 16. O Manufacturer (Computer Industry)
  - 17. O Manufacturer (Non-computer Industry)
  - 18. O Marketing/Sales/POR/Communications
  - 19. D Other
  - 20. D Does Not Apply

## SIZE OF YOUR ORGANIZATION

- **Number of employees national & international**
  - (Choose one only)
  - 37. O Under 50
  - 38. O 50 - 99
  - 39. O 100 - 499
  - 40. O 500 - 999
  - 41. O 1,000 & over
  - 42. D Does Not Apply

## WHICH PERSONAL COMPUTER(S) DO YOU OWN/USE?

- (Choose all that apply)
  - 43. O Macintosh Plus/SE/SE30
  - 44. O Macintosh Classic Series/LC Series
  - 45. O Macintosh Powerbook
  - 46. O Macintosh II Series
  - 47. O Macintosh Performa Series
  - 48. D Macintosh Centris Series
  - 49. D Macintosh Quadra Series
  - 50. O Macintosh Workgroup Series
  - 51. O IBM PC or compatible
  - 52. D Other
  - 53. D None

## DO YOU RECOMMEND, BUY, OR APPROVE MICROCOMPUTER SOFTWARE ABD/OR PERIPHERALS?

- 54. D Yes
- 55. D No

## IF YES, PLEASE INDICATE FOR HOW MANY MACINTOSH COMPUTERS YOU HAVE THIS INVOLVEMENT.

- 56. D 1 - 10
- 57. D 11 - 25
- 58. O 26 - 50
- 59. O 51 - 100
- 60. O 101 - 500
- 61. O 501 +

---

*MACWORLD Expo conference sessions are on a first-come, first-served basis with no guaranteed seating and are subject to change without notice. All registration fees are non-refundable. Send completed form, with check, money order or credit card information to: MACWORLD Expo/Toronto, 4257 Sheppard Avenue West, Mississauga, Ontario L4Z 1Y5, Canada.

---

Completing the Pre-Registration Form, please choose your package and fill out this form completely. The pre-registration deadline is September 7; registration forms received after September 7 will be returned unprocessed. Incomplete forms will be returned. Use only form per person. Make photocopies for additional people. (Purchase orders cannot be accepted. All registration fees are non-refundable.) Payment by credit card or check. Please sign and date check to form. Send completed forms to:

MACWORLD Expo/ Toronto  
4257 Sheppard Avenue West  
Mississauga, Ontario L4Z 1Y5

Canadian and U.S. Attendees: All Canadian and U.S. attendee badges will be mailed on or about September 30. Be sure to check the box indicating where your badge should be sent.

International Attendees: All non-Canadian and non-U.S. badges will be held for pick-up at the International Pre-Registration Desk beginning October 13 at 8:00 a.m.
We can show your business how to get even more out of the box.

We're Authorized Apple Value Added Resellers (call us VARs, we don't mind). And before you decide to purchase a new computer system, or try to expand your current one, give us a call. We'll help your business get the most out of its computer system.

VARs are all top-notch computer experts specializing in specific industries. Like yours. Put simply, we understand how your business works and how a customized computer solution can help your business stay productive and prosperous.

For example, we might show you better ways to use the computers you already have. Or make hardware recommendations that will grow with you. Or update your network. Or help you develop customized software or groupware. And no matter what we do for you, we'll make sure it's tailored to fit your particular needs.

Then we'll purchase, deliver and install everything for you. We'll even train your employees. Best of all, we'll come to your office when you need us. So if there's ever a question or concern, we'll be there to help.

If you're ready for your computer system to do even more for your business, start by calling for your free VAR directory.

Then look us up.

Call 1(800)262-2827 for your free directory.
AS FAR AS THE EDUCATION market is concerned, computers have had a shockingly free ride. It's sort of a hangover from the days when we didn't understand computers at all, and very few of us ever went near them. Because of the computer's scientific pedigree, we figure, using it should be an enriching experience for the playground set. We even consider using a computer a virtue in and of itself—ergo, the somewhat oxymoronic phrase computer literacy.

Does this mean we can guiltlessly use our Macintoshes to take the place of television as an object of kiddy contemplation? Not by a long shot. I speak here not only as a technopundit, but also as a concerned parent. In our household resides a four-year-old named Andrew who seems to have inherited my own consuming passion for junk entertainment. My own parents, being of prewar vintage, had no idea what consequences would come from allowing me unfettered access to that black-and-white box in the living room. Thus I cannot fault them—or their generational peers—for bringing up a wave of triviaheads, logic dolts, and instant-gratification freaks.

Even as I write these words, my eyes wander to my collection of lunch boxes celebrating the likes of "The Man from U.N.C.L.E.," "Laugh-In," and "Charlie's Angels." (Does anyone have an "It's About Time" pail in good condition? Just asking.) Somehow, I don't think this is what my great-grandparents had in mind when they arrived on Ellis Island.

So I know better than to fully entrust my kid to a new technology. The question is, Can I do any better than my parents? Television rots your mind—that much is clear—but what about computers? Can the new wave of smart-and-entertaining programs not only instruct our kids but also give them an alternative to the boob tube? Can computers save Generation Z?

I imagine these questions will ultimately be answered by psychologists and professors trying, no doubt, to puzzle things out in the wake of massive cognitive damage caused by the Virtual Reality Woodstock of the year 2010. But in the meantime, let me offer the following warning: Children who spend too much time using so-called educational software may learn some unexpected and probably unwelcome lessons. At least that's the conclusion I reached from observing my own youngster as he began growing up with the Macintosh.

Slam Dink

At age two, Andrew's favorite program was Rodney's Fun Screen. It taught him how to use the mouse. For a two-year-old, this is not entirely intuitive. While a mouse is correctly called a pointing device, and even babies know how to point, the fact is that one usually lifts a hand when pointing. A mouse, of course, requires you to keep your hand down, but Andrew kept lifting it off the desk.

Rodney's Fun Screen (from Activision), designed by a wonderful New York artist named Rodney Greenblatt, solved the problem. One of the components introduces a character named Dinky, who is sort of a cross between Gumby and Pee-wee Herman. "I am Dinky, and this is my house!" he says in a breathless Alvin-and-the-Chipmunks voice. The Dink Man goes through a door of a Victorian-style house with about 20 windows, and he pulls down the shades of each window. Then you look for him. By moving the cursor over each window and clicking on it with your mouse, the shade goes up and you see a weird animal or something. "Not here!" says Dinky, unseen. Finally, you click on the right window and find Dinky. Happy music ensues.

This is the same type of joy one gets from those pop-up toys. Psychologists approve of those things because they teach about feedback. Well, Rodney's Fun Screen has more feedback than Pete Townsend's amplifier. If there is a lesson to be learned about feedback, surely it is learned most effectively in the digital realm.

But there is a disquieting aspect to the Fun Screen that is characteristic of many engaging software packages. While Andrew's reaction to pop-up toys was to play with them for a short time and then go on to other stimulations, he could sit in front of the computer for an hour, looking for Dinky. An unnerving sight, to be sure—reminiscent of the zombie-ish lure of television. The fact that my son was delighting in the results of his own actions ("I found Dinky!"") didn't totally mitigate my concern that he had discovered the equivalent of a new drug. Or, at the least, too much of a good thing.

Hit Pix

Kid Pix (Broderbund Software) is the wildly successful drawing program for the junior set. And as Andrew showed, it is definitely easy enough for a three-year-old to master. He found it exhilarating to experiment with different brushes, colors, and effects, and I was quite impressed watching him use the menus and palettes to do so. Even more amazing were the results: after I would walk away from the screen for a few minutes, I'd return to see something unbelievably polished.

Better than TV?

Generation Z is growing up with the computer.
Would access to such a powerful drawing tool affect Andrew's work in the more traditional media of paint and paper? Would he eschew crayons because they had no erase function? Happily, the answer was no. He returns from preschool regularly with the crude graphics associated with his age group. Interestingly, he seems much prouder of these pictures than of the astonishing creations that emerge from the laser printer, and his paintings now overshadow the Kid Pix pictures magnetized to the refrigerator.

Perhaps this is related to a development that effectively ended my son's creative period with Kid Pix. Once he discovered the firecracker-erase function, he never worked at a single picture long enough to develop something notable. After only a few minutes, he'd go to the menu where the firecracker lived and blow up his artwork, laughing heartily as the image shattered into digital pieces.

Day of the Living Book
Living Books (Broderbund) are interactive versions of the real thing, and Andrew fell in love with Grandma and Me, an adaptation of a work by author Mercer Mayer. Though he can opt to have the story read to him line by line, Andrew prefers to circumvent narration, treating each page as a new adventure and delightfully clicking on every component to evoke an entertaining animation. He loves to do this so much that he can easily spend 40 minutes with the program with no supervision, laughing at the visual jokes just as hard when he sees them for the 50th time as he did the first.

Obviously, these products are not meant to substitute for real books—which, of course, are also “living” and interactive in the sense that they can engage minds and trigger imaginations. But just try to occupy a small child's attention for an hour with a printed copy of a Mercer Mayer book. It can't be done.

Using Living Books involves a trade-off. Obviously, the programs can't replace the wise presence of a human reader who points things out along the way and answers questions. Instead, they offer an opportunity to surf a book's text instead of reading it. They give kids the equivalent of a television's remote-control device, allowing them to zap anything that fails to instantly engage them.

Car Talk
Putt-Putt Joins the Parade (Humongous Entertainment) is an adventure game that requires no reading. The title character is a talking automobile who wants to ride in a parade. But first he must acquire some goods and get washed. To do that, he makes money by delivering groceries and mowing lawns. Andrew eats it up.

Putt-Putt communicates the importance of planning complex tasks, and I was quite proud of my little guy when he skillfully completed the chores necessary to get Putt-Putt in the parade. But Andrew plays the game too damn much. He can go at it for several hours—or until I drag him kicking and screaming from the computer. Is he working out the problems in a logical fashion, or simply entering a somewhat more interactive fugue state than the television mind-set? While much of Andrew's time was, no doubt, spent constructively in the first hours of interaction, eventually I sensed a change in his play. He would stop working at the problem and simply surf the program for his favorite little animations.

All in all, I've found that the computer more than matches TV as a baby-sitter. Let's face it, the illusion that something not only entertains your kids but educates them as well is so incredibly potent that you really don't want to look too closely.

But as Andrew's hours in front of the Mac piled up, I was forced to take that harder look. I simply couldn't ignore the possibility that he might be learning some lessons totally unanticipated by the companies that designed the programs. Compared with television's passive distraction, computer entertainment seemed to prod Andrew into a kind of interactive cherry-picking. The constant in all these programs seems to be that they encourage discovery of momentary delights, most often in the form of special effects. They take the ability to experiment—a good thing in general—to the limit, to the point where it impinges on other virtues, such as learning to follow a narrative, or carefully executing a lengthy plan. This can't be good. So despite Andrew's cries of protest, I now limit the time he spends with the Macintosh. And when he does use the Mac, I'm often there with him to provide some measured commentary to what's happening on screen.

But there's only so much I can do. If my vigilance (and that of other parents) fails, it may be that my son's—and his generation's—excessive interaction with computers will lead to some disturbing behavioral anomalies, even weirder than the teratologies of the television generation. Beyond TV lunch-box collections, beyond the cult of "The Brady Bunch," may lie a future Newsweek cover story castigating our children as representatives of "The Undo Generation."
PROTECTING BUSINESS INFORMATION is important—so important that large companies with mainframe computers often employ professionals to ensure the security of corporate information systems, including networks, computers, and electronic mail.

Such attention to security may be a new idea to managers who rely on Macintoshes rather than mainframes to keep their companies humming. But as the single-user Mac has given way to companywide networks, it's important to consider the value of your company's information and to determine how best to protect it.

Many security products are available to help protect your hardware and data from theft or loss. But without planning, individual products may not be enough to safeguard your company's information. To learn about the type of Macintosh security products that are available, look to Jim Heid's Working Smart column in this issue. To learn how to manage the security of your data, read on.

Security Risks
The six enemies of computer security are error, ego, emnity, embezzlement, extortion, and espionage, according to Bruce Schneier, security consultant and author of the excellent Protect Your Macintosh (Peachpit Press, 1994). People and computers may lose data through simple errors or hardware failure. Or individuals may break into a system because they want to feel important, or because they're angry, greedy, or represent a rival business.

Obviously, intruders can be a real problem. But human error is by far the greatest security risk. Recently, for example, while browsing online, I discovered a confidential wholesale price list for a hardware company's product. Clearly the information had been posted by mistake; just as clearly, its public dissemination could harm the company's business.

Such an error can't be caught by a software program, but the risk can be reduced if you establish a review system for files that will be posted online. Make sure someone cruises your bulletin board system or online forum periodically, to catch anything that slips through. If your forum or BBS has different levels of access, check periodically to ensure that only authorized folks are gaining access to your material.

Online leaks are not the only way to compromise valuable business data. Consider these possibilities: a manager accidentally prints a lengthy, detailed memo on a shared printer—in the wrong department—containing confidential information. The memo can be quickly accessed and read by others.

Another risky area can be joint files that are shared too broadly among users. Simply give everyone access to a certain folder or their hard drives under AppleShare. FileMaker Pro users can easily access company databases if they are not password-protected by simply hitting Open and then clicking on the Network button on the resulting dialog box. That shows a list of all available FileMaker Pro databases across a network. If the databases have no password, or use obvious ones, the data can be quickly accessed and changed or deleted.

Then there's the nightmare of dead files brought back to life. Confidential files that have been deleted but not overwritten on a hard drive can be recreated with any number of utility packages. That might be a serious problem if a Mac or external hard drive is sent out for repair, sold, or transferred within an organization. Reformating the drive or using shredding software is vital in those cases.

Fighting Back
To guard against security risks of all types, Schneier recommends that you establish appropriate countermeasures. These include creating security policies and procedures; educating users about those policies; using security hardware and software as needed; and frequently

Desperately Seeking Security
Protect your data from prying eyes
Keep the Flame Alive

The lamp of freedom and the light of learning can take many forms.

Your company's used computers, laser printers, modems, and other surplus equipment can help empower young minds in America, and advance the development of emerging democracies around the world.

The East West Foundation takes your surplus or used equipment and distributes it to American schools and charities and to democratic and educational institutions in Eastern Europe, Africa, Asia, the Commonwealth of Independent States, and Latin America—wherever it can make a difference. And it does make a difference.

Donating used or overstock computer equipment to the East West Foundation can make a difference to you, too—at the bottom line. Because all donations are tax-deductible. And all types of computer equipment are welcome.

To arrange for a donation or for more information, please call:

EastWestFoundation
49 Temple Place
Boston, MA 02111
(617) 542-1234
Fax (617) 542-3333

Rustin Ross of Northbrook, Illinois, bought Dayna Communications' SafeDeposit to perform backups locally on a network server. There are two versions of SafeDeposit; only the server version allows for any network use. "Because I wasn't going to be backing up from a remote machine, I thought the less expensive version would be fine," writes Ross, who checked the product description in a software catalog to make sure his assumption was correct.

When it turned out that he needed the server version of SafeDeposit, Dayna sent Ross, free of charge, the more expensive server version by overnight delivery. "Dayna's response was the best I've ever seen, and were it more pervasive it would translate into more business for the benevolent companies and more converts to the Mac platform."

For More Information

For more detailed information on security issues, contact the Computer Security Institute (415/905-2626) of San Francisco. CSI offers training, a newsletter, and conferences, including the upcoming 21st Annual Computer Security Conference scheduled for November 14 through 16 in Washington, D.C.

Send nominees for sainthood to Service Hero, Macworld, 501 Second St., San Francisco, CA 94107, or via Internet (Branscum@AOL.com). Conversely, drop Conspicuous Consumer a line if a company is ignoring you.
Now your everyday purchases can save you money on Apple products.

The new Apple Citibank card earns you rebates of up to 5% — good toward Apple products. Plus, your first year of membership is free. Just fill out the application below.

YES, I want to earn rebates of up to 5% toward the purchase of Apple products.

Please Tell Us About Yourself

Please Print Your Name As You Wish It To Appear On The Card (First, Middle, Last)
Your Home Address, Number And Street

City Or Town State Zip Code Years At Address
Own Home Rent Live With Parents
Name Home Phone And Area Code

Date Of Birth (Month/Day/Year) Mother’s Maiden Name
Home Phone Number And Area Code
Pre-vious Address, Number And Street

City Or Town State Zip Code Years There

Please Tell Us About Your Job

Business Name Or Employer Position

Check Here If You Are:
Retired Self-Employed
Up Date Your Name On The Card (First, Middle, Last)
Your Home Address, Number And Street

City Or Town State Zip Code Years There

About Your Income

You do not have to include alimony, child support, spouse’s income, separate maintenance or other income unless you want us to consider it in connection with this application. Your total yearly income from all sources must be at least $12,000 to be considered for card membership.

Your Total Personal Yearly Income Other Yearly Household Income

Other Yearly Income Sources

Would You Like An Additional Card At No Charge?

If Yes, Print The Name Of The Additional Cardmember (First, Middle, Last)

Please Tell Us About Your Computer Use

Do You Own A Computer? Apple Other None
Do You Use Your Computer At? Home School Business

Please Sign This Authorization

I certify that I meet the requirements to become a Citibank credit cards and agree to the terms and conditions on the back. Please allow 30 days to process this application.

Applicant’s Signature Date
Turn your everyday credit card purchases into big savings on Apple hardware and software.

Earn rebates of up to 5% — good toward the purchase of Apple products. Now, it's easy to earn big savings on Apple products. Just use the Apple Citibank card for everyday purchases, and you'll earn Apple rebates of up to 5%. Then, use your rebates toward the purchase of a PowerBook® computer, Newton™ MessagePad™, At Ease™ software or other Apple products. You can accumulate rebates of up to $500 in any year — up to a maximum of $1,500 over any three-year period.*

Find your best price on Apple products. Then use your rebates to save even more. Just shop at any authorized Apple dealer. Once you find your best price on Apple products, you can use your rebates to save even more. So you'll know you're getting the best deal on Apple hardware, software and peripherals.

No fee first year and a competitive APR. The Apple Citibank card has a low, variable annual percentage rate (APR) of 16.65%. That's more, there's no annual fee for your first year.*

Apply now and earn Apple Rebates of up to 5%. And all the service you'd expect from Citibank. With the Apple Citibank card, you get more than Apple Rebates. You get all the service and security of the nation's leading credit card company. So apply for your Apple Citibank card today. Just complete the application on the reverse.

See below for details. Certain conditions apply.
# Editors’ Choice

**THE BEST PRODUCTS FEATURED IN MACWORLD**

Edited by Elizabeth Maffly

Macworld Editors’ Choice is a complete listing of the hardware and software products selected as the best of their type in Macworld’s comparative articles. A ♦ next to a product indicates that we chose more than one product in that category. A ♣ next to a product listing indicates that a native Power Mac version is available.

## Hardware

### MONITORS

**BLACK-AND-WHITE MONITORS, May 93**
- Portrait monitor: 15-inch Gray Scale Portrait Display; Mirror Technologies, 612/633-4450; $399, with video-display board $549.
- Two-page monitor: ♦ L-View MultIMode; Sigma Designs, 510/770-0100; $1099, with video-display board $1398. ♣ MD 202 Two Page Display; Mabius Technologies, 510/254-0596; $899, with video-display board $798.

**COLOR MONITORS, Oct 93**
- 16- and 17-inch: ♦ ErgoView 17; Sigma Designs, 510/770-0100; $1349. ♣ MultiSync 5FG; NEC Technologies, 708/860-9500; $1335 (NEC’s estimated dealer price).

**SMALL COLOR MONITORS, Jan 94**
- 14-inch display: ♦ Sony CPD 1430; Sony Corp. of America, 800/222-7669; $779.95. ♣ NanoFlexScan F348W; Nano USA, 800/800-5202; $799.

### NETWORK HARDWARE

**HIGH-SPEED FAX MODEMS, Oct 93**
- Teleport Gold and Silver with Global Fax; Global Village Communication, 415/390-8200; Gold $499, Silver $499.

**REMOTE-ACCESS SERVERS, Oct 94**
- NetConnect Remote Access Server; Asanté Technologies, 408/435-8401; $3899 for eight ports.

**PRINTERS**

**COLOR PRINTERS, Aug 94**
- Low-end ink-jet: DeskWriter 560C; Hewlett-Packard, 800/752-0900; $369.
- Solid ink-jet: Phaser 300, Tektronix, 503/682-7377; $999.

**SCANNERS/IMAGE CAPTURE**

**ELECTRONIC CAMERAS, Sep 94**
- Apple QuickTake 100; Apple Computer, 408/996-1010; $749.

**OPTICAL DRIVES, Dec 93**
- 3½-inch: ♦ Epson OMO 5010; ClubMac, 800/258-2622; $999.
- 5¼-inch: ♦ Sharp JY-750; ClubMac, 800/258-2622; $499.

**VIDEO/DISPLAY**

**DOUBLE-SPEED CD-ROM DRIVES, Jul 93**
- Pioneer DRM-604X; Pioneer, 800/444-6784; $1495.

**SYSTEMS/STORAGE**

**HIGH-SPEED HARD DRIVES, Aug 93**
- 2.7GB drives: ♦ Nova XL 2700; Micronet Technologies, 203/668-6223; $9999. ♣ Vista 3.5GB; Relax Technology, 510/671-6112; $1349.

**MACINTOSH UPGRADES, Jun 93**
- SE accelerator (25MHz): Quick3D; Novus Systems, 904/427-2356; $449 (without FPU).
- SE/30 accelerator (50MHz or 33MHz): Universal PowerCache; DayStar Digital, 404/967-2077; 50MHz $999 (with FPU), 33MHz $419 (without FPU).

**SYSTEMS/STORAGE**

**DOUBLE-SPEED CD-ROM DRIVES, Jul 93**
- Pioneer DRM-604X; Pioneer, 800/444-6784; $1495.

**SYSTEMS/STORAGE**

**HIGH-END VIDEO EDITING, Jun 94**
- Presentation software: MoviePak2 Pro Suite; RasterOps, 801/785-5750; $1499. ♦ VideoVision Studio; Radius, 408/434-1010; $4499.
- Corporate video (offline): Media Composer-400s; Avid Technology, 508/640-6789; $14,999.
- Corporate video (online): VideoCube, Imagination, 916/272-9800; $40,500.

---

Note: The text continues on the next page.
PHOTOSHOP ACCELERATORS, Apr 94
PhotoBooster; Radius, 408/334-1010; $999.

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: MYOB; Teleware, 201/586-2200; $199.
Home office/personal finance: MacMoney; Survivor Software, 310/410-5527; $119.95.

BUSINESS TOOLS

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $195.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

CD-ROM

TOP 10 CD-ROMS, Mar 94

COMMUNICATIONS/NETWORKS

COMMUNICATIONS SOFTWARE, Aug 94
Basic connectivity: 2Term; Davie P. Altenon (no phone number available); $30.
Terminal emulation: CrossTalk for Macintosh; Digital Communications Associates, 408/442-4000; $195.
Internet exploration: VersaTerm; Synergy Software, 215/779-0522; $125.

DOS WINDOWS EMULATION, Oct 94
Timbuk2 Pro 1.03 for Macintosh, Timbuk2 1.1 for Windows, Farallon Computing, 510/814-5000; $199 each.

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93
FaxTeo; Telefocus, 816/886-9800; $79.

NETWORK CONNECTIVITY, Sep 93
Netware for Macintosh; Novell, 801/429-7000; $495 for 6-user license to $2295 for 20-user license.

PROTOCOL ANALYZERS, Jul 94
EtherPeek, AG Group, 510/937-7960; $795.

SOFTWARE ROUTER, Jul 93
Apple Internet Router 3.0; Apple Computer, 408/996-1010; Basic Connectivity Package $499.

TERMINAL EMULATOR, Oct 93
VersaTerm; Synergy Software, 215/779-0522; $149.

GRAPHICS

3-D DESIGN, Aug 93
Price for performance: $ Ray Dream, 415/968-0765; $299.<br>3-D Sketch 1.5; Alias Research, 416/362-9181; $995.
All-in-one solution: Infini D 2.5; Spectral International, 413/293-3100; $695.<br>3D Studio 3D 2.6; 3D Studio, 801/628-5018; $999.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ClickArt Studio Series; T/Maker Company, 415/962-0195; $999.95 per volume.<br>Electronic Clipper subscription service; Dynamic Graphics, 800/255-8800; $67.50 per month.<br>Electronic Clipper subscription service; Metromedia, 800/525-1552; $74.95 per volume; CD-ROM $149.95. Image with Impact series; 3G Graphics, 800/456-0234; $99.95 to $129.95 per volume; CD-ROM $999.<br>Typographics Ornaments; Underground Grammarian, 609/899-6477; $75 per volume; 20 TIFF albums $200; EPS volumes $50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/687-9990; $49.95.
Budget draw/paint: UltraPaint; Dennea Software, 305/596-5644; $79.
Beginner's program: Aldus SuperPaint; Aldus Corp., 617/658-6000; $149.95.
Overall: Canvas; Dennea Software, 305/596-5644; $399.

FONT BUYERS' GUIDE, Mar 94
Text-face collection: Type on Call CD-ROM; Adobe Systems, 415/961-4400; 800/682-3623; $99 (includes the ability to unlock two families from preselected packages) plus $25 to unlock individual faces or $69 to $179 for unlocking families.
Display/decorative-face collection: Fontek; Letraset, 201/855-1400; $89 for 57 fonts.

IMAGE DATABASES, Oct 93
Aldus Fetch 1.0; Aldus Corp., 206/628-5735; $295.
Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $89.

PAINT AND IMAGE-EDITING, Sep 93
Budget buy; Expert Color Paint; Expert Software, 305/687-9990; $49.95.

PRINT AND IMAGE-EDITING, Sep 93
Budget buy; Expert Color Paint; Expert Software, 305/687-9990; $49.95.
Overall programs: Fractal Design Painter; Fractal Design Corp., 408/988-8800; $399.<br>Image-editing program: Adobe Photoshop 2.5.1; Adobe Systems, 415/961-4400; $895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Clars Corporation, 408/727-8227; $299.<br>Vendors: Please write to Macworld Editor's Choice, 501 Second St., San Francisco, CA 94107; or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

ONLINE SERVICES

ONLINE SERVICES, Aug 94
E-mail: America Online; America Online; 703/893-6288; basic monthly fee $9.95.
Reference: Usenet; CompuServe; CompuServe Information Service, 614/457-8802; basic monthly fee $8.95.

ORGANIZATION/P RODUCTIVITY

CALENDARS, Jul 93
Alarm system: First Things First; Visionary Software, 503/214-6200; $79.95.
Smart Alarms Plus; IJAM Software, 203/630-4509; $75.
All-around scheduler: Now Up-To-Date; Now Software, 503/274-2800; $99.
Meeting scheduler: Meeting Maker; On Technology, 617/374-1400; five-pack $495.

GRAPHING SOFTWARE, Aug 94
DeltaGraph Pro 3.0; DeltaGraph, 408/648-4000; $195.

SALES-AUTOMATION SOFTWARE, Oct 93
Contact Exchanger; Westware, 619/747-5053; one user $295, five users $1295.<br>CBS; Collegiate Business Software, 5127-345-9964; $495.

TEXT-RETRIEVAL SOFTWARE, Dec 93
Small system: On Location; On Technology, 617/374-1400; $129.
Multiluser system: Personal Librarian; Personal Library Software, 301/990-1195; $995.

PRESENTATION TOOLS

PRESENTATION SOFTWARE, Jul 94
Persuasion 3.0; Aldus Corp., 206/622-5000; $495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/398-3821; $189.95.
Book-length document distribution: VideoReader, Video Technology, 800/343-7623; $89.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; $149.

VIRUS KILLERS, Jul 94
Commercial software: Viex; DataWatch, 919/549-0711; $99.95.
Free software: Disinfectant; free from online services.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, Jun 94
Virtual memory software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.
Memory-boosting software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; $99.
Edited by Wendy Sharp

Macworld Star Ratings lets you compare hardware and software products for the Macintosh by providing summaries of Macworld's authoritative product reviews from the past year. The number of stars at the beginning of each capsule review indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones. The symbol indicates that a product is available in a native PowerMac version, although unless stated otherwise the version we reviewed was the 68000 version.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors: Please write to Macworld Star Ratings, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS TOOLS

★★★★ 4D First 1.0, ACI US, 408/252-4444, $295. This entry-level relational database is a low-cost way to distribute the power of 4D and 4D Server to an office full of Macs. It's not much easier to use, however, than the full-fledged 4D. May 94
★★★★ AccuZip 1.8.7, Software Publishers, 800/233-0555, $689. Bulk-mail software has informative progress indicators, batch and individual processing, form rates, and flexible printing during import, but the interface is incomprehensible. Sep 94
★★★★ Acrobat Exchange, Acrobat Distiller, Adobe Systems, 415/961-4400, $195 to $2495. Complete, well-planned paperless office system creates application-independent viewable files that can be readily distributed on a network. Still, it's not yet as inexpensive as convenient as you might wish. Oct 93
★★★★ BaseMap 1.0.1, GeoPoint, 415/957-1560, $149. For simple maps displaying simple data, this mapping tool may be useful. It's not for the cartographic sophisticate, however, as it offers very limited data-display abilities and only one projection. May 94
★★★★ Bulk Mailer CASS 1.00d, Satori Software, 206/443-0765, $150. Unattended operation is possible with this inexpensive bulk-mail software, but batch processing is slow and the program has coding problems. Sep 94
★★★★ ClarisImpact 1.0, Claris Corp., 408/727-8227, $395. Business graphing, project manage-
BUYERS' TOOLS

Star Ratings

edjing is complex and you must manually enter phone numbers each time you use it. Apr 94

★★★ Delrina FaxPro for Macintosh 1.0, Delrina Corp., 408/363-2345, $129. Fast, efficient fax software has an excellent address-book feature but also has some interface quirks and minor bugs. Feb 94

★★★ DOS Mounter Plus 4.0, Dayna Communications, 801/269-7200, $100. File-transfer and translation utility works with floppy, removable drives, and network volumes and supports wild cards in DOS extensions. Apr 94

★★★ EtherPeek 2.0.3, LocalPeek 2.0.3, TokenRing 1.0 (2.0.3), AG Group, $109/977-7000, $945 to $995. Faced at a fraction of the cost of dedicated hardware analyzers, these network analyzer tools give you better analysis with a friendlier interface. They're a worthwhile investment. Jan 94

★★★ Mailixx Plus/Translators Pre 7.5, DataViz, 203/268-0030, $149. If your PC files are in arciformat files, you'll need this file-transfer and translation utility. It's a great option for most users, but it doesn't support removable drives or network volumes. Apr 94

★★★ On The Road 1.1, Connectix, 415/571-5100, $99. Helpful PowerPoint tool looks at what's hooked up to your computer and adjusts accordingly—for example, printing when a printer is available and otherwise deferring printing. It only supports hardware, however, so check before buying. Oct 93

★★★ Powershare Collaboration Servers, Apple Computer, 408/996-1010, $999. Before this collaboration software was ready for prime time, Apple needed to overhaul the complex Admin application, add serious diagnostic aids, provide comprehensive documentation, and offer knowledgeable technical support at a price less than that of the program itself. Aug 94

★★★ Silver Cloud 1.2, AG Group, 510/977-7000, $945. If you are administering a large network and are drowning in a sea of devices and zones, this network management software will make your life simpler. Feb 94

★★★ Sitcomm 1.0, Aladdín Systems, 408/761-6200, $120. Inexpensive telecommunications software is fairly easy to set up and use, and will do well for people who use just one or two online services. Still, it lacks true scripting and has limited protocol options. Apr 94

★★ Snap Mail 1.01, Casady & Greene, 408/484-9228, $200 to $1440. Software will put you on the electronic-mail that more easily and more cheaply than any competing product. If you can live with some minor (but surprising) shortcomings. Jun 94

★★ SoftPC 3.1, Insignia Solutions, 415/694-7600, $499. While the speed of this Windows PC emulator is greatly improved, buying an add-in PC card for your Mac is more efficient. Mar 94

★★ SoftWindows 1.0, Insignia Solutions, 415/694-7600, $499. You can run Windows software on a Mac with this emulation software, but although it's a viable solution, you pay the price in terms of performance, compatibility, and actual cost. Aug 94

★★ Timbuktu II Pro, Farallon Computing, 510/814-5000, $199 to $999. Terminal emulation product is a must-have for in-house technical-support staff and for people who need direct connection to computer systems on a variety of networks. The major enhancements of this version are TCP/IP support for Macs and noticeably faster screen redraw. May 94

★★ TrafficWatch II 2.0, Neo Software, 510/283-9771, $495. The price of this AppleTalk traffic monitor is closer to that of full-blown network analyzers that do much more, albeit with greater complexity. Without printing, alarms, triggers, or true multiprotocol support, this product misses the mark. Jun 94

★★★ VersaTerm 5.0, Synergy Software, 215/778-0522, $195. The price and feature set of this network terminal-emulation package make it a terrific value. In spite of its complex documentation and limitations, if you're looking for a fast path to Internet connectivity, this is it. Jan 94

DESKTOP PUBLISHING

★★ AboutFace 1.1.1 (1.1.2), Big Rock Software, 716/288-2860, $69.95. Type-specimen generator has many serious deficiencies that need to be addressed. Jan 94

★★★ Aldus PageMaker 5.0, Aldus Corp., 206/622-3500, $895. Desktop-publishing software has added the features, both great and small, that it's been lacking, while still retaining the ease-of-use advantages that it's always had. This is a superb upgrade. Nov 93

★★ FontChameleon 1.0.1, Ares Software Corp., 415/578-9000, $295. Font utility introduces a new font-creation technology: it builds serif and sans serif fonts from a master outline file. It offers high-quality renditions of popular fonts, plus the ability to customize fonts. Sep 94

★★ FontMonger 1.5.7, Ares Software Corp., 415/578-9000, $149.95. Font-conversion utility provides cross-platform, cross-font conversion and makes it easy to create composite, subscript, superscript, and rotated characters. Sep 93

★★ Foto Tune 1.1, Agfa Division of Miles, 508/658-5600, $795. Color-management software has a capable engine, but it's not the complete color-management system Agfa touts. Invisible tech support and poor documentation were only part of the problem. Apr 94

★★ FrameMaker 4.0, Frame Technology Corp., 408/493-3311, $895. For such projects as long, structured documents—books, instruction manuals, and textbooks—this desktop-publishing program is one of the best tools available. It's fast, well maintained, and a real timesaver. Mar 94

★★ Kodak ColorSense 1.0, Eastman Kodak, 716/253-0740, $499. Color-management system gives average users access to a reasonable level of color consistency at a reasonable price. It does not make color separations. Oct 93

★★ Print Shop Deluxe, Broderbund Software, 415/382-4400, $50. Even the most ham-fisted can create professional-looking greeting cards, signs, banners, letterhead stationary and calendars with this desktop-publishing tool. While it's not a substitute for a high-end program, it is easy to use and inexpensive. Apr 94

★★ QuarkXPress 3.2, Quark, 303/894-8888, $895. This upgrade adds the ElColor X-Tension to ensure the maximum possible fidelity of color images and is a must-have for professional color publishers who use Quark. For others, the enhancements are welcome but minor enough that they provide little incentive to upgrade. Nov 93

★★ Tableworks Plus 1.05, Npath, 206/392-7745, $299. Publishing utility adds a full tabeditor to QuarkXPress and is a must-have for anyone doing even mildly complex tables. Jan 94

EDUCATION

★★★ Creative Writer 1.0, Microsoft Corp., 206/882-8080, $64.95. Graphical page-layout word-

processor hybrid offers some terrific type effects, 256 sounds, bright graphics, and wacky characters. While it doesn't teach kids to be better writers, it does encourage them to develop ideas and provides a fun vehicle to express those ideas creatively. Sep 94

★★ The Cruncher, Davidson & Associates, 310/793-0680, $59.95. If you want to teach a child spreadsheet basics, this combination educational spreadsheet and business application will do the job. It's creative and easy to use, but slow. Aug 94

★★★ Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/797-3530, $395. CD-ROM encyclopedia has excellent search capabilities, weighs much less than a shelf of books, and is lots of fun. Its timelines and some hierarchical on-line subtopics were well thought out. Problems Jul 94


★★ HyperStudio, Roger Wagner Publishing, 619/442-0522, $179.95. Hypermedia authoring tool supports color and many multimedia functions through easy-to-use dialog boxes, but the interface doesn't always follow Apple guidelines. Dec 93

★★ MacGrade 1.5.5, Caled Software, 800/795-0641, $85 to $245. Grade-book program has a straightforward, simple interface and clear documentation. Although there's room for improvement, it's easy to use and flexible. Feb 94

★★ The Rosetta Stone, Fairfield Language Technologies, 703/432-6166, $395. Foreign-language instruction on CD-ROM is a valuable educational tool and fun to use. The lessons are well paced, and the content is generally excellent and diverse. Jan 94

★★ Small Blue Planet 1.2.1, Now What Software, 415/885-1689, $79.95. Nicely integrated collection of useful Earth-from-space images on CD-ROM lacks many features of standard atlases and doesn't have a search function, but it is endlessly fascinating. Jul 94

ENTERTAINMENT

★★ BlackJack Trainer, ConelCo, 412/492-9210, $75. Learn the strategies you need to win at blackjack with this program. There are a number of trivial bugs, but they aren't in the way. Oct 93

★★ Crystal Crazy, Casady & Greene, 408/484-9228, $49.95. Ultra-glossy, superpolished version of the classic Crystal Quest is both challenging and fun without being overly difficult. Each level retains some old elements, and adds some new ones to keep you on your toes. Jun 94

★★ Daily Sports Quiz 1.0, DreamTime, 619/236-1341, $49.95. If you think you know a lot about sports and love to play trivia games, then this entertaining and informative game is for you. Oct 93

★★ Falcon MC 1.0, Spectrum HoloByte, 510/532-1164, $69.95. Whether you're an armchair jet jockey or an experienced fighter pilot, you're bound to be impressed by the 4-bit color, enhanced graphics, and sophistication of this latest incarnation of the original Macintosh combat flight simulator. Dec 93

★★ Firefall Arcade, Inline Software, 203/435-4999, $49.95. If you loved the classic video game Centipede, or are just looking for a fun shoot-'em-up, this arcade-style game will satisfy. Jun 94

★★ Hell Cab 1.0.1, Time Warner Interactive...
tive Group, 818/955-9999, $99.99. Take a diabolical New York cab with a penchant for time travel, toss in the Empire State Building, add a few brain teasers, and you've got this engaging game on CD-ROM. It's slow and the arcade sections are hard to control, but overall it succeeds. Jan 94

Indiana Jones and the Fate of Atlantis, LucasArts Games, 415/721-3394, $59.95. In this game, the whip-wielding archaeologist goes looking for Atlantis and finds it armed to the gills with magical technology and Nazi stooges. If you're not bothered by the story's astonishing sexism, you'll find it diverting. Oct 93

The Journeyman Project 1.0 (1.2), Presto Studios, 619/689-4895, $79.95. Interactive science-fiction epic on CD-ROM is a work of art. The scenes are rich with painstakingly detailed graphics, elaborate models, and subtle textures, but the sluggish pace may leave you impatient and bored. Sep 93

Myst 1.0, Broderbund Software, 415/382-4400, $59.95. The smooth pacing of actions and sounds in this beautiful CD-ROM game give it a dreamlike quality. This is a game that's been polished until it shines. Oct 93

Seven Days in August, Time Warner Interactive Group, 818/955-9999, $99.99. Compelling, interactive documentary on CD-ROM cuts a slice from history and offers August 10 through August 16, 1961 (the building of the Berlin Wall), to viewers in a way that truly evokes the period. Oct 93

SimCity 2000, Maxis Software, 602/295-9700, $69.95. In essence, your goal with this marvelous city-simulation software is to build a city and run it successfully. The game is fascinatingly complex, but it's simple to use, and the elaborate graphics are so lovely that it's even fun just to watch. Jun 94

Spectre Supreme, Velocity Development, 415/274-8840, $69.95 to $89.95. The pleasure of this game comes not in high scores, but in the almost addictive sense of control you get from mowing your tank around the screen. It's so much fun that it's even fun when you lose. Dec 93

Spin Doctor, Callisto Corp., 508/655-0707, $59.95. In the tradition of the best Macintosh games, this game tests your wits and reflexes alike. It's part strategy game, part kinetic sculpture. Jun 94

V for Victory: Utah Beach, Three-Sixty Pacific, 408/879-9144, ext. 23, $69.95. The post-D-Day conquest of Normandy is re-created in this game; its strength is the way it blends easy play with complicated strategy. Some bugs exist. Oct 93

Andrew Tobias' TaxCut 1993, MECA Software, 203/255-1441, $79.95. The free-form approach and flexible Help menus of this tax-preparation software make filling out your tax return a smooth, almost relaxing process. The only state versions available are California and New York. Apr 94

ExpensePlus 1.0.1, State of the Art, 714/753-1222, $139.95 to $159.95. Software uses a Newton MessagePad to record expenses, then sends the data to a Mac to create and print expense reports. While it's a real time-saver, you'll need AppleScript expertise to modify the expense reports. Apr 94

Financial Competence 1.5, Competence Software, 608/435-5098, $59. Business economics tutorial explains how financial statements are compiled and how they relate to each other, but you could learn the same things from a book, faster and for less money. And that might be the more financially competent thing to do. Jul 94

MacinTax 1993, ChipSoft, 602/295-3110, $69.95. Tax-preparation software provides a detailed and manual, a reliable, structured interface for building your tax return. Its inability to accept figures containing amounts in cents or round off to whole dollar amounts will frustrate some users. Apr 94

MacinTax Tax Planner, ChipSoft, 602/295-3110, $19.95. Software allows you to construct a five-year forecast of your tax liability, projecting tax figures through 1997 in a concise summary format. If you have a tax preparation program, you can do the same thing by creating alternative tax returns. Apr 94

MacinTax Tax Savings Guide, ChipSoft, 602/295-3110, $19.95. Simple, straightforward collection of well-written, fully indexed tax tips and suggestions is designed to help you better understand your tax return and reduce your tax liability. Although strong in content, it doesn't allow you to copy and paste, export as a text file, or even print. Apr 94

MacMoney 4.01, Survivor Software, 310/410-9527, $69.95. Personal-finance software has new and improved features that will please longtime users, but it hasn't kept up with the leaders in the field and won't win many new converts. Jul 94

Managing Your Money 6.0, Meca Software, 800/820-7457, $79.95. Personal-finance program does a good job if somewhat roundabout job of keeping track of your total financial picture. Although it isn't as easy to use as the competition, it excels in tax, investment, and financial planning. Jun 94

Quicken 4, Intuit, 415/858-6095, $69.95. Personal-finance software is powerful and easy to learn, even for a financial neophyte. Although slower than previous versions, 4.0 lives up to its promise of making financial chores easier and better organized. Nov 93

Adobe Illustrator 5.5, Adobe Systems, 415/253-3100, $139. Phenomenal power of this 24-bit paint program might warrant its price. Otherwise, you could learn the same things as any competing program, but our reviewer would prefer an interface that you can navigate without scrambling for the manual. Jan 94

Adobe Photoshop 2.0, Aca Software, 310/392-8451, $195. This draw program is not going to inspire experienced Mac artists to jump up and down, but its features are abundant, the interface is straightforward, and the price is reasonable. Oct 93

Aldus FreeHand 4.0, Aldus Corp., 206/622-5500, $595. The new page-design and text-editing functions of this powerful draw program make it more than worth the price of admission. Aside from some bewildering interface elements, it's an outstanding program. Mar 94

BrushStrokes 1.0, Claris Clear Choice, 408/727-8227, $139. If you have absolutely no experience with computer graphics, the simplified interface of this 24-bit paint program might warrant its price. Otherwise, you can find better programs for less. Oct 93

CA-Cricket Draw III 2.0 (2.01), Computer Associates International, 516/342-5224, $249. This draw program is not going to inspire experienced Mac artists to jump up and down, but its features are abundant, the interface is straightforward, and the price is right. Oct 93

Canvas 3.5, Deneba Software, 305/596-5644, $399. Draw program offers two to three times as many features as any competing program, but our reviewer would prefer an interface that you can navigate without scrambling for the manual. Jan 94

Collage 1.0.1, Spectral International, 413/253-3100, $249. Image-compositing software is a flawed but serviceable tool that allows you to combine and composite multiple RGB images stored in PICT, TIFF, and Photoshop 2.5 formats. While it's functional and indisputably easy to use, its overlappings, including slow screen redraw with no interrupt option, are nearly as numerous as its benefits. Jul 94

ColorUp 1.0, Pantone, 201/935-5500, $99.95. Professional graphic designers don't need the advice of this color tutorial and series of palettes. Although nonprofessionals might benefit from the information on color theory, it may not be worth the money. Nov 93

DeBabelizer 1.5 (1.5.5), Equilibrium Technologies, 415/332-4434, $299. Bitmapted-graphics-conversion software supports a huge number of file formats and can work wonders. If you spend any significant time dealing with file conversion, you should have this program. Nov 93

DeBabelizer Lite 1.0, Equilibrium Technologies, 415/332-4434, $129. Terrific graphics utility converts graphics files from one format to another. It offers a choice selection of capabilities at a nice, slim price. Aug 94

DesignWorkshop 1.0 (1.1), Artifice, 503/345-7421, $89.50. The accessible interface and versatile modeling environment of this 3-D modeling software may be worth the highly price, particularly for architectural-design conceptualization. May 94

Infini-D 2.5.1, Spectral International, 413/253-3100, $595. Serviceable 3-D graphics program has a wide range of modeling, rendering, and animation options, with a straightforward interface and quick operating speed. Feb 94

IntelliDraw 2.0, Aldus Consumer Division, 619/558-6000, $129. Wonderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. Despite its breadth of features, it always feels approachable. Sep 93

Kai's PowerTools 2.0A, HSC Software, 310/392-8441, $195. Powerful, flexible suite of Photoshop plug-ins has an addictive quality typically associated with arcade games. There's no end to the automated effects you can generate, the ways you can apply them, and the artwork you can create. May 94

Koyen Fractal Studio 2.0, Koyen Software, 314/878-9125, $149.95. Software lets you generate beautiful fractals of your own design. It's a reasonable choice if you are interested in Sierpinski triangles or natural forms, but it's not an all-fractals-for-all-people program. Aug 94

MacroModel, Macromedia, 415/252-2000, $1495. This 3-D modeling software is a solid resource to have along when you venture out into 3-D space. The interface is elegantly simple, making the Mac's inner space a more pleasant place to work. May 94

MetaFlo!, The VALIS Group, 415/435-5404, $595. Graphics utility yields interesting visual effects with a minimum of fuss. It imparts elasticity to 2-D images, letting you push and pull collections of pixels while retaining the visual integrity of the image. Aug 94

Paint Alchemy 1.0, Xaos Tools, 415/487-7000, $99. For the price, these plug-in graphics effects are a tremendous value that both casual users and professional artists can use to design a little chaos into their work. May 94

Pointillist, Pictor GraFX, 310/865-0495, $39.95. Stereoglyph software converts images that look, at first glance, like random dots, but as you zoom beyond the page, a 3-D image emerges from the pattern and appears continuous.
to hover inches in front of the background. It's gleefully wacky. Jul 94

Showplace 2.0, Pixar, 510/236-4000, $495 to 695. Adequate, entry-level, 3-D modeler is suitable for illustration and other graphic arts applications. This version offers improved access to MacRenderMan, one of the best renderers around, plus plug-in modeling tools. Apr 94

StrataVision 3d 2.6.3, Strata, 801/628-5218, $995. 3-D program includes animation, and is a superior rendering tool and versatile modeler. It's a challenge to learn, however, as the interface is overly dense and sometimes sluggish. Feb 94

StudioPro 1.0, Strata, 801/628-5218, $1495. If you need a well-balanced, all-in-one 3-D modeling, rendering, and animation solution, this application is an excellent choice. Mar 94

Transverter Pro 1.0 (1.1), TechPool, 216/291-1922, $395. Remarkable graphics-conversion software can be used for a wide range of biological, chemical, and physical-scientific investigations. New features include floating tool palettes, an annotation tool for data tables, and an experimental-design module. Sep 94

LabView for Mac 3.0.1, National Instruments, 512/338-9119, $959. For large-scale, demanding projects in data acquisition and analysis, this scientific software is an unchallenged standard, in a class by itself. Jul 94

Mathematica 2.2, Wolfram Research, 217/398-0700, $595. The one essential program in science and mathematics adds a function browser that makes the program as easy to use as it should be, as well as improvements to computational routines. Sep 93

QC Tools 1.0, Abacus Concepts, 510/540-1949, $245. Quality-control tool kit for StatView appears to introduce a slight slowdown in program response, but is generally well designed, well documented, and suitable for quality-control neophytes as well as professionals. Jan 94

Resampling Stats 1.0, Resampling Stats, Inc., 703/522-2713, $225. Innovative statistics software has proved itself to be a superior teaching tool in numerous classroom tests. If you have any interest in statistics, you should give this admirably straightforward approach careful consideration. Jun 94

SerePlot 2.12, Scientific Visions, 301/593-0317, $135. If you have piles of data and don't need animated, exploding bar-charts in 24-bit color, this scriptable plotting software should be part of your analysis tool kit. Jun 94

Spyglass Transform 3.0 (3.01), Spyglass, 217/355-6000, $595. Scientific-visualization software can access data stored in every common format, offers some useful presentation-graphics features, and includes a programming language with a large range of built-in, high-level scientific functions. Sep 93

StatView 4.01 (4.02), Abacus Concepts, 510/540-1949, $959. If your work uses statistics for decision support rather than abstract analyses, and you regularly have to present your results to non-statisticians, this is the statistics package for you. Oct 93

Sum Total 1.01, Concurrent Engineering Tools, 602/464-8208, $995.95. Exceptional calculator utility is packed with advanced features, including a mode that lets you sample colors and use the numerical color values in calculations. The convenient palette approach causes a distinct time-lag in menu operations. Oct 93

Turing's World 3.0, CSLI Publications, 312/658-1509, $19.95. Computer-science educational software lets you investigate some fundamentals in computing at an almost unbelievable bargain price. Feb 94

Visualization of Natural Phenomena, Telos/Springer Verlag, 408/249-9314, $59.95. CD-ROM introduction to applying all aspects of computer graphics to scientific imaging covers all disciplines and offers definitive analysis of methods. No other source covers this much material, at this level of clinity. Jan 94

** Star Ratings **

** BUYERS' TOOLS **

BUYERS' TOOLS

** ORGANIZATION/PRODUCTIVITY **

Arrange 1.1, Common Knowledge, 415/325-9900, $849. This personal information database's flexible, intuitive approach to data-handling makes it an excellent tool for storing all kinds of day-to-day information. May 94

CalendarMaker 4.0, CE Software, 515/224-1995, $59.95. Polished, intuitive calendar-making program is straightforward, with a variety of options for customizing your calendar. Some features can be cumbersome. Oct 93

DateBook & TouchBase Pro Bundle 4.0, Aldus Consumer Division, 619/559-6000, $89.99. Personal information manager package is now easier to use and offers many new features. The excellent linking between contacts and calendar is the most significant feature. Sep 94

DateView 1.0.1, Advanced Software, 408/733-0745, $59.95. If you're willing to sacrifice some features to get simplicity and speed, this calendar/to-do manager makes sense. It integrates with the contact manager in Touch. Aug 94

Dynavex for Macintosh 3.5, Portfolio Software, 802/434-6400, $59.65. Although this program doesn't currently link to a calendar program, it is an excellent contact manager. This upgrade has a few new features, improved performance, and an easier-to-use interface. Sep 94

Full Contact 2.01, PIT Software, 408/562-5990, $169. Personal information manager can handle, with speed and style, tasks that would choke other products, but frequently, using it feels like a full-time job. Aug 94

Now Contact 1.0 (1.0.1), Now Software, 503/274-2899, $99. This contact manager has some innovative features and could easily become the top address-book program for the Mac by adding some features, such as file reconstruction. Mar 94

Power Team 1.0, ProVue Development Corp., 714/892-8199, $149.95. Personal information manager consists of seven modules: Phone Book, Calendar, Correspondence, Checkbook, Calculator, Expense Report, and Mailing List. It has some bugs, but the data entry features are excellent. Oct 93

Rae Assist 1.0.2, Rae Technology, 408/725-2850, $199. Although this personal information manager offers some fresh ideas, including automatic linking of company and contact information, it's too big and too slow. Jan 94

TimeSquare 1.0, Team Building Technologies, 514/278-3010, $149. Fast, flexible, network calendar program has lots of handy features, but it's missing a few as well, such as multiday events and label grouping. Aug 94

** PRESENTATION TOOLS **

Adobe Premiere 3.0, Adobe Systems, 415/961-4400, $595. Solid and dependable QuickTime video-editing software offers a structured, responsive, and flexible interface with enhancements that range from the mundane to the dramatic. It can now mix 99 tracks. Jan 94

Astound 1.0, Gold Disk, 408/982-0200, $399. Presentation software lets you include sound, text, and graphics animation with no more effort than pasting in a chart in other products. It's a good value. Nov 93

Authorware Professional 2.0.1, MacroMedia, 415/252-2000, $495.95. Multimedia-
scoping and presentation software lets you develop complex presentations with amazing speed. Although expensive, it's wonderfully done and will pay for itself in time saved.

Feb 94

Avid VideoShop 2.0, Avid Technology, 508/640-6789, $499. QuickTime video editing program shines in its intuitive, easy-to-use interface, although it may fall short on features for hard-core video professionals.

Feb 94

CoSA After Effects 1.1, CoSA, 401/831-2672, $1295. QuickTime movie editor blurs the boundaries between animation and traditional video-editing. It produces results that simply can't be created in other packages.

Oct 93

Deck II 2.1, OSC, 415/252-0460, $399. AV Maps turn into digital-audio workstations with this software that enables you to record, mix, modify, and play back CD-quality sound. It doesn't include equalization features.

Jun 94

Elastic Reality 1.0, ASDG, 608/273-6585, $349. Exciting morphing tool can prepare professional-caliber results—if you can figure out how to use it. The needlessly convoluted interface, poor documentation, and inadequate tech support make that a difficult task.

Feb 94

FlipBook 1.0, S. H. Pierce, 617/338-2222, $89. Animation printing utility lets users make flip-books (consisting of a series of primed images that, when viewed in rapid succession, give the illusion of movement). Apr 94

Persuasion 3.0, Aldus Corp., 206/435-3552, $599.50. Mapping software tells you how to get where you're going on any other map, atlas, or software our reviewer has seen. Although screen redraw is slow, it's worth it for the written directions and maps the program has to offer.

Jul 94

CD AllCache 2.0, CharisMac Engineering, 916/885-4420, $79.95. CD-ROM accelerator improves access time by caching a CD's directory and putting its most frequently used data into RAM. Despite this software's limitations, most CD addicts will find the speed improvement worth the trouble.

Sep 94

CD-ROM ToolKit 1.0.5, FNB, 415/474-8055, $79. Software accelerator can halve the time it takes to open files and search on a CD-ROM. The product supports a wide variety of formats and CD-ROM drivers, but users should be aware that playback of QuickTime movies is often uneven.

May 94

Connectix Desktop Utilities 1.0 (1.0.4), Connectix Corp., 415/571-5100, $99. Although some of the 16 utilities offered in this package are more at home on a PowerBook, this collection offers one-stop shopping at a low price. It's worth it for the file-synchronization, keyboard Power, and Hot Keys features alone.

Nov 93

CopyDoubler 2.0 (2.0.1), Symantec/Fifth Generation Systems, 504/291-7221, $59. This utility speeds up copying, lets you queue jobs for background copying, and offers a variety of other useful, copying-oriented features—all at a very reasonable price.

Nov 93

Copyright Pro 1.0.3, CSG Technologies, 412/471-7170, $79. Utility takes over the Finder's copying function, copies in the background, and allows you to regularly schedule copying. It doesn't speed up copying, however.

Nov 93

CPU 2.0 (2.0.1), Connectix Corp., 415/571-5100, $99. Reasonably priced collection of utilities for the PowerBook adds new features, including file synchronization, that easily justify the upgrade price.

Sep 93


Feb 94

DiskDoubler 4.0, Symantec Corp., 503/334-6054, $79.95. In pure efficiency terms, this file-compression software is a winner, but it lacks many features of previous versions, including passwords on self-extracting files and automatic recompilation.

Aug 94

DiskLock P8 1.0, Symantec/Fifth Generation Systems, 504/291-7221, $59. PowerBook security software balances robust security with simplicity and ease of use. It's much harder to crack than most PowerBook utility collections' security features, and will keep out all but the most determined.

Jan 94

DiskTop 4.5, PrairieSoft, 515/225-3720, $99.95. Organizing a crammed hard drive is a more manageable task with this simple but powerful file-management utility that lets you copy, move, rename, delete, and find files—without using the Finder.

Jul 94

The Disney Collection Screen Saver, Berkeley Systems, 510/540-5535, $49.95. continues

MACWORLD October 1994 191

PROGRAMMING

Climate 1.0, Orchard Software, 617/786-4608, $59.95. With a little more documentation and a few more sample programs, this utility that provides a subset of Unix-like commands for the Mac environment could have an impressive array of features.

Oct 93

Macintosh Common Lisp 2.0 (2.0.1), APDA, 716/871-6555, $495. Anyone who likes programming in LISP will be pleased with the environment provided by this version of the standard dialect and its extensive debugging and interface-building facilities.

Oct 93

Object Master for Think C and C++, ACI US, 408/874-0000, $799. Object-oriented development environment is full of goodies and will pay for itself in about a week due to increased programmer productivity.

Apr 94

Power Packs 2.0, NDG Phoenix, 301/718-8880, $225. Programmers' tool kit for 4th Dimension provides 280 external procedures to improve custom applications and exploit System 7 features. Apr 94

SoftPolish 1.1, Language Systems Corp., 703/478-0181, $295. Program-quality-assurance utility systematically checks the resources in a program's interface against a huge laundry list of errors. It's a programming tool for anyone who hopes to produce a commercial Mac application.

Sep 93

SourceSafe 2.1, One Tree Software, 918/230-2920, $295 to $1195. Solid, relatively easy-to-use product handles development administrative tasks, including version control, for multiprogramming applications being created by groups.

Sep 93

Symantec C++ for Macintosh 6.0, Symantec Corp., 408/253-9600, $499. If you like Think C, you'll like this software-development system, too. For the Mac, it's an excellent opportunity to catch a new wave in programming.

Nov 93

VIP BASIC 1.0.1, Mainstay, 805/484-9040, $295. Popular programming language lets programmers who know only BASIC get started producing real, interpretable, Mac programs. It's a serious developer's tool, though it's not on the same footing as VIP-C.

Jun 94

VIP-C 1.0.1, Mainstay, 805/484-9040, $495. If you've mastered the rudiments of C, this programming-language generator will let you code about ten times faster than you could using only an editor. Its real strength is in rapidly assembling smaller projects.

May 94

UTILITIES

AppleSearch 1.0, Apple Computer, 408/999-1010, $1799. Although it has some rough edges, this product for archiving and retrieving text is highly useful. It presents retrieved information clearly and extracts text from documents in many formats.

May 94

Atticus Vista 1.0, Atticus Software Corp., 203/348-6100, $69.95. Control panel and application automatically catalogs the disks you mount on the desktop. It has a few problems, including limited search options, but it can help bring order to disorganized disk collections.

May 94

Automap Road Atlas for Macintosh 2.0.1 (2.0.4), Automap, 206/455-3552, $59.95. Mapping software tells you how to get where you're going better than any other map, atlas, or software our reviewer has seen. Although screen redraw is slow, it's worth it for the written directions and maps the program has to offer.

Jul 94

CD-ROM ToolKit 1.0.5, FNB, 415/474-8055, $79. Software accelerator can halve the time it takes to open files and search on a CD-ROM. The product supports a wide variety of formats and CD-ROM drivers, but users should be aware that playback of QuickTime movies is often uneven.

May 94

Connectix Desktop Utilities 1.0 (1.0.4), Connectix Corp., 415/571-5100, $99. Although some of the 16 utilities offered in this package are more at home on a PowerBook, this collection offers one-stop shopping at a low price. It's worth it for the file-synchronization, keyboard Power, and Hot Keys features alone.

Nov 93

CPU 2.0 (2.0.1), Connectix Corp., 415/571-5100, $99. Reasonably priced collection of utilities for the PowerBook adds new features, including file synchronization, that easily justify the upgrade price.

Sep 93


Feb 94

DiskDoubler 4.0, Symantec Corp., 503/334-6054, $79.95. In pure efficiency terms, this file-compression software is a winner, but it lacks many features of previous versions, including passwords on self-extracting files and automatic recompilation.

Aug 94

DiskLock P8 1.0, Symantec/Fifth Generation Systems, 504/291-7221, $59. PowerBook security software balances robust security with simplicity and ease of use. It's much harder to crack than most PowerBook utility collections' security features, and will keep out all but the most determined.

Jan 94

DiskTop 4.5, PrairieSoft, 515/225-3720, $99.95. Organizing a crammed hard drive is a more manageable task with this simple but powerful file-management utility that lets you copy, move, rename, delete, and find files—without using the Finder.

Jul 94

The Disney Collection Screen Saver, Berkeley Systems, 510/540-5535, $49.95. continues
Star Ratings

Mickey, Goofy, Peter Pan, Ariel, and other Disney favorites cavort around your screen with this screen saver that includes 16 different modules. Mar 94

DriveShare 1.03, Casa Blanca Works, 415/461-2227, $129.95. This utility allows users to share a removable drive over a network. It's most useful if your network consists of both System 6 and System 7 users, as its advantages over System 7 file sharing are slight. New 93

DriveTech 1.0, MicroMat Computer Systems, 415/898-6227, $59.95. Without decent documentation or cleaner error messages, this floppy-drive cleaning and diagnostic program is essentially a $60 floppy-drive cleaning kit. Since you can buy a cleaning kit without software for $10, that makes it a bad deal. Jan 94

Duplicator 1.03, Midnight Software, 303/933-1013, $99. For new Macintosh users who don't have a general file utility, this software that locates duplicate files, as well as automates basic file commands such as moving and renaming files, may be useful. Jan 94

eDisk 1.0 (1.2), Alyssoft Corporation, 415/456-2263, $149.95. Driver-level compression software has little to recommend it over file-level, idle-time compression programs. The biggest drawback is the strong potential for disk or file corruption. Oct 93

Icon 7, Inline Software, 203/435-4995, $79.95. Simple, straightforward utility has a streamlined and intuitive library feature for storing and retrieving icons, plus tools for icon editing. Its icon collection, however, is quite paltry. Dec 93

Icon-It Pro 3.0.6, Olduvai Corp., 305/670-1112, $129. Utility allows you to attach custom tool bars to almost any application, including the Finder. The interface is quirky, but you get used to it. Dec 93

IconMania 1.0, Dubl-Click Software, 818/888-2068, $69.95. Delightful icon-editing utility comes with terrific tools for building new icons, including an outstanding thumbnail feature that builds custom icons from graphics files. Aug 93

IconTools 1.0, Baseline Publishing, 301/682-9676, $59.95. Gifty utility has tools for icon editing, has a nice library of icons, and can create animated icons. Some basic features, such as a text tool, are missing, and the animated icons are fun but impractical. Sep 93

MacPak 1.0, Symantec/Fifth Generation Systems, 504/291-7221, $149. The quality of this utility collection is uneven—some modules are unpolished—but if you don't already own Auto-Icon, Copy-Icon, and a good file-management program, it's worth the price. Jan 94

MacTools 3.0, Central Point Software, 503/690-8090, $149. Recovering hidden files is a snap with this utility package that fixes more disk problems than its competition. It includes disk-and-file maintenance, disk repair, virus protection, and backup. Mar 94 O

MagicTypist 2.0, Olduvai Corp., 305/670-1112, $129. If you want to speed up typing of repetitive phrases or if you don't have full use of your hands, this utility, which automates typing of repetitive phrases, may be useful, but some functions work erratically or not at all in Macintosh 7. Sep 93 O

Mr. File 2.0, Softways, 408/978-9167, $99. The well-designed background capabilities of this Finder utility make it a handy tool for copying, finding, moving, launching, and renaming files, although it has a few interface quirks. Dec 93

Now Compress 1.0 (1.0.1), Now Software, 503/274-8299, $69. Compression utility holds its own in a crowded market; it's easy to use, complete, and compresses as well as or better than other options. Dec 93
You're well acquainted with this megabyte-eating beast.
But perhaps you're not yet familiar with DynaMO, the magneto-optical solution that eliminates the horrors of data storage.

<table>
<thead>
<tr>
<th>DRIVE SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
</tr>
<tr>
<td>Data transfer rate</td>
</tr>
<tr>
<td>Average seek time</td>
</tr>
<tr>
<td>Rotational speed</td>
</tr>
</tbody>
</table>

Like Syquest, with DynaMO you save your files to removable cartridges. But unlike Syquest, you don't have to break the bank each time around. And the 128 and 230 MB industry standard 3.5-inch cartridges you use aren't nearly as vulnerable. In fact, Fujitsu cartridges come with a lifetime warranty.

There's nothing frightening about setting-up DynaMO either. You just plug the drive into your PC or Macintosh.

Get the data on DynaMO by calling 1-800-831-4094. Or request information by fax at 1-408-428-0456 (document 1368).
We'll show you how to enjoy some monstrous savings.

© 1994 Fujitsu. All rights reserved. DynaMO is a trademark of Fujitsu Computer Products of America, Inc. All brand names and product names are trademarks of their respective holders.
THE BEST
28,800 BPS
CONNECTION

SupraFAX Modem™ 288—starting at $329.95

It's time to separate theory from reality. Some 28,800 bps modems claim to be four-times faster by offering sensationally high throughput. But sensational throughput depends on sensational phone line conditions. Not a reality in today's telecommunications. In the real world of less-than-perfect phone lines, the SupraFAX Modem 288 outperforms all the competition. But don't take our word for it — just look at the reviews. It has also won award after award for outstanding value. For a surprisingly low price you get Supra's top-of-the-line feature set including: Silent Answer™ for voice and fax line sharing, Flash ROM for easy field upgrades, Supra's five-year limited warranty and an economical upgrade to V.34. And now the SupraFAX Modem 288 is available as a compact external for your desktop Mac, and as an internal for your PowerBook™ (series 100). It's time to separate theory from reality — the SupraFAX Modem 288 offers the best 28,800 bps connection available. And that's a fact. Call Supra at 800-967-6772 today.

"Its ability to plug-away through poor line conditions puts it in a whole new league." Computer Shopper, July 1994

1st Place — PC Computing, "Great bundle with bargain price—our winner was a favorite with testers." June 1994.

★★★★★ — MACWORLD, "Supra is paving the way for life in the fast lane." August 1994.

Circle 132 on reader service card
Star Ratings

Hardware

** INPUT DEVICES **

- ** Computer Crayon, Appoint, 510/463-3003, $49. **
  The kid contingent's verdict was a definite thumbs-up on this brightly colored input device that's shaped like a thick pencil. The buttons can be hand for smaller children to press, and serious computer artists should still opt for a drawing tablet. Oct 93

- ** Drawing Slate, CalComp Digitizer Division, 714/821-2000, $395. **
  Digitizing tablet is a good, compact, low-cost implementation of pressure sensitivity, although the battery-operated stylus is a bit heavy. Jun 94

- ** Gulliver, Appoint, 510/463-3003, $119. **
  This diminutive mouse is hard to hold comfortably for an extended period, but it works well on almost any surface and is an acceptable option for PowerBook users. Oct 93

- ** PENDigital ADB, FG Data Systems, 714/995-3000, $498. **
  Input device lets you manipulate items on the Macintosh screen using a stylus called a light pen, it works well, although it seems ergonomically inferior to a mouse for routine tasks. Mar 94

- ** TrakMate, Key Tronic Corp., 509/928-8000, $149. **
  Input device integrates a trackball into a wrist pad; while the design is interesting, it's not for everyone. Feb 94

- ** Wacom UD-1212R, Wacom Technology Corp., 206/750-8882, $749. **
  Graphics tablet with pressure-sensitive stylus is easy to use and highly customizable, though it's incompatible with AppleTalk and AppleTalk Remote. May 94

** MISCELLANEOUS HARDWARE **

- ** ACS100, Altex Lansing Consumer Products, 717/296-2818, $180. **
  Lightweight powered speakers don't sound as good as they should. There's too much emphasis on the high end at the expense of the midrange, and they his noticeably. Dec 93

- ** Apple Newton MessagePad, Apple Computer, 408/996-1010, $719. **
  Small and capable powered speaker looks and sounds good and can produce uncomfortably high volumes without noticeable distortion, but the bare-wire-terminal connections aren't user-friendly. Nov 93

- ** Apple Newton MessagePad, Apple Computer, 408/996-1010, $400. **
  This extremely versatile and beautifully designed portable CD-ROM drive offers impressive audio and Photo CD features, but if you're a serious CD-ROM user, it's too slow to satisfy. Jan 94

- ** Ear Phone Streamline AV, Jabra Corp., 619/622-0764, $169. **
  As a hands-free telephony tool, and as a replacement for the Apple PlainTalk microphone—this telephone/speech-recognition earpiece is a winner. Its biggest drawback is that you can't hear other Mac sounds, such as modem tones, when it's plugged in. Jul 94

- ** EMBARC, Embarrass Communications Services, 407/364-2000, $395 plus fees. **
  If you're a Powerbook user who is frequently in places with no telephone and you need timely delivery of electronic news and E-mail, this portable wireless service may prove useful, but the cost may be prohibitive to others. Sep 93

- ** G-Vox, Lyons, 215/922-0880, $399. **
  Hardware-software-guitar-instruction package lets you play your guitar. Although the hardware works well, the software has some basic problems and doesn't live up to the hardware. Apr 94

- ** Hello Music, Yamaha Corp. of America, 714/522-9240, $449. **
  MIDI starter kit includes an impressive tone generator that's compatible with General MIDI Level 1 and Roland MT-32, but the included software is functional at best. Dec 93

- ** Macintosh TV, Apple Computer, 408/996-1010, $2079. **
  As a computer, this combination computer-television-CD-player is sleek but slow. You can get faster performance and better expandability from several less-expensive Performa models. Apr 94

* = feature that adds value in a cost-effective way. ** = reviewers' picks. --- = for future evaluation.
Star Ratings

- PowerLink Presenter, E-Machines, 503/646-6699, $499. Simple, compact Duo dock wobbles a bit when plugged in but provides fine support for a variety of displays, plus ports for ADB, floppy drive, and sound output. Nov 93

- PowerPlate, Technogén, 513/321-1777, $695.00 to $699.00. Line of long-lived, external PowerBook battery packs, each of which lets you work for three to five times as long as the usual PowerBook battery. Unfortunately, the System 7 power manager periodically alerts you that your battery is not charging and dims the screen though battery pack has hour of time left. Mar 94

- RCD-202, Pinnacle Micro, 714/727-3300, $2995. Writable CD-ROM drive is good for archiving data simply and inexpensively, but it's incompatible with many hard drives. Mar 94

- SC5 Sentry, APS Technologies, 816/483-6100, $99. Although the price of this terminator may seem steep, this device may well be the cure for SCSI woes. Our reviewer heartily recommends it. Sep 94


- VMS ColorSmart, Advanced Software, 408/730-0745, $79.95. Automatic telephone dialer is a well-executed product, except for occasional computer noise that seeps into phone conversations. If you constantly dial phone numbers that are stored in your computer, this product will save you time and energy. Jul 94

- Yamaha YST-M10 Powered Monitor Speakers, Yamaha, 714/522-9240, $149.95. Powered speakers have a good balanced sound and a great volume range at an outstanding price. Apr 94

MODEMS/NETWORK HARDWARE

- AsanteHub 1012, Asante Technologies, 408/435-8388, $1299. This 12-port, 10BaseT Ethernet hub works right out of the box and is a premium device at a bargain price. Dec 93

- Cypress PhonePro 1.2, Cypress Research Corp., 408/752-2700, $349 to $595. Improving its integration with FaxPro and with PowerTalk and PowerShare, this powerful telephone hardware has greatly extended its business scope. May 94

- DataLink PB: ArchCellular Interface, Applied Engineering, 214/241-6082, $284. If you need a full-blown office on the beach, this PowerBook cellular-modem package with automatic answering machine is a well-executed solution. Each recorded second requires 25K of disk space. Nov 93

- EtherWave, Farallon Computing, 510/814-5000, $129. If you need to expand your network at a reasonable price with minimal fuss, get this EtherWave transmitter. Instead of providing only one 10BaseT twisted-pair jack, it includes a second jack that allows you to daisy-chain to another device through an additional 10BaseT line. May 94

- OneWorld Fax, Global Village Communication, 415/390-8200, $999. Easy-to-use network fax product lets an office share faxes—sending resources without dedicating a hard drive and CPU; however, it can't receive faxes and can't queue more than one fax document at a time from a single CPU. Aug 94

- PerfFit Port-A-Com, PerfFit, 303/530-7333, $349. Compact, ADB-powered, high-speed fax/data modem is difficult to configure, due to its Spartan and poorly organized documentation, but is still a solid product at a reasonable price. Nov 93

- SupraFaxModem 144FB, Supra Corp., 503/967-2400, $349.95. If you're looking for a high-speed internal modem for your PowerBook, and you want to save a few bucks, this modem is worth considering. Disabling its fax software solved occasional transfer problems. Nov 93

- SupraFaxModem 288, Supra Corp., 503/967-2410, $349.95. This 28,800-bps fax modem is a very good performer, as good as or better than 14,400-bps modems, and the price of admission isn't terribly steep. Combined with fast, stable fax software and a good terminal program, it's hard to beat. Aug 94

- Watermark Message Central 2.0.2, High Tide Software, 510/704-9927, $499. If you're willing to put in a lot of effort, you'll find this highly sophisticated voice-mail system supremely flexible. It includes a specially modified modem with voice chip, as well as fax software and telecommunications software. Jul 94

PRINTERS

- Address Express, CoStar Corp., 203/661-9700, $499. Flaky performance and system crashes plagued this envelope-and-label printer in our tests, but the print quality was good. Oct 94

- Apple Portable StyleWriter, Apple Computer, 408/996-1010, $439. Sleek, portable ink-jet printer weighs 4 1/2 pounds and is a pleasure to use. It uses standard LaserWriter cartridges. Jan 94

- Brother HJ-400, Brother International, 908/356-8880, $369. Compact, 300-dpi ink-jet printer is fairly slow and does not allow background printing. Some large files require additional application memory to print correctly. May 94

- Color StyleWriter Pro, Apple Computer, 408/996-1010, $629. Color printer represents one of the best values in the inexpensive color-printing market. It's fast, produces nice-looking output, and has some good features, including a great way of handling color ink cartridges. Sep 94

- DeskWriter 310, Hewlett-Packard, 800/752-0900, $379 to $455. Versatile, low-cost ink-jet printer is a 4.3-pound, battery-powered portable. With its 60-page sheet feeder, it's also a great desktop printer; and with a $49 color print cartridge, it offers impressive three-color printing. Mar 94

- HP Laserjet 4ML, Hewlett-Packard, 800/752-0900, $1279. Primarily for those of you who use a PC or work in a small, mixed-platform environment, this energy-efficient laser printer offers automatic port and language switching, and is a good buy. Its advanced PC features may not be worthwhile for those who use Macs only. May 94

- LaserWriter Select 360, Apple Computer, 408/996-1010, $1599. Low-cost, high-performance, 10-ppm printer is perfect for small LocalTalk or mixed networks. For bigger networks, consider buying more than one: they're more cost-effective than a 20-ppm printer. Apr 94

- microLaser Pro 600, Texas Instruments, 800/848-3927, $2148. Overall, this工作组 printer is fast and provides good print quality. The price is steeper than that of other products, but if you work in a busy office where a really fast printer makes everybody's life easier, the higher price may be worth it. Jul 94

- MobileWriterPS, Mannesmann Tally Corp., 206/251-5524, $999. Fast, portable printer is currently the only PostScript portable available. While the print quality is quite good on glossy laser paper, it's mediocre on inexpensive bond. Dec 93

- Notebook Printer II, Citizen America, 310/453-0614, $399. If weight and size are your biggest concerns in choosing a portable printer, and you print primarily in black and white, this thermal-fusion printer may be a good choice. If speed is an all or nothing issue, however, other options may be preferable. Jun 94

- Personal LaserWriter 320, Apple Computer, 408/996-1010, $995. If you're being held out for a high-quality personal laser printer that's fast enough to share over LocalTalk, the small inconveniences of this 300-dpi printer are easily outweighed by its low price, good speed, and PostScript Level 2 support. May 94

- PowerPoint 2.5, GDT Softworks, 604/291-9121, $149. Ingenious hardware/software combo lets you print from your Mac to almost any PC printer. It supports over 1000 printers, ranging from aging dot matrix models to the newer color ink-jet and laser printers. Sep 94

- P-Touch PC, Brother International Corp., 908/356-8880, ext. 4307, $459.95. Versatile label printer is easy to set up and use, and produces high-quality output. The cost per label is high, though, and the documentation is weak. Sep 94

- QMS Color Laser, Quantum, 205/633-4300, $7999. Color laser printer succeeds in combining the versatility of monochrome laser printing with attention-getting color, but if you don't need to chase rainbows right away, you might wait and see if competition drives capabilities up. Jul 94

- Silentwriter 640, NEC Technologies, 508/264-8000, $800. With 3MB of RAM, PostScript Level 2 support, and a 6-ppm engine, this printer is a capable performer. Generally, it represents hassle-free printing, but it doesn't handle single sheets of paper well. Jun 94

- Smart Label Printer Pro, Selko Instruments, 408/922-5900, $299.99. If you need to print only a few labels at a time, this label printer may be an expensive but good choice. It prints very quickly, and with excellent print quality. May 94

SCANNERS

- Coolscan LS-10e, Nikon Electronic Imaging, 516/547-4200, $2600. Compact desktop scanner for digitizing images from 35mm transparencies is slow, but delivers images good enough for newspaper publications and some catalogs. Dec 93

- IX-4015 Color Image Scanner, Canon Computer Systems, 714/438-3000, $1169. The price of this color flatbed scanner is competitive, and its speed and excellent bundled software make it easy to use and a good choice for the small office. If you can get by without legal-size scans, it should serve you well. Jul 94

- LightningScan Portable, Thunderware, 510/254-6581, $459. PowerBook owners will find this hand-scanner's modem- or serial-port connection, light-weight interface, and total portability worth the cost, although the scanner is incompatible with some desktop Macintoshes. Dec 93

- Mirror 800 Plus Color Scanner, Mirror Technologies, 612/633-4450, $1299. Add the NuBus JPEG board ($300) and easy-to-use 35mm transparency scanning module ($599) and you get a nifty—if slow, large—and powerful desktop scanning package for a reasonable price. Jan 94

- ScanMaker 35t, Microtek, 213/321-2121, $1995. Spendy 35mm film scanner accommodates
...is critical, but it is otherwise a good, economical option.

DataPak 105, Mass Microsystems, 408/522-1200, $949 to $1049. Well-built 105MB SyQuest drive comes with a decent, no-frills cartridge-formatting package and a copy of 7th Heaven. The preformatted cartridges have a lifetime warranty. Sep 93

EtherDock, E-Machines, 408/541-6100, $699. Heavy-duty Duo docking option is equipped with a full set of 11 ports, including an Ethernet port. The locking mechanism is alarmingly wobbly—although reliable enough to ensure a good connection. May 94

Expert Pad PI-7000, Sharp Electronics Corp., 800/993-9737, $899. Personal digital assistant features the advantages of the Newton, in a better industrial design and at a comparative price. If the battery lasted longer and the message network were implemented, the PDA revolution could begin. Feb 94

HP Optical Disk Library 10LC, Hewlett-Packard, 800/752-0900, $9495. Optical jukebox may fill the need for 10 gigabytes of online storage, but its performance is poor, and the software lacks the features needed for adequate management. Jan 94

Infinity 105 Turbo, Peripheral Land, 510/657-2211, $795 to $894. Light, quiet, inexpensive 105MB SyQuest drive is ingeniously packaged and ideal for both desktop and PowerBook use. Sep 93

LC 575, Apple Computer, 408/996-1010, $1699. For students and small-business professionals who want high power and the convenience of having everything integrated into one case, this 32MHz 68040 system is an ideal choice. Jun 94

Newton MessagePad 110, Apple Computer, 408/996-1010, $1599. This is the personal digital assistant that Apple should have shipped in August 1993, with improved handwriting recognition, including deferred and letter-by-letter recognition. It also has more memory, longer battery life, and a more efficient design. Aug 94

NuTeck Duet, NuTek USA Corp., 408/973-8799, $2396. Mac workstations are both in a PC and a Mac in a single box, but because of many incompatibilities and problems, the Duet is not a computer anyone should consider using for serious work. Feb 94

OrangePC Model 200 Series, Orange Micro, 714/779-2772, $1139 to $3237. If your goal is to get a Mac that runs Windows as fast as a PC, you can't get there from here. If your goal is to get business-level performance for day-in, day-out use, these PC coprocessor cards are probably your best choice. Aug 94

PLI Infinity 270 Turbo, PLI, 510/657-2211, $651. This 270MB SyQuest drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of optical drives.

PowerBook 140 F/25 Upgrade, Digital Eclipse Software, 510/547-6101, $399. By changing the oscillators and adding an FPU, Digital Eclipse changes PowerBook 140s into 170s, minus the active matrix screen. While the upgrade seems expensive, it's the only way to extend the viability of a 140. Dec 93

PowerBook 180c, Apple Computer, 408/996-1010, 4/80 $4169. The active matrix screen of this color notebook computer is beautiful but so small that its usefulness is very limited. Sep 93

PowerBook Duo 270c, Apple Computer, 408/996-1010, 4/240 $3099. Notebook computer meets all the demands of power users; it weighs less than five pounds, features a color active matrix display, and offers longer battery life. The lack of a floppy drive can be inconvenient, though. Feb 94

Power Macintosh 6100/60, Apple Computer, 408/996-1010, base model $1819. Given its price and performance, this Power Macintosh is hard to resist. When developers offer in Power/RISC format a computer that uses a 68040 and an AT&T 3210 digital signal processor, and is brimming with sophisticated speech recognition and audiovisual technology, beware of some hardware and software incompatibilities.

Power Mac 8100/80, Apple Computer, 408/996-1010, $4249. While this system doesn't quite offer the excellent price-performance ratio of the other available Power Macs, you should consider it if you're a high-end user moving your work over to RISC-based computing. Aug 94

Quadra 605, Apple Computer, 408/996-1010, 4/80 $979. Never before has Apple offered so much performance for so little money. The performance and price of this 604-based machine match those of a standard entry-level 486-based Windows PC.

Quadra 840AV, Apple Computer, 408/996-1010, 8/230 $4089. Technological tour de force uses a 40MHz 68040 and an AT&T 3210 digital signal processor, and is brimming with sophisticated speech recognition and audiovisual technology. Beware of some hardware and software incompatibilities.

SCSI MicroDock, Newer Technology, 316/685-4904, $175. Tiny Duo docking station weighs just under 4½ ounces and barely 5 inches long. It adds only an ADB port and a SCSI port—but both are useful.

SledgeHammer2000FNAF, FNBW, 415/474-0055, $3719. RAID drive is both fast and inexpensive. Although it can be a bit noisy when accessing data, it's a good deal. Apr 94

SmartStack, Envision, 612/628-6288, SmartSource $119; SmartModules $289 to $1379. The SmartStack line of modular storage peripherals may be neatly stacked on top of a common power supply to reduce desktop clutter and cabling problems. Sep 93

Turbo 400, DayStar Digital, 404/967-2077, $1899. This accelerator card is equipped with the fastest, most advanced hardware chip available and is as fast as or faster than any Macintosh in processor-intensive tasks. For the price, however, it may make more sense to trade up to a faster computer. Dec 93

Apple QuickTake 100 for Macintosh, Apple Computer, 408/996-1010, $749. If you're in the market for a medium-quality, digital color camera that costs less than $1000, this in the best deal around. But if you're not in a hurry, you may want to wait until some of the camera's more obvious problems, such as its fixed-focus lens and lack of a zoom option, are ironed out. Jul 94

AudioVision 14 Display, Apple Computer, 408/996-1010, $769. Monitor integrates audio and video with built-in speakers that produce surprisingly rich, full-bodied sound. The display, while nice, is small for multimedia use.

 Dyacam Model 3, Dyacam, 818/998-8008, $895. Low-end, digital still camera is easy to use, and is a solid product if Instamatic grade-gray-scale meets your image-quality requirements. Sep 93

Editing Aces Suite, RasterOps, 801/785-5750, $3899. Video professionals can record and play back full-screen movies in 24-bit color with 16-bit CD-quality sound with these products. Despite flaws, this package represents a step forward in QuickTime technology. Nov 93

Intellicolor Display/20, Radius, 408/431-1010, $3199. Although this product's exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellicolor software, which lets you control the settings of your display, doesn't offer much added value.

L-TV Portable, Focus Enhancements, 617/938-8088, $299. Study, inexpensive, external TV-converter plugs into your Mac and converts video output to NTSC. It provided a crisp, clean image, but small flicker and conspicuous shimmer were persistent. Aug 94

L-Television, Focus Enhancements, 617/938-8088, $399.99. NuBus card converts your Mac's RGB video signal to NTSC so you can use your Mac with a TV or VCR. It supports a wide range of Macs, but the image has some flicker and distortion, despite flicker-filtering software.

MovieMovie, Sigma Designs, 510/770-0100, $3499. This 7-inch NuBus video-capture board may be what you've been waiting for. The price is right, and the addition of on-board audio input is a plus, even if it is only mono.

OneBoard Turbo, RasterOps, 408/562-4200, $1499. Midrange video board supports 24-bit color on monitors up to 17 inches and resolutions as high as 1024 by 768 pixels. If you can live without changing resolutions on the fly, it's a reasonably good deal.

The Presenter Plus Mac/PC, Consumer Technology Northwest, 503/643-1624, $429. Small, external TV-converter supports output to television from most Macs with built-in video. It does a barely passable job of providing a stable image. Aug 94

QA-350 LCD, Sharp Electronics Corp., 800/237-4277, $2495. At less than half the cost of a typical active matrix LCD panel, this passive matrix projection panel offers an economical alternative for presenters who don't need multimedia capability. Jul 94

Simple TV, E-Machines, 408/541-6100, $439. Easy-to-install video card plugs snugly into a PCI slot, and allows you to use your Mac with a television for display. The image is impressively flicker-free, but the resolution is limited to 256 colors. Oct 94

Aabbate Video, 508/376-1272, $279. Despite a few rough edges, this is an attractive, inexpensive solution for those who need to catalog and edit videotapes on a budget. Sep 93
The PowerBook 500 Series. In depth.

Welcome to the next generation of PowerBook. Four new Apple PowerBook computers that redefine, once again, what a notebook computer can be.

One look tells you these are very new indeed. The flowing shape. The sleek lines. The futuristic curves. But the new appearance is only your first clue to the dramatic changes, refinements and improvements we've engineered inside.

The PowerBook 500 series is designed around the Motorola 68LC040 processor—a chip that offers far more power than the chips that powered previous PowerBook models.

In benchmark tests, the new PowerBook 540c running at 66/33 MHz was 80% faster than the fastest previous PowerBook. (Its gray-scale counterpart, the 540, is equally fast.) And with the same chip running at 50/25 MHz, the 520 and 520c aren't far behind.

We've supported that processing power with 80% more memory capacity (up to 36MB), 56% more internal storage capacity (up to 320MB) and built-in high-performance Ethernet networking (as well as LocalTalk). This makes the PowerBook 500 series powerful enough not only for word-processing long documents or Fortune 500-sized spreadsheets, but also for doing fieldwork with programs like Adobe Photoshop and other high-end, graphics-intensive programs.

Add SoftPC software from Insignia Solutions Inc., and you've got the ability to run MS-DOS programs as well.

The 500 series offers the possibility of even more power later, because you can upgrade to PowerPC technology when it's available for PowerBook. (Contrast this with 486 notebooks that aren't upgradable to Pentium technology)

Kindly direct your attention to the revolutionary new Apple trackpad pointing device that replaces the trackball and is centered on the comfortable palm rest.

The trackpad's ultrasensitive surface senses the touch of your finger, tracks it across the pad and moves the cursor across the screen accordingly.

This intuitive method of moving the cursor, combined with the new dual-scan and active-matrix screens, gives you much more precise control over the location of the cursor and makes extremely detailed work.
possible (it's actually precise enough for photo retouching) wherever you happen to be.

The PowerBook 540c has what may well be the finest screen ever to grace a notebook computer: an active-matrix, 95-inch display capable of showing thousands of colors at the same time. Combined with QuickTime video and built-in stereo sound, these screens make for truly spectacular presentations in the most unspectacular locations: on a crowded plane, in a noisy diner, wherever.

More expandability. The new PowerBook 500 series includes a lot of things that aren't standard on ordinary notebook computers.

Things like built-in file sharing and networking, stereo sound and video-out, Macintosh PC Exchange software, eWorld and PowerBook File Assistant file-synchronizing software. And we've even included Apple Remote Access software that allows any modem-equipped PowerBook to work with the Macintosh computer on your desk, and with your network, as if you were sitting in your office. Even during those times when your office happens to be thousands of miles away.

Still, there's a lot of room to grow. These are the first PowerBook computers to come with a built-in Processor Direct Slot (PDS) for third-party expansion modules. And they're also the first ones to offer the optional plug-in PowerBook PCMCIA Expansion Module, so you can use two Type II or one Type III PCMCIA card for even more flexibility.

You can even install an optional 19,200-baud internal modem to send and receive information quickly, and when it becomes available, a third-party cellular interface for convenient wireless access to your office network.

More battery life. Even the batteries have been thoughtfully redesigned. The PowerBook 500 series can use two PowerBook Intelligent Batteries. These high-powered NiMH batteries use special processors within each pack to monitor battery power and the new PowerBook Control Strip—power management software that tells you exactly how much time you have before you need to recharge the batteries.

The result is 40% more battery life than before — up to seven hours per charge — when using both batteries.

They recharge faster, too — in as little as two hours for both batteries when the PowerBook is asleep or shut down. And the batteries even recharge while you're using the PowerBook.

More information. While this has been an abundance of information, by any standard, it can't serve as a substitute for a personal demonstration. Something that can be easily arranged at your authorized Apple reseller. To find the one nearest you, simply call 800-732-3131, ext. 100. (In Canada, call 800-665-2775, ext. 910.)

And soon discover more of the power you buy a PowerBook for. The power to be your best.

Introducing the PowerBook 500 Series.

The next generation of PowerBook.

---

Processor

PowerBook 530c

PowerBook 540c

Memory

PowerBook 530c

PowerBook 540c

Hard Drive

PowerBook 530c

PowerBook 540c

Battery Life

PowerBook 530c

PowerBook 540c

Audio

PowerBook 530c

PowerBook 540c

<table>
<thead>
<tr>
<th>Processor</th>
<th>Motorola 68040 @ 25 MHz</th>
<th>Motorola 68040 @ 33 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>24-bit Color</td>
<td>24-bit Color</td>
</tr>
<tr>
<td>Hard Drive</td>
<td>80MB</td>
<td>100MB</td>
</tr>
<tr>
<td>Memory</td>
<td>4MB SDRAM expandable to 32MB</td>
<td></td>
</tr>
<tr>
<td>Battery Life</td>
<td>Up to 7 hours with 2 batteries</td>
<td>Up to 6 hours with 2 batteries</td>
</tr>
<tr>
<td>Audio</td>
<td>64-bit stereo in and out, built-in stereo speakers and microphone</td>
<td>64-bit stereo in and out, built-in stereo speakers and microphone</td>
</tr>
</tbody>
</table>
Hungry For Data?
Your computer looks and performs differently than ever before. Your processing power has increased as never expected. Today's applications are far more demanding than even one year ago. Are you relying on your old storage system to support this new processing power?

Now you can have the speed and security that today's applications demand. Mirror is proud to introduce its new line of disk array storage systems, designed to deliver peak performance to any workstation or server. Our flexible, easy-to-operate configurations provide solutions for any work environment—including desktop publishing, multimedia and image processing applications.

Mirror Establishes A New Performance Standard
All configurations include a fast and wide SCSI-2 card that propels data via a 32-bit data path. Most Macintosh computers are limited to data transfer rates of 2MB/sec., but a Mirror RAID system gives you unparalleled data throughput of up to 15 MB/sec! In addition, our disk arrays are compatible with most high-end audio and video editing systems.

Choose Your Level Of Data Security
RAID technology is available in a number of levels, each representing a different way of partitioning data on your hard drives. Mirror's two, three and four drive systems allow support for RAID Levels 0 and 1. This makes them perfect for use with high-speed striping or fully redundant mirroring applications.

Mirror’s five and ten drive hot-swappable arrays are ideal for archival storage and large database applications. These systems feature RAID Levels 0, 1, 4 and 5 support. Plus, you get our exclusive hot-swappable drive technology, “on-the-fly” data reconstruction, a drive failure warning feature and automatic block repair—giving you unparalleled data integrity.

We Stand Behind Our Products
Mirror’s product development team is backed by a knowledgeable sales staff, award-winning toll-free technical support and a service team that understands your needs. In addition, all of our RAID systems carry a full two-year limited warranty.

Call Now For Your 30-Day Trial
We invite you to try a Mirror RAID system risk-free—if you decide for any reason that it’s not for you, simply return it within 30 days for a refund. We offer a complete line of RAID solutions, from 2GB to 34GB, to fit every need and budget. Call us toll-free at 1-800-643-3371 for complete information on Mirror disk array systems.

Ask about our other industry-leading products including: displays, scanners, optical drives, DAT drives, CD-ROM drives, hard drives, and more!
Selected and edited by Charles Barrett
The following listings include both time-sensitive promotions and open-ended offers being sponsored by Macintosh vendors and their resellers. The listings indicate which products have been awarded a star rating in Macworld’s Reviews (products rated *** or lower are not eligible for inclusion), have been selected as an Editors’ Choice, or have won a World-Class award. In some cases, the editorial evaluation quoted is for an earlier product version. The ○ symbol indicates that the product is Power Mac related.

When placing an order, please mention that you saw the offer in Macworld. Should any problems arise, contact the Streetwise Shopper editor by fax (415/442-0766), phone (415/978-3241), or mail (Macworld, 501 Second St., San Francisco, CA 94107).

Vendors and resellers desiring to have products and services included in this section are encouraged to contact the Streetwise Shopper editor with particulars.

BUNDLES
Bernoulli MultiDisk 150 + Macromedia Director 4.0: Iomega Corporation is bundling Macromedia’s $1195 multimedia/animation program (Sep 94 ***; 1994 World-Class) with its $580 MacTransportable Bernoulli MultiDisk 150 removable-drive disk. This bundle also includes a 150MB Bernoulli cartridge on which Director has been preinstalled to ensure fast start-up. Available on or before 9/1/94 for about $850. Call 800/777-6654 for more information.

DayStar Digital PowerPro 601 + Ray Dream Designer 3.1: DayStar Digital is including a free copy of the $349 native Power Mac version of Ray Dream Designer 3-D illustration software (Aug 93 “Depth-Defying Design” Editors’ Choice for version 2.0A; Sep 92 *** for version 2.02) with its PowerPro 601 PowerPC processor-based card that upgrades the Quadra 650, 700, 800, 900, 950, and Centris 650 to Power Macintosh 7100 and 8100 performance levels. Call 800/962-2077 for more information.

EdgePrint Image-Pro Package: Visual Edge Technology is offering this $24,995 bundle consisting of a $14,995 ImageMaster EdgePrint electronic RIP, a $9950 Imagejet Edgeprint ink-jet RIP, and a $1995 paling of the LogoStamp application for batch-processing images and text combined with the PrintViewer proofing utility. The bundle also ships with a $995 software module supporting Varc Systems’ PowerPC-based NuBus accelerators and S. H. Pierce & Co.’s PosterWorks (Consumer Edition) large-format production tool (Aug 93 *** for PosterWorks 3.0d. Call 800/662-0808 for more information.

NetWare 3.12 or NetWare 4.02 + GroupWise 4.1: Novell is offering a free copy of its $4700 GroupWise (formerly WordPerfect Office)工作组/colaboration application for network environment to customers who purchase an upgrade to NetWare 3 or 4 (ten-user version or above) between 8/1/94 and 10/31/94 for prices recently reduced by an average of 15 percent. Third-party upgrades can be from any competitive network or peer-to-peer operating system. Available through authorized resellers or by contacting Novell at 800/346-7117. Offer expires 10/31/94.

Newton MessagePad + TopWorks: Apple Computer is offering customers who purchase either its Newton MessagePad 100 or 110 PDA between 7/1/94 and 9/30/94 a free copy of its $199 TopWorks document-creation software that provides spreadsheet, text processing, graphing, and drawing tools. To qualify, Apple must receive point-of-sale mail-back coupons by 10/31/94. Offer expires 9/30/94.

Optima Disk Subsystem + DiskArray: Optima Technology is including a free copy of its $995 DiskArray software, which supports RAID levels 0 and 1, with all of its hard disk subsystems. Existing Optima subsystem owners may obtain DiskArray for $25 (for S&H) through 12/31/94. Call 714/476-0615 for further information.

StyleScript + Adobe Fonts: GDT SofWorks is offering three Adobe font packs at close to their list price (WildType, with 14 fonts, for $29; Variety Pack, with 20 fonts, for $29; Value Pack, with 30 fonts, for $39; or all three packs for $79) to purchasers of its $149 StyleScript, which enables Apple Color StyleWriter users to produce true PostScript Level 2 output. Call 800/663-6222 for more information. Offer expires 12/31/94.

COMPETITIVE UPGRADES
addDepth 1.0.2: Ray Dream is offering this $149 graphical utility for enhancing 2-D images with 3-D effects (Aug 93 ***/4 for $49 to users of Adobe Illustrator, Aldus FreeHand, Aldus PageMaker, or QuarkXPress. Call 800/846-0111 to order. Offer expires 9/30/94.

CD AutoCache: ChariMac Engineering is offering this new $79.95 CD-ROM acceleration software for $30 to users of any other CD acceleration package such as FVB’s CD-ROM Toolkit. Users of ChariMac’s CD AllCache may upgrade for $20. Call 800/487-4420 for more information.

FastSpace Instant Contact: In addition to offering this new $79.95 multiuser contact manager at an introductory price of $29.95, Foresight Technology is encouraging users of competitive products to purchase it for $19.95. Call 800/701-9393 for more information.

In Control 3.0: Attain Corporation is offering this $85 personal organizer (Oct 94 ***/4 for $59.95 to owners of other to-do list managers and calendar organizers such as First Things First, Full Contact, and Now Up-To-Date. Call 800/925-5615 to order. Offer expires 10/15/94.

O McCormac Workstation 4.0: Digital Communications is offering this $425 Mac-to-mainframe 3270 terminal- emulation software, which combines support for DCA Netway and MacMainframe Gateways, for $125 to owners of competitive products. Call 800/348-3221 for more information.

MacMoney 4.01: Survivor Software is offering this $89.95 personal-finance program (Jul 94 ***/4) to owners of no-longer-published Dollars & Sense for $45 (plus $4.50 S&H). MacMoney can import DAS version 4 or 5 transaction and account data. Call 310/410-9572 for more information.

QuickMail 3.0: CE Software is offering this brand-new version of its cross-platform e-mail system to users of competing LAN-based e-mail products for $12 per user in multipacks ranging from 5 to 100 users. Call 800/523-7638 to order and for more information. Offer expires 10/31/94.

Vellum 2D 2.5: Vellum 3D 2.5: Astara is offering $800 and Power Mac versions of its $2,995 Vellum 2D and $2,995 Vellum 3D design and drafting packages to Clamp CAD users for $695 and $795 (plus $25 S&H), respectively. Users of Autodesk’s Generic CAD can obtain Vellum 2D for $495. A free graphics translator allows Clamp CAD files to be moved over to Vellum, and DXF file compatibility is provided for reading Generic CAD files. Call 800/877-2745 for more information and to order. Offer expires 12/31/94.

WordPerfect 3.1 for Macintosh: WordPerfect Corporation is offering this new version of its $495 word processor (Mar 94 ***/4 for version 3.0) to users of any competing product for $99. Version 3.1 automatically corrects typing errors as they occur and supports QuickDraw GX printing. Order direct (800/321-9566) or through resellers. Call 800/451-5161 for more information.

SPECIAL DISCOUNTS/REBATES
Canvas 3.5: Deneba SofWorks is offering corporate sites a “competitive trade-up” to its $399 Canvas draw program with cross-platform compatibility (Can 94 ***/4 for $149.95. A two-hour $49 training video from MacAcademy is included free of charge. Call 305/596-5641, ext. 2, to order.

Epson ES-6000 Color Scanner: Epson is offering a $100 rebate (effective 9/1/94) on this $999 scanner, which is bundled with Scanlantic’s plug-in module and desktop accessory plus Adobe Photoshop LE. Call 800/289-3776 for further information. Offer expires 12/31/94.

Media Suite Pro: Avid Technology is offering nonprofit groups a special configuration of this desktop video-editing system for $799—a 10 percent savings over the regular suggested price. The package includes version 2.2 software (plus a free upgrade to 3.0), a hardware board set, and a 2GB hard drive. Call 800/929-2843 for more information.

Microsoft Works 4.0: Microsoft Corporation is offering a $20 rebate (via coupon included in product box) on this integrated software package (Feb 93 *** for version 3.0) to users of any competitive product for $99. Version 4.0 ships with Adobe Illustrator, Aldus FreeHand, and Adobe Photoshop LE. Call 800/289-3776 for further information. Offer expires 12/31/94.

Imagine how far you could expand your horizons if you could communicate in languages other than your own. Now you can with Power Translator®, the fastest and most cost-effective way to produce highly accurate draft translations of letters, faxes, contracts, brochures, and much more.

Bilingual screens and manuals make Power Translator easy to learn and use. You can enter text interactively, import a text file, or scan in your entire text. Power Translator also comes in a PROFESSIONAL version that includes industry-specific dictionaries, such as Legal, Telecommunications, and Computer, that you can customize to meet your requirements.

Translate from English to or from any of these languages:
- Spanish
- French
- German
- Chinese (English to Chinese only).

Power Translator products are available for Windows, Macintosh, DOS, OS/2, and UNIX.

Power Translator and Power Translator Professional are available from your local computer retail store. Or call:

800-255-5660

YOUR GLOBAL LANGUAGE LINK
Say you saw it in Macworld. To purchase products advertised in this issue call the phone numbers below or use the reader service number for our FastFacts Product Information Card located after the product index.

<table>
<thead>
<tr>
<th>Advertiser</th>
<th>Page No.</th>
<th>Phone 1</th>
<th>Phone 2</th>
<th>Advertiser</th>
<th>Page No.</th>
<th>Phone 1</th>
<th>Phone 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe</td>
<td>120-121</td>
<td>800/685-4271</td>
<td>—</td>
<td>Direct Connections</td>
<td>219</td>
<td>800/572-4305</td>
<td>—</td>
</tr>
<tr>
<td>Agfa</td>
<td>12</td>
<td>800/685-4271</td>
<td>—</td>
<td>Educational Resources</td>
<td>220</td>
<td>800/524-2825</td>
<td>—</td>
</tr>
<tr>
<td>Agfa</td>
<td>52</td>
<td>800/685-4271</td>
<td>—</td>
<td>Edurcor</td>
<td>261</td>
<td>800/943-9497</td>
<td>—</td>
</tr>
<tr>
<td>Agfa Technology Expo</td>
<td>145</td>
<td>800/283-5001</td>
<td>—</td>
<td>Engineered Software</td>
<td>10</td>
<td>910/295-4843</td>
<td>—</td>
</tr>
<tr>
<td>Agfa</td>
<td>14</td>
<td>800/686-2446</td>
<td>—</td>
<td>Epson America</td>
<td>30-31</td>
<td>800/BUY-EPSON</td>
<td>—</td>
</tr>
<tr>
<td>Alliance Peripheral Systems</td>
<td>216-217</td>
<td>800/874-1428</td>
<td>—</td>
<td>Express Direct</td>
<td>212-213</td>
<td>800/365-0020</td>
<td>—</td>
</tr>
<tr>
<td>Atsoft</td>
<td>12</td>
<td>800/257-6381</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>America Online</td>
<td>109-170</td>
<td>800/827-6364</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>American Power Conversion</td>
<td>128-129</td>
<td>800/785-2208</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Archivo</td>
<td>28</td>
<td>800/225-3841</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>178</td>
<td>800/282-2828</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>195-195B</td>
<td>800/271-1110</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Attach Software</td>
<td>20</td>
<td>611/376-1110</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Berkeley Systems</td>
<td>26</td>
<td>800/235-8000</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>BottomLine Distribution</td>
<td>222-222</td>
<td>800/622-6721</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>BottomLine Distribution</td>
<td>224</td>
<td>800/622-6721</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Care Corporation</td>
<td>159</td>
<td>800/535-SCAN</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>CD ROM Expo</td>
<td>228</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>CE Software</td>
<td>42</td>
<td>800/523-7638</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Charles Schwab &amp; Company</td>
<td>132</td>
<td>800/447-5111</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Chiron Americas</td>
<td>9</td>
<td>800/491-0222</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Cibick</td>
<td>183-184</td>
<td>800/374-6509</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Claris Corporation</td>
<td>13</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Claris Corporation</td>
<td>74</td>
<td>800/554-0554</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Claris Corporation</td>
<td>157</td>
<td>800/253-9054</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Club Mac</td>
<td>210-211</td>
<td>800/CLUB MAC</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>CompuServe</td>
<td>29</td>
<td>800/848-8199</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Computer Discount Warehouse</td>
<td>84-85</td>
<td>800/651-ACDW</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Connectix</td>
<td>44</td>
<td>800/950-5880</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Connectix</td>
<td>50</td>
<td>800/950-5880</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Cored Corporation</td>
<td>70</td>
<td>800/836-3239</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>CRA Systems</td>
<td>225-227</td>
<td>800/375-0500</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>CTX International</td>
<td>166</td>
<td>800/395-6148</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Dantz Development</td>
<td>45</td>
<td>510/253-3800</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Daystar Communications</td>
<td>160-161</td>
<td>800/443-2602</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Delphi</td>
<td>24</td>
<td>800/995-4005</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Digital Axis</td>
<td>214</td>
<td>800/747-7555</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Dantz</td>
<td>46</td>
<td>800/365-3000</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Daystar Communications</td>
<td>160-161</td>
<td>800/443-2602</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Delphi</td>
<td>24</td>
<td>800/995-4005</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Digital Axis</td>
<td>214</td>
<td>800/747-7555</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Daystar Communications</td>
<td>160-161</td>
<td>800/443-2602</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Delphi</td>
<td>24</td>
<td>800/995-4005</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Digital Axis</td>
<td>214</td>
<td>800/747-7555</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
## Product Index

A quick and easy product index from Macworld. Simply use this index to find the page or advertisement of the products which interest you. Then, use the reader service number for our FastFacts Product Information Card located on the following page.

### SOFTWARE

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>CE Software</td>
<td>170</td>
</tr>
<tr>
<td>192</td>
<td>Corel Corporation</td>
<td>89</td>
</tr>
<tr>
<td>52-53</td>
<td>Symantec Corporation</td>
<td>134</td>
</tr>
<tr>
<td>173</td>
<td>Stasoft</td>
<td>99</td>
</tr>
<tr>
<td>12</td>
<td>A-all</td>
<td>98</td>
</tr>
<tr>
<td>26</td>
<td>Berkeley Systems</td>
<td>191</td>
</tr>
<tr>
<td>26</td>
<td>Connectix</td>
<td>191</td>
</tr>
<tr>
<td>50</td>
<td>Connectix</td>
<td>189</td>
</tr>
<tr>
<td>45</td>
<td>Dantz Development</td>
<td>26</td>
</tr>
<tr>
<td>8</td>
<td>GD Tools</td>
<td>32/42</td>
</tr>
<tr>
<td>60</td>
<td>Insignia Solutions</td>
<td>68</td>
</tr>
<tr>
<td>127</td>
<td>Now Software</td>
<td></td>
</tr>
<tr>
<td>52-53</td>
<td>Symantec Corporation</td>
<td></td>
</tr>
<tr>
<td>112-113</td>
<td>Microsoft</td>
<td></td>
</tr>
<tr>
<td>152-153</td>
<td>WordPerfect Corporation</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Zedcor</td>
<td>9</td>
</tr>
</tbody>
</table>

### CD-ROM

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>Corel Corporation</td>
<td>78</td>
</tr>
<tr>
<td>261</td>
<td>Educorp</td>
<td>157</td>
</tr>
</tbody>
</table>

### DATA MANAGEMENT

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>Foremost Technology</td>
<td>68</td>
</tr>
<tr>
<td>22-23</td>
<td>Microsoft</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Zedcor</td>
<td>9</td>
</tr>
</tbody>
</table>

### EDUCATION

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
<td>Educational Resources</td>
<td></td>
</tr>
<tr>
<td>258-259</td>
<td>Quality Computers</td>
<td>263</td>
</tr>
</tbody>
</table>

### ENTERTAINMENT

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Berkeley Systems</td>
<td></td>
</tr>
</tbody>
</table>

### GRAPHICS/OTP

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>120-121</td>
<td>Adobe</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>Corel Corporation</td>
<td>78</td>
</tr>
<tr>
<td>11</td>
<td>Fractal Design</td>
<td>190</td>
</tr>
<tr>
<td>15</td>
<td>HSC Software</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Magnet Interactive Studio</td>
<td>274</td>
</tr>
<tr>
<td>164-165</td>
<td>Microsoft</td>
<td>114</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>158</td>
<td>Inspiration Software</td>
<td></td>
</tr>
</tbody>
</table>

### MULTIMEDIA

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>220-221</td>
<td>MacBargains</td>
<td>70</td>
</tr>
<tr>
<td>10</td>
<td>Magnet Interactive Studio</td>
<td>274</td>
</tr>
</tbody>
</table>

### HARD DISKS/STORAGE

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>216-217</td>
<td>Alliance Peripheral Systems</td>
<td>62</td>
</tr>
<tr>
<td>222-223</td>
<td>BottomLine Distribution</td>
<td>63</td>
</tr>
<tr>
<td>224</td>
<td>BottomLine Distribution</td>
<td>65</td>
</tr>
<tr>
<td>9</td>
<td>China America</td>
<td>94</td>
</tr>
<tr>
<td>210-211</td>
<td>ClubMac</td>
<td>96</td>
</tr>
<tr>
<td>219</td>
<td>Direct Connections</td>
<td>121</td>
</tr>
<tr>
<td>68</td>
<td>Iomega</td>
<td>273</td>
</tr>
<tr>
<td>16-17</td>
<td>La Cie</td>
<td>52</td>
</tr>
<tr>
<td>49</td>
<td>La Cie</td>
<td>54</td>
</tr>
<tr>
<td>218</td>
<td>MegaHaus</td>
<td>245</td>
</tr>
<tr>
<td>40</td>
<td>MicroNet Technology, Inc.</td>
<td>139</td>
</tr>
<tr>
<td>27</td>
<td>Pineapple Micro Inc.</td>
<td>115</td>
</tr>
<tr>
<td>231</td>
<td>Pro Direct</td>
<td>135</td>
</tr>
<tr>
<td>215</td>
<td>SuperMicro</td>
<td>126</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>Momentum, Inc.</td>
<td>8</td>
</tr>
</tbody>
</table>

### MODEMS

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
<td>Logitec Technology</td>
<td>297</td>
</tr>
<tr>
<td>192B</td>
<td>Supra</td>
<td>132</td>
</tr>
</tbody>
</table>

### MULTIMEDIA

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>Pantograph Display Systems, Inc.</td>
<td>1</td>
</tr>
<tr>
<td>82-83</td>
<td>Portrait Display Lab</td>
<td>89</td>
</tr>
<tr>
<td>154</td>
<td>Pravna Corporation</td>
<td>47</td>
</tr>
</tbody>
</table>

### NETWORKING

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>160-161</td>
<td>Dayna Communications</td>
<td>161</td>
</tr>
<tr>
<td>6-7</td>
<td>IBM</td>
<td>179</td>
</tr>
</tbody>
</table>

### POWERBOOKS

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>135</td>
<td>Fargo Electronics</td>
<td>172</td>
</tr>
<tr>
<td>8</td>
<td>CDT Softworks</td>
<td>32/42</td>
</tr>
<tr>
<td>39</td>
<td>Hawlett Packard</td>
<td>11</td>
</tr>
<tr>
<td>2-3</td>
<td>NEC Technologies</td>
<td>15</td>
</tr>
<tr>
<td>72</td>
<td>Tektronix</td>
<td>143</td>
</tr>
<tr>
<td>94-95</td>
<td>Texas Instruments</td>
<td>266</td>
</tr>
<tr>
<td>21</td>
<td>Xarte Corporation</td>
<td>111</td>
</tr>
</tbody>
</table>

### PRINTERS

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Advertiser</th>
<th>Reader Ser. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>135</td>
<td>Fargo Electronics</td>
<td>172</td>
</tr>
<tr>
<td>8</td>
<td>CDT Softworks</td>
<td>32/42</td>
</tr>
<tr>
<td>39</td>
<td>Hawlett Packard</td>
<td>11</td>
</tr>
<tr>
<td>2-3</td>
<td>NEC Technologies</td>
<td>15</td>
</tr>
<tr>
<td>72</td>
<td>Tektronix</td>
<td>143</td>
</tr>
<tr>
<td>94-95</td>
<td>Texas Instruments</td>
<td>266</td>
</tr>
<tr>
<td>21</td>
<td>Xarte Corporation</td>
<td>111</td>
</tr>
<tr>
<td>Name</td>
<td>City</td>
<td>State</td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>John Doe</td>
<td>New York</td>
<td>NY</td>
</tr>
<tr>
<td>Jane Smith</td>
<td>Los Angeles</td>
<td>CA</td>
</tr>
<tr>
<td>Mary Johnson</td>
<td>Chicago</td>
<td>IL</td>
</tr>
<tr>
<td>Michael Brown</td>
<td>Houston</td>
<td>TX</td>
</tr>
</tbody>
</table>

Please print or type all information.

Thank you!

FASTFAX

For faster results, fax this sheet to...

(111) 555-1212

Thank you!
FREE PRODUCT INFORMATION.
Get valuable information about the products that interest you. There's no cost; no obligation. Just fill out both sides of this FASTFACTS Information form. Circle the numbers for the desired products. Then mail the card. We pay the postage! For even faster results fill out and send the card via our FASTFAX.
Now fast... get the facts, the competition's gaining on you.

Macworld
Creative Computers’ MacMall is the first and largest full line...

Now you can order Apple® Macintosh® computers by mail.

Creative Computers’ MacMall announces a breakthrough partnership with Apple® Computer, Inc. that will forever change the way you buy Apple Macintosh® products. As the first Apple Authorized Catalog Reseller, Creative Computers’ MacMall brings you the same level of award-winning service and low pricing that has made us the #1 Apple Macintosh® Reseller in Southern California and the fastest growing Macintosh mail-order company. You can now purchase any Apple product by mail through our catalogs. You benefit from a full Apple warranty, toll-free technical support, helpful salespeople, and the peace of mind that comes with buying from a company that is an Apple Authorized Catalog Reseller. For a free copy of our giant catalog, call 1-800-222-2808 today or fill out the form below and we will send you one right away.

Look over the following pages for a sample of our great selection and pricing.

For a copy of our catalog, call

1-800-222-2808

Apple, the Apple logo, and Macintosh are registered trademarks of Apple Computer, Inc.
The HP Deskwriter Printer

- Clear 100 dpi text and graphics
- 35 scalable fonts
- Prints up to 3 pages per minute
- 156 levels of grayscale
- 26MB standard memory
- Threeland limited warranty

HP Deskwriter 520 Printer

HP's most affordable high-quality printer:
- Easy, sharp 400x300 dpi professional quality output
- Advanced Resolution Enhancement Technology
- Greyscale printing for dynamic black graphics
- 35 scalable fonts
- AppleTalk and serial interfaces

INCREDIBLE! $189 2075

HP Deskwriter 560C Printer

HP's affordable high-quality black and color printer for the Macintosh computer:
- Clear, sharp 400x300 dpi professional quality output with HP's exclusive Resolution Enhancement Technology
- Easy color printing with ColorSmart technology
- Prints up to 3 pages per minute
- 35 scalable fonts
- AppleTalk and serial interfaces

3-YEAR LIMITED WARRANTY! $289 33320

HP Laserjet 4ML Printer

- HP Resolution Enhancement technology
- 35 scalable fonts
- Greyscale printing for dynamic black graphics
- 1st year limited warranty

$579 35321

HP Laserjet 4MP Printer

- True 600dpi resolution utilizing Resolution Enhancement Technology and microfine toner
- 35 scalable fonts
- AppleTalk and serial interfaces

$1029 61709

HP Laserjet 4MP Printer

- 6MB RAM standard memory
- Macintosh and Windows PC compatible

$1369 36278

HP SCANJET IIp Scanner

- 300dpi, Greyscale Flatbed Scanner
- 8 bit gray scale provides high quality reproduction
- New AccuPage technology features scan to disk OCR software even more accurate
- Automatic exposure setting for high-quality scans
- Automatic exposure setting saves time and eliminates guesswork

$483 60124

HP SCANJET IIc Scanner

The high performance color/greyscale scanner that provides advanced features at a breakthrough price!
- Superior image quality with 1600 DPI transparencies
- 48bit color resolution (1677 million colors)
- 24-bit color allows you to recognize and scan over 16 million colors
- Optional transparency adapter available
- Optional HP LaserJet 4 printer compatible
- Optional HP LaserJet 4 printer driver software

$949 62025

HP Deskwriter 310 Printer

- The new HP Deskwriter 310 printer, compatible printers for Apple Macintosh®/PowerBook® users
- 350 dpi black print
- 35 scalable fonts
- Optional first page color output
- 35 scalable fonts
- Automatic two-page print setup
- Automatic 300 dpi black print
- Background printing
- Optional rechargeable battery

$309 62544 Desk Writer 310 $375 62544 Sheet Feeder $375

Transparent Adapter for ICX
Desk Writer 310 Battery
Desk Writer 310 Rapid Charger
Desk Writer 310 Carrying Case
Desk Writer 310 Sheet Feeder
Black Ink Cartridge for Deskwriter 310
Black Cartridge for Writer II, Jet IIJt IIJ II, JI, JI Plus, LJ 300...
Black Cartridge for Personal Laser Writer LS, NT, NT4...
Black Cartridge for Laser Jet BII...
Black Cartridge for Laser Writer Pro, Laser...
Black Cartridge for Deskwriter, DeskJet
Tri Color Cartridge DeskWriter/DeskJet

CHART Business Standard™ 3.01

A full featured business application that provides powerful features with ease of use.
Now you can generate invoices, track customer orders, create purchase orders, print and scan bar code labels and accurately track inventory movements. All within one software application! It also features password security, employee time-clock, mail label and more!

$1899 62544

DesignWorkshop™ A breakthrough in 3D modeling for designers.

DesignWorkshop™ presents a new paradigm for modeling the Macintosh, with design-oriented 3D direct manipulation. By extending the familiar click-and-drag MacDraw style of interaction into true 3D, the unique interface provides a fluent environment for designing in 3D with a computer – for the first time.

Fast shadow casting gives you true-color object-based rendering, not just pixel images. The sun position is set directly by latitude, date and time. And the view-independent shadows permit multiple views of the shaded model without recalculating. Time-lapse sun studies are easily calculated and automatically saved as QuickTime™ movies. DXF import and export for both models and drawings is built-in, and hidden-line and shadowed section drawings are generated automatically.

90 Day Money Back Guarantee

DesignWorkshop™ $4399 for 64k
DesignWorkshop™ $4399 for PowerPC
The MacTRAC 2.0 Trackball is the most comfortable pointing device you’ll ever lay a hand on. It is also the most productive with the included MacTRAC Control Panel Software. 

$64.99 

Keyboard Deluxe – Mac™

Keyboard Deluxe – Mac™ is a foot-flat, non-slip, slip-resistant Apple Macintosh® and Power Mac® compatible extended US keyboard. It features four ADB ports and three positioning legs for users to adjust the keyboard’s angle.

$79.99

Mouse Deluxe – Mac™

Mouse Deluxe – Mac is designed to provide one, two, or three button input and high resolution 500dpi tracking for Macintosh® applications. Mouse Deluxe – Mac is designed to provide one, two, or three button input and high resolution 500dpi tracking for Macintosh® applications. 

$44.99

Trinitron Digital Control Color Monitor

- 17” Trinitron CRT with 16.1” maximum diagonal viewable area
- 25mm Aperture Grille pitch
- Bonded anti-reflective panel
- Maximum refresh rate at 60Hz (15% acceptable screen damage)
- EPA Energy Star and MPR II compliant
- New design features simple front panel control buttons

$459.99

Multiscan 15sf

$999.99

Multiscan 20se

- 20” Multiscan Trinitron CRT with 19.1” maximum diagonal viewable area
- 30mm Aperture Grille pitch
- Trinitron technology delivers bright images and vibrant colors
- Supports resolutions up to 1600x1200 at 60Hz
- Vertically flat screen and anti-reflective panel to maximize viewability by minimizing glare
- EPA Energy Star and MPR II compliant
- Includes choice of user definable or preset color temperature control settings

$1499.99

MacView Sony to Mac Adapter 

- 18” Sienna 1.3GB Optical Drive
- 15” Color Monitor (CM4015)
- Texas Instruments microLaser Pro 600 PS35
- microLaser Pro 600 PS65
- microWriter PS65
- Phillips Brilliance 1520AS 15” color
- 17” Trinitron Display

$469.99

Pinnacle Micro

- 15” Color Monitor (CM4015)
- Sierra 1.3GB Optical Drive

$999.99

CanOpener 3.0

“Must Have Utility” – MacUser Magazine, April 1992

With CanOpener you can open damaged files even when all else fails. Works on all Macs System 6 or 7.

$149.99

SyncMaster™ 14GL

$299.99

SyncMaster™ 15GL

$379.99

MacView Sony to Mac Adapter 

- 18” Sienna 1.3GB Optical Drive
- 15” Color Monitor (CM4015)
- Sierra 1.3GB Optical Drive

$849.99

MacView Sonor Mac Adapter 

- 18” Sienna 1.3GB Optical Drive
- 15” Color Monitor (CM4015)
- Sierra 1.3GB Optical Drive

$1949.99

Call us for all your Apple Macintosh® Needs!

800-222-2808
High Performance for your PowerBook.

**BTI Slim Pack**

Compatible with PowerBook 100 to 180c, with typical runtime of 7 to 9 hours on 100 to 180c. Requires Apple AC adapter to charge. Compact (6.6" x 3.7" x 1") and weighs only about 2 lbs. Assembles the bottom of any PowerBook! $149

**SlimPack for Duo**

Simplicity for the PowerBook Duo is an internal zero footprint (1.9" x 1.6" x 0.5") battery that weights approximately 2 lbs. SlimPack is made of foam and has no memory effect. It powers Macintosh Duo 210 to 280c up to four times longer than Apple's standard PowerBook Duo batteries. Five-light LED charge indicator and comes with own adapter for recharging. $239

**PowerGage Battery for PowerBook**

Compatible with 140 to 180c models. 3.1 Ah capacity. LCD indicator. Protective cover for high-quality gold-plated contacts. Quick-lock design. 5 LED charge indicator. Six-month warranty. $74

**X-Pack for Newton Message Pad**

Extended rechargeable power of up to 15 hours inside a great leather case with room for POCSOC cards, checkbook, etc. with AC adapter. $104

**PowerCharger Plus for PowerBook**

Conditioner compatible with Apple and BTI power transformers. 140 to 180c. Includes both AC and cigarette adapter. Recharges in 1.5 hours. Twelve-month warranty. $98

**RapidCharger for PowerBook Duo**

Compatible with Duo 310 to 370c. Includes cigarette adapter. Use original Apple AC adapter. Recharges battery in about 45 minutes. $99

**High Capacity Battery for PowerBook**

Compatible with 140 to 180c, 3.1 Ah capacity. Protective cover for high-quality gold-plated contacts. Quick-lock design. 4-month warranty. $58

**Mini AC Adapter for PowerBook**

$59

**Mini AC Adapter for Duo**

$59

**PowerBook Starter Kit**

$124

Call MacMail for Memory!

For the lowest prices on memory products for your desktop Macintosh or PowerBook, call us FIRST!

- 8-Bit 80ns SIMMs (30 pin)
  - 1x8Bns .......... $47
  - 2x8Bns .......... $87
  - 4x8Bns .......... $165

- 32-Bit SIMMs (72 pin)
  - LC III, Performa, Centris, Quadra, Power Mac
  - 4MB 80ns ....... $169
  - 8MB 80ns ....... $269
  - 16MB 80ns ....... $499

- PowerBook 140, 145, 170
  - 4MB 80ns ....... $19
  - 6MB 80ns ....... $269
  - 8MB 80ns ....... $299

- PowerBook 160, 165, 180c
  - 4MB 80ns ....... $169
  - 6MB 80ns ....... $269
  - 8MB 80ns ....... $329
  - 16MB non-composite ....... $739

- PowerBook 165c, 170c
  - 4MB 80ns ....... $169
  - 6MB 80ns ....... $269
  - 8MB 80ns ....... $329
  - 10MB non-composite ....... $939

- PowerBook 165c, 170c
  - 4MB 80ns ....... $169
  - 6MB 80ns ....... $269
  - 8MB 80ns ....... $329
  - 10MB non-composite ....... $939

- PowerBook 520/540
  - 4MB 80ns ....... $499
  - 8MB 80ns ....... $999

- PowerBook 540c
  - 32MB non-composite ....... $1,449

- PowerBook 140, 145, 170
  - 4MB 80ns ....... $19
  - 6MB 80ns ....... $269
  - 8MB 80ns ....... $299
  - 16MB non-composite ....... $739

- PowerBook 160, 165, 180c
  - 4MB 80ns ....... $169
  - 6MB 80ns ....... $269
  - 8MB 80ns ....... $329
  - 10MB non-composite ....... $939

- PowerBook 165c, 170c
  - 4MB 80ns ....... $169
  - 6MB 80ns ....... $269
  - 8MB 80ns ....... $329
  - 10MB non-composite ....... $939

- PowerBook 520/540
  - 4MB 80ns ....... $499
  - 8MB 80ns ....... $999

- PowerBook 540c
  - 32MB non-composite ....... $1,449

- PowerBook Utilities 2.0
  - $59

- Maxima 3.0
  - $59

- Connectix Desktop Utilities
  - $59

**Order Code:** D492MG14

**206 October 1992 MacWorld**
PowerBook to NEC Monitor

MultiSync 660A/V, 840 A/V Adapter, 1024x768 MAC A/V

The RELi 2412 Mac is a scanning tool ideal for PrintPress and the graphics professional. It is of a single pass design, capable of scanning a 24-bit 8/12" x 14" 16.8 million color image with a maximum resolution of 2400 dpi. The RELi 2412 Mac's maximum resolution translates into 360,000 pixels per square inch, which benefits anyone scanning color images and transparencies. Bundled with Adobe Photoshop LE image processing and Omnigage Direct OCR software.

RELi 9624 Professional Color Scanner with Transparency Option

The RELi 9624 is a scanning tool ideal for PrintPress use and the graphics professional. It is of a single pass design, capable of scanning a 24-bit 8/12" x 14" 16.8 million color image with a maximum of 4600 dpi. The RELi's 9624's maximum optical resolution translates into 1,440,000 pixels per square inch. Includes a transparency adapter for up to 4"x9" transparencies. Bundled with Adobe Photoshop image processing and Omnigage Direct OCR software.

RELi 2412 Mac Color Scanner .......................... $789
RELi 4816 Mac Color Scanner .......................... $979
RELi 4816 Mac/T Color Scanner ........................ $1499

Send mail orders to: MacMail Order Dept., 2645 Maricopa St., Torrance, CA 90203-5144
Motion Works

Camera Man 2.0
The Screen Recording Utility for Developers, Trainers, and Educators

CameraMan 2.0 is the best version yet of the first and only screen recording utility available for the Macintosh. It is the tool of choice for educators, trainers and software developers, among many others, who need an easy and inexpensive way to create applications and system software tutorials, demonstrations, and on-line help. A CameraMan movie is the most efficient way to show Macintosh users how to get the most from their software.

Highest quality internal and external hard drives
All external Hard Drives include *FWB* Hard Drive Software

$269

Quantum

VividQuest

The Best in Removable Media

VividQuest 88MB drives provide you with unlimited storage of your data with the flexibility of a floppy disk. Once you fill up one disk, just pop in a new one and your ready to go. Transferring documents has never been easier, just place your cartridge in any Macintosh type drive and you are ready to go back to business! Archive irreplaceable files with the confidence that your data will not be compromised. VividQuest 88MB internal and external drives also read and write to 44MB cartridges.

VividQuest 88MB Internal Drive RIW 44MB Mounting bracket and cartridge extra $249

$499

VividQuest 88MB External Drive RIW 44MB Cartridge extra $299

FREE FWS HD TOOL KIT

Genuine SyQuest Cartridges

Lowest pricing on high quality removable cartridges for any compatible SyQuest® drive mechanism.

270MB $299

$441

200MB $299

$441

105MB $299

$324

88MB $299

$324

44MB $299

$324

Call us for all your Apple Macintosh® Needs!

MODEMS

实践型外设

1,400 bps data and 1,400 bps send/receive fax for cost effective operation. Includes Free SmartCom for the Mac software.

Hayes

Cost-effective, 2400, 1200 and 300 bps stand-alone modems. Includes Free SmartCom for the Mac software.

Accura 2400/5C $74

38090

Free SmartCom Mac data and FAX software and Modem-cable modem

14.4 Accura $1,499

38035

US Robotics

14,000 bps data/fax supports ITU-T V.34b and V.34b fax

Mac & Fax 14.4 $1,599

38035

Supports V.92 at 28,800 bps.

Mac & Fax 28.8 $2,499

38035
Name: Noah Cohen  
Title: MIS Analyst  
Age: 25  
Hobbies: Mountain biking, volunteer work, home brewing, guitar  
Favorite Band: The University of California Marching Band  
Favorite Artist: Matisse  
Favorite Book: Exodus  
Favorite Color: Amber  
Favorite Shape: Pint glass  
Favorite Publication: 
  "Macworld. It has everything I need: great opinions, insightful letters, and thorough analysis. Macworld arrives with the answers I am looking for—and the back issues make for great reference material."
Seagate drives carry a 3-Year Warranty.

Quantum’s hard disk drives are available in 2.5 and 3.5-inch form factors in storage capacities ranging from 170 mebibytes to 2.1 gigabytes.

**LPS 270MB INTERNAL**

- 170mb 17ms $259 $379
- 256mb 17ms $339 $459

**LPS SERIES 3.5 LOW PROFILE**

- 170mb 14ms $185 $245
- 270mb 13ms $219 $279
- 340mb 11ms $269 $329
- 540mb 10ms $329 $389

EMPIRE SERIES 3.5 HIGH PERFORMANCE

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Access Time</th>
<th>Actual Capacity</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>1080mb</td>
<td>9.5ms</td>
<td>$705</td>
<td>$765</td>
<td></td>
</tr>
<tr>
<td>1400mb</td>
<td>9.5ms</td>
<td>$859</td>
<td>$919</td>
<td></td>
</tr>
<tr>
<td>2100mb</td>
<td>9.5ms</td>
<td>$1169</td>
<td>$1229</td>
<td></td>
</tr>
</tbody>
</table>

Quantum Pro and Empire series carry a 3-Year Warranty.

Go-Drives carry a ONE Year Warranty.

---

**CLUBMAC 3.5" REMOVABLES**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Access Time</th>
<th>Format</th>
<th>Media</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1GB</td>
<td>180ms</td>
<td>DDS</td>
<td>60mb</td>
<td>$199</td>
<td>$299</td>
</tr>
<tr>
<td>2.5GB</td>
<td>219ms</td>
<td>DDS</td>
<td>60mb</td>
<td>$289</td>
<td>$399</td>
</tr>
<tr>
<td>4.2GB</td>
<td>263ms</td>
<td>DDS</td>
<td>80mb</td>
<td>$419</td>
<td>$519</td>
</tr>
</tbody>
</table>

2.1 GB ST12550

2.5 GB ST12755

4.2 GB ST12955

---

**CLUBMAC Tape Backups**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Access Time</th>
<th>Model</th>
<th>Format</th>
<th>Media</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 GB</td>
<td>10ms</td>
<td>ClubMac DAT</td>
<td>DDS</td>
<td>60mb</td>
<td>$739</td>
<td></td>
</tr>
<tr>
<td>2.5 GB</td>
<td>10ms</td>
<td>ClubMac DAT/DC</td>
<td>DDS-DC</td>
<td>60mb</td>
<td>$929</td>
<td></td>
</tr>
<tr>
<td>4.5 GB</td>
<td>10ms</td>
<td>ClubMac DAT-2</td>
<td>DDS-2</td>
<td>60mb, 90mb, 120mb</td>
<td>$1139</td>
<td></td>
</tr>
<tr>
<td>2.5 GB</td>
<td>10ms</td>
<td>ClubMac DAT-3</td>
<td>DDS-3</td>
<td>60mb, 90mb, 120mb, 180mb</td>
<td>$1349</td>
<td></td>
</tr>
</tbody>
</table>

---

**NEC MultiSpin 3xp**

The 3xp combines 3x transfer rate performance, 250ms access time and a 256 KB continuous-flow cache in a compact design, making it an ideal drive for users who need both high performance and high reliability. At only 2.4 lbs the 3xp is the world’s lightest triple speed CD-ROM reader.

**CD-ROM READER**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Access Time</th>
<th>Actual Capacity</th>
<th>Media</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>MultiSpin 3xp</td>
<td>Portable, 250ms access time, very light, 2.4 lbs</td>
<td>10ms</td>
<td>$399</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MultiSpin 3x1</td>
<td>External, 195ms access time, 450KB/sec data transfer</td>
<td>10ms</td>
<td>$439</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MultiSpin 3xe</td>
<td>External, 195ms access time, 450KB/sec data transfer</td>
<td>10ms</td>
<td>$469</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MultiSpin 4x Pro</td>
<td>External, 180ms access time, 600KB/sec data transfer</td>
<td>9ms</td>
<td>$929</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**ClubMac CD-ROM Bundle**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Access Time</th>
<th>Media</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>ClubMac 3x2 Speed CD-ROM Reader</td>
<td>30ms access time, Lighter design</td>
<td>220ms</td>
<td>$199</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ClubMac Dual-Speed</td>
<td>External, 200ms access time</td>
<td>150ms</td>
<td>$199</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ClubMac Quad-Speed</td>
<td>External, 180ms access time</td>
<td>300ms</td>
<td>$199</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**ClubMac CD-ROM Reader**

- MultiSpin 3x1 CD-ROM Reader
- MultiSpin 3x2 CD-ROM Reader
- MultiSpin 3x3 CD-ROM Reader
- MultiSpin 3x4 CD-ROM Reader
- MultiSpin 4x Pro CD-ROM Reader
We're not like the other

We go the extra
ti.

Whether you need a system for high-
end color publishing, professional pre-
press applications, desktop design
and production or simply business
productivity — Express Direct can
custom configure a Mac System that's
right for your specific job and right for
your budget.

New Prices!

Power Macintosh™ Systems

Whether you need a system for high-
end color publishing, professional pre-
press applications, desktop design
and production or simply business
productivity — Express Direct can
custom configure a Mac System that's
right for your specific job and right for
your budget.

And remember, all Maxis aren't
created equal! At Express Direct we
do more than take orders and ship
boxes. We install the memory, video
card and system software. Then we
test every System — so all you need to
do is plug it in! And only Express
Direct gives you Toll-Free Technical
Support with every Mac!

Power Macintosh™

Call

Get it
Direct!

We stock a complete line of quality products from all of the above manufacturers & more.

1-800-765-0020

Express Hours (CST) M-F 8am-7pm, Sat 10am-2pm • 24hr Fax • Customer Service Hotline: 1-800-236-3059

Apple, the Apple logo, Macintosh, Macintosh Quadra and Power Macintosh are trademarks of Apple Computer, Inc. Prices are subject to change without notice. A 2% surcharge applies to American Express purchases. All returned orders may be subject
to a 15% restocking fee plus return shipping. Call for RMA before returning. Software, unless otherwise noted, cannot be returned after it has been opened. All warranties on Macintosh or Apple brand products sold by Express Direct will be honored by
Express Direct or its authorized agents only. All other manufacturers' warranties still apply. Extended Service Plans are optional and available for an additional cost. Call for complete details.
We'll give it to you straight.

When it comes to product knowledge and understanding the needs of graphic professionals – nobody even comes close to Express Direct. Not the other mail-order companies, not the superstores, not even your local dealer.

When you call us - you'll talk with an expert. Someone who's done their homework, knows the product, knows what they're talking about. Not an order-taker, like you get with the other mail-order companies.

We carry only top-notch products from the industry's best manufacturers. No garbage. You demand quality and so do we. What's more, our strict criteria for selecting products means we always get the lowest price – directly from the manufacturer. So nobody can give you a better value than Express Direct.

But that's just the beginning. With customer service and technical support that's the best in the industry, we make it our business to take care of you. All this is just a free phone call away. So, call Express Direct today. You're going to love working with us!

Call to receive a FREE catalog!
Circle 81 on reader service card
Wacom Digitizers
12" x 18" Til with 2 Handed Input
Calligraphy/Cordless Pen
$659
Wacom #U012180M

ARTZ/Painter 2.0 Bundle .................................. $479
4"x5" - Compatible with Mac or PC .......................... $199

PhotoShop 2.5.1
With purchase of Scanner or Wacom Tablet
$199
FULL VERSION!

UMAX Scanners
UMAX 630 - 600dpi ........................................ $529
UMAX 840 - 800dpi ....................................... $669
UMAX 1260 - 1200dpi ................................... $899
UMAX 1200SE - 1200dpi/One Pass ....................... $1,999
PowerLook - including Transparency Adapter .......... Call
UMAX Transparency Adapter $429

Kodak ColorEase PS
Color DyeSub Printer/PS level 2 .... $6,589
30-Day Satisfaction Guarantee!
One Year Free On-Site Service!
$940 in free supplies thru September!

20" Color Display
$1,389
+ Multi-Scan, Multi-Res, Ikegami CN-20A
+ MacUser 4-Mice Rating!
+ 24-bit Accelerated Video Card Bundle $1,799

Microtek 45T Slide Scanner .................. Call
CD-Writers
JVC, Kodak, Philips, Ricoh, Sony .................. Call
Sony CD Blank Media - 74 min. ....................... $24
High Performance Drives
3.5" 128MB External Optical Drive w/Cartridge .... $699
3.5" 230MB External Optical Drive w/Cartridge .... $929
2GB DAT Tape Backup, External w/Retrospect 2.0 $789
Quantum 16/2GB AV Hard Drives ..................... $1,499
Seagate Barracuda 4GB, bms access, fast/wide SCSI $2,369

512-329-7001
800-521-6111
Fax 512-327-0921

Circle 83 on reader service card

THE INTERNATIONAL DEALER SUPPORT NETWORK
Internationale Händler-Konditionen
Corporate and government P.O.'s accepted, subject to approval.
Wire transfer, COD, all major credit cards accepted, UPS, FedEx, DHL 2-day to Europe,
5000 Plaza On The Lake, STE 230, Austin, TX, USA 78746
LEASE YOUR NEXT SYSTEM FROM SuperMicro!

Get the system you need now—with zero down and low monthly payments! Call 800-352-3415 to find out all the advantages leasing has to offer...

- **QUADRA 840AV SUPERSTATION**
  - Only $369 PER MONTH
  - Quadra 840AV 40MHz 040 processor
  - 7MB RAM, external 2.0GB
  - Disk array, extended keyboard
  - Dual spine CD ROM drive
  - SuperMac 20T, 20" Trinitron monitor
  - SuperMac PDX+, 1152 x 870 video card
  - Image processing multiple functional drive: 650MB optical and SyQuest 86c in one enclosure

- **QUADRA 840AV VALUE STATION**
  - Only $299 PER MONTH
  - Quadra 840AV 40MHz 040 processor
  - 72mb RAM, ext. keyboard
  - 12GB internal hard drive
  - Dual spine CD ROM drive
  - SuperMac 17T, 17" Trinitron monitor
  - SuperMac PDX+, 24-bit, 1152 x 870 video card
  - Image processing multiple functional drive: 650MB optical and SyQuest 86c in one enclosure

- **6100/60AV POWERPC**
  - Only $290 PER MONTH
  - Power Macintosh 6100/60AV w/ internal CD-ROM drive
  - 486DX2, 48MB RAM, 100MB hard drive, extended keyboard
  - 17" high-res 24-bit color monitor
  - External SyQuest 200MB with cartridge
  - WDMAT Hi-WDATG 2.0GB DAT tape backup system
  - GCC SelectPress Pro, 600 x 600 dpi printer
  - AVision 86DA, 6400 x 6400 dpi flatbed scanner

- **QUADRA 650 DTP STATION**
  - Only $189 PER MONTH
  - Power Macintosh 650 33MHz, 68000 processor
  - 16MB RAM, 1GB hard drive, extended keyboard
  - 17" high-res 24-bit color monitor
  - SuperMac PoQ+, 24-bit, 1152 x 870 video card
  - SyQuest 86c read/write drive
  - AVision 660AV, 4800 x 4800 dpi flatbed scanner
  - TI Pro 600, 5 ppm, 600 dpi laser printer

6100/60AV POWERPC

**HiLITE TAPE DRIVES**

At only $679, the Archive 2.0GB tape drive is the most economical backup solution around. And if you need more speed, HiLITE's line of WangDat drives provides it.

**MICROTEK**

Microtek's new ScanMaker IIv, with true 600 x 1200 dpi optical resolution, gives you sharper, more richly defined details than ever before! And it comes complete with the full version of Adobe Photoshop.

**SuperMicro**

SuperMicro has a complete line of Macintosh Quadra and PowerPC computers in stock. All system bundles are assembled and tested before shipping. Custom configurations are no extra charge.

**LEASING**

Circle 126 on reader service card

**SuperMicro**

We Specialize in Image Processing

385 Van Ness Ave. #110, Torrance, CA 90501

310-782-5760 International • 310-782-5974 Fax
Introducing the APS “I” Series

APS is proud to introduce technologically superior drives based on IBM mechanisms with MR-Head technology.

APS HARD DRIVES

For your Mac or Power Mac

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Internal</th>
<th>SR2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS MX 290</td>
<td>163MB - 1003MB</td>
<td>$199</td>
<td>$299</td>
</tr>
<tr>
<td>APS Q 340</td>
<td>163MB - 1003MB</td>
<td>$279</td>
<td>$379</td>
</tr>
<tr>
<td>APS I 360</td>
<td>163MB - 1003MB</td>
<td>$299</td>
<td>$399</td>
</tr>
<tr>
<td>APS I 540</td>
<td>163MB - 1003MB</td>
<td>$399</td>
<td>$499</td>
</tr>
<tr>
<td>APS Q 540</td>
<td>163MB - 1003MB</td>
<td>$399</td>
<td>$499</td>
</tr>
<tr>
<td>APS I 720</td>
<td>163MB - 1003MB</td>
<td>$499</td>
<td>$599</td>
</tr>
<tr>
<td>APS MS 1.2AV</td>
<td>163MB - 1003MB</td>
<td>$759</td>
<td>$859</td>
</tr>
<tr>
<td>APS MS 1.2T</td>
<td>163MB - 1003MB</td>
<td>$699</td>
<td>$799</td>
</tr>
<tr>
<td>APS MS 103MB</td>
<td>163MB - 1003MB</td>
<td>$699</td>
<td>$799</td>
</tr>
<tr>
<td>APS MS 4110</td>
<td>163MB - 1003MB</td>
<td>$699</td>
<td>$799</td>
</tr>
</tbody>
</table>

Model Capacity Internal SR2000

<table>
<thead>
<tr>
<th>1029MB - 2545MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS Q 1080</td>
</tr>
<tr>
<td>APS MS 1.7AV</td>
</tr>
<tr>
<td>APS MS 1.7T</td>
</tr>
<tr>
<td>APS ST 2.0T</td>
</tr>
<tr>
<td>APS MS 2.4T</td>
</tr>
<tr>
<td>APS MS 3.0G</td>
</tr>
<tr>
<td>APS ST 4.0T</td>
</tr>
<tr>
<td>APS ST 9.0T</td>
</tr>
</tbody>
</table>

SCSI Sentry™

Now you can "stop SCSI Voodoo" on your SCSI Chain, even when you're not ready to buy a new drive. Our new SCSI Sentry™ gives you all the benefits of APS acclaimed DaTerm technology in the form of an external SCSI performance monitoring instrument.

Benefits

- Optimizes Overall SCSI Performance
- Provides Ideal Termination Power
- Diagnostically Reduces SCSI Rollovers
- Regulates SCSI Line Voltage
- Solves Bus Impedance Issues
- Easy Installation, Takes Seconds

APS HARD DRIVES

Just

$99

POWERBOOK DRIVES

Model Capacity Internal Companion II

<table>
<thead>
<tr>
<th></th>
<th>PowerBook 85</th>
<th>PowerBook 100</th>
<th>PowerBook 170</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS PB 85</td>
<td>80MB</td>
<td>$249</td>
<td>-</td>
</tr>
<tr>
<td>APS T 213</td>
<td>202MB</td>
<td>$319</td>
<td>649</td>
</tr>
<tr>
<td>APS PB 250</td>
<td>240MB</td>
<td>$349</td>
<td>449</td>
</tr>
<tr>
<td>APS T 340</td>
<td>324MB</td>
<td>$449</td>
<td>649</td>
</tr>
<tr>
<td>APS T 520</td>
<td>500MB</td>
<td>$699</td>
<td>799</td>
</tr>
</tbody>
</table>

PORTABLE STORAGE

Model Capacity Internal Battery

<table>
<thead>
<tr>
<th>PowerBook 85</th>
<th>PowerBook 100</th>
<th>PowerBook 170</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS PB 85</td>
<td>80MB</td>
<td>$249</td>
</tr>
<tr>
<td>APS T 213</td>
<td>202MB</td>
<td>$319</td>
</tr>
<tr>
<td>APS PB 250</td>
<td>240MB</td>
<td>$349</td>
</tr>
<tr>
<td>APS T 340</td>
<td>324MB</td>
<td>$449</td>
</tr>
<tr>
<td>APS T 520</td>
<td>500MB</td>
<td>$699</td>
</tr>
</tbody>
</table>

The Perfect Home for your 2.5" PowerBook Drive. Companion II Enclosures AC/DC Endorsement $89 $139

$799

APS Technologies

1-800-874-1428
Get the Best: APS DAT

Only APS DATs bring you all the benefits of our SR 2000 enclosure with DATerm, Digital Active Termination

**APS HyperDAT**

If you need high-speed backup (not the kind that ties your server up and slows down your network), you need the DDS-2 power of the APS HyperDAT. Back up locally at rates as high as 25MB per minute. Pack up to 1GB on a single tape. Best of all, your regular DDS and DDS compression tapes can be read in the APS HyperDAT, too.

**APS DAT**

The amazing APS DAT offers you great performance and reliability. Get up to 2GB of data on a 90 meter tape with backup speeds as high as 10MB per minute. APS DATs include Retrospect, a $199 Value, Free!

---

**DAT Model**

**Model** | **Capacity** | **Internal SR 2000**
---|---|---
**APS DAT** | 1.8 Gb/ Min. Tape | $749
**APS TurboDAT** | 8.1 Gb/ 90m Tape | $949
**APS HyperDAT** | 8.1 Gb/ 120m Tape | $1149

**DAT Media**

- 1.4 5-19 20-
- 50 meter DAT Tapes — $30 85.50 85.50
- 90 meter DAT Tapes — $17 11.50 10.50
- 120 meter DAT Tapes — $21 22.50 21.50

**CD-ROM Model**

**Model** | **SR 2000**
---|---
**APS T4101** | $299
**APS T 3401** | $439

---

**MAGNETO OPTICAL**

**Model** | **Internal** | **SR 2000**
---|---|---
**APS 128MB MO** | $629 729
**APS 230MB MO** | $899 999
**APS 1.3Gig MO** | $2399 2499

---

**POWERBOOK STUFF**

**Model** | **Price**
---|---
**APS SCSI DOC** | $39
**APS SCSI Boy** | $19
**APS PowerBalls** | $9.99

---

**SYQUEST**

**Model** | **Price**
---|---
**APS SQ 555** | $44/38MB | $259
**APS SQ 510c** | $44/88MB | $429
**APS SQ 5200** | 200MB | $499
**APS SQ 3105** | 105MB | $329
**APS SQ 3270** | 270MB | $499

---

Price list is for unformatted media.

---

**APS INTERNATIONAL**

Global Storage Resource
APS Intl. Sales Line: (816) 920-1109
On parle francais au: (816) 920-4135
Se habla espanol en: (816) 920-4136
Si parla Italiano in: (816) 920-4137
Wir sprechen Deutsch (816) 920-4138
1-800-874-1428

---

**ADVANTAGE**

**The APS ADVANTAGE**

- 30-Day MBG
- Toll-Free Support
- Awesome Warranties
- Factory Direct Quality
- Rapid Repair Return
- 24-Hour Product InfoFax

---

Visa, MasterCard, Discover, American Express: No Surcharge.

---

1-800 874-1428

Circle 62 on reader service card

---

APS Technologies 6151 Deramus
Kansas City, MO 64120

---

**TIPS**

- Open 24 hours a day, 7 days a week.
- Free tech support, call APS Sales (816) 874-1428, Fax: (816) 374-5001.
- Same day shipping for personal checks (restrictions apply).
- Visa, MasterCard, Discover, American Express: No Surcharge.

---

**THE APS ADVANTAGE**

- Open 24 hours a day, 7 days a week.
- You get the best at APS DAT because we buy only the best.
- 30-Day MBG
- Toll-Free Support
- Awesome Warranties
- Factory Direct Quality
- Rapid Repair Return
- 24-Hour Product InfoFax

---

**SYQUEST**

- APS SQ 5559 44 MB
- APS SQ 510c 44/38MB
- APS SQ 5200 200MB
- APS SQ 3105 105MB
- APS SQ 3270 270MB

---

24 Hours a day, 7 days a week.
## Quantum

### #1 HARD DRIVE FOR MAC!

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>RPM</th>
<th>Buffer</th>
<th>Why</th>
<th>Model</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>170MB</td>
<td>17ms</td>
<td>3600</td>
<td>32K</td>
<td>2yr</td>
<td>ELS170S</td>
<td>$179</td>
<td>$239</td>
</tr>
<tr>
<td>270MB</td>
<td>12ms</td>
<td>4500</td>
<td>128K</td>
<td>2yr</td>
<td>LPS270S</td>
<td>$229</td>
<td>$289</td>
</tr>
<tr>
<td>340MB</td>
<td>12ms</td>
<td>4500</td>
<td>128K</td>
<td>2yr</td>
<td>LPS340S</td>
<td>$275</td>
<td>$335</td>
</tr>
<tr>
<td>540MB</td>
<td>9.5ms</td>
<td>5400</td>
<td>512K</td>
<td>5yr</td>
<td>EMP540S</td>
<td>$509</td>
<td>$569</td>
</tr>
<tr>
<td>1080MB</td>
<td>9.5ms</td>
<td>5400</td>
<td>512K</td>
<td>5yr</td>
<td>EMP1080S</td>
<td>$669</td>
<td>$729</td>
</tr>
<tr>
<td>1440MB</td>
<td>9.5ms</td>
<td>5400</td>
<td>512K</td>
<td>5yr</td>
<td>EMP1440S</td>
<td>$879</td>
<td>$939</td>
</tr>
<tr>
<td>2160MB</td>
<td>9.5ms</td>
<td>5400</td>
<td>512K</td>
<td>5yr</td>
<td>EMP2160S</td>
<td>$1199</td>
<td>$1259</td>
</tr>
</tbody>
</table>

**MegaHaus is your #1 source for Quantum drives.**
- Low price guarantee on all Quantum drives!
- Same day shipping on most orders!

---

## SyQuest

### Genuine Syquest Media

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>Model</th>
<th>Buffer</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>44MB</td>
<td>12ms</td>
<td>$59</td>
<td>88MB</td>
<td>$68</td>
<td></td>
</tr>
<tr>
<td>88MB</td>
<td>12ms</td>
<td>$68</td>
<td>105MB</td>
<td>$56</td>
<td></td>
</tr>
<tr>
<td>200MB</td>
<td>18ms</td>
<td>$56</td>
<td>448K,200MB</td>
<td>$499</td>
<td></td>
</tr>
<tr>
<td>270MB</td>
<td>13.5ms</td>
<td>$69</td>
<td>105,270MB</td>
<td>$499</td>
<td></td>
</tr>
</tbody>
</table>

**Low price guarantee on Syquest!**
- 1 FREE cartridge with each drive!
- 2 year warranty on drive and case!
- 5 year warranty on all cartridges!
- Same day shipping on most orders!

---

## Optical Drives

### Smart Storage Solutions

- High performance optical drives.
- Ask for your free "Dare to Compare" specification brochure.
- Includes SCSI Manager 4.3 compliant driver, cables, and a free disk.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>30MB</td>
<td>8ms</td>
<td>7200</td>
</tr>
<tr>
<td>50MB</td>
<td>8ms</td>
<td>7200</td>
</tr>
</tbody>
</table>

**Low price guarantee on Pioneer!**
- Requires only 1 SCSI ID number.
- DRM602X, 6 Disc, Double Speed
- DRM604X, 6 Disc, Quad Speed
- DRO 1804X, 18 Disc, Quad Speed

- Includes formatting software and cables. We stock multiple bay enclosures for custom configurations.

## CD Rom Drives

### Toshiba

- XM3401
- 200ms
- 330KB/sec
- $299
- $369

### NEC

- CDRS10
- 195ms
- 450KB/sec
- $419
- $489

### Plextor 4PLEX

- 150ms
- 600KB/sec
- $549
- $609

Includes driver software with music play, $25 Photo CD processing coupon, and cables. Multi Drive CD Towers in stock!

## TAPE DRIVES

### Quantum

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Type</th>
<th>Brand</th>
<th>Archive</th>
<th>Internal</th>
<th>External</th>
<th>Capacity</th>
<th>Type</th>
<th>Brand</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>250MB</td>
<td>QIC 150</td>
<td>Archive</td>
<td>$459</td>
<td>$529</td>
<td>4-8Gig</td>
<td>DDS DAT</td>
<td>Conner</td>
<td>$939</td>
<td>$999</td>
<td></td>
</tr>
<tr>
<td>580MB</td>
<td>Mini C</td>
<td>Tec</td>
<td>$539</td>
<td>$699</td>
<td>4-8Gig</td>
<td>DDS DAT</td>
<td>HP</td>
<td>$1029</td>
<td>$1099</td>
<td></td>
</tr>
<tr>
<td>7.5-1.5Gig</td>
<td>Mini C</td>
<td>Exabyte</td>
<td>$899</td>
<td>$649</td>
<td>4-8Gig</td>
<td>DDS DAT</td>
<td>Sony</td>
<td>$1079</td>
<td>$1139</td>
<td></td>
</tr>
<tr>
<td>2Gig</td>
<td>DAT</td>
<td>Conner</td>
<td>$819</td>
<td>$869</td>
<td>4-8Gig</td>
<td>DDS DAT</td>
<td>Conner</td>
<td>$1069</td>
<td>$1129</td>
<td></td>
</tr>
<tr>
<td>2Gig</td>
<td>DAT</td>
<td>HP</td>
<td>$979</td>
<td>$979</td>
<td>4-8Gig</td>
<td>DDS DAT</td>
<td>HP</td>
<td>$1289</td>
<td>$1349</td>
<td></td>
</tr>
</tbody>
</table>

Includes Retrospect 2.1, 1 tape, and cables. OPTIMA DeskTape software mounts DAT on desktop $289.

## MICROPOLIS

- New AV series hard drives are specifically designed for enhanced digital video and audio performance in applications such as multimedia, desktop publishing, and video editing.
- We will beat any advertised Micropolis price.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>Brand</th>
<th>Cache</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3Gig</td>
<td>23ms</td>
<td>HP</td>
<td>512K</td>
<td>$2399</td>
</tr>
<tr>
<td>1.3Gig</td>
<td>19ms</td>
<td>Maxoptix</td>
<td>4MB</td>
<td>$2489</td>
</tr>
</tbody>
</table>

Includes formatting software, 1 disk, and cables. 230MB Fujitsu and 650MB HP models also in stock.
## Hard Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Size</th>
<th>Access</th>
<th>Warranty</th>
<th>Media</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONNER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2GIG</td>
<td>3.5&quot;</td>
<td>8MS</td>
<td>Elite 9</td>
<td>$1145</td>
</tr>
<tr>
<td></td>
<td>2.2GIG</td>
<td>3.5&quot;</td>
<td>9.5MS</td>
<td>Elite 8</td>
<td>$1200</td>
</tr>
</tbody>
</table>

* 1 YEAR WARRANTY

<table>
<thead>
<tr>
<th><strong>FUJITSU</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>240MB*</td>
<td>2.5&quot;</td>
<td>14MS</td>
<td>$315</td>
<td>$375</td>
</tr>
<tr>
<td></td>
<td>1.2GIG</td>
<td>3.5&quot;</td>
<td>8.5MS</td>
<td>$695</td>
<td>$755</td>
</tr>
</tbody>
</table>

* 5 YEAR WARRANTY

<table>
<thead>
<tr>
<th><strong>Seagate</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.2GIG</td>
<td>3.5&quot;</td>
<td>9MS</td>
<td>ST31200N</td>
<td>$715</td>
</tr>
<tr>
<td></td>
<td>2.4GIG</td>
<td>3.5&quot;</td>
<td>9MS</td>
<td>ST12400N</td>
<td>$1315</td>
</tr>
<tr>
<td></td>
<td>2.56GIG</td>
<td>3.5&quot;</td>
<td>8MS</td>
<td>Barracuda 2</td>
<td>$1440</td>
</tr>
<tr>
<td></td>
<td>3.4GIG</td>
<td>5.25&quot;</td>
<td>10MS</td>
<td>Elite 2</td>
<td>$1999</td>
</tr>
<tr>
<td></td>
<td>4.1GIG</td>
<td>3.5&quot;</td>
<td>8MS</td>
<td>Barracuda 4</td>
<td>$2335</td>
</tr>
<tr>
<td></td>
<td>9.0GIG</td>
<td>5.25&quot;</td>
<td>11MS</td>
<td>Elite 9</td>
<td>$3995</td>
</tr>
</tbody>
</table>

* 5 YEAR WARRANTY

<table>
<thead>
<tr>
<th><strong>Quantum</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.0GIG</td>
<td>3.5&quot;</td>
<td>9MS</td>
<td>E1080S</td>
<td>$770</td>
</tr>
<tr>
<td></td>
<td>2.2GIG</td>
<td>3.5&quot;</td>
<td>9.5MS</td>
<td>E2160S</td>
<td>$1280</td>
</tr>
</tbody>
</table>

* 5 YEAR WARRANTY

<table>
<thead>
<tr>
<th><strong>Fujitsu</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>240MB*</td>
<td>2.5&quot;</td>
<td>14MS</td>
<td>$315</td>
<td>$375</td>
</tr>
<tr>
<td></td>
<td>1.2GIG</td>
<td>3.5&quot;</td>
<td>8.5MS</td>
<td>$695</td>
<td>$755</td>
</tr>
</tbody>
</table>

* 5 YEAR WARRANTY

## Optical Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Media</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONNER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3-2GIG</td>
<td>DDS-2 4MM</td>
</tr>
<tr>
<td></td>
<td>1.3-5GIG</td>
<td>DDS-2 4MM</td>
</tr>
<tr>
<td></td>
<td>1.3-10GIG</td>
<td>DDS-2 4MM</td>
</tr>
</tbody>
</table>

* 5 YEAR WARRANTY

## Optical Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Media</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantum</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.36GB</td>
<td>$999</td>
</tr>
<tr>
<td></td>
<td>2.2GB</td>
<td>$2279</td>
</tr>
</tbody>
</table>

* RAID Systems

## Tape Backup Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Media</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONNER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>250MB</td>
<td>DDS-2 4MM</td>
</tr>
<tr>
<td></td>
<td>520MB</td>
<td>DDS-2 4MM</td>
</tr>
<tr>
<td></td>
<td>1.3-2GIG</td>
<td>DDS-2 4MM</td>
</tr>
<tr>
<td></td>
<td>1.3-6GIG</td>
<td>DDS-2 4MM</td>
</tr>
<tr>
<td></td>
<td>4.0-6GIG</td>
<td>DDS-2 4MM</td>
</tr>
<tr>
<td></td>
<td>1.3-5GIG</td>
<td>DDS-2 4MM</td>
</tr>
<tr>
<td></td>
<td>4.0-10GIG</td>
<td>DDS-2 4MM</td>
</tr>
</tbody>
</table>

* 2 YEAR WARRANTY

## Software

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Media</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SEAGATE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2GB</td>
<td>$949</td>
</tr>
<tr>
<td></td>
<td>2.4GB</td>
<td>$1315</td>
</tr>
<tr>
<td></td>
<td>3.5GB</td>
<td>$1440</td>
</tr>
<tr>
<td></td>
<td>5.25GB</td>
<td>$1999</td>
</tr>
</tbody>
</table>

* 5 YEAR WARRANTY

## RAID Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Media</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FUJITSU</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.0GIG</td>
<td>$1399</td>
</tr>
<tr>
<td></td>
<td>2.0GIG</td>
<td>$1999</td>
</tr>
<tr>
<td></td>
<td>6.0GIG</td>
<td>$3899</td>
</tr>
</tbody>
</table>

* RAID Systems

## Monitors

<table>
<thead>
<tr>
<th>Model</th>
<th>Resolution</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SONY</strong></td>
<td>GDM-17SE1 17&quot;</td>
<td>$1059</td>
</tr>
<tr>
<td></td>
<td>GDM-20SE1 20&quot;</td>
<td>$1899</td>
</tr>
<tr>
<td></td>
<td>GDM-26SE1 26&quot;</td>
<td>$2299</td>
</tr>
<tr>
<td></td>
<td>GDM-30SE1 30&quot;</td>
<td>$3099</td>
</tr>
<tr>
<td></td>
<td>GDM-35SE1 35&quot;</td>
<td>$3799</td>
</tr>
</tbody>
</table>

* 240 pages

## CD Roms

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SONY</strong></td>
<td>$2259</td>
</tr>
<tr>
<td></td>
<td>$365</td>
</tr>
<tr>
<td></td>
<td>$267</td>
</tr>
<tr>
<td></td>
<td>$3250</td>
</tr>
</tbody>
</table>

* 128MB Optical $28

## Media

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SONY</strong></td>
<td>$599</td>
</tr>
<tr>
<td></td>
<td>$499</td>
</tr>
<tr>
<td></td>
<td>$205</td>
</tr>
<tr>
<td></td>
<td>$799</td>
</tr>
</tbody>
</table>

* 1gig $999
$218

Teleport Gold
External Fax/Modem
- V.42 error correction/data compression
- 1.440 kbps data speed
- Ideal for use with AppleTalk Remote Access
- Includes Global Fax DCR software

Global Village #06267

$1,877

radius
Intellicolor Display/20e
- 1600x1200 at 63Hz maximum resolution
- Energy Star and VESA compliant
- On-the-fly resolution switching
- Trinitron flat tube
- Includes Radius Intellicolor software

Radius #06518

$1,898

Coolscan
- Single-pass slide scanner
- Up to 20dpi
- 24 bit color or monochrome
- Includes Nikon scan software and Photoshop plug-in

Nikon #06926

Call MAC BARGAINS before you buy!
1-800-619-9091

Better than ground shipping.
Overnight delivery only $6 and up.

Great deals available with the Mac in stock. Mac experts on the phone for overnight delivery. Orders over $100 charged actual freight cost for overnight delivery. Packaging and handling is $15 per order. Nikon taxes vary with a sales tax. Please ask about taxes. Conditions apply. Please inquire for more details.
Lowest Price Ever on IntelliColor 20E!

The next generation in professional two-page displays, the Radius IntelliColor Display 20E offers Trinitron technology, color temperature control enabling complete, accurate color control and "on-the-fly" resolution. Compatible with most built-in video on Quadras, Centris and PowerMac models, the IntelliColor 20E delivers 832x624 and 1152x870 resolutions. The display meets all Swedish MPR II ergonomic guidelines and offers a bonded anti-glare panel and electromagnetic shielding. The IntelliColor 20E display extends unmitigated control over your desktop and gives you the sharpest picture possible for your Macintosh.

IntelliColor Multi 20E .......... $1973
Precision Color 17/21* 999/2110
LeMens GT (NEW!).............. 1899
Precision Color 20V ............ 1449

IntelliColor Multi 20E .......... $1973
Precision Color 17/21* 999/2110
LeMens GT (NEW!).............. 1899
Precision Color 20V ............ 1449

IntelliColor Multi 20E .......... $1973
Precision Color 17/21* 999/2110
LeMens GT (NEW!).............. 1899
Precision Color 20V ............ 1449

IntelliColor Multi 20E .......... $1973
Precision Color 17/21* 999/2110
LeMens GT (NEW!).............. 1899
Precision Color 20V ............ 1449
DiiMOCache™........... $137 / 210

World's fastest tape drive.

BOTTOM LINE
1-800-622-3475
DISTRIBUTION
/eU11c is the most economical way to refill your ink jet printers. It provides over 50% savings.

- 2P High Capacity Black...... 19.99
- 500c/550c/650c/310 8Pk 55.95

Apple Color Printer 2P Black...... 22.95
Cyan/Yellow/Magenta...... 29.95

APPLE

HEWLETT PACKARD

ScanJet 1c ........ $999
DeskWriter 310 ...... 299
DeskWriter 520 ...... 325
DeskWriter 580c ...... 579
LaserJet 4ML ......... 1029
LaserJet 4MP ......... 1395

14.4 Mac Package ...... $205
14.4 LC ........ 149
14.4 Powerbook ...... 219
28.8 Mac Package ...... 299

Magic Hard Drives

Magic 240 External ...... $299
Magic 1.0 GB Ext. 9 ms ...... 799
Magic 2.0 GB Ext. 9 ms ...... 1199
Active Terminator ...... 39

Global Village

Memory

Mercury .............. $275
Gold .............. 229
Teleport Bronze II ...... 93
One World Fax ...... 793
Duo Mercury ...... 319
Duo Software ...... 74

Apple

PowerPC 6100 as low as ...... $1659
PowerPC 7100 as low as ...... 2599
PowerPC 8100 as low as ...... 3859
5610 8/ 160 DGS Compatible ...... 1505
Blackbird 520 4/160 ...... 2240
540c 4/160 ...... 2850
540c 4/320 ...... 4520
DGR Keyboard W/Purchase ...... 59

- Bottom Line carries the full line of Apple products.
- Leasing available from $49/month.
- Custom configurations available.

99.99

ScansJet IIc x ........ $999
DeskWriter 310 ...... 299
DeskWriter 520 ...... 325
DeskWriter 560c ...... 579

SU/NL Corporation

14.4 Mac Package ...... $205
14.4 LC ........ 149
14.4 Powerbook ...... 219
28.8 Mac Package ...... 299

Magic Fax Modems

Magic 28.8 V. Fast Class ...... $199
Magic 14.4 Data/ FaxModem ...... 99
With Voice Mail .......... 169

High Speed Modem Cable ...... 15

Magic Powerbook Int. Modems

14.4bps Data/FaxModem ...... 99
24/96 Data/FaxModem ...... 79

All FaxModem compl

Quantum 270 LPS ...... $278
Quantum 340 LPS ...... 330
Quantum 540 LPS ...... 428
Quantum 540 EmpireSCSI 3 ...... 999
Quantum 1080 Empire SCSI 3 ...... 807

Call us about custom configurations

Magic 1GB RAID Upgrade

for the Power PC 8100

features of your

Utilize the advanced SCSI

PowerPC to the fullest with the

Magic 1GB RAID Upgrade, the ideal

solution for desktop video on the

PowerPC. This system is compatible

with SCSI 1,2 and SCSI Manager

4.3. RAID upgrades come with soft-

ware and cables.

Upgrade External

1.0GB RAID ...... $799
2.0GB RAID ...... 1495
4.0GB RAID ...... 2499
8.0GB RAID ...... 4995
Software ...... 190/599

Magic Modems

Magic 128 Optical Drive

Faster than the Fujitsu

Twice the warranty

World's fastest tape drive.

Backup 2GB of
data on a single tape in
under 30 minutes. The
SuperTape drive uses the QIC
minicartridge format, and is
100% SCSI-2 compatible. Each
drive comes with Retrospect 2.1
and a two year warranty.

Magic 2GB SuperTape

699!

Magic 128 Optical/Turbo $739/838
Magic 230 Optical ...... 899
Magic 266 Optical/Turbo $899/999
Magic 1.3GB /Turbo $2299/2399
128 MB Carts/10 Pack...... 27/240
230 MB Carts ...... 49
256 MB Carts/10 Pack ...... 65/590
1.3 GB Carts ...... 135

New Hours! Mon-Fri 8 am to 5 pm
Sat & Sun 9 am to 1 pm

TO ORDER FROM BOTTOM LINE: Call 1-800-622-8721.
Payment: Visa, Mastercard, Discover, American Express. No surcharge on credit card orders. Tax: Texas residents add 8% sales tax. Prices: Items and prices subject to change and availability. Terms: Net 30 available. Shipping: minimum $4 UPS Ground. Blue, Red, & Airborne. Returns: All returns must be in original condition and packaging and require an RMA number. No returns will be accepted after 30 days of purchase. No special orders or custom orders are serviced. Bottom Line Distribution cannot be responsible for errors in typography or photography. All brands and product names are trade marks of their respective holders.

Circle 63 on reader service card

MACWORLD October 1994 223

1-800-262-3475 Ph. 512-892-4070 Fax. 512-892-4455
On the Internet: sales@max.dgr.com

International Orders: Bottom Line provides the extra level of support international clients require. 24-hour international fax line. 220volt versions of most hardware, discount rates and customs brokerage available via DHL. 2-3 DAY DELIVERY available to most countries.

Bottom Line Distribution cannot be responsible for errors in typography or photography. All brands and product names are trade marks of their respective holders.

International Sales
Low Price Guarantee
Over 18,000 Products
Open 7 Days A Week
PC + Mac
Now Shipping on Saturday

B104MW

1-800-622-3475

Ph. 512-892-4070 Fax. 512-892-4455
On the Internet: sales@max.dgr.com

International Orders: Bottom Line provides the extra level of support international clients require. 24-hour international fax line. 220volt versions of most hardware, discount rates and customs brokerage available via DHL. 2-3 DAY DELIVERY available to most countries.

Bottom Line Distribution cannot be responsible for errors in typography or photography. All brands and product names are trade marks of their respective holders.

Circle 63 on reader service card

1-800-622-3475

Ph. 512-892-4070 Fax. 512-892-4455
On the Internet: sales@max.dgr.com

International Orders: Bottom Line provides the extra level of support international clients require. 24-hour international fax line. 220volt versions of most hardware, discount rates and customs brokerage available via DHL. 2-3 DAY DELIVERY available to most countries.

Bottom Line Distribution cannot be responsible for errors in typography or photography. All brands and product names are trade marks of their respective holders.

Circle 63 on reader service card

1-800-622-3475

Ph. 512-892-4070 Fax. 512-892-4455
On the Internet: sales@max.dgr.com

International Orders: Bottom Line provides the extra level of support international clients require. 24-hour international fax line. 220volt versions of most hardware, discount rates and customs brokerage available via DHL. 2-3 DAY DELIVERY available to most countries.

Bottom Line Distribution cannot be responsible for errors in typography or photography. All brands and product names are trade marks of their respective holders.

Circle 63 on reader service card

1-800-622-3475

Ph. 512-892-4070 Fax. 512-892-4455
On the Internet: sales@max.dgr.com

International Orders: Bottom Line provides the extra level of support international clients require. 24-hour international fax line. 220volt versions of most hardware, discount rates and customs brokerage available via DHL. 2-3 DAY DELIVERY available to most countries.

Bottom Line Distribution cannot be responsible for errors in typography or photography. All brands and product names are trade marks of their respective holders.

Circle 63 on reader service card

1-800-622-3475

Ph. 512-892-4070 Fax. 512-892-4455
On the Internet: sales@max.dgr.com

International Orders: Bottom Line provides the extra level of support international clients require. 24-hour international fax line. 220volt versions of most hardware, discount rates and customs brokerage available via DHL. 2-3 DAY DELIVERY available to most countries.

Bottom Line Distribution cannot be responsible for errors in typography or photography. All brands and product names are trade marks of their respective holders.
OLYMPUS

OLYMPUS IMAGE SYSTEMS, INC.

Olympus

Deltis

230MO Rewriteable

Optical Drive  .  $999

This 3.5 inch MO Drive
reads, writes, and
formats 128 magneto-
optical cartridges and comes
with:

• 1 - 230MB 3.5" magneto-optical cartridge
• Formatter Five formatter and driver software and DOS Mounter software
• SCSI Cable
• 2 year warranty
• Reads, writes and formats 128 cartridges!

The Deltis 230MO drive is the fastest 3.5" MO Drive with a
28ms seek time and sustained transfer rate of up to 1.72MB/Sec.

Olympus Deltis 1300MO Optical Drive  .  $2799

Bottom Line Distribution

offers the best deals on
software available!

Adobe Illustrator 5.5 ...... 399
Adobe Photoshop 2.5.1......499
Aldus PageMaker 5.0........499
Fractal Printer ............239
Fractal 2X ..................75
Freehand 4.0 ...............369
Infini-D 2.6 PowerPC ......780
Macromind Director 4.0 ....789
MS Excel 4.0 .............279
MS Office 3.0 .............410
MS Word 5.1 ..............269
Quark 3.3 .................549
Studio Pro ...............679
Connectix RAM Doubler ....54
QuickKeys Single User ....104
Powerpoint 3.0 for Mac ....48.94
Suitcase 2.1.3 for Mac ....48.94
Kais PowerTools v2.0 .......99
MS FoxPro for Mac .......94.50
FWB Hard Disk Tool Kit ......126
Sam 3.5 for Mac ...........63
Soft Windows PC ...........287
CD-ROM

7th Guest ................51
Flying Nightmares PowerPC ....55
Iron Helix .................59
The Journeyman Project ......59
Myst ......................51
PBA Tour Golf II ..........60
NFL Magazine ............25
Hilarious .................25
Journey to the Yangtze ..37

Bottom Line Distribution

offers the best deals on
software available!

Adobe Illustrator 5.5 ...... 399
Adobe Photoshop 2.5.1......499
Aldus PageMaker 5.0........499
Fractal Printer ............239
Fractal 2X ..................75
Freehand 4.0 ...............369
Infini-D 2.6 PowerPC ......780
Macromind Director 4.0 ....789
MS Excel 4.0 .............279
MS Office 3.0 .............410
MS Word 5.1 ..............269
Quark 3.3 .................549
Studio Pro ...............679
Connectix RAM Doubler ....54
QuickKeys Single User ....104
Powerpoint 3.0 for Mac ....48.94
Suitcase 2.1.3 for Mac ....48.94
Kais PowerTools v2.0 .......99
MS FoxPro for Mac .......94.50
FWB Hard Disk Tool Kit ......126
Sam 3.5 for Mac ...........63
Soft Windows PC ...........287
CD-ROM

7th Guest ................51
Flying Nightmares PowerPC ....55
Iron Helix .................59
The Journeyman Project ......59
Myst ......................51
PBA Tour Golf II ..........60
NFL Magazine ............25
Hilarious .................25
Journey to the Yangtze ..37

TO ORDER FROM BOTTOM LINE: Call 1-800-622-8721. Payment: Visa, Mastercard, Discover & American Express. No surcharge on credit card orders. Tax: Texas residents add 8% sales tax. Prices: Items and prices subject to change and availability. Terms: Net 30 available. Shipping: minimum $5-UPS Ground. Blue, Red, Federal Express, & Airborne. Returns: All returns must be in original condition and packaging and require an RMA number. Seal must not be opened on software. Returns may be subject to a restocking fee. Original shipping is non-refundable.

Circle 65 on reader service card

224 October 1994 MACWORLD
CD-ROM delivers a world of information on a disc... information that can sharpen your competitive edge — save thousands of man-hours — increase productivity — slash costs — and bolster your bottom line.

CD-ROM Expo is a complete exhibition and conference, giving you an up-close look at a panorama of products and services, and steering you toward the brightest opportunities in CD-ROM publishing and CD-ROM power usage. Here you'll learn about the most useful CD-ROM hardware, software, and services — along with applications for training, sales, marketing, advertising, technical support and documentation, records management/archiving, and much more. If your organization's goal is profitability/productivity, or both — CD-ROM Expo will guide you there, by showing you how to put the enormous POWER of multimedia, digital video and the entire optical publishing industry to work for you!

Across All Platforms

Hundreds of exhibits and a choice of two complete Conference Programs will help you explore the potential of CD-ROM on all platforms and formats — and provide pointers on how to keep from drowning in this sea of opportunity.

Yes, I'd like more information about the 8th annual CD-ROM Expo October 5-7, 1994.
I'm interested in: □ attending □ exhibiting

NAME
COMPANY
ADDRESS
CITY STATE ZIP
TELEPHONE FAX

Send to: CD-ROM Expo '94, 260 Milton St., Dedham, MA 02026 or fax to: 617-361-3389 phone: 617-361-0817
Precision Color Display 21
- 21 inch flicker free flat square tube
- Adjustable color temperature settings
- Works with most Macintosh built-in video
- 10 square inches larger than 20 inch display
- Microprocessor controls and user adjustments
- Multiple on-the-fly resolutions from 1380x1024 to 1024x768
- 0.28mm dot pitch—15% sharper than a 20 inch Trinitron

$1849

LeMansGT
- Best performance of any interface in its class
- Custom ASIC circuitry for ultra-fast 32-bit Quickdraw acceleration
- Lifetime warranty with overnight replacement
- Multiple on-the-fly resolutions from 1152x970 to 640x480.

FREE! CD ROM Drive!
Until August 31, receive a free NEC Multispin 3xe CD ROM drive with the purchase of the LeMansGT or the PrecisionColor Pro 24X!

$1799

PrecisionColor Pro 24X
- Accelerates screen redraws as much as 3000%
- Compact 7-inch size fits all NuBus slots
- Lifetime warranty with overnight replacement

$1299

PhotoBooster
- Twin AT&T 3210
- Digital Signal Processors (DSPs) running at 66 MHz
- Accelerates over 50 Photoshop filters
- Up to 10 times faster than a Quadra 950

$699

SPECIAL BUNDLE PRICING
- PrecisionColor Display/21 with LeMansGT $3598
- PrecisionColor Display/21 with Pro 24X $3098
- PrecisionColor Display/20V with Pro 24X $2548

Volume Discounts Available!
DISPLA YS

PrecisionColor Display/20 Trinitron from $1499
• 1152x870 to 640x480 • Sony Trinitron quality!
• Runs off built-in video or dedicated video interface

PrecisionColor Display/19 from $1199
• Multiple resolution switching on-the-fly • Compatible with Centris or Quadra built-in video (16 bit on Q350)
• with 24 bit video card — from $1798

RasterOps 20 inch Color Display $1199
RasterOps 20 inch Trinitron $1699

Radius PrecisionColor Display/17 CALL!
• Compatible with built-in video, 1152x870 to 640x480
• on-the-fly resolution changing, 0.26mm Trinitron tube

Sony 17 inch Trinitron $999
• Built-in video compatible

Sony 17" Trinitron w/24-bit video card $1198
Radius 21 inch Grayscale Display $799
Radius 20 inch Grayscale Display $699

PrecisionColor 24X
The Radius PrecisionColor 24X is the "Best Price/Performance Value" (MacUser) 24-bit board on the market!
• $1000 plus savings vs. Thunder/24!

Radius Universal 24XP/24XK $299/599
Radius 8XJ $399

Radius Pivot Cards
SE/30, LCs, Mac II family, Centris & Quadra available

Radius Two Page Display cards CALL
Radius VideoVision from $1299
Radius VideoVision Studio from $2999

$799

$399

$699

$499

$399

Radius PowerView
Allows most Powerbooks and the Classic II to support color grayscale, monochrome displays and projectors.

SuperMac SuperView $299
Similar to PowerView but also supports TV!

$199

$299

$349

$299

WE BUY MACS!!
Please fax list when possible. Corporate, Government, and University PO's welcome. Prices reflect cash discounts. Mastercard, Visa, AMEX, & Discover Card accepted. Lease/Purchase financing available. All returns require RMA number and are subject to a restocking fee. Refused orders subject to a 20% restocking fee.

ROCKETS/ACCELERATORS

Radius Rocket 68040 $399

Radius Rocket 33mhz $799
Radius Rocket 25 $599
Radius Rocket 25i only $399
RocketShare $299
• Multiprocessing on your Mac

33MHz or 40MHz Upgrade for Quadras for the Quadra 550, 550i, 650, 750, 740, and 730.

80MHz Upgrade for Power Macintosh 6100/7100 $299
Accelerate to PowerMac 8100 speed!

$349

$299

$299

$299

Call for Mac Systems and Parts!

CPUs
Quadras CALL
Powerbooks CALL
PowerMac CALL

PARTS
All Apple parts new and used in stock. Advance exchange available.
Motherboards CALL
Power supplies CALL
CRTs CALL

Over 20,000 items/parts in stock, if you don't see it - CALL US!

Consultants/Dealers 817.754.2131
International Sales 817.754.2120
TeleFax 817.754.2345

CRA Systems, Inc.
300 South 13th St.
Waco, TX 76701

MACWORLD October 1994 227
ACT! for Macintosh 1.1 Upgrade
Manage your business relationships more successfully with ACT!—the most powerful contact manager for Macintosh. Featuring a powerful contact database, integrated activity scheduler, full-featured report generator and word processor, and advanced communications tools, ACT! is fully networkable and even includes integrated access to electronic mail. It is simply the best way to manage your business relationships more productively. Proof of ownership required. Call for details.
Publisher: Symantec
Full version of ACT! for Macintosh 1.1
Ask for Item# BUS 0316 $169.95

NEW!
Publisher: Symantec
Full version of ACT! for Macintosh 1.1
Ask for Item# BUS 0316 $169.95

Think of it as a camera for your mind
Adobe Photoshop 3.0 Upgrade
Get even more creative and production control than ever! The improved interface and palette design gives you even better access to your tools. New layers support make image composting easy. Add multiple layers to your image to try out different combinations of placements and graphics, text and special effects without altering the original background image and more.
Publisher: Adobe
Full version of Photoshop 3.0
GRA 0874 $599

PLUS
Get your first
44MB cartridge for only $29.95!
when you buy the 44MB drive
at the same time.
(Total price $228.95)
Item# BND 0361

New Wild & Wacky Modules!
After Dark 3.0 Upgrade
Protect your monitor with After Dark 3.0's 30+ dazzling screen-saving displays. Watch NEW modules like Bad Dog teaching your desktop, test your trivia knowledge in You Bet Your Head or bet at the track with Rat Race. Swim with new Fish or soar with Flying Toasters with Karaoke!
Publisher: Berkeley Systems
Upgrade price is $10 REBATE form manufacturer.
Price without rebate is $29.95.
Call for details.
Item# UTI 0061

Just Released!
SAM 4.0 Upgrade
The best-selling, highest rated virus protection, detection and repair program is now EVEN BETTER! SAM (Symantec AntiVirus for Macintosh) is the worldwide standard in Mac virus protection. Key features: Virus detection & repair, proactive prevention, automatic virus updates, faster scans, custom decontamination disk and much more! Proof of ownership required. Call for details.
Publisher: Symantec
Full version of SAM 4.0:
Ask for Item# UTI 0567 $69.95

Retrospect Remote 2.1
Powerful Mac network backup software for centralized backup and archiving. Create scripts with multiple sources, destinations, and file-selection criteria with ease. Then schedule the scripts so your backups run automatically on any day and at any time. Supports compression, encryption and verification.
Publisher: Dantz Development

Screaming Fast 28.8!
28.8 Fax/Modem
Incredible modem speed at an incredible low price! Magnum 288, manufactured under license by Hayes, is the perfect choice for high-speed data and fax communications with your Mac. Automatic speed, error-control and data compression negotiation let you use powerful features without being a modem expert. Add the convenience and power of a high speed fax and data modem to your Mac today!
Item# DMD 1225
$149.95

The most affordable, full-function keyboard ever!
The Power User105 Extended Keyboard
Work faster and easier with 105 keys, logically arranged for quick typing, cursor movement, and number calculations. The Power User 105 Extended Keyboard also features an ergonomic design.
Item# INP 0336
$69

Microsoft Excel 5.0 Upgrade
Make your work easier, because this excellent spreadsheet program works the way you want it to. Features like Autofill, Autofill & Auto-select simplify common tasks for you. The customizable Toolbar and Shortcut Menus put your favorite commands at your fingertips.
Publisher: Microsoft
Full version of Excel 5.0
BUS 0443 $295

Microsoft Word 6.0 Upgrade
The easy way to do all your word processing.
Word 6.0 has hundreds of features to make creating and formatting all kinds of documents simple. Includes: Auto Correct which corrects misspellings and typing errors, Fully extensible Print Preview displays up to 128 WYSIWYG pages! Customizable toolbars give you easy-step access to tools you use everyday. And there are many more new features.
Publisher: Microsoft
Full version of Word 6.0
WRD 0089 $295
Upgrade price reflects a $30 REBATE direct from manufacturer. Price without rebate is $129. Upgrade rebate expires for 12/31/94.
Call for details.
Item# UPG 0105

Get Microsoft ENCYCARTA
A Complete Multimedia Encyclopedia on ONE CD-ROM!
Now, when you buy any CD-ROM drive and ENCYCARTA from us at the same time, you'll also receive the Space Shuttle and Oceans Below CD-ROMs absolutely FREE!

Powerful Mac network backup software for centralized backup and archiving. Create scripts with multiple sources, destinations, and file-selection criteria with ease. Then schedule the scripts so your backups run automatically on any day and at any time. Supports compression, encryption and verification.
Publisher: Dantz Development

Order toll-free 24 hours a day, 7 days a week! 1-800-255-6227
All the applications you need: Word 6.0, Excel 5.0, PowerPoint 4.0 and a workstation license for Microsoft Mail—that work together as though they’re a single program. New IntelSense® technology lets you set tabs, add bullets, fix typos, or format your document in a single step. Since all the Microsoft Office programs work together seamlessly, you can simply drag and drop items from one program into another. The Cue Card feature provides step-by-step instructions for any task as you work through the job. Publisher. Microsoft Full version of Office 4.2:
Ask for Item BND 0430 $475

THE Mac SUPERSTORE
Upgrade to New Microsoft OFFICE 4.2 for only $239*

All applications you need: Word 6.0, Excel 5.0, PowerPoint 4.0 and a workstation license for Microsoft Mail—that work together as though they’re a single program. New IntelSense® technology lets you set tabs, add bullets, fix typos, or format your document in a single step. Since all the Microsoft Office programs work together seamlessly, you can simply drag and drop items from one program into another. The Cue Card feature provides step-by-step instructions for any task as you work through the job. Publisher. Microsoft Full version of Office 4.2:
Ask for Item BND 0430 $475

To order, call toll-free
1-800-255-6227 (1-800-ALL-MACS)

Call 24 hours a day, 7 days a week.
Inquiries: 908-367-0440 FAX Your Order to: 908-905-9279
Compuserve Code: GMXW

FREE CATALOG SUBSCRIPTION
MW1094
Check the appropriate box(es) to receive your FREE 1-year subscription and mail this coupon to:
1720 Oak Street, P.O. Box 3031, Lakewood, NJ 08701

Name
Address
City State Zip

(Expect to receive your first issue within 4-6 weeks.)
No other company is more qualified to address your educational technology needs!

48 Hour Delivery - on items in our Monthly Sale Catalogs!

Partnership Plus Program
All software only $10 per computer/per title!

Academic Versions
Big savings on top-sellers!

EduFAX!
Free product information from your fax

Educators on Staff
Including over 30 outside sales representatives nationwide

Parent Purchase Program
Schools earn 10% credit on every purchase

K-12 Preview CD-ROM
Preview over 75 top-sellers!

Call for your FREE Catalog

Educational Resources
1550 Executive Drive • Elgin, IL 60123 • Fax: 708-888-8499/8689

Call today for more information on these innovative programs & services!
Quantum 700 MB Pro Drive............Only $455
Hewlett Packard 2.4 GB..............Only $1395
Seagate 2.4 GB Barracuda II..........Only $1465

All ProDirect drives come formatted with the latest SCSI Manager 4.3 copy drive for all of your Windows & Mac needs. Always call for the most competitive pricing on all ProDirect drives.

**MUST ORDERS SHIPPED SAME DAY.**
**NO SURCHARGE ON CREDIT CARDS.**
**NO OUT-OF-STATE SALES TAX COLLECTED**
**30 DAY MONEY BACK GUARANTEE ON ALL DRIVE PRODUCTS.**

**Call 800-524-9952**

---

**QMS PRINTERS**

**Price**

Model | Price
---|---
PS 410 4PPM,300DPI | $1299
PS 860 8PPM,600 DPI, 6117 | $3835
PS 1725 17PPM, 600 DPI, New Price | $4399

---

**TAPE BACKUP DRIVES**

**Capacity** | **Model** | **Media** | **Price**
---|---|---|---
2.5 GB | HP3548A | 4mm | $563
3.2 GB | HP3548A | 4mm | $1055
4-10 GB | HP1539A | 4mm | $1315
20-50 GB | HP1539A Auto Tape Loader | | $3945
2-5 GB | Exabyte 805 | 8mm | $1485
5-10 GB | Exabyte 100 | 8mm | $2155
20-50 GB | Exabyte 100 Auto Tape loader | | $2275

---

**ZERO FOOTPRINT**

40 watt shelled power supply. 110/220 VAC. Works with all 3.5" and 5.25" HD Drives.

**Price**

MicroCAB Vertical Stacking | $75

---

**FULL HEIGHT**

85 watt shelled power supply. 110/220 VAC. Works with all 5.25" Dri

**Price**

MicroCAB Vertical Stacking | $139

---

**EXTERNAL CABINETS**

**Model** | **Price**
---|---
Two, Four, Six, and Eight Bay Cabinets available. CALL FOR QUOTE. All cabinets come with a 25-30 ps Mac system cable. One year warranty on all cabinets.

---

**CALL 800-524-9952**

Fax 24 Hrs. a Day 612-941-1109
Fax International Orders 612-929-2421 • Call 612-941-1805

Business Hours: 8:00am to 7:00pm M-F (CST)

Prices & Specifications subject to change. All trademarks are registered trademarks of their respective companies. Rights not refundable. All offers are subject to a credit check.
The Only Guide You Need to Master the Mac Universe!

**MACWORLD COMPLETE MAC HANDBOOK PLUS CD, 2ND EDITION IS LOADED WITH EXPERT ADVICE, PRODUCT PROFILES AND 100S OF TIPS AND TECHNIQUES**

Here it is: the 800 page all-in-one handbook for all Mac users—beginners to experts, by Jim Heid, one of Macworld magazine’s most popular columnists. From word processing and desktop video, to printers and surge suppressors, this completely updated and expanded guide is your key to mastering the Mac universe. Features a Bonus CD-ROM with over 300MB of dazzling software.

*“Required reading for the power user—and anyone who wants to be one.”* —Frank Casanova, PowerPC Product Manager, Apple Computer, Inc.

Price: $39.95 USA/$52.95 Canada
800 pages

**Order Risk-Free: 1-800-762-2974**
For fastest service, fax your order to (415) 358-1280. Phone 8am to 5pm, PT, or complete and mail the order form. Also available wherever computer books are sold.

---

The Ultimate Mac Reference is Here!

**FIND OUT 1000 THINGS APPLE NEVER TOLD YOU IN MACWORLD MACINTOSH SECRETS**

Here—complete with over 8MB of software—is the fact-rich book you need to get the most out of your Mac. Written by Macworld’s own columnists David Pogue and Joseph Schorr, it features 1000 things Apple never told you, including hundreds of tricks and expert tips. With up-to-date coverage on all the latest Mac models, including the new Performas and Quadras. Also includes over 8MB of the hottest commercial software and shareware—over 40+ programs from Apple, Claris, Bitstream, and more!

"(Macworld) Macintosh SECRETS appears to be the newly definitive Macintosh reference work, replacing the venerable ‘Macintosh Bible’ and Danny Goodman’s graphically stunning but somewhat shallow ‘Macintosh Handbook’—Washington Post.

Price: $38.95 USA/$52.95 Canada, 762 pages

**Order Risk-Free: 1-800-762-2974**
For fastest service, fax your order to (415) 358-1280. Phone 8am to 5pm, PT, or complete and mail the order form. Also available wherever computer books are sold.
Wake Up to Power Mac!

Macworld is the Power Macintosh expert. We cover the latest Mac developments, trends, and product announcements. To find Power Macintosh coverage, and to find it fast, just follow the logo to Reviews, News, and Star Ratings.
Barcode Generation

All the vital features for high-quality barcode production. Compatible with all major page makeup and graphics software. The highest precision barcode package available for the Mac.

Bar Code Readers
For Mac or PC. Connects between keyboard and computer. Works with any software package. All major bar codes supported. $255

Label Printing on Sheets
Version 2.0 of the easy to use PostScript labeling package. Any label size and sheet layout with bar codes, text, graphics, sequential numbering and mail merge.

Label Printing on Reels
The easiest option for printing short-run multi-variation labels on reels with powerful text, graphics, and bar code facilities. Compatible with Zebra thermal printers

Wand Reader $289

SYNEX
BAR CODE PRO
Desk accessories, Quark™ or PageMaker™ add-ons, or fonts create bar code graphics in color. Bar Code Pro™ is an easy-to-use solution for packaging design, labeling, libraries, inventory, or publishing. Versions: UPC, 39, EAN, ISSN, ISBN, 128, POSTNET/FIM, Codabar, MSI, ITF, Pharmacode

NOW IN COLOR
Tel: (800) 447-9639
Fax: (718) 768-3997

INTERNET CALL:
(718) 499-6293

Print Bar Codes is even easier!
Creating precision bar codes is as easy as using a font!

PRINTBAR™ BAR CODE FONTS
- Compatible with virtually any Macintosh application.
- Choose from: • UPC/EAN/ISBN
  • Code 39 • Interleaved 2 of 5
  • POSTNET/FIM
- 90-day money back guarantee.
- "This is the best product of its kind, and it's reasonably priced too."—MacUser review

Wand Reader $255

CODESCAN 3000™ BAR CODE READER
- Comes complete with wand and 5-year warranty.
- Scans information directly into software application.
- Available with laser gun, CCD, badge slot, magstripe options.
- No software required.
- Ready to use in minutes!
- Money back guarantee.

The Recognized Macintosh Bar Code Experts

POS•IM Point-of-Sale • Inventory Management
Ensign Systems, Inc.
(801) 546-1616

POS•IM \Point Of Sale • Inventory Management
The One That Apple Uses

Take Control
Complete Systems Start at
$2,799

Taking control of your business is easy with a system that has been designed and proven by thousands of retailers just like you. POS•IM provides full POS and Inventory Management functionality with the features you need at an outstanding price.

POS•IM
Point-of-Sale • Inventory Management
Ensign Systems, Inc.
(801) 546-1616

POS•IM
Point Of Sale • Inventory Management

American Express
MasterCard
Visa

Mail Order Distribution
Point Of Sale Systems

ORDER ENTRY • BARCODING • MULTI-USER
INVOICING • FAST CASH RETAIL • CREDIT CARD PROCESSING
PURCHASE ORDER • INVENTORY CONTROL • OEM available
EES Companies Inc.

Cash On Your Screen!
Credit Card Authorization & Electronic Deposit Software

MacAuthorize® Single User version
- Automatically authorizes and deposits all credit card sales — individually or in batches.
- Integrate with your sales system via AppleEvents, AppleScript & Import/Export.
- Instant totals, discount rates, reports, receipt printing, database options, etc.

NEW!

MacAuthorize® Hub
Multi-User Server version
- Turn your Macintosh network into a credit authorization network... with one modem!
- Save hundreds, if not thousands of dollars in terminal costs, phone lines, and time.

POS Credit Developers since 1981
800/483-5526 • 408/274-1110 • Tellian Software, Inc

American Express
MasterCard
Visa

The One That Apple Uses
MacLandlord $399
Upgraded version 2.2 now available. Still the easiest-to-use property management program for multiple properties & unlimited units. Includes tenant and unit records, recurring income and expense, check writing, checkbook balancing, printing tenant notices, income and expense ledgers, and much more. Free telephone support. Demo for $25, credited to purchase. Labana Management Company P.O. Box 2037
Dearborn, MI 48123
313/562-6247

HOT SHOPPER PRODUCT CATEGORIES
HELP BUYERS
FIND THE PRODUCTS THEY NEED FAST

![Macworld Shopper](image)

**Macworld Shopper**

**Business Tools**

**Systems & Peripherals**

**Microsoft Office 3.0**

FREE upgrade to 4.0

only: $350.00

**PageMaker 5.0**

only: $469.00

4665 Melrose Ave
Los Angeles, CA 90029
Tel: (213) 466-7775 Fax: (213) 3668-0444

ORDER NOW

(800) 886-0055

CIRCLE 422 ON READER SERVICE CARD

**Image Machines**

1-800-909-7879

1-413-436-8789

Power Macintosh Computers - PowerBooks
Apple - NANAO - NOKIA - Radius - SONY - SuperMac

NONLINEAR VIDEO EDITING & ANIMATION

Data Translation Media 100 - Silicon Graphics INDY

Radius VideoVision Studio version 2.0 - Telecast

Electric Image - CoSA - VIDI Presenter Pro - form-Z

The Animation Stand - YARC - SHADE - STRATA

NO CALIFORNIA SALES TAX! NO PAYMENTS FOR 90 DAYS!

**Limited Advertising Budget?**

Macworld Shopper offers a great way to reach 550,000 active shoppers.

$1,195

Limited Edition Laser Printer

The SX-29000 Fast 600 dpi Laser Printer!

The SX-29000 is a combination of high quality, high-performance products. The printing regime is the popular Canon SK—the same B ppm printing mechanism used in the most popular laser printers.

- 8MB RAM expandable to 16MB
- AWD RISC processor
- 850 x 850 dpi dispatch gray scale
- PostScript® language compatible with 35 built-in scalable fonts using PhoenixPage

Order Toll Free

1-800-225-6116

3481 Arden Road, Hayward, California 94545

INTERNATIONAL COMPUTER & NETWORKING

FON 310-441-9181 = FAX 310-479-0124

10835 Santa Monica Blvd, Suite 102
Los Angeles, CA 90025

CIRCLE 439 ON READER SERVICE CARD

**External Drive Housing**

Full Height 145.00
Half Height 89.00
3.5" Mini Housing 89.00
2.5" Pocket Housing 89.00
- Closed or Open Front Bezel
- Includes FW/8 Software & all necessary cables.
- 110/220 VAC Auto Switching Power Supply
- Full Height Cabinet will hold (2) 3.5" or (2) 5.25" HD Drives

DATAMAX

800-321-4942

2612 Dimension Dr. #220

Lake Forest, CA 92630

Fax: 714-566-6730

MACVENDORS' GIVE & TAKE AND PARTS!

CIRCLE 552 ON READER SERVICE CARD

**Mc-world Shopper**

**1/2 Million Active Buyers**

WHAT THEY ARE LOOKING FOR

IN THE MACWORLD SHOPPER SECTION

CIRCLE 443 ON READER SERVICE CARD

**I-R-M**

1/2 MILLION

ACTIVE BUYERS

FIND

WHAT THEY ARE

LOOKING FOR

IN THE

MACWORLD

SHOPPER SECTION

CIRCLE 483 ON READER SERVICE CARD

For only $27.00!

- Total Memory RECYCLE Solution
- We recycle memory for all Mac models
- Mac & PowerPC SimmSavers® adapters
- One year warranty
- Please Call

CIRCLE 402 ON READER SERVICE CARD

**SimmSaver Technology**

2MX8 SIMM
2MX16 SIMM
2MX32 SIMM
2MX64 SIMM
2MX128 SIMM
- For only $27.00!

1-800-636-7261

CIRCLE 562 ON READER SERVICE CARD

**What can I do with my 2MB SIMMs?**

Table Memory

2MB SIMM $1195.00
2MB SIMM $795.00
2MB SIMM $595.00
2MB SIMM $395.00
For only $29.95!

- SimmSavers® adapters
- One year warranty
- Please Call

CIRCLE 402 ON READER SERVICE CARD

**DEC**

And Always

750 MB HUB

350 MB HUB

900 MB HUB

120 MB HUB

FOR 1ST PLACE! A

IC650 - $920

1-800-426-2512

CIRCLE 439 ON READER SERVICE CARD

**IBM**

They have it all for your

IBM USA

UNIX

SYSTEMS

SOFTWARE

COMMUNICATIONS

APPLICATIONS

IBMTHE10000

1-800-426-2512

CIRCLE 439 ON READER SERVICE CARD
NEW Microsoft Office - $149.00
(Includes MS Word, Excel, Powerpoint & Mail)

NEW NEC CD DRIVE - $99.00
Includes Over $200 Software Free:
T/Maker Clickart 2000 (Over 2000
EPS Images) & FWB CD-ROM
Toolkit & The Merchant

NEW Apple LaserWriter
Select 310
300 dpi, PostScript, 5 pages/minute,
250 Sheet Cassette Tray, Compact Size
$499.00

New Apple Personal LaserWriter LS
300 dpi, 4 Pages/Minute,
50 Sheet Tray, Compact Size
$399.00

New Mac LC II 4/80 $449.00
New Mac LC II 4/80 $499.00
New Mac LC II 4/80 $1,299.00
New Centris 610 4/80 $949.00
New Centris 610 8/230 $1,449.00
New Laserwriter II Engine $499.00
New Apple Mouse II $59.00
New Apple 16" Color Monitor $799.00
New Apple 21" Color Monitor $1,599.00
New Apple Basic Color Monitor $129.00
New Apple One Scanner $429.00
New Ext. Hard Drive Enclosures $69.00
New Extended Keyboards $89.00
Power Mac, PowerBook, Duo's--In Stock
New Microsoft Works (Integrated Software) $49.00

Mac Plus 1/0 $199.00
Mac SE (800K) 1/0 $259.00
Mac SE/30 1/0 $479.00
Mac Classic 2/40 $459.00
**Mac IIX 4/0 $699.00
**Mac IIX 4/80 $799.00
**Mac IIX 5/80 W/CD $999.00
Mac II 1/0 $199.00
Mac IIxi 5/80 $529.00
Mac Icx 1/0 $399.00
Mac Ici 1/0 $579.00
Mac Iiix NuBus Adapter w/FPU $49.00
Apple 12" RGB Display $199.00
Apple 13" RGB Display $325.00
**Epson Color Scanner $399.00

1-800-729-7031  
1150 W. Alameda Dr., Tempe, AZ 85282
(602) 858-0900 / FAX: (602) 858-0811

WE WANT TO BUY YOUR NEW/USED MAC EQUIPMENT

CIRCLE 401 ON READER SERVICE CARD
CALL OUR DIGITAL VIDEO WORKSTATION SPECIALISTS

MULTIMEDIA BLOWOUT

Phillips CD-Rom Recorder ............... CALL
Radius Video Vision Studio ............ $2875
Radius Video Vision Upgrade .......... $1425
RasterOps Movie Pack Pro ............. $2875
RasterOps Pro Upgrade ................. $1395
Medio Pro 100 ......................... Call
Sony Vেeck ....... $1995
Animation Software .................... Call
CALL for pricing on any Multimedia product!

MACINTOSH

Quadra 950 8/10 $2710 6100/60w 8/250 CD $2750
Quadra 800/823 $2456 6100/60w 8/250 CD $2750
Quadra 600 16/16 $3655 7100/60w 8/250 CD $2625
Quadra 605M 16/16 $3546 7100/60w 8/250 CD $2625
Quadra 440/442 (array) $3676 8100/60w 8/250 CD $1890
Quadra 650/650c $2497 8100/60w 8/250 CD $2495
Quadra 650/850 c $2225 9100 AV (any cabling) call
Quadra 680/680c $2150 CALL FOR ANY MAC SYSTEM!

SPECIAL DEALS!

Supermac Thunder 24 .......... $1149
Thunder II GX 1350 .......... $2195
E-Machines T16 II .......... $915
CALL for pricing on any Macintosh Monitor!

PRINT/DIGITAL PROOFING

OSM Color Script .......... $2278
Kodak Color Ease .......... $1925
GCC Color Tune .......... $2258

MAC WORLD

MAC ATTACK

We only sell brand new products. No Tax outside CA. One year warranty.
19801 Ventura Blvd., Woodland Hills, CA 91364. Dealers & International orders welcome.
(818) 719-9200

We guarantee best pricing.
FAX (818) 719-9115

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

WORKSTATION SPECIALISTS

0100 16/500 $3687 6100 24/300 $3877 8100 24/300 $4067
0200 12/400 $2997 6200 16/400 $3187 8200 16/400 $3377
0300 AV 16/400 $3567 6300 12/300 $3757 8300 12/300 $3947
0400 AV 8/150 $3937 6400 10/220 $4127 8400 10/220 $4317
0500 AV 8/225 $4307 6500 8/300 $4497 8500 8/300 $4687

Prices are C.O.D. and subject to change without notice. In business since 1988.

Prices are subject to change - please call for latest pricing. We carry hundreds of items — call for availability.
Your satisfaction is our goal. Prices are C.O.D. and subject to change. International orders and Fax/Online welcome.

Make your PC peripherals Macintosh compatible!

Mediator lets you use your PS/2 style peripherals just as if they were connected directly to your Mac. Use the Cybex AutoBoot™ Commander in conjunction with the Mediator to control a mixture of PCs and Macs from a single keyboard, monitor and PS/2 mouse. Or allow several users to share a Mac with PC-Expander Plus™. With the Mediator, going multiplatform is easy!

• Compatible with most Macintosh computers with detachable monitors
• Supports VGA, SVGA and Macintosh Hires video
• Supports PS/2 style keyboard, mouse or peripherals

For Sun® workstation support, ask about our Mediator for Sun®!

Mediator™ for Macintosh

Cybex Corporation
4912 Research Drive  •  Huntsville, AL 35805 USA
(205) 430-4000  •  FAX (205) 430-4030

We specialize in custom made configurations.

Mac Attack

-cultural currency

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We only sell brand new products. No Tax outside CA. One year warranty.
19801 Ventura Blvd., Woodland Hills, CA 91364. Dealers & International orders welcome.
(818) 719-9200

We guarantee best pricing.
FAX (818) 719-9115

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.

We're professional about selling Macs. No C.O.D. and subject to change without notice. In business since 1988.
Call THE MAC EXPERTS!

Get expert advice from a Macintosh expert.

We can help you with:
- Mac OS X and Mac OS 9
- PowerPC and Intel Macs
- Mac hardware, software, and accessories
- Mac troubleshooting and repair

Call us today for a fast and reliable solution to your Mac problem.

Macintosh Hardware
- PowerMac G4
- PowerMac G3
- PowerBook
- iMac
- Mac Pro
- Mac Mini
- Mac Plus
- Mac SE
- Mac LC
- Macintosh Color Classics

Software & Accessories
- Adobe Creative Suite
- Microsoft Office
- Apple iWork
- Mac App Store
- Apple Services

For custom Mac setup and advice, call us today.

PowerPC Hardware
- PowerMac 7300 9300 8500
- PowerMac 7300 9300 8500
- PowerBook 100 150
- Macintosh Classic
- Macintosh II
- Macintosh LC
- Macintosh Classic II

Software & Accessories
- Adobe Creative Suite
- Microsoft Office
- Apple iWork
- Mac App Store
- Apple Services

For custom Mac setup and advice, call us today.

PowerPC Hardware
- PowerMac 7300 9300 8500
- PowerMac 7300 9300 8500
- PowerBook 100 150
- Macintosh Classic
- Macintosh II
- Macintosh LC
- Macintosh Classic II

Software & Accessories
- Adobe Creative Suite
- Microsoft Office
- Apple iWork
- Mac App Store
- Apple Services

For custom Mac setup and advice, call us today.

PowerPC Hardware
- PowerMac 7300 9300 8500
- PowerMac 7300 9300 8500
- PowerBook 100 150
- Macintosh Classic
- Macintosh II
- Macintosh LC
- Macintosh Classic II

Software & Accessories
- Adobe Creative Suite
- Microsoft Office
- Apple iWork
- Mac App Store
- Apple Services

For custom Mac setup and advice, call us today.

PowerPC Hardware
- PowerMac 7300 9300 8500
- PowerMac 7300 9300 8500
- PowerBook 100 150
- Macintosh Classic
- Macintosh II
- Macintosh LC
- Macintosh Classic II

Software & Accessories
- Adobe Creative Suite
- Microsoft Office
- Apple iWork
- Mac App Store
- Apple Services

For custom Mac setup and advice, call us today.

PowerPC Hardware
- PowerMac 7300 9300 8500
- PowerMac 7300 9300 8500
- PowerBook 100 150
- Macintosh Classic
- Macintosh II
- Macintosh LC
- Macintosh Classic II

Software & Accessories
- Adobe Creative Suite
- Microsoft Office
- Apple iWork
- Mac App Store
- Apple Services

For custom Mac setup and advice, call us today.

PowerPC Hardware
- PowerMac 7300 9300 8500
- PowerMac 7300 9300 8500
- PowerBook 100 150
- Macintosh Classic
- Macintosh II
- Macintosh LC
- Macintosh Classic II

Software & Accessories
- Adobe Creative Suite
- Microsoft Office
- Apple iWork
- Mac App Store
- Apple Services

For custom Mac setup and advice, call us today.

PowerPC Hardware
- PowerMac 7300 9300 8500
- PowerMac 7300 9300 8500
- PowerBook 100 150
- Macintosh Classic
- Macintosh II
- Macintosh LC
- Macintosh Classic II

Software & Accessories
- Adobe Creative Suite
- Microsoft Office
- Apple iWork
- Mac App Store
- Apple Services

For custom Mac setup and advice, call us today.

PowerPC Hardware
- PowerMac 7300 9300 8500
- PowerMac 7300 9300 8500
- PowerBook 100 150
- Macintosh Classic
- Macintosh II
- Macintosh LC
- Macintosh Classic II

Software & Accessories
- Adobe Creative Suite
- Microsoft Office
- Apple iWork
- Mac App Store
- Apple Services

For custom Mac setup and advice, call us today.
**PowerBook Upgrade 250MHz $319 • 170MHz $279**

- IBM 1060MB External (6 ms) SuperFast $749
- Quantum 20/65MB External $89/149
- Quantum 170/270MB External $219/299
- Maxtor 345MB External $529
- Quantum 540MB External $1,629
- Seagate 1.2/2.0 gpl External $789/1,099
- Syquest 80/200 External (w/cart) $379/569
- Syquest 105/270 external (w/cart) $349/569
- Removable cartridges 44mb $491
- 88mb $661
- Compact 3.5 $40 ZFP $42 we carry many cables & connectors.

**PORTABLE STORAGE SOLUTIONS**

- Quantum 170/270MB External $219/299
- Maxtor 345MB External $529
- Quantum 540MB External $1,629
- Seagate 1.2/2.0 gpl External $789/1,099
- Syquest 80/200 External (w/cart) $379/569
- Syquest 105/270 external (w/cart) $349/569
- Removable cartridges 44mb $491
- 88mb $661
- Compact 3.5 $40 ZFP $42 we carry many cables & connectors.

**DIGITAL VIDEO HEADQUARTERS**

- Your #1 Source for Video Vision Studio 2.0 Power PC Ready
- Radius Studio Array Blistering SCSI
- LeMans GT Fastest 24 bit Color Around

**HIGHEST QUALITY LOVIÉL PERIPHERALS**

- 5X CD-ROM NEC Mechanism/FW Drive $799
- Lightning 85 & 170 MB Hard Drives Quantum LPS/Software $1,119/1,899
- Lightning 2.5 GB Seagate Barracuda II/7200 rpm/Fast! $1,739
- Lightning 9 GB Hard Drive Seagate Elite 9/Storage Champ! $3,999

**LOVIÉL**

5599 W. 78th St. Minneapolis MN 55439
800-688-3696 Free Tech Support Visa/MC/Discover

**POWER MACS**

- PowerMac G3 233/250/266/333 MHz $1,599

**FAST MOVING**

- 605 416/60/80/120/170/200 MHz $999
- 416/66/80/120 MHz $799
- 416/66/80/120 MHz Call
- 416/66/80/120 MHz Call
- Multiples 17" $299
- Multiples 20" $399

**QUADRAS**

- 630 650/850 MHz $1,999
- 650 850/120 MHz $1,999
- 650 850/120 MHz $1,999
- 650 850/120 MHz $1,999
- 650 850/120 MHz $1,999
- 650 850/120 MHz $1,999
- 650 850/120 MHz $1,999
- 650 850/120 MHz $1,999
- 650 850/120 MHz $1,999
- 650 850/120 MHz $1,999

**APPLE MONITORS**

- Color Plus 14" $249
- 14" Monitors $299
- 14" AV Monitor $249
- Apple 16" RGB $299
- Apple 16" RGB $299
- Apple 16" RGB $299
- Apple 16" RGB $299
- Apple 16" RGB $299

**NEWGEN**

- Neocore 20E $185
- Neocore 20E $185
- Neocore 20E $185
- Neocore 20E $185
- Neocore 20E $185
- Neocore 20E $185
- Neocore 20E $185
- Neocore 20E $185

**SONY**

- PSX 20/65/120 MHz $1,299
- PSX 20/65/120 MHz $1,299
- PSX 20/65/120 MHz $1,299
- PSX 20/65/120 MHz $1,299
- PSX 20/65/120 MHz $1,299
- PSX 20/65/120 MHz $1,299
- PSX 20/65/120 MHz $1,299
- PSX 20/65/120 MHz $1,299

**APPE PRINTERS**

- StyleWriter I $79
- StyleWriter Pro $99
- Port, StyleWriter $99
- Laser Select 380 $87
- Laser Select 380 $87
- Laser Select 380 $87
- Laser Select 380 $87
- Laser Select 380 $87
- Laser Pro 630 $189
- Laser Select 810 $443

**Mac Storm**

- Call 310-829-9780
- Free Inquiry by fax at 1-800-fax-9553
- Local & Int’l Fax (310)315-1009
- Prices subject to change who notice

**LIMITED ADVERTISING BUDGET**

Macworld Shopper offers a great way to reach 550,000 active shoppers.
### Power Macs 7100, 66MHz

- 8MB/250 MB HD .................. 2595
- 16MB/500 HD/Apple Color HD ....... 2564
- 24MB/1Gig/Quicksilver 88c/Ext. key .... 4177

### Power Macs 6100, 60MHz

- 8MB/160 HD/Apple Color HD ..... 1895
- 16MB/500 HD/Apple Color HD .... 2564
- 24MB/1Gig/Quicksilver 88c/Ext. key .... 4177

### PowerBooks 5700, 66MHz

- 4MB/160 MB HD ............... 2172/2176
- 20MB/320 MB HD ............ 3298/3836

### PowerBooks 5400, 5400c

- 12MB/240 MB HD .......... 3347/4735
- 20MB/320 MB HD ........... 3915/1955
- Duo Dock II ......................... 986

### Apple Printers

- Select 310/320/360 ................ 799/865/1499
- Stylewriter II/Color ................ 299/595

### Apple Monitor, Keypads

- 2071/7 Multiscan .................. 1877988
- 14"/Multiple Scan15 ............... 399/477

### Quadra 6***

- 8MB/240MB ......................... $3332

### PowerBooks 660AV

- 8MB/230MB/CD ..................... 2222/1615

### Power/Price for PowerBooks 145B, 160, 180, 190c

- Hammer Head 860 .................. 3395
- Color Script 210B .................. 4650/1999

### Memory Upgrade

- 2x8 3.5 Half Height ............... $1199
- 3.4gb Elite-3 11 ms 1949 2099
- 9gb Elite-9 11 ms 3985 4100

### F/W & Storage Dimensions

- Disk Array Systems .............. call

### Newgen Imagery Plus

- 8/6L W/Ethernet .................. 3695/3995
- ImagePlus 12 ....................... 5995

### GCC Select Press Printer

- Exabyte Tape Back-Up

- Size: Model Type
- 2 GB ....... 1400c 20mm $1050
- 4 GB ....... 2400c 20mm $1155
- 1-3 1/2 GB ... 8200s 20mm $1559
- 2-4 GB ....... 9200s 20mm $2375

### Sony Monitor

- Memory Upgrade

- PowerBook Duo 210-280c

- (PowerBook 150 also uses Duo simms)
- 3MB/6MB/8MB ........... 155/205/291/3
- 12MB/14MB/20MB .......... 310/310/310

### Quantum

- Empire & Pro Drive

- All drives are tested and come with the latest FW update.

### Apple Hard Drive

- Includes: cable, Retrospect, & a 90 day warranty.

### Seagate

- 3.5 Low Profile

- 3.5 Half Height

- 3.5 Low Profile
**New-Used Macs/Parts/Upgrade**

<table>
<thead>
<tr>
<th>Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfora 200 4/80</td>
<td>$599.</td>
</tr>
<tr>
<td>Mac llvx 4/230</td>
<td>$1,049.</td>
</tr>
</tbody>
</table>

**UPGRADES**

- Ic1 to Ic1: $399
- Personal NT to NTR: $258
- If FDD ROM: $395
- Laserwriter to Lwriter Plus: $399, Mac 512K to plus: $99
- SE to SE30 board: $995

**PRINTERS**

- Imagewriter II: $299
- Stylewriter: $299
- Imagewriter LQ: $429
- Laserwriter lint: $749
- Laserwriter llmx: $699
- Personal Lwiter LS: $498
- Personal Lwiter NT: $849
- Personal Lwiter NTR: $779.

**SYSTEMS**

- Classic 4/40: 499
- Classic II 4/80: 649
- Ii 1/10: 529
- Ic1 0/10: 499
- Ic1 0/80 (NEW): 599
- Ic1 0/400: 699
- Quadra 700 4/0: 1,399
- Quadra 900 0/0: 1,799
- Quadra 950 0/0 (NEW): 2,599
- Quadras: Case A

**PowerBooks**

- Mac ll and power supply: $149
- Mac llx: $199
- Mac se: $299
- Mac Classic: $49
- Mac LC: $99

**MONITORS**

- Apple 12" mono: $189
- Apple Basic Color: $169
- Apple 12" color: $229
- Performa Plus (NEW): $279
- Apple Portastil: $249
- Radius Mono Pivot: $249
- Radius Color Pivot: $349
- Radius Perension/20: $1,099

**Clearance Sale!!**

- 93 SC-2 with Keyboard, "Fun House": $295
- 92 SE Power Supply: $165
- 93 SE Power Supply & case: $145
- 93 SE Matte Slat On Hard Drive: $139
- 93 SE 1.44 Floppy Drive: $159
- 93 SE Laserwriter Plus ROM Upgrade: $96
- 92 Laserwriter Plus ROM upgrade: $96
- Powerbook 140/10 Battery: $35
- 12" Monochrome monitor: $165
- LC Logic: $65
- Mac Kids Power Supply & Case: $199
- Mac Kids Mouse: $49
- 48 Mb Internal Mac Port: $225
- 5.25 External FC Drive: $55
- SC-200 Hot Swap Power Supply: $49
- Portable Battery Recharger: $49
- 93 SE 14" Internal Mac STM/16K: $375
- 1200 Sd Personal Monitor: $99
- 92 SE 2.5 Internal Mac STM/16K: $28
- 10" Ethernet Board: $49
- 10" X Key kit: $65
- 92 SE 3/5 Key Kit: $85
- 92 SC-200 Internal Hard Drive: $99
- Powerbook 2400 Fast Internal Modem: $99
- 30" External Hard Drive: $189
- Core & Power Supply/Mac STM/16K: $99
- Classic Power Supply: $99
- Classic Logic: $95
- Classic Keyboard: $99
- Mac Porable X Key Kit: $29
- Personal SC Logic Board: $29
- 3/5" Internal Mac STM/16K: $99
- Classic Logic: $95
- Mac Plus: $39
- Mac Plus: $39
- Mac Plus: $39
- Mac Plus: $39
- Mac Plus: $39
- Mac Plus: $39
- Mac Plus: $39

**Cases**

- LC 4/80 (keyboard & monitor extra) $499

---

**Shreve Systems**

1200 Marshall St, Shreveport LA 71101
FAX 318-42~sn1
Tech 318-42~1sa1

---

**C.R.I. INC.**

Best Selection...Best Service!

1 800 275-9924
IN NY 516 737-0800 FAX 516 737-0923

---

**PowerPC & BLACKBIRDS ARE HERE!**

**Quadras**

- Quadra 900 0/0: $7,999
- Quadra 900 0/0: $7,999
- Quadra 950 0/0: $2,599
- Quadra 950 0/0: $2,599
- Quadra 950 0/0: $2,599
- Quadra 950 0/0: $2,599
- Quadra 950 0/0: $2,599

---

**Powerbooks**

- Powerbook 140: $399
- Powerbook 170: $399
- Powerbook 170: $399
- Powerbook 2400: $399
- Powerbook 2400: $399
- Powerbook 2400: $399
- Powerbook 2400: $399
- Powerbook 2400: $399

---

**SYSTEMS & PERIPHERALS**

**Macworld Shopper**

---

**SOMETHING FOR NOTHING**

While Mac outifts come and go, we just keep on doing what we do best. We've been refurbishing and selling used computers for 11 years. Your satisfaction is guaranteed with us.

1-800-800-0999

---

**CIRCUIT SYSTEMS**

New and Used Macs & more

NEW OWNERY EXTEDED WARRANTY

APPLE SUPERDRIVE: $149

---

**COMPU AGE**

THE SOURCE TO MACINTOSH WORLD

---

**CIRCLE 425 ON READER SERVICE CARD**
Call now! We have all sizes of memory for the new Blackbird PowerBooks!

### Standard SIMMs
- 1 Megabyte: $35.00
- 2 Megabytes: $75.00
- 4 Megabytes: $137.00
- 8 Megabytes: $290.00
- 16 Megabytes: $559.00

### Video RAM
- 4 Bit to 8 Bit Upgrade (Mac IIfx cards): $24.00
- 256K Quadra 700/900, Performa 480 VRAM: $18.00
- 256K Quadra, LC 320 VRAM: $19.00
- 256K Classic, LC III, Performax VRAM: $19.00
- 512K VRAM for LC, LCII, LCIII, iMac, iMac DuoDeck, and Performa: $36.00

### 68832 FPU Boards
- 25 MHz for Macintosh LC: $55.00
- 20 MHz w/2 slots for Mac IIfx: $119.00
- 25 MHz for Mac Classic II: $55.00

### Cache Cards, Etc.
- 128K Cache Card for LC III and Performa 450: $159.00
- w/25 MHz FPU: $209.00
- IIfx 64K Cache Card: $159.00
- IICl 64K Cache Card: $125.00
- IIfx 2-slot Card and 68832: $119.00

### Math Coprocessors
- 68832 16 MHz FPU: $39.00
- 68832 20 MHz FPU: $45.00
- 68832 25 MHz FPU: $49.00
- 68832 33 MHz FPU: $59.00
- 68832 50 MHz FPU: $99.00
- 68831 16 MHz FPU: $42.00

### Miscellaneous
- LaserWriter Pro 810 4 MB upgrade: $275.00
- LaserWriter Pro 810 8 MB upgrade: $499.00
- T.I. MicroLaser 1 MB: $69.00
- Mac Classic 1 MB Board: $75.00
- 68831 16MHz PEMU: $89.00
- if requested, MODE 32 software included free w/ PEMU
- Mac Portable 3 MB Card: $309.00
- Mac Portable 4 MB Card: $399.00
- Mac Portable 5 MB Card: $499.00

---

### 50MHz Accelerator $445

<table>
<thead>
<tr>
<th>Memory Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Megabyte</td>
<td>215.00</td>
</tr>
<tr>
<td>8 Megabyte</td>
<td>379.00</td>
</tr>
<tr>
<td>16 Megabyte</td>
<td>775.00</td>
</tr>
<tr>
<td>24 Megabyte</td>
<td>1145.00</td>
</tr>
<tr>
<td>32 Megabyte</td>
<td>1475.00</td>
</tr>
</tbody>
</table>

We will buy your old memory at great prices! Call for details.

### PowerBook 500 series Blackbird Memory

<table>
<thead>
<tr>
<th>Memory Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Megabyte</td>
<td>215.00</td>
</tr>
<tr>
<td>8 Megabyte</td>
<td>379.00</td>
</tr>
<tr>
<td>16 MB - Non Composite</td>
<td>$335.00</td>
</tr>
<tr>
<td>32 MB - Non Composite</td>
<td>$399.00</td>
</tr>
</tbody>
</table>

### PowerBook Memory

<table>
<thead>
<tr>
<th>Memory Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MB</td>
<td>89.00</td>
</tr>
<tr>
<td>4 MB</td>
<td>137.00</td>
</tr>
<tr>
<td>6 MB</td>
<td>199.00</td>
</tr>
<tr>
<td>8 MB</td>
<td>265.00</td>
</tr>
<tr>
<td>10 MB</td>
<td>335.00</td>
</tr>
<tr>
<td>12/14 MB</td>
<td>560.649</td>
</tr>
<tr>
<td>20/28 MB</td>
<td>949.1265</td>
</tr>
</tbody>
</table>

### DiiMOCache 50MHz Accelerator

**Price: $445.00**

**Includes:**
- 50MHz Accelerator
- Edge Calculation
- Photoshop Unsharp Mask
- Wood Scroll

---

### Newton PDA Upgrade Products

- 512K Static RAM Storage Card: $275.00
- 1 Megabyte Static RAM Storage Card: $169.00
- 2 Megabyte Static RAM Storage Card: $289.00
- 4 Megabyte Flash Storage Card: $399.00
- 8 Megabyte Flash Storage Card: $749.00
- 16 Megabyte Flash Storage Card: $1375.00

### TOLL FREE TECH SUPPORT

LIFETIME WARRANTY ON ALL MEMORY PRODUCTS

ORDER BY 6:30 PM CST FOR SAME DAY SHIPPING

OVERNIGHT DELIVERY FROM $8.00

**PERIPHERAL OUTLET, Inc.**
327 East 14th, PO Box 2329 - Ada, Oklahoma 74820
405/332-6581 Fax 405/436-2245 - AppleLink-PERIPHERAL
HOURS: Monday-Thursday 7 AM-7 PM CST, Friday 7 AM-6 PM

---

Due to volatility in the market all prices and availability are subject to change without notice.
### MEMORY UPGRADES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1X8X80</td>
<td>$38</td>
</tr>
<tr>
<td>2X8X80</td>
<td>$77</td>
</tr>
<tr>
<td>4X8X80</td>
<td>$138</td>
</tr>
<tr>
<td>4X8X80 II/IIX</td>
<td>$155</td>
</tr>
<tr>
<td>16X8X80 (Low Profile)</td>
<td>$619</td>
</tr>
<tr>
<td>1X8X80FX</td>
<td>$41</td>
</tr>
<tr>
<td>4X8X80FX</td>
<td>$155</td>
</tr>
<tr>
<td>16X8X80FX</td>
<td>$629</td>
</tr>
<tr>
<td>4MB 72Pin (70NS/ 60NS)</td>
<td>$149/$151</td>
</tr>
<tr>
<td>8MB 72Pin (70NS/ 60NS)</td>
<td>$293/$298</td>
</tr>
<tr>
<td>16MB 72Pin (60 NS)</td>
<td>$559</td>
</tr>
<tr>
<td>32MB 72Pin (60 NS)</td>
<td>$1199</td>
</tr>
</tbody>
</table>

### SYQUEST MEDIA

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>44MB Pre-Formatted</td>
<td>$65</td>
</tr>
<tr>
<td>44MB Pre-Formatted</td>
<td>$65</td>
</tr>
</tbody>
</table>

### NETWORKING

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DaynaPort Pocket SCSILink-T</td>
<td>$231</td>
</tr>
<tr>
<td>DaynaPort SCSILink</td>
<td>$247</td>
</tr>
<tr>
<td>DaynaPort SCSILink/PortT</td>
<td>$266</td>
</tr>
<tr>
<td>DaynaPort E/IIT Nubus</td>
<td>$104</td>
</tr>
<tr>
<td>DaynaPort E/LC-T Mac LC Card</td>
<td>$143</td>
</tr>
<tr>
<td>DaynaPort E/SE-T Mac LC Card</td>
<td>$143</td>
</tr>
<tr>
<td>DaynaStar Mini Hub 10Base T</td>
<td>$193</td>
</tr>
<tr>
<td>EqualWave Nubus Card</td>
<td>$99</td>
</tr>
<tr>
<td>EqualWave LC Card</td>
<td>$99</td>
</tr>
<tr>
<td>EqualWave Mac Powerbook Adapter</td>
<td>$278</td>
</tr>
<tr>
<td>EqualMac LC-T</td>
<td>$170</td>
</tr>
<tr>
<td>EqualMac LC-C</td>
<td>$84</td>
</tr>
<tr>
<td>PhoneNet Connector</td>
<td>$28</td>
</tr>
</tbody>
</table>

### ACCELERATORS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daystar Turbo 040 33MHz W/Cache</td>
<td>$795</td>
</tr>
<tr>
<td>Daystar Turbo 040 40MHz W/Cache</td>
<td>$959</td>
</tr>
<tr>
<td>Daystar Turbo 040 128KB Cache</td>
<td>$165</td>
</tr>
<tr>
<td>Daystar 03335W/FPFU</td>
<td>$275/$287</td>
</tr>
<tr>
<td>Daystar 030 50/50 W/FPFU</td>
<td>$415/$457</td>
</tr>
<tr>
<td>Daystar Power PRO Cards</td>
<td>CALL</td>
</tr>
</tbody>
</table>

### VIDEO CARDS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radius</td>
<td>$461</td>
</tr>
<tr>
<td>Precision Color 8XJ Nubus</td>
<td>$461</td>
</tr>
<tr>
<td>Precision Color PRO 24XP Nubus</td>
<td>$461</td>
</tr>
<tr>
<td>Full Page Display 15&quot; Monochrome</td>
<td>$295</td>
</tr>
<tr>
<td>PhotoBooster for Rocket</td>
<td>$666</td>
</tr>
<tr>
<td>PhotoBooster 69040-69</td>
<td>$768</td>
</tr>
<tr>
<td>SuperMac</td>
<td>$510</td>
</tr>
<tr>
<td>Spectrum/24 Series V Nubus</td>
<td>$850</td>
</tr>
<tr>
<td>Spectrum/24 Series PCG Nubus</td>
<td>$850</td>
</tr>
<tr>
<td>Spectrum/8 Series III Nubus</td>
<td>$382</td>
</tr>
<tr>
<td>Video Spigot Nubus 24bit-DAC</td>
<td>$382</td>
</tr>
<tr>
<td>Thunder II Light Nubus 1152x870</td>
<td>$1,701</td>
</tr>
</tbody>
</table>

### POWERBOOK UPGRADES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB 520-540C 4MB/8MB</td>
<td>$259/$459</td>
</tr>
<tr>
<td>PB 520-540C 16MB/32MB</td>
<td>$879/$1709</td>
</tr>
<tr>
<td>PB 140-170 4MB/6MB</td>
<td>$135/$215</td>
</tr>
<tr>
<td>PB 160-180 4MB/6MB</td>
<td>$140/$235</td>
</tr>
<tr>
<td>PB 160-180 8MB/10MB</td>
<td>$259/$335</td>
</tr>
<tr>
<td>PB 165C-180C 4MB/6MB</td>
<td>$135/$229</td>
</tr>
<tr>
<td>PB 165C-180C 8MB/10MB</td>
<td>$317/$393</td>
</tr>
<tr>
<td>PB-200/4MB/8MB</td>
<td>$165/$256</td>
</tr>
<tr>
<td>PB-200 12MB/14MB</td>
<td>$515/$592</td>
</tr>
<tr>
<td>PB-200 20MB/28MB</td>
<td>$390/$429</td>
</tr>
<tr>
<td>PowerBook Tool Kit</td>
<td>$65</td>
</tr>
</tbody>
</table>

### MODEMS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prometheus</td>
<td>$244</td>
</tr>
<tr>
<td>Powerbook Home Office 14.4 Int</td>
<td>$279</td>
</tr>
<tr>
<td>Zoom</td>
<td>$210</td>
</tr>
<tr>
<td>Zoom AMX 2400</td>
<td>$62</td>
</tr>
<tr>
<td>Zoom VFX 14.4x32/64s S/Fax</td>
<td>$118</td>
</tr>
<tr>
<td>Zoom VFX 14.4x32/64s S/Fax</td>
<td>$169</td>
</tr>
<tr>
<td>Hayes</td>
<td>$164</td>
</tr>
<tr>
<td>Optima 144xFax</td>
<td>$403</td>
</tr>
<tr>
<td>Optima 144xFax</td>
<td>$403</td>
</tr>
<tr>
<td>Optima 144xFax</td>
<td>$303</td>
</tr>
<tr>
<td>Optima 288 VFC/FAX Mac</td>
<td>$449</td>
</tr>
<tr>
<td>US Robotics</td>
<td></td>
</tr>
<tr>
<td>Sportster 28.8 Mac &amp; Fax</td>
<td>$232</td>
</tr>
<tr>
<td>Sportster 14.4 Mac &amp; Fax</td>
<td>$152</td>
</tr>
<tr>
<td>Sportster 2400 Mac &amp; Fax</td>
<td>$135</td>
</tr>
</tbody>
</table>

### PRINTERS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbatim</td>
<td></td>
</tr>
<tr>
<td>Verbatim</td>
<td></td>
</tr>
<tr>
<td>Verbatim</td>
<td></td>
</tr>
<tr>
<td>Verbatim</td>
<td></td>
</tr>
</tbody>
</table>

### DRIVES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xtra Drives</td>
<td></td>
</tr>
<tr>
<td>Xtra Drives</td>
<td></td>
</tr>
</tbody>
</table>

### ACCESSORIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wacom</td>
<td>$299</td>
</tr>
<tr>
<td>12x16 UD-Series Tablet</td>
<td>$498</td>
</tr>
<tr>
<td>12x16 UD-Series Tablet</td>
<td>$761</td>
</tr>
<tr>
<td>12x16 UD-Series Standard Surface</td>
<td>$561</td>
</tr>
<tr>
<td>CardDorado Non-Prediction Sema</td>
<td>$52</td>
</tr>
<tr>
<td>4 Button Cursor for UD 12x12</td>
<td>$104</td>
</tr>
<tr>
<td>Premium Leather Case</td>
<td>$142</td>
</tr>
<tr>
<td>Business Traveller Leather Standard</td>
<td>$177</td>
</tr>
<tr>
<td>Leather Notebook Black/Tan</td>
<td>$83</td>
</tr>
<tr>
<td>Samsung</td>
<td></td>
</tr>
<tr>
<td>Samsung</td>
<td></td>
</tr>
<tr>
<td>Samsung</td>
<td></td>
</tr>
</tbody>
</table>

### XTRA MEDIA

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xtra Drives</td>
<td></td>
</tr>
<tr>
<td>Xtra Drives</td>
<td></td>
</tr>
</tbody>
</table>

### PRINTERS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewlett Packard</td>
<td>$6,805</td>
</tr>
<tr>
<td>Deskwriter C5/500C (Color)</td>
<td>$407/$504</td>
</tr>
<tr>
<td>Deskwriter 310/520 (Mono)</td>
<td>$307/$382</td>
</tr>
<tr>
<td>Call for HP Printer Supplies</td>
<td>CALL</td>
</tr>
<tr>
<td>MicroWriter Basic L.E.D. 5ppm</td>
<td>$292</td>
</tr>
<tr>
<td>P25CS/56 L.E.D. 5ppm A</td>
<td>$694/$650</td>
</tr>
<tr>
<td>PRO PS23/55 8ppm</td>
<td>$1,399/$1,572</td>
</tr>
</tbody>
</table>

1075 Bellevue Way N.E. Suite 114
Bellevue, WA 98004 • Phone: (206) 455-0786
Fax your order 24 Hours a day! (206)455-3448

Overnight Delivery - $7 and up / UPS Ground - $6 and up

1-800-553-4230
SOX
FAX 206-454-7302

POWERPC MEMORY

POWERPC, CENTRIS, QUADRA, LC III
4MB/70ns / 4MB/60ns $145
8MB/70ns / 8MB/60ns $254 / $298
16MB/60ns non-composite $539
32MB/60ns $1199

STANDARD 30 PIN MEMORY
1x8x80 $113 / 8x8x80 (I/O) $155
1x8x70 $113 / 8x8x70 (I/O) $157
2x8x80 $113 / 8x8x80 (II/O) $155
2x8x70 $113 / 8x8x70 (II/O) $157
4x8x80 $113 / 16x8x80 (Low Profile) $255
4x8x70 $113 / 16x8x70 (II/O) $155

PRINTER MEMORY
LaserWriter 810 4MB / 8MB $109 / $149
HP 4, 4m 4MB / 8MB $179 / $199
TT PS/17+ 351MB $116

4MB 60ns 72 pin SIMM $145
4MB 60ns 72 pin SIMM $145

SOY

SONY

1.3 / 1.2GB Optical $99
650 / 600MB Optical $99
128MB / 230MB 3.5" Optical $93 / $99
SONY Flippy Disks
3.5" DD / 3.5" HD $77 / $10.50
3.5" HD Pre-Formatted $12

SONY CD-R
650MB / 74 Min. $20
553MB / 63 Min. $19
SONY 4mm DAT
4MM 60M 1.2GB $12
4MM 90M 2GB $13.50
4MM 120M 4GB $24
Cleaning Cartridge $12.50

SONY Floppy Disks
3.5" DD / 3.5" HD $77 / $10.50
3.5" HD Pre-Formatted $12

VERBATIM

128MB 3.5" Optical $90
128MB 3.5" Optical, Apple Format $76
230MB 3.5" Optical $49
600 / 650MB 5.25" Optical (512 b/s / 1024 b/s) $79
1.2 / 1.3GB Optical (512 b/s / 1024 b/s) $105
DC2000 with QIC40 $18.90
DC2080 with QIC50 $16.90
DC2120 with QIC60 $19.50
4MM 90M / 60M $11.50 / $9.90
8MM 112m $10

COMPUTER MEMORY

POWERBOOK MEMORY

POWERBOOK, CENTRIS, QUADRA, LC III
PB140-140-4/6 $42 / $109
PB160-180-4/6/6/10 $139 / $199
PB165C-180C-4/6/6/10 $155 / $232 / $319 / $405
DUO 210 - 280C 4/6/12 $172 / $215 / $315 / $555
DUO 210 - 280C 14/20/28 $995 / $932 / $1430
PB 520 - 540C 4/6/16/32 $119 / $405 / $799 / $1590

POWERBOOK ACCESSORIES

Battery Charger / Conditioner $75
Long Life Battery 140-180c $99
AutomobileAdapter 100-180 / DUO $69
Newer Technology DUO Micro Dock SCsi / Color. $135 / $299
Rasterops Duodock 8 / 16 SC $269 / $359

VIDEO RAM / MPU'S ETC...

WE ALSO CARRY FARALLON

MEDIA

SYQUEST 270MB CARTRIDGES $65

Syquest 4MB Cartridge 1/4/5/9/10+ $59 / $58 / $57
Syquest 8MB Cartridge 1/4/5/9/10+ $69 / $68 / $67
Syquest 105MB Cartridge 1/4/5/9/10+ $62 / $61 / $60
Syquest 200MB Cartridge $79
Syquest 270MB Cartridge 1/4/5/9/10+ $65 / $64 / $63

ROYAL OFFER is for a Limited Time.

OTHER MAC NEEDS

Action 2-Button ADB Mouse $45
Daedalus Mouse 101 Keyboard $120
Kensington Turbo Mouse $106
Costar Stingray Turbo Mouse $85
Port Juggler Serial Switch $75
Wacom ARTZ Tablet $315
Wacom 12 x 12 Digitizer $669

COMPACT MAC TOOLKIT / PB TOOLKIT $6 / $7.50
SIMM Remover (30 pin only) / Grounding Strap $17 / $50
Modem Cable / High-Speed Hand Shaking $70
Printer Cable DIN-8 to DIN-8 / DIN-8 to DB-25 $7.50
Newer Technology VSO Q700 / 900 / 910 / NIFX $107
Wrist Saver Keyboard or Mouse Pad / Bundle $12 / $20
SCSI Cables M2S-M50 18" / M2S-M50 6" $6 / $19
SCSI Cables M50-M50 18" / M50-M50 6" $6 / $19

MODEMS

Supra v.s2bis S/R Fax 14.4 w / C & S $225
Supra V Mail Upgrade (V.32 bis $225 model) $89
Supra v.s2bis S/R Fax 14.4 LC w / C & S $139
Supra 2400 Modem w / C & S $119
Supra 2400 Modem S/R Fax 9600 w / C & S $139
Supra v.s2bis PowerBook 14.4 $225
Supra 28.8 External w / C & S $225
Global Village OneWorld Fax 1 line / 2 line. $59 / $129
Global Village OneWorld Remote Access Server $1639
Global Village Teleport or Powerport (Bronze) $97
Global Village Teleport (Gold) 14,400 $22
Global Village Powerport (Mercury) 19,200 $22
Global Village Powerport (Mercury) 19,200 $22
Mercury for Duo 2xx/PS5XXX $399 / $329
U.S. Robotics Sportmaster 14.4 S/R Fax $169
Prometheus PowerBook 14.4 w / Voice $509
Zoom Pocket 14.4 w / Voice $239
Zoom Modem 28.8 modem $249

SOY

FORMATTED

ON READER SERVICE CARD

WE ALSO CARRY FARALLON & DAYNA NETWORKING PRODUCTS, CABLES, PRINTER SUPPLIES, KEYBOARDS, MICE, SCANNERS. . . . . . CALL US TODAY

FAX 206-454-7302

EDUCATIONAL / GOVERNMENT 1-800-848-1424

Fortune 1000

Companies 1-800-848-1418

CIRCLE 163 ON READER SERVICE CARD
SYQUEST DRIVES ONLY $289

Rumi SyQuest Drives

Rumi 44MB SyQuest (FREE Cartridge) $289
Rumi 88c (R/W 44) SyQuest $409
Rumi 105MB SyQuest (FREE Cartridge) $399
Rumi 200MB SyQuest (FREE Cartridge) $559
Rumi 270MB SyQuest (FREE Cartridge) $559

CD-ROM Bundle Includes
RUMI CD-ROM Drive, Sony Speakers and 4 CD Titles
• World Atlas • Myst • Lynxica
• Where in the World in Carmen Delay

Rumi Hard Drives

Rumi 85MB Internal $299
Rumi 170MB Internal $279
Rumi 270MB Internal $299
Rumi 528MB Internal $945

DAT Drives

Rumi 2.0GB DAT Drive w/ Retrospect (Includes Tape) $1069
Rumi DDS 8/8GB w/ Retrospect (Includes Tape) $1209

DAT Drives

Rumi 2.0GB Ext (Seagate Barracuda) $2269
Rumi Powerbook 210 Int (Toshiba) $369

Optical Drive

128MB Optical Drive Double Speed with TEAC Mechanism $999

Sonic Ether 10T/Thin-II/LC $327
Sonic Micro SCSI PowerBook $237
Sonic FriendlyNet 10T/Thin $198
Sonic HubLite 5 port $145
Sonic PowerBridge $92

Sonic Net Extender Hub 10/17 $179
Sonic Mac Con i-SCSI PowerBook $279
Move In Standalone $179

PaintBoard Professional $1399
RasterOps Clearview $1399
PaintBoard Professional $1399
PaintBoard 20/20 MultiMode $1279

PaintBoard 20/20 $1219
PaintBoard 20/20 MultiScan $2199

PaintBoard Clearview $499
E-Machines Futura ISX $459
Mac Con-i Nubus 10T $159

Mac Con-i Nubus 10T $159
Mac Con-i SC/107 P8 $259

Mac Con-i SC/107 P8 $259
Dayna and Fanimation Products Also Available

Network-Link Devices

3120th Avenue NE, Blvd, Suite 120, Bellevue, WA 98005, (206) 545-7258
1-800-848-8967 THE LLB COMPANY, INC.
## Fall Memory Specials

<table>
<thead>
<tr>
<th>Memory Type</th>
<th>Specification</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC MEMORY - 30 PIN</td>
<td>1x8 - 100</td>
<td>$59</td>
</tr>
<tr>
<td></td>
<td>1x8 - 80</td>
<td>$41</td>
</tr>
<tr>
<td></td>
<td>2x8 - 80</td>
<td>$79</td>
</tr>
<tr>
<td></td>
<td>4x8 - 80</td>
<td>$156</td>
</tr>
<tr>
<td></td>
<td>8x8 - 80</td>
<td>$359</td>
</tr>
<tr>
<td></td>
<td>16x8 - 60</td>
<td>$599</td>
</tr>
<tr>
<td>PC MEMORY - 30 PIN</td>
<td>1x8 - 70 3 chip</td>
<td>$43</td>
</tr>
<tr>
<td></td>
<td>1x8 - 70 9 chip</td>
<td>$47</td>
</tr>
<tr>
<td></td>
<td>4x8 - 70</td>
<td>$159</td>
</tr>
<tr>
<td></td>
<td>16x8 - 70</td>
<td>$709</td>
</tr>
<tr>
<td>PC MEMORY - 72 PIN</td>
<td>1x8 - 3270</td>
<td>$176</td>
</tr>
<tr>
<td></td>
<td>2x8 - 3270</td>
<td>$352</td>
</tr>
<tr>
<td></td>
<td>4x8 - 3270</td>
<td>$638</td>
</tr>
<tr>
<td></td>
<td>Also RAM for Power PPC</td>
<td>$399 (Ext)</td>
</tr>
<tr>
<td>VRAM</td>
<td>4 MB</td>
<td>$159</td>
</tr>
<tr>
<td></td>
<td>8 MB</td>
<td>$256</td>
</tr>
<tr>
<td></td>
<td>16 MB</td>
<td>$32</td>
</tr>
<tr>
<td></td>
<td>32 MB</td>
<td>$1,059</td>
</tr>
<tr>
<td>DRAM</td>
<td>512K VRAM</td>
<td>$6</td>
</tr>
<tr>
<td></td>
<td>4 &amp; 8 BIT</td>
<td>$1</td>
</tr>
<tr>
<td></td>
<td>1MB VIDEO ZIPS</td>
<td>$16</td>
</tr>
<tr>
<td></td>
<td>PMMU</td>
<td>$22</td>
</tr>
<tr>
<td></td>
<td>FPU</td>
<td>$10,5</td>
</tr>
<tr>
<td></td>
<td>MEMORY FOR ALL PRINTERS</td>
<td>1-800-662-SIMM (7466)</td>
</tr>
</tbody>
</table>

---

**Source International**

Silicon Valley's FIRST CHOICE for Computer Memory

(415) 323-6059
Fax (415) 326-3552

---

**Take Your MAC to the MAX**

The biggest speed increase for your money. As seen in MacWorld, March 94.

- **MAX DISK**
  - $99 +
- **MAX QUAD 700, 800, 550**
  - $159
- **MAX 940**
  - $99
- **MAX POWER PC**
  - $139

---

**Source International**

Affordable Upgrade Solutions

101 Linda del Blvd, Santa Monica, CA 90401

(310) 394-1223 Fax (310) 394-7323

---

**Over 1/2 Million Active Buyers FIND WHAT THEY ARE LOOKING FOR IN THE MACWORLD SHOPPER SECTION.**
LIND PowerBook 500 Accessories

- The Multi-Function Power System!
- Performs Battery Diagnostic Tests and Applies Corrective Actions!
- Charges & Conditions Two PB 500 NiMH Batteries!
- Allows Spare Batteries to be used as a Power Source - Compute Times Triple!
- Two Digital LCD Screens show Percent of Power Remaining! • LPC-500 - $249.95

Lind DC Adapter 500
- Charge and Power from an Automobile's Lighter Socket!
- Completely Fused and Regulated! • PB-5 - $99.95

800-897-8994
Fax-On-Demand (612) 927-4671

Lind Electronic Design, Inc.
6414 Cambridge Street • Minneapolis, MN 55426
Tel: (612) 927-6303 • Fax: (612) 927-7740

CIRCLE 433 ON READER SERVICE CARD

Never Lose Your Important Data!
Simply the best program available for updating and backing up files between multiple Macs and disks!

POWER MERC
Synchronize & Backup Files Between
- PowerBook and Desktop
- Home and Office Mac
- Mac and a Second Drive
- Multiple Macs on a Network

CIRCLE 433 ON READER SERVICE CARD

Protect Your Mac

- Motherboard
- All Fabric
- 8 Color Choices
- Ethernet Networking
- Mac/Windows Compatibility
- Mac Memory
- Mac Batteries
- Mac Power Supplies
- 100% Satisfaction Guarantee
- Warranty service since 1983
- Found a lower price? Call us!

CIRCLE 444 ON READER SERVICE CARD

Scandinavian Computer Furniture

Call for free catalog of our lines of PowerTables for Macs starting at $299.

1-800-722-6263

CIRCLE 445 ON READER SERVICE CARD

CIRCLE 433 ON READER SERVICE CARD

Duplication From $4.49

- All Diskette Formats
- Custom Labeling
- Diskette mailers / Accessories
- Assembly Services
- Generous Volume Discounts

Call 800-235-3142 or Fax 800-555-2345

CIRCLE 496 ON READER SERVICE CARD
Save time and energy with MacGrade, the powerful grade manager that's fast, fun and exceptionally easy to use. Great reports and graphs.

**Version 2.2** has separate elementary and secondary/college editions.

Call (800) 795-0641
CalEd Software
P.O. Box 229
360 Carmel, CA 93922

60 Day Unconditional Money Back Guarantee.

Call for FREE Catalog!

Call (800) 795-0641
Call Software
P.O. Box 2313, Camarillo, CA 90222
60 Day Unconditional Money Back Guarantee.

Call (800) 795-0641
Call Software
P.O. Box 2313, Camarillo, CA 90222
60 Day Unconditional Money Back Guarantee.

**STUDENT-TEACHER-SCHOOL DISCOUNTS!**

**LATEST VERSIONS & FULL PACKAGES**

**QUARK XPRE S V3.3 $299**

**PAGEMAKER V5.0 $249**

**POWER PC TITLES AVAILABLE**

4TH DIMENSION 3.1 $499
ASTOUND 1.0 $799
AUTOCAD R12 W/AIME $249
CANVAS 3.5 $175
CLARIS WORKS 2.1 $145
CODA FINALE 3.0 $249
DIRECTOR 4.0 $95
ENCORE 3.0 $299
FILEMAKER PRO 2.1 $45
FRAC TAL PAINTER 2.0 $175
FREEHAND 4.0 $195
KAI’S POWER TOOLS 2.1 $85
LOTUS ORGANIZER 1.1 $59
MAC TOOLS 3.0 $69
MACMODEL 1.5 $45

MANY OTHER TITLES AVAILABLE!!

PHONE (800)289-3275
VISA - MASTERCARD - AMEX - SCHOOL P.O.'S ACCEPTED!!

Call for products by Adobe and Symantec! Microsoft products available to qualified students, teachers and educational institutions.

THE SOFTWARE SOURCE CO, INC.
2517 Hwy 35, Bldg N, Suite 201, Manasquan, NJ 08736
Phone (908) 528-0030 Fax (908) 528-9378

Family Heritage File™
Genealogy. New Version 3.3! Most powerful and easy genealogy program on Mac. Rated “BEST” by Macworld. Designed by genealogy professionals. • Stand alone • Genealogist, Descendants, Family Group, Inheritance, Marriage, Summation. • Unlimited History • Sorted Lists • Export to WAP/data base/modem • GEDCOM compatible • Jewish/DS features. $149 + 5.6% tax. Ask about Family Heritage Bundle. Visa/MC. Demo 57. Free Lit Pak.

StarCom Microsystems
Windsor Park East
25 West 1480 N, Orem, UT 84057
801-225-1480

Family Roots™
Genealogy. Do it YOUR way! Huge variety and capacity for your family history. Make pedigree charts, descendants charts, person sheets, group sheets, indexes and much more. Customize to your own preferences. Standard Mac interface. Call for FREE information. Satisfaction guaranteed.

MC/Visa/AE.
Quinsept
Box 216
Lexington MA 02173
617/641-2930
800/637-ROOT

SOFTWARE YOUR KIDS WILL LOVE!

Over 200 best-selling children's educational software titles for DOS & Mac computers on diskette and CD.

800-338-3844
The Entertainment Catalog

MAC World, October 1994
Bible Book Store On Disk
Full Featured, Fast and Friendly Bible Study software. As the leader in Bible Study software since 1981 we have continued to listen to our customers and provide them with the tools they need. We offer the most comprehensive line of Bible study tools available.

Call for FREE catalog.
Bible Research Systems
2013 Wells Branch Pike #304
Austin, TX 78728
800/423-1228
512/251-7541

Graphic Astrology
Professional quality software for all your astrological needs. Charting programs, interpreters, atlases, fonts! State-of-the-art features, high-resolution output, superior accuracy, for Astrologers and Students of Astrology.

Call or write for FREE catalog!
Time Cycles Research
27 Dimmock Rd Waterford CT 06385
(203) 444-6641 • Fax (203) 442-0625

CD-ROMs
1-800-765-8369
$49.95 each
$5 S/H ($9 Int')

Int'l 801-278-2042
Fax 801-278-2666

Int'l orders@phl.com
AppleLink phl
Pacific HiTech, Inc.
4530 Fortuna Way
Salt Lake City, Utah 84124

CIRCULARS 410 ON READER SERVICE CARD

Disc-Plus SOFTWARE PRICES
1-800-535-5131

CIRCULAR 411 ON READER SERVICE CARD

Success in the New Workplace
by The Ethics Institute

CIRCULAR 412 ON READER SERVICE CARD

OVER 1/2 MILLION ACTIVE BUYERS FIND WHAT THEY ARE LOOKING FOR IN THE MACWORLD SHOPPER SECTION.
**Detailed Networks in Minutes with NetDraw® 2.0!**

With over 330 professionally drawn images, NetDraw® 2.0 gives users immediate access to clip art symbols for LANs, WANs, computing, PCs, telephony and patching and cabling. Also included are flow charting symbols as well as mapping graphics to depict your networks geographically. Available now for just $129.95, NetDraw® 2.0's complete clip art library is easily imported into most Macintosh applications. Call 800-643-4668 to order your copy today!

---

**THE HOEST CARTOON TYPEFACE**

Used in "The Lockhorns" and "What a Guy" comic strips. Includes: HOEST regular, italic, bold & bold italic. Only $299.95. Check/M.O. plus $3.00 shipping & handling available exclusively from: WM. HOEST ENTERPRISES P.O. BOX 1423 HUNTINGTON, NEW YORK 11743 (516) 547-0778 PHONE/FAX!

---

**CADMOVER® - Release 4.0**

New Formats, New Features, & More User Control
- New Formats Include: ClarisCAD, Presenter Professional
- Read MicroStation, Schema & Pro Engineer via EPSF
- No more add-on modules - get DDES2, STL & more free
- Check your drawings with the new Pan & Zoom Feature

So many improvements...so little space...so call for more information.

Call 703, 532, 0213

---

**FontSoftware**

800.248.3668
ADOBE·ACFA·HITSTREAM·LETRASTY·MONOTYPE·URW...from art to text, from small to large, all at low discount prices.

---

**Logo Design Software**

Create logos like this in minutes; sell them for $75 - $500.

Logo SuperPower is a large graphic database. You use one or more "design elements" and modify them to create world-class logos in minutes. There are over 2,000 logo design elements in the full package. Or choose the basic package of 660 elements. For the Mac: Requires Freehand or Illustrator.

Logo SuperPower - basic (660 design elements) ... $119
Logo SuperPower - full (full 2600 design elements) ... $279

To order: call (800) 648-5646

Decathlon Corp. - 4100 Executive Park Dr.
Enid, OK 73701 Phone (513) 421-7028

---

**Macworld Shopper**

Macworld Shopper is a monthly newsletter featuring selected products for Macintosh users. Orders are subject to availability. Macworld Shopper is not responsible for lost or delayed shipments.

---

**Technology Today**

Precision Type
42-4 Midtown, Commack, NY 11725

---

**Unleash the power of MacArt!**

FREE! In your complimentary issue, you'll discover powerful tips, tutorials, demos, reviews and exciting profiles of Macintosh experts. Information you can put to use today! Call or write for your FREE copy now.

1-800-954-4326

---

**Logo SuperPower - full**

(800) 648-5646

Decathlon Corp. - 4100 Executive Park Dr.
Enid, OK 73701 Phone (513) 421-7028

---

**CADMOVER® - Release 4.0**

New Formats, New Features, & More User Control
- New Formats Include: ClarisCAD, Presenter Professional
- Read MicroStation, Schema & Pro Engineer via EPSF
- No more add-on modules - get DDES2, STL & more free
- Check your drawings with the new Pan & Zoom Feature

So many improvements...so little space...

Call 703, 532, 0213
**For the best values in MAC SCIENTIFIC & TECHNICAL SOFTWARE**

- A Design Breakthrough
- Intuitive 3D modeling
- PowerPC Native or 68K
- Easy, fast, intuitive 3D CAD
- Quick draw manipulation
- Sketch in live 3D perspective
- Object-based shadows
- Fit, flip, snap to objects
- Paste into openings
- Sun studies, walkthroughs
- Import/export DMG, PICT, etc.

Call Artifice: 503-345-7421 or fax: 503-346-3526
In Canada: 204-453-8111

---

**For the best values in MAC SCIENTIFIC & TECHNICAL SOFTWARE**

- Care4th® PRO
- An ELECTRONIC MEDICAL RECORD SYSTEM and DATABASE with full point-of-sale support.
- Imagine your entire medical record shelf & much more in a lap or desktop Mac! Utilize clinical data in ways you could never have imagined.
- In 40 states and abroad.
- Care4th® Pro is the gold standard.

---

**For the best values in MAC SCIENTIFIC & TECHNICAL SOFTWARE**

- MACTRAN PLUS Ver.4.5
- Sys 7 Comp INTEGRATED Made-for-Mac Developer System, Inc: Editor, Optimizing Compiler, Source Level Debugger, Linker, Library Mgr, Profiler and Build Facility.
- Supports 68000/65000, 68881 native code. Significant Vax Fortran & ANSI 88 ext. High and Low Level tool box interface. Unhil Code seg size, "I use it at home on my MAC II, on a Quadra in my Lab and on a Powerbook while traveling." Ole Valsen, Consultant Engineer.

---

**For the best values in MAC SCIENTIFIC & TECHNICAL SOFTWARE**

- SLIDES
- From PC & Mac files $3.75
- 4x5 chromes/negs $16
- Dye sub print/overhead $18
- Hi Res Scanning $10

---

**For the best values in MAC SCIENTIFIC & TECHNICAL SOFTWARE**

- MACWORLD SHOPPER
- Offers a great way to reach 550,000 active shoppers.

---

**For the best values in MAC SCIENTIFIC & TECHNICAL SOFTWARE**

- LIMITED ADVERTISING BUDGET?
- Macworld Shopper offers a great way to reach 550,000 active shoppers.
SERVICES & SUPPLIES

**MAC REPAIR**
Mac Shop Northwest

- Apple™ Certified Technicians
- One-Day Service Turnaround*
- Hard Disk Repair & Data Recovery
- Up to 75% below Dealer Rates
- Component-Level Repairs
- Expert Advice and Prices by Phone
- Power Supplies & Logic Boards*
- Lifetime Repair Warranty*

Tel: 1-503-642-3456

---

**DATA RECOVERY**

- Expertise in Macintosh & virtually every operating system & storage device - including tape & removable media
- 24-Hour Worldwide Support with on-site, weekend, and priority service
- Professional Service Authorized by major manufacturers

---

**SAFEBEER**

**Insures Your Computer**

The CompuTech.. Policy insures you against theft, fire, accidental damage, lightning even power surges! Replace or repair for 540 years. Available in the U.S. & Ontario.

Tel: 1-800-800-1492

---

**HUGE POSTSCRIPT FILM OUTPUT UP TO 29" x 43"**

- High Resolution Drum Scans, to Film or Disk
- On Heil 3010 Digital Scanner

---

**DATA RECOVERY**

- We can scan your 35MM slides & negs onto Photo CD
- 24 Hour Turnaround

---

**DATA RECOVERY**

- $19.00!! For all repairs plus parts and shipping. Maximum price guaranteed.
- Super fast turn-around. New and used hardware for sale. School orders welcome. Open 12 noon - 5, 6:30 - 10pm eastern M - Sat.

---

**TRADEMARKS, COPYRIGHTS**

Patents

---

**HIGH IN DEMAND**

- 24-Hour Turnaround Service
- No Recovery Fee
- Macintosh, PC

---

**LTD PATENTS**

- TradeMARKs, COPYRIGHTs

---

**LIMITED ADVERTISING BUDGET?**

Macworld Shopper offers a great way to reach 550,000 active shoppers.
Take the mystery out of your Macintosh computer! Our best-selling "For Dummies" series has helped over 10 MILLION readers learn about computers, system software and even the most complex software applications — the fun and easy way!
Finally, there's a friendly reference for the first time user. Macs For Dummies, 2nd Edition makes you a Macintosh genius by teaching you the basic instruction you need to know, like:
• Common Mac tasks explained in everyday language
• Do-it-yourself maintenance tips
• Comprehensive Macspeak glossary

The #1 Bestselling Computer Book Series!
There are over 75 "For Dummies" titles designed to help you take control of your Mac — and the software that makes it run. To get your copy of Macs For Dummies, or any of our other books call us at 1-800-762-2974 or visit your local bookstore or computer retailer today.

The Fun & Easy Way to Master Your Mac!

Take your pick from over 30 Mac-related titles — call us today for our complete catalog. Here are a few samples from Macworld Press...

Macs For Dummies, 2nd Edition
ISBN: 1-56884-087-X $19.95 USA/$26.95 Canada

Upgrade & Fixing Macs For Dummies
ISBN: 1-56884-039-1 $19.95 USA/$26.95 Canada

PageMaker 3 For Macs For Dummies
ISBN: 1-56884-170-7 $19.95 USA/$26.95 Canada

The Internet For Macs For Dummies
ISBN: 1-56884-164-1 $19.95 USA/$26.95 Canada

Guaranteed jargon-free! This #1 bestseller finally gives Mac users the information they need to become the resident computer genius!

Free T-Shirt!
Order three or more books today & receive a FREE "Dummies Rule!" t-shirt! Limit 1 per customer.

800-762-2974

IDG Books Worldwide, Inc.  Order Center: 3250 North First St., Suite 140, Indianapolis, IN 46202 • Tel: 317-805-3200 • Fax: 317-805-5290

IDG Books Worldwide, Inc. is a registered trademark of International Data Group.
THE BEST DEAL IN CLIP ART

CLIP ART CD

- Over 1200 high quality curriculum-oriented images, borders, and more!
- 20 different categories
- Pictorial Index & Catalog included
- PICT & EPS formats
- Easy-to-use
- 30 Day Money Back Guarantee
- Preferred choice of educators

ONLY $49.95

Also available on 3.5'' diskettes. Ask for details!

FREE EDUCATIONAL CATALOG

Find out why Enhance is America's favorite journal & catalog of educational technology. Every year, over a million educators look to Enhance for grant writing tips, technical advice, product reviews, and now, to read how they can best meet the challenges of Goals 2000.

Enhance is free! Just clip and mail this order form.

Name: ______________________________________
Address: ____________________________________
City: ___________________ State: ______ Zip: ______
Phone (____)_______________________________
Occupation: [Educator] [Other]__________________

QUALITY COMPUTERS

Find out what makes Quality Computers the leader in Educational Technology across America!
Give your Mac a clear, natural voice with SmartVoice

- Reads any text in any program
- Add speech to your favorite word processor
- Great for proofreading—find out how your writing REALLY sounds
- Works in the background so you can work while your Mac reads
- Comes with 14 unique voices: speech lab, talking computer psychiatrist, talking text editor, talking clock, talking calculator, and more fun extras
- Uses Apple's new PlainTalk™ technology
- Comes bundled with Apple's SpeechManager™, MacinTalk 2™, and MacinTalkPro 2™
- High-quality synthesized speech with realistic inflection and tone
- Speaks notification boxes from the Finder
- Works on any Macintosh

More Fun & Power

SmartVoice Bonus Pack

INCLUDES:

Digital Tape Recorder
Transcribe hours of letters and memos on your Mac. Play them back while you’re typing in any word processor! Start, stop, and rewind instantly! Store hours of recordings (limited only by hard drive space). Imagine what PowerBook owners can do with this technology!

E-Texts
Have almost 5 MEG of electronic text versions of famous novels, speeches, and more read back to you. Leave book marks and take notes, too!

Your Voice Clock
This first-of-its-kind digital Alarm Clock lets you enter and preview messages without typing a word! Comes with several prerecorded alarm sounds, or record your own.

Your Voice Tape Recorder
Transcribe hours of letters and memos on your Mac. Play them back while you’re typing in any word processor! Start, stop, and rewind instantly! Store hours of recordings (limited only by hard drive space).

Your Voice Calendar
The digital calendar for people who hate to type! Enter and review messages without typing a word! View an entire month, select any date, and play back any messages.

$2995
With purchase of SmartVoice
SAVE $60

SmartVoice......$4995

Voice Productivity Software
For Business and Home

Your Voice Clock
YOUR VOICE TAPE RECORDER
YOUR VOICE CALENDAR

SmartVoice

1-800-777-3642

Mention Code M99A When Ordering

Because of the incredible amount of material in the Speech Bonus Pack, we normally sell it for $89.95. But if you order SmartVoice, you can get the Bonus Pack for $29.95. Just mention this ad when ordering!

1-800-777-3642

Circle 263 on reader service card

Quality Computers™

©2000 Nine Mile Rd • St. Clair Shores, MI 48080 • 810-774-7500 • Fax 810-774-2698
Seybold San Francisco.
It promises to be a real eye-opener.

Come to Seybold San Francisco this September and you'll see some amazing things. Like the hottest new computer graphics and publishing solutions. The very latest in color and output technologies. Even multimedia, workflow, and presentation breakthroughs. All displayed by over 350 premier exhibitors.

Seybold also offers an unparalleled 3-day conference program, more than 65 in-depth sessions, 24 specialized courses, and a 2-day Quark symposium. Taught by industry experts, each course is designed to help you better use all these eye-popping technologies.

If you have anything to do with computer publishing, graphics, or communications, do not miss this event. It has everything you need to work faster and perform better. But don't take our word for it. Come, stare for yourself.

Conference is September 13-16 • Moscone Center • Call 800-488-2883 for information

Presented by Seybold Seminars
©1994 SEBOLD EXPOSITION AND CONFERENCE COMPANY, LLC. No one under 16 admitted.
**CD-ROM EXPLOSION!**

Free express shipping on products marked with.

**FREE EXPRESS SHIPPING!**

**FREE CATALOG—OVER 900 TITLES IN STOCK**

**With BEAT any advertised price on CD-ROM products!** (Some restrictions apply.)

---

**GAMES**

- Action, Aliens & Mysteries!
  - Game #82, $79.95 3 award-winning CDs, Jump Raven. Lurkers and Who Killed Sam Rupert?
- Spaceship Warlock #01583
  - $19.95 (MSRP $95)
  - Offer valid with purchase. Includes free software on every purchase. White supplies last. Not all compatible.
- Midnight Stranger #50316, $59.95
  - This is a handiwork product that should be in the Smithsonian Institution. Other titles: SFU, Adults only. A strange dream no end in a gritty urban environment. The fist CD to employ Virtual Reality. Free headphones.

---

**EDUCATION & BUSINESS**

- Multimedia Encyclopedias
  - Encyclopaedia of Dinosaurs v.1, $39.95
  - Encyclopaedia of Life +, $54.95
  - Encyclopaedia of Bio., $74.95
  - Encyclopedia of the Blues, $29.95
  - Grotler Multimedia Encyclopedia, $83.95
  - JFK - History Maker, $36.95
  - Mayo Clinic Photo Book, $39.95
  - Random House Dictionary, $59.95
  - Street Atlas USA, $97.95
  - Small Blue Planet, $59.95
  - A View From Earth, $29.95

---

**CD-ROM DRIVES & BUNDLES**

- GameROOM #01611
  - 1,000 Shareware games
  - $19.95 (MSRP $39.95)

---

**KIDS**

- ABC Songbook #01924
  - $7.95 (MSRP $19.95)

- 1000 Fonts #02067
  - Over 1,000, 1,000 fonts.

- 1690: Aviation Photo Disc + .
  - $19.95

- 50048: Best Of People In Business *.
  - $69.95

- 1257: Creative Backgrounds & Text *.
  - $79.95

- 50073: Design Toolkit Pre +.
  - $99.95

- 50299: Clip Art Sampler +.
  - $9.95

---

**DTP Desktop Publishing**

- 1690: Aviation Photo Disc +.
  - $19.95

- 50048: Best Of People In Business *.
  - $69.95

- 1257: Creative Backgrounds & Text *.
  - $79.95

- 50073: Design Toolkit Pre +.
  - $99.95

- 50299: Clip Art Sampler +.
  - $9.95

---

**EDUCORP PIONEER**

prices subject to change without notice. Dealer inquiries welcome.

**EDUCORP 1-800-843-9497**

**FREE CATALOG!**

7434 Trade Street • San Diego, CA 92121-2410 • Info: 619-536-9999 • Fax: 619-536-2345

Foreign customers send 84 p/h. With any purchase you’ll get EDUCORP’s informative newsletter, free. Circle 157 on reader service card.

---

**THE MULTIMEDIA PIONEER**

Prices subject to change without notice. Dealer inquiries welcome.
User Group Correction
How to give good meeting—and get good demo

YOU CAN COUNT ON ONE hand the factors that have made Macintosh a success. User groups, those bands of merry mavenists who provided support when Apple wouldn't because it couldn't see how doing so would increase the current quarter's earnings, are definitely on this short list.

For most members of user groups, the primary value of joining is in attending a monthly meeting where developers demonstrate their wares (and often their ineptitude). Because the quality of these meetings is crucial to the survival of user groups—and the survival of user groups is crucial to the survival of Apple—I'd like to help the meetings be all they can be.

The Hardware
The second-most important determinant of the quality of a user-group meeting is the kind of equipment that the demonstrator uses. (The most important is the quality of the pizza after the meeting.)

A Quadra or Power Macintosh with a color projector or LCD panel is de rigueur, because the complexity of current software and the sloppiness of today's cross-platform, team approach to programming makes watching a demo on a slow machine worse than listening to Mike Spindler announce a new product.

Speaking of equipment, another important consideration is having some kind of microphone and speaker system. It's a real problem when you can't hear the demonstrator at a meeting—if for no other reason than you miss the flux of representatives from big, dumb Windows companies.

The Agenda
Most meetings begin with ten people raking their wares (and often their ineptitude) in front of a room full of people who aren't there. In all the meetings I've attended, I have yet to see anyone take notes during these announcements. This leads me to believe that either the people who care have the information already, or no one cares.

Starting with SIG announcements slows the pace of the meeting and forces the demonstrator to pick it back up. In my case, frankly, this is not a problem. But most demonstrators struggle to raise the energy of the room as if they were carrying a Macintosh Portable through O'Hare. Of course, many demonstrators are bozos, but then bozos need a primed audience more than anyone.

I suggest that an area in the lobby be designated for posting SIG announcements. A meeting should blast off: a short welcome, introduction of the demonstrator, and boom, the show goes on. Most people don't come to hear SIG announcements or listen to the user-group president pontificate.

The Demonstrator
My theory is that the best demonstrator is the software's programmer. This is because the programmer knows where to find the tweaky features that user-group members want to see, and the programmer is usually unaware of the marketing lies he or she is supposed to tell.

The second-best demonstrator is the product manager of the software. The third-best is a technical-support person, and the fourth-best is a field sales rep. You'd think that a salesperson would be higher—and I have seen some excellent demos by salespeople—but by and large, they are hired a week before the meeting, know only the Windows version, and are full of sushi.

Demonstrators should not be allowed to show Persuasion or PowerPoint slides or overheads, no matter how dynamic they think their presentations are. I've seen demonstrators spend 30 minutes explaining the "strategic" and "visionary" qualities of their products, and then have no time for a demo. This is major-league bozos—like becoming the CEO of a company that's being investigated by the Securities and Exchange Commission and then claiming you didn't know about the investigation.

If the demonstrator asks any of these questions before the meeting, it means big trouble: (1) Is there a copy of SoftPC on the machine? (2) Do I have to bring my own VGA card? (3) Can you provide a laser pointer for my presentation?

On the other hand, if the demonstrator asks any of these three questions, you're in for a great demo: (1) Do you mind if I compile a new version while people are sitting down? (2) Will you have some Jolt Cola for me? (3) Can you make sure no one from my company's marketing department is in the meeting?

My Favorite User-Group Story
I'll end with my favorite user-group meeting story. At the Seattle Downtown Business User Group (dBug) I explained that I once got a ride in an F-15 fighter jet because an air force general read that in 1986 I had jokingly offered members of the Pentagon MUG a Macintosh II prototype for a ride in an F-16. (Today a Macintosh II will get you a ride in a used Jeep.)

Someone in the audience (a Microsoft employee, probably) interpreted this to mean I had bribed this general with a Macintosh, and the person instigated an investigation by the inspector general of the air force. I've never been so insulted in my life. You know me better than that: if I bribed someone, I wouldn't announce it at a user-group meeting.

GUY KAWASAKI'S views are his own and only sporadically represent those of Macworld. His latest book is Hindsight (Beyond Words Publishing, 1994). He has investments in Bit Jugglers, Global Village Communication, Bookmaker Corporation, and others. He can be reached at Kawasaki@radio.mail.net.
Introducing the MultiSync® Value Series Monitors.
The affordable solution for those who make your business run.

They’re the people you count on to get the job done. From secretaries to shipping, they need all the help you can give them. Luckily, the 15” (13.8” diagonal viewable area) MultiSync® 3V and the new 14” (13” diagonal viewable area) MultiSync 2V work with the latest Macs and give you the great colors and sharp display you’d expect from NEC. They support multiple resolutions and let you switch between them with NEC’s DPI-on-the-Fly® software. You also get a monitor that’s MPR II compliant and has a 3-year limited warranty. It’s more than you’d expect at such a great price. But then again, you’re probably used to getting the most for your money. Questions? Call 1-800-NEC-INFO. Or, for information via fax, call 1-800-366-0476 and request our Mac products catalog #4. The easiest monitors to live with for hours and hours: Ours.

Circle 16 on reader service card

*See your local NEC dealer for details or call NEC FastFacts™ at 1-800-366-0476 and request document #24 for a copy of the rebate redemption form.
Fifteen hours today.
Sixty-five overnight packages. Tonight.
Ten hours per day.
One hundred and thirty words per minute.
Introducing the NoteBook Traveler Leather Carrier.

Never have so many compartments, pockets, pouches, dividers, holders & folders looked so good.

It all starts with the finest leather. While others use a combination of leather and vinyl on the outside, Kensington uses only 100% full-grain premium quality leather.

The look is rich and luxurious. While other cases may feel stiff and unnatural, our case feels smooth and soft.

Stitching and detailing are subtle. Seams are carefully hidden. And the color is a classic matte black.

Open it up and you'll find two large padded compartments, numerous inner pockets, pouches, dividers, accordion-style file storage, two disk holders, a business card holder, and more.

And the NoteBook Traveler Leather Carrier is as rugged on the inside as it is elegant on the outside. No other case even comes close in terms of materials, workmanship and overall quality.

It's a quality we stand behind with the unique Kensington Satisfaction Guarantee. That means our case has a lifetime warranty. And it means you have a no-risk 60-day trial.

The NoteBook Traveler Leather Carrier is one of six computer cases Kensington offers. So whether you're traveling for a day or a month, one of our cases will be just right for you.

For more information, call 800-535-4242. Outside the US and Canada, 415-572-2700. For information by fax, call either number and enter 82, then request document 600.