POWER MACINTOSH RUNS FAST WITH IN STOCK. JUST WAIT TILL YOU SEE IT

Offer good only in the 50 United States and Canada. Offer good for purchases after April 1, 1994, and freight charges do apply. © 1994 Microsoft Corporation. All rights reserved. For more information inside the 50 United States, call 1-800-434-3976. A subsidiary of Microsoft, Inc. Microsoft and PowerPoint are registered trademarks of Microsoft Corporation. Macintosh is a registered trademark and Power Macintosh is a trademark of Apple Computer, Inc.
While it's true that the Power Macintosh will zip right along with current programs, it'll perform even better with the next version of Microsoft Office for the Macintosh.

The programs in the Microsoft Office will not only take advantage of the power and speed of Power Macintosh, they'll also work together. Seamlessly. Effortlessly.

In other words, you'll have a suite of full-featured business programs so well integrated that they act as if they were one program.

But it doesn't stop there. These programs have built-in intelligence that senses what you want to do and helps you do it.

Isn't this something you want?

If so, you really should consider Microsoft Office. Far and away, it's the best way to get the most out of the new Power Macintosh.

But we warn you, you'd better fasten your seat belt.

Pick up Microsoft Office for Macintosh now. And we'll send you the new version for Macintosh or Power Macintosh at no charge when they ship in the near future.
You've reached a crossroads in computer technology. A point where choosing between a PowerPC or a Pentium™ processor-based PC could be a difficult decision.

The PC is not what it used to be. Everything you want to do on a Macintosh®, you can just as easily do on a PC. And now, all of the most popular Mac applications are available for PCs, including those by Aldus, Microsoft, Adobe, Quark and Broderbund.

With Windows,® they're just as easy to use. And they run at incredible speeds. To put it in
and ask directions.

Best of all, you have a choice of over 100 computer vendors who now offer Pentium processor-based PCs. These PCs give you access to some of the world’s most innovative technologies. Like ProShare™ document and video conferencing. Video software using the Indeo™ format. Even future performance upgrades with the OverDrive™ processor technology.

So before you buy another Mac, stop and ask some questions. Find out where Apple is going, especially with the PowerPC. Then ask Intel about the Pentium processor. What you find out might put you on a whole new path.

To learn more about the Pentium processor and other innovative technologies, call 1-800-395-7009, Ext. 111.
Features

94 Video-Editing Tools
   BY AVI HOFFER Whether you need to create a presentation or an in-house training video, today's editing tools bring professional-quality video in reach.

104 Video Production Techniques
   BY MATTHEW LEEDS Step-by-step techniques to make your QuickTime movies look great.

110 PowerBook Power Management
   BY CARY LU How do you squeeze every last minute out of your PowerBook's battery? Macworld Lab tests real-life situations to find out.

118 Virtual Memory Realities
   BY DAVID POGUE AND GALEN GRUMAN More is often better, but why buy what you don't need? Macworld Lab tests methods that let you get the most out of virtual memory.

News

35 MacBulletin

36 News Apple's future system software plans • Adobe and Aldus to merge • Director 4.0, and more

43 PowerPC News PowerPC 604 chip nears production • Intel fights back with faster Pentium • Power Watch: Who's shipping now, and more

45 New Products

Opinion

21 State of the Mac
   BY ADRIAN MELLO Is the original Mac design gone for good?

27 Letters

169 The Desktop Critic
   BY DAVID POGUE The serial-port multiplier of champions.

173 The Iconoclast
   BY STEVEN LEVY The high and low roads to PowerPC.

177 Conspicuous Consumer
   BY DEBORAH BRANSCUM Fires, floods, earthquakes—how to safeguard your data.

274 Wise Guy
   BY GUY KAWASAKI The SOHO warrior.
Graphics

126 News Complete color calibration under $1000 • 30-, 36-bit color flatbed scanners • Illustrator updated for Power Mac, and more

130 Expert Graphics BY CATHY ABE S Graphics professionals share their secrets.

132 FreeHand vs. Illustrator BY DEKE MCCLELLAND Just how do FreeHand and Illustrator differ? We take a close, feature-by-feature look at how the new versions compare.

Networks

160 News Global Village fax, ARA Server • Virus repairs over the network • Power on, power off by phone, and more

163 PowerBook Notes BY CARY LU Managing hard drives and SCSI.

Buyers' Tools

181 Editors' Choice Top picks from our comparative articles.

183 Star Ratings More than 300 product-review summaries.

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

At Work

142 News In Control adds views, features • New AppleScript-aware agent • Real-time document conferencing, and more

145 Working Smart BY JIM HEID Get the most from LaserWriter 8.

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

How to Contact Macworld

MACWORLD June 1994 5
The new NEC Silentwriter 640 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.
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.
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!
MacHandwriter® Named "Best" In Pen Computing

MacHandwriter — the all-in-one, plug-and-play input device for entering graphics, text and commands — was named by MacWeek as one of MacWorld’s "must see" products. The PC version has been acclaimed by everybody from Windows Source to PC Computing. Now you can join thousands of satisfied customers who take us up on our satisfaction-or-your-money-back offer* to see how it can supercharge your desktop computer.

THE ULTIMATE EDITING TOOL

You spend at least 80% of your document-creation time editing. Give me an ample amount of time

Imagine highlighting, changing words with gestures you already know, moving text, spell-checking, pointing and clicking with one device. MacHandwriter will make your pen the ultimate keyboard complement.

The first product we’ve seen that makes pen computing seem exciting, viable, and even fun. Windows Source, April 1994

WHAT DO THE EXPERTS SAY?

Companies offering CIC Recognition Technology:

- Apple/Japan
- AT&T
- Dargen
- Fujitsu
- IBM
- MicroSlate
- NEC
- Samsung
- Seiko Epson
- Symbol Technology
- Toshiba
- and others

... and its handwriting recognition is the best we’ve ever seen.
March 1994, PC Computing

"We found it to be fast and highly accurate — easily the best recognition engine we’ve tested. Perhaps the most versatile input device available.
April 1994, Windows Source

... accepts human handwriting in a way that runs circles around Newton, Zoomer or EO.

January 1994, Chicago Tribune

MacHandwriter®

THE CREATIVITY TOOL

WILL CHANGE YOUR LIFE OR YOUR MONEY BACK. $299.95 \$299.95

Until July 15, 1994

Mac or PC Versions

Buy From Your Local Dealer or Call CIC Direct: 800-888-9242 (extension 5026)

Or Fax: 415-802-7777

Communication Intelligence Corporation
NASDAQ: CICI

You may return your MacHandwriter within 30 days for a full refund, provided it is in resalable condition. ©1994 by CIC. MacHandwriter, Handwriter Recognition System and PenMac are trademarks of Communication Intelligence Corporation. All other trademarks acknowledged. TRIBA
UNFORGETTABLE.

THE nVIEW® Z SERIES.

They won't forget your message. You won't forget the applause. Project your next presentation directly from your computer in big, bold color images with nVIEW's new line of LCD projection panels.

Sleek, feather-light panels that are so easy to use, yet so durable, you can deliver presentations anywhere, anytime. With impact.

nVIEW VISIONARY DISPLAY TECHNOLOGIES

nVIEW products are manufactured under U.S. Patent #4,765,583; #4,976,536; #5,135,821; #5,150,236; #5,277,971; and 5,255,029. Other and foreign patents pending. nVIEW and ViewFrame are registered trademarks and MediaPro, Lumina and nSIGHT are trademarks of nVIEW Corporation.

Put Our List On Your List

Our list is the Consumer Information Catalog. It’s free and lists more than 200 helpful government booklets. So send for the free Catalog. It’s the thing to do. Write:

Consumer Information Center, Dept. LL, Pueblo, CO 81009

A public service of this publication and the Consumer Information Center of the U.S. General Services Administration.

Circle 117 on reader service card
OWN 100 EXOTIC CARS!
100 photographs of Exotic Cars on CD-ROM can be yours with Corel Professional Photos series 29000.

The World's Leading Photo CD-ROM Collections
from the makers of CorelDRAW, the world's best-selling graphics software.

100 Royalty Free Images
Kodak Photo CD Format
Mac & PC Compatible
Ideal for Desktop Publishing
Corel Screen Saver & Utilities

OVER 160 STUNNING CATEGORIES AVAILABLE!

Great as screen savers or stock photography. Ideal for ads, brochures, presentations and multimedia. Use CorelDRAW to retouch or add special effects.

DTP Direct $29.00 EACH CATEGORY

1-800-395-7778 SERIOUS GRAPHICS SOFTWARE & HARDWARE

Circle 78 on reader service card
"The Best Mac Desk Ever."

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

Free Catalog! 800.688.2446

| Phone 503.690.1400 | FAX 503.690.1423 | Europe 011.41.62.631026 | Japan 011.81.3.3583.0436 |

---

Expert Results

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

---

PowerDraw

IN 41 COUNTRIES AROUND THE WORLD

CALL 910-299-4843 OR FAX 910-852-2067 • IN CANADA 204-453-8111

Circle 12 on reader service card

---

Macworld

ADVERTISING SALES

VICE PRESIDENT/ASSOCIATE PUBLISHER
Shannon D. Dolan
(415) 243-6905

BUSINESS MANAGER/AD SALES
Lisa Buckingham
(415) 974-7345

NO. CALIFORNIA (SAN JOSE, SOUTH)
Cherie LaFrance
(415) 978-3276

SALES ASSOCIATE
Navy Farhang
(415) 978-3237

NO. CALIFORNIA (SAN FRANCISCO, WESTERN CANADA)
Stephen McGill
(415) 978-1155

SALES ASSOCIATE
Edward Ramirez

SOUTHWEST REGIONAL MANAGER
Nancy Caz
t(714) 250-1307

SALES ASSOCIATE
Gail T. Bledsoe

Molly Shank

EUROPE
(011) 41.62.631026

SALES ASSOCIATE
Kathy Poppenhagen

SOCIAL MEDIA
Annette Quant
(201) 387-0090

SALES ASSOCIATE
Carla Langhaefer

BEAVERTON, OREGON
Phone 503.690.1400
FAX 503.690.1423

IN CANADA
204.453.8111

Circle 12 on reader service card

---

MACWORLD GLOBAL PRODUCT SUPPORT CENTER

DIRECTOR OF MARKETING AND COMMUNICATIONS
Kimberlee A. LueDee

TECHNICAL MANAGER
Chip Garman

MARKET RESEARCH

VICE PRESIDENT/DIRECTOR OF RESEARCH
Gary L. Rocchio

MARKET RESEARCH MANAGER
Linda Lawrence

RESEARCH SERVICES COORDINATOR
Jason Douglas

MARKETING

DIRECTOR MARKETING
Cynthia Korol

MARKETING MANAGER
Anne Nichols

PROMOTION MANAGER
Lisa McKort

MARKETING COORDINATOR
Rhona Hamilton

CIRCULATION

DIRECTOR OF CIRCULATION
Angeline Betts

SINGLE-COPY SALES DIRECTOR
George Clark

CIRCULATION MANAGER
Lori Hitchcock

NEWSTAND SALES MANAGER
Martin Garchar

SUBSCRIPTION MANAGER
Elizabeth Jensen

DIRECT MARKETING MANAGER
Jennifer Cartini

PROMOTION MANAGER
Kevin Gee

NEWSTAND COORDINATOR
Dalia Schwartz

SUBSCRIPTION COORDINATOR
Deidre Digan

SUBSCRIPTION INQUIRIES
800.288.6848

PRODUCTION

DIRECTOR OF PRODUCTION
Annie Foley

PRODUCTION MANAGER
Cynthia Mazzeo

BILLING INFORMATION MANAGER
So Fong Yip

AD TRAFFIC MANAGER
Shelley Anderson

DTP COORDINATOR
Clayton Haberman

---

IN 41 COUNTRIES AROUND THE WORLD

ENGINEERED SOFTWARE™

CALL 910-299-4843 OR FAX 910-852-2067 • IN CANADA 204-453-8111

Circle 12 on reader service card
PRESSVIEW™ 21 DISPLAY SYSTEM
1993 MacUser Eddy Award Winner

Now You Can Control the Way You See Color!

CONTROL COLOR VIEWING
PressView 21 offers a calibrated 5000° Kelvin white point, delivering natural daylight colors on your display for accurate and consistent color and letting you better match what you see printed on paper.

Designed exclusively for SuperMac by Hitachi, PressView 21 offers high-resolution viewing — up to 1360 x 1024 — with nearly 40-percent more viewable work area than most other 21" displays.

CONTROL WITH CALIBRATION
PressView includes the SuperMatch™ Calibrator Pro tristimulus colorimeter for highly accurate display calibration. Because the calibrator updates the display control software, as well as your color management software, you'll know that your settings are accurate and up to date.

CONTROL PROOFING COSTS
Now you can save time by preproofing on the screen — and save money by reducing the use of costly proofing materials.

THE COMPUTER IS IN THE DISPLAY
PressView 21 Display System gives you the ultimate in control over color settings and screen geometry. Your Macintosh™ computer communicates directly to the computer inside PressView 21 via a standard serial connection.

PressView software lets you customize, save, and restore display settings. The ColorSentry™ password security system ensures your settings won't be altered accidentally.

For the nearest Authorized Reseller, call: (800) 334-3005
For information via fax, call: (800) 541-7680

© 1994 SuperMac Technology, Inc. All rights reserved. The SuperMac logo, the SuperMac stylized "S," ColorSentry, PressView, and SuperMatch are trademarks of SuperMac Technology, Inc. Macintosh is a registered trademark of Apple Computer, Inc.

Circle 88 on reader service card
After All These Years—Better Than Ever!

These days every Mac has a hard drive. And every hard drive needs NEW DiskTop 4.5! It finds, copies, moves, renames, deletes, sorts and launches files and applications quickly and easily. The “Find” function is a thing of beauty. DiskTop finds by date created or modified, size, type, creator, name or any combination. Search drives, CDs, carriages, opticals, networks, drives... everywhere! Retain found and application quickly and easily. The menu to get to frequently used folders instantly.

NEW DiskTop 4.5 also lets you create aliases and save them into any location. DT Launch, included, creates a menu with programs or files that you can launch in an instant, anywhere, anytime.

NEW DiskTop 4.5 is ideal for novices or power users alike.

Your Mac got up to speed. Did you? Using more powerful computer means new tasks. That takes more time! Now comfort becomes a real issue. Unlike most other computer tables in its price range, PowerTable's many features include an adjustable keyboard surface, which reduces fatigue. Call today for a free catalog.

PowerTable®
More quality for your money.

800-722-6263

PowerTable design is patent pending. PowerTable is a trademark of Scandinavia Computer Furniture, Inc.
Introducing Joule™, a modular system so innovative it redefines mass storage.

LACIE
LIMITED
A QUANTUM COMPANY

The Joule™ Modular Storage System only from La Cie, a Quantum Company
Like building blocks, Joule tops one great drive with another—No tools required.

There's a reason Joule (pronounced “Jewel”) doesn't look like other mass storage systems. It isn't. Joule is modular. Uniquely versatile. Unconventionally easy-to-use. And unexpectedly elegant.

Joule is a radical concept that transcends the boundaries of conventional drive engineering. It allows you to combine a variety of hard disk drive and removable media drive options into a single vertically interlocked system.

Joule's modular concept eliminates cumbersome redundancies in cables, power supplies and circuitry. It's unique tower design makes installation child's play and expanding or changing your system effortless and fast. It also allows you to move drive modules in and out of the system—at will—without affecting the system's operation.

Joule reinvents the “ins and outs” of portable mass storage.

Everyone knows the hardest part of moving portable hard drives from one computer to another is wrestling with the cables. Joule’s drive modules are cable free. They mount and dismount from the system with single-handed ease. And, because removing modules doesn't affect the system's operation, there's no easier way to move mass storage—from workstation to workstation, across the office, across town or across the country.

Joule Base with 1080MB Hard Disk Installed, plus 105MB SyQuest Module and 270MB Hard Disk Module

Joule Base with 340MB Hard Disk Installed
advantages are simply towering.

The ultimate in plug n’ play versatility. Here’s how it works.

The Joule Base combines a hard drive or removable drive mechanism with a universal 100 watt power supply and standard SCSI circuitry plus a unique list of performance and convenience features. It can operate alone or support up to seven mounts and drive modules. Each features La Cie’s exclusive LaTerm™ digital active termination switch (patent pending), a SCSI port and ID switch, and two auxiliary power outlets for attaching other SCSI peripherals. The power switch, activity LED and termination status LED are conveniently located in the front.

Joule Mounts pass power and SCSI signals from the base through each interlocking mount (patent pending). Mounts also allow modules to be inserted or removed, leaving the SCSI chain intact.

Joule Drive Modules offer even greater selection. Hard disks from 170MB to 2050MB, plus a full range of SyQuest, optical, tape and DAT modules are available to complete your system.

The Joule Top Cap contains the SCSI cable to the Mac giving the system a clean single-cable design, regardless of the number of modules.

Building on a firm foundation.

With Silverlining disk management software, Quantum quality, a great warranty and toll-free technical support, Joule offers every La Cie advantage. As a Quantum Company, La Cie is backed with a Fortune 500® commitment to quality and service.

---

Joule Base with 1080MB Hard Disk Installed, plus
2050MB Hard Disk Module,
2050MB Hard Disk Module (detached),
2050MB Hard Disk Module and
1080MB Hard Disk Module
OVER 8000MB TOTAL!
Everything about Joule™ is

Joule System Components

Joule interlocking storage system.
The Joule Modular Storage System is the most versatile and convenient mass storage solution available (patent pending). Select from a full range of hard disk and removable media options in base and module units.

1 Quantum 3.5” Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Base w/TopCap</th>
<th>Module w/TopCap</th>
</tr>
</thead>
<tbody>
<tr>
<td>170MB</td>
<td>$259</td>
<td>$249</td>
</tr>
<tr>
<td>270MB</td>
<td>$329</td>
<td>$319</td>
</tr>
<tr>
<td>340MB</td>
<td>$389</td>
<td>$379</td>
</tr>
<tr>
<td>540MB</td>
<td>$639</td>
<td>$629</td>
</tr>
<tr>
<td>1080MB</td>
<td>$949</td>
<td>$939</td>
</tr>
<tr>
<td>1800MB</td>
<td>$1259</td>
<td></td>
</tr>
</tbody>
</table>

2 Quantum 2.5” Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Module w/TopCap</th>
</tr>
</thead>
<tbody>
<tr>
<td>85MB</td>
<td>$299</td>
</tr>
<tr>
<td>160MB</td>
<td>$349</td>
</tr>
<tr>
<td>256MB</td>
<td>$449</td>
</tr>
</tbody>
</table>

3 Seagate Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Module w/TopCap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1650MB</td>
<td>$2039</td>
</tr>
<tr>
<td>2050MB</td>
<td>$2329</td>
</tr>
</tbody>
</table>

4 Removable Drives

<table>
<thead>
<tr>
<th>Drive</th>
<th>Base w/TopCap</th>
<th>Module w/TopCap</th>
</tr>
</thead>
<tbody>
<tr>
<td>SyQuest</td>
<td>$539</td>
<td>$509</td>
</tr>
<tr>
<td>DAT 105MB</td>
<td>$689</td>
<td>$659</td>
</tr>
<tr>
<td>DAT 270MB</td>
<td>$1159</td>
<td></td>
</tr>
<tr>
<td>DAT Turbo</td>
<td>$1629</td>
<td></td>
</tr>
<tr>
<td>DAT 8GB</td>
<td>$1729</td>
<td></td>
</tr>
</tbody>
</table>

5 Additional Accessories

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Cap</td>
<td>$49</td>
</tr>
<tr>
<td>Mount</td>
<td>$69</td>
</tr>
<tr>
<td>Joule Base (no drive)</td>
<td>$199</td>
</tr>
</tbody>
</table>

The La Cie Advantage

- Silverlining™ Disk Management Software
- Unlimited TOLL-FREE Technical Support
- 30 Day Money Back Guarantee
- All Drives Burned In and Tested
- Ready to Plug and Play
- Valuable Warranties
- LaTerm™ Digital Active Termination
- Double Shielded SCSI Cables
- FCC; UL, TUV, VDE & CSA Approved
- Termination Status LED
- Surge Protection
- Front Power Switch

*Call for details on terms, conditions, limited money back guarantee (shipping not included), warranty and free offers. Comparisons may not apply to all vendor products, check specifications. ZFV = Drives do not have switchable termination. Prices do not include shipping and only apply to products shipped within the continental United States. International customers must pay for all shipping charges. Add sales tax where applicable. Joule, ZFP, ZFP+, Tsunami, PocketDrive, PocketDock, Silverserver, 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. 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 recourse. FCC pending pending on Joule. ©Copyright 1994 La Cie, Ltd. 8700 SW Creekside Place, Beaverton, OR 97005. Phone: (503) 520-9000. Fax: (503) 520-9100. All rights reserved. Printed in U.S.A.
remarkable...even the price.

**La Cie Storage Solutions**

Tsunami™: Sleek, transportable.
Our award-winning Tsunami drives offer superb performance and design.

**Quantum 3.5” Drives**

<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>$549</td>
<td>$609</td>
</tr>
<tr>
<td>700MB</td>
<td>$699</td>
<td></td>
</tr>
<tr>
<td>1080MB</td>
<td>$859</td>
<td>$919</td>
</tr>
<tr>
<td>1650MB</td>
<td>$1979</td>
<td>$2039</td>
</tr>
<tr>
<td>1800MB</td>
<td>$1199</td>
<td>$1259</td>
</tr>
<tr>
<td>2000MB</td>
<td>$1919</td>
<td>$1979</td>
</tr>
<tr>
<td>2050MB</td>
<td>$2269</td>
<td>$2329</td>
</tr>
</tbody>
</table>

S=Seagate mechanism

PocketDrive™: Palm-sized portability.
Weighing in just under 10 ounces, the only pocket portable to offer the PocketDock™ docking option.

**Quantum 2.5” Drives**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Internal PowerBook</th>
<th>PocketDrive</th>
</tr>
</thead>
<tbody>
<tr>
<td>40MB</td>
<td>$199</td>
<td>$239</td>
</tr>
<tr>
<td>85MB</td>
<td>$199</td>
<td>$299</td>
</tr>
<tr>
<td>160MB</td>
<td>$249</td>
<td>$349</td>
</tr>
<tr>
<td>170MB</td>
<td>$259</td>
<td>$359</td>
</tr>
<tr>
<td>256MB</td>
<td>$349</td>
<td>$449</td>
</tr>
</tbody>
</table>

*LaserWriter 630 installation kit available

**Removable media:**
Limitless storage options.
For the finest in removable media mass storage solutions, La Cie offers an outstanding selection of drive technologies in our zero-footprint case. Silverlining (or Retrospect® with tape and DAT drives) plus one free media cartridge included.

**Color Scanning Solutions**

As low as $1599

Silverscan 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.

"...Fast and a pleasure to use...
Produced high-quality printed images with good resolution, and its documentation was tops."
Macworld, November 1993

**Multimedia**

LaserWriter 630 installation kit available

**Silverscan II**

All Silverscanners come with our powerful Silverscan software, Color! Image editing software and Read-It OCR Pro.

<table>
<thead>
<tr>
<th>Option</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Bundle</td>
<td>$1599</td>
</tr>
<tr>
<td>Basic Bundle Plus Cachet</td>
<td>$1899</td>
</tr>
<tr>
<td>Bundle Plus Cachet &amp; ColorStudio</td>
<td>$1999</td>
</tr>
<tr>
<td>Bundle Plus Photoshop</td>
<td>$1999</td>
</tr>
<tr>
<td>Optional Transparency Attachment</td>
<td>$999</td>
</tr>
<tr>
<td>Optional Sheet Feeder Attachment</td>
<td>$999</td>
</tr>
</tbody>
</table>

To order or for more information, call toll-free
800-999-1457
Mon.-Fri. 5 a.m.-7 p.m. & Sat. 8 a.m. - noon PST
International 503-520-9000 Fax 503-520-9100 (24 hrs.)
LACIE LIMITED A QUANTUM COMPANY
Mon. - Fri. 9 a.m. - 5 p.m. PST
Mon.-Fri. 5 a.m.-7 p.m. & Sat. 8 a.m. - noon PST
International 503-520-9000 Fax 503-520-9100 (24 hrs.)
LACIE LIMITED A QUANTUM COMPANY
Mon. - Fri. 9 a.m. - 5 p.m. PST

Circle 52 on reader service card
Now you can access your office from anywhere you happen to be. Bummer.

Under normal circumstances, the last thing you want to think about when you're away from the office is the office. Then again, when was the last time you operated under normal circumstances?

What you really want is the power to control the way you work. To turn wherever you are at the moment into the most productive place on earth. Unrestricted by walls, time sheets and bad coffee.

What you really want, in other words, is freedom. The freedom that comes with the Apple Remote Access family of Client, Personal Server and Multiport Server products.

With Apple Remote Access, Macintosh and PowerBook users can easily dial into office computers, servers and networks from virtually anywhere they happen to be. Anytime they happen to be there.

Once connected, it's just like being in the office. You can retrieve files. Collaborate with colleagues. Send and receive electronic mail. Or even print documents. All from the most remote locations.

Apple Remote Access works with System 7. Which means you work with tools you're already familiar with, such as the Chooser and Finder. And with integrated DialAssist, you can dial in from just about any place on the planet without having to hassle with outside lines, country codes or credit card numbers.

No matter how big your organization is, there's an Apple Remote Access solution designed for you. Call 800-538-9696, extension 150, for the Apple reseller in your area. Wherever that may be.
Once and Future Classic

The Mac’s original design is no more. How to resurrect it?

Sometime in early winter, the Color Classic vanished from the U.S. market. Just as it was discontinued in the United States, a faster version called the Color Classic II was introduced in Japan (and is still available there). While everyone was distracted by the pyrotechnics of the Power Macintosh introduction, the ancestor of all Macs faded from view. Along with the Mac’s system software, the Classic’s charismatic design represented the essence of the Macintosh computing experience.

After the Power Macintosh intros in mid-March, it dawned on me that Apple no longer sells anything that looks like the original Mac. I felt a strange sense of loss. Why was the Color Classic killed? Why didn’t it succeed? How could Apple create a new Classic that could recapture buyers’ interest and the Macintosh community’s loyal admiration?

The Fall of the Classic

There’s nothing mysterious about the Classic’s demise, according to the Apple people I talked to. Apple’s customers prefer other Macs. Despite being somewhat more expensive, the big all-in-one models such as the Performa 550 and LC 520 are very successful due to their larger screens and built-in CD-ROM drives. Economy-minded buyers can get an entire LC III system with a (larger) 14-inch monitor for under $1000—around the best price for a Color Classic. The Classic also couldn’t accommodate a number of standard components that buyers want in a low-cost personal computer. Buyers expect color, and the education and home markets want CD-ROM drives. Because of lower production volumes, the Color Classic’s 9-inch monitor costs as much as or more than the 14-inch monitors sold with most computers. A standard CD-ROM drive wouldn’t fit into the Classic’s case. The Classic had become an expensive novelty that didn’t offer as much value to buyers as other, feature-laden (if more prosaic-looking) Mac models.

I’m not doubting the wisdom of Mac buyers, or Apple’s understanding of its customers. Most of the Classic’s practical virtues live on in other Macs, but through pragmatism we lost the emblematic cabinet design and something else—personality, character, and tradition.

The Lost Icon

The Classic had a personality. Every other desktop computer is a faceless clone. Put the Classic in a room with other desktop PCs and it looks alive, while all the other boxes sit like dull automatons. The Classic’s physical demeanor meshed perfectly with the Mac’s mission. The original Macintosh wasn’t trying to be another muscle-bound three-box computer. It was the most human of computers, relying on intelligence and approachability instead of brute strength. The compact and upright stance of the Classic demonstrated courage, affability, and individuality—all aspects of the Macintosh design philosophy. Basically, the Classic looked like a higher life-form, like E.T.

The soul of the Mac lives on in its friendly operating system, but its favorite vessel has passed on. In most ways, Macs have improved. Apple still has the best industrial design in the business, but in becoming as practical and affordable as PCs, the Mac family has unfortunately started to look like PCs.

One of the outstanding virtues of the original Mac was its plug-and-play capability. Nearly ten years after the original Mac came out, Compaq has begun trumpeting the virtues of this simple-but-brilliant design philosophy. And the company promises to deliver it real soon now, just as soon as Microsoft delivers the Chicago version of Windows, which is delayed—again. Similar to the other ways PCs have imitated the Macintosh, this version of plug and play will probably be a kludgy add-on for some PCs, and nothing like the ground-up integration built into every Mac.

Of course, plug and play lives on in all current Macs, but the most committed plug-and-play models come as a single box, like the original Mac. This eliminates cables between the monitor and the system box, and makes it unnecessary for users to learn about and choose between monitors because the display is integrated into the cabinet.

There are still all-in-one Macs, including the LC 575, LC 520, and Performa 520. These highly successful machines are like the Classic on steroids. But they have no character, and they don’t evoke the response that a Classic Mac did. Because their designers courted the cases to look as if the monitor could be separated, these computers seem Obscureous or unsure of themselves. Apple should redesign these one-box systems to have personality.

Remaking of a Classic

It is clear that for the Classic to rise again, Apple would have to reinvent it. The Color Classic was an attempt at reinventing the Classic. It looked different from the Classic and had more functionality. Not everyone liked its looks, but it did have character. Unfortunately, it was too slow and too expensive. A pizza-box
model such as the LC III costs just a bit more with a bigger screen and a lot more speed. But the Color Classic's biggest problem was that it had no clear mission, distinct from other Macintosh models. So how can Apple revitalize the Classic so that it resonates with the personality and tradition of the original design?

- A new Classic should be small, with a keyboard not much wider than the system. There's still a need for a small-footprint desktop computer.
- A new Classic should be fast. A small upright computer should feel swift and nimble, not ponderous. A speedy Classic could use the 68LC040 chip found in the Quadra 605.
- A new Classic should have the expandability of the Color Classic, which offered a pullout expansion drawer.
- A new Classic should have a strong visual identity. It should assert its individuality and stand upright instead of assuming the prone position of a PC. Apple should make it black and slick.

A New Mission
But more important, give the next Classic a new mission. Its smaller size would make it ideal for personal communications. The next Classic could combine a desktop computer and communications center, saving desk space and money. An office phone has nearly two-thirds the footprint of the original Mac. The new Classic could have an option for a built-in phone. Perhaps a videoconferencing option would be appealing in a hybrid communications/computing system that combines voice mail, E-mail, and other communications. The new Classic would also be good for word processing, contact management, and other mainstay productivity tasks.

A version of the Classic could have an integrated docking station for a Newton, another PDA, or a palmtop. I think most people have a greater need for a fully integrated approach like this than for a stand-alone PDA. People should be able to take notes and manage their activities with maximum portability, and then seamlessly integrate data with the new Classic.

There you have it. Frankly, I'm not expecting Apple to make a new Classic. Fans of the original compact Mac design should probably form a club and find ways to breathe new life into our old machines. I've heard that it's technically possible to install a Performa 550 or LC 320 motherboard in a Color Classic if someone could write a simple enabler. And somewhere in my garage there's a can of spray paint labeled Batmobile Black.

It would be hard for Apple to make a successful new Classic. All the same cost issues apply that led to the Classic's demise in the first place. It would take a tremendous act of will on Apple's part to reinvent the Classic, and it would be a brave gamble. It couldn't be the least expensive Mac, and this runs against the lessons learned over the last few years.

Pragmatism is at least as important as innovation at today's Apple. But pragmatism alone won't ensure the long-term success of the Mac. The Power Macintosh promises to eventually provide an astonishing new interface with innovative applications. But we need a model that preserves the tradition of the Macintosh way. To maintain our strength and hope against the mindless robotic hordes of PCs and their championship of mediocrity, we need an emblem to rally around. We need a new Classic to remind us that the Mac has always been insanely great.
It's smaller; yet our new CY-8505 backs up the largest Macintosh computer systems and networks, unattended.

How? Optional data compression boosts the 5 GB capacity to up to 25 GB. And it's fast — able to write data at speeds of up to 90 MB per minute. Such high performance means huge savings in manhours and media costs. Best of all, the MTBF rate of 80,000 hours gives you data reliability you can depend on.

The CY-8505 features software that lets you schedule full or incremental backups to run any time, day or night. A directory of files is stored on the disk, making it fast and easy to restore. A backlit status display gives you command under execution, compression ratio, transfer rate, tape remaining and more in a clear, easy to read format.

In short, you won’t find a more advanced, more reliable solution on the market.

What's more, we back this turnkey solution with a two year warranty that includes responsive service and support from our in-house staff.

For more information, call today at (804) 873-9000.
If you're a sophisticated scanner user, you shouldn't have to settle for a semi-sophisticated scanner. Not when the 1600 dpi EPSON 800C Pro/Mac has so much more to offer. More versatile controls. More powerful software. Better connections. Stronger support. More flexible options. All of which makes this the one scanner that will actually live up to your

HP ScanJet II CX

*One-year warranty, extendable to two years with return of registration card, at no charge. EPSON, HP, Macintosh, Adobe Photoshop, and Kai's Power Tools are trademarks or registered trademarks of Seiko EPSON Corporation, Hewlett-Packard Co., Apple Computer, Inc., Adobe Systems, and HSC Software respectively. All other trademarks are the property of their owners. ©1993 EPSON America, Inc., 20770 Madrona Ave., Torrance, CA 90503. For dealer referral or warranty details, call 800-BUY-EPSON (800-289-3776). In Canada, call 800-367-4766. For Latin America, 305-265-0092."
exacting professional standards. For our free booklet on scanning, or more information on
the 800C Pro/Mac or our other scanners for Macintosh and PCs, call the EPSON Connection
at 1-800-BUY-EPSON (800-289-3776). And get the scanner that's in a league of its own.
"Pixar has outdone themselves with the new special effects in Typestry 2... Cool new features include Particle effects, Tubes and Rubber Sheets... Many of the new capabilities make it suitable for multimedia professionals but can easily be used in print.

With these high-end features, Typestry 2.0 could be the titling tool of choice at just $299."

Sean Safreed — MacUser

Pixar Typestry 2 transforms Type 1 or TrueType fonts and your Adobe Illustrator files. Scale them, twist them, stretch them, warp them. Even make a little movie with them.

Pixar Typestry 2.0 — more power, more design options, more amazing effects. Makes images that sparkle, sizzle and glow. Make your own perforations and make custom versions of your Looks. Simple as 2D, stunning as 3D.

You loved Typestry 1 — you’re not going to believe Typestry 2!

1 (800) 888-9856

Pixar Showplace with MacRenderMan
Wonderful scene composition software for creating 3D pictures without modeling. Has over 130 pre-designed objects, powerful plug-ins, Adobe Illustrator, DXF and RIB support, impressive Looks and Glimpse, the amazing Looks editor. The perfect next step for Pixar Typestry users.

Pixar One Twenty Eight CD
Classy collection of seamlessly tiling digital photographs. Exquisite quality TIFF images, easy-to-use Photoshop/Photoshop-Styler plug-ins. Perfect for backgrounds or composites in 2D design or as texture maps for 3D. Makes great Looks for Typestry and Showplace.
Drawing the Wrong Conclusions

I'll bet Deke McClelland's review of Aldus FreeHand 4.0 (Macworld, March 1994) would not be as favorable if it were not for his extensive experience with Adobe Illustrator. Perhaps, compared with Illustrator, FreeHand 4.0 is a step in the right direction. But compared with FreeHand 3.1, it is a step backward. Being a longtime devotee of FreeHand (since 1988), I can assure you that version 4.0 does the same thing as your vacuum cleaner, and I don't mean that it cleans up.

With release of this upgrade, I fear that Aldus has lost the grip it once held in the drawing program market, drawing being the operative word here. Over half of Mr. McClelland's review of a drawing program was devoted to its text-handling features. What's wrong with this picture? We do not need slow and often impossible-to-edit tables in a drawing package, nor do we need a poorly designed text ruler. Leave the text to Aldus PageMaker—FreeHand is supposed to be an illustration tool.

FreeHand 4.0 is cluttered with palettes (Deke claims nine, but there are actually ten); even the old masters could handle only one palette at a time. In all, these palettes occupy nearly 35 square inches of screen real estate. What was the program-development team at Aldus thinking? What was wrong with the dialog boxes you brought into view with a keystroke, edited quickly, and closed by touching the enter key? They helped make the software work like a taboret, a common piece of art-studio furniture that holds graphics tools so that only the drawing occupies the drawing board. The artist pulls tools from the taboret without interrupting the work in progress.

The system requirements listed on the FreeHand 4.0 package should read "68040 (or plenty of free time), a minimum 20-inch monitor (to accommodate palette clutter), and a burning desire to become a word processor instead of an illustrator." One more request: Aldus, if you're listening, please don't fix these problems by releasing another version and renaming it "Professional."

Bill Jennings
Placentia, California

In truth, FreeHand 4.0 has 11 palettes—we found another after we read Mr. Jennings's letter. We hope the palettes aren't breeding.—Eds.

Consider the instruction/reference card for my Hewlett-Packard LaserJet IV printer. I could not solve a persistent (and expensive) stoppage problem by following the instructions. When I called HP tech support, I learned (after 20 minutes on long-distance hold) that the instructions were in error, and that HP had known about the errors for more than a year but didn't deem it enough of an issue to bother correcting it.

Joel Amkrunt
Los Angeles, California

According to Hewlett-Packard, the Quick Response Card that Mr. Amkrunt refers to is intended to provide short-term help with common problems encountered by HP LaserJet users. The information on the card is incomplete, but the correct information can be found in the LaserJet owner's manual.—Ed.

Freeware ≠ Public Domain

I'm a longtime subscriber to Macworld and am tickled to death, in one sense, to see myself mentioned in Erfert Fenton's article on fonts in the March 1994 issue ("The Right Font"). But I'm also good 'n' mad, too, because she got much of it wrong.

On page 119 of the issue, my Logger font is featured in "Specialty and Miscellaneous Faces" as example 8, with the identification "Logger, a public-domain font by David Rakowski." I never released a font into the public domain; to do so would mean I relinquish any copyright. I released that font as freeware while retaining the copyright, which is vastly different from Ms. Fenton's characterization of Logger as in the "public domain."

The second, even more glaring, error regards Ms. Fenton's description of Lazy Dog Foundry's Cheese Dog and Running Dog collections, which she calls the "cream of the crop from shareware and public-domain font archives." Wrong again. All of the fonts in those collections continue
**LETTERS**

**CORRECTIONS**

- In the April 1994 Desktop Critic, PCPC's number should have been 813/530-0123. The toll-free number is 800/622-2888.
- Also in April, Diagnos' s toll-free number in the "Troubleshooting Tips and Tools" feature should have been listed as 800/442-4763.
- In Step 6 of Expert Graphics (April 1994), the artist moved the Input (not the Output 'Levels' white triangle to the Levels histogram's rightmost peak.
- In April's "Corrections," we should have said that Blyth Software is not yet shipping the Unix version of Omnibus.
- In the February 1994 review of the NuTek Duet Mac work-alike, the "What Works—And What Doesn't" sidebar incorrectly implied that the Duet cannot work with network cards. In fact, the NuTek cannot work on an AppleTalk network, except for printing. Also, NuTek has tested compatibility with Apple's 8/24 Display Card.
- In the May 1994 feature "Power Mac Software," we listed the incorrect Core-Performance Index rating for the prototype 66MHz 486DX2-based Orange Micro OrangePC 290 coprocessor card. Its rating should be 18.4, putting it halfway between a 33MHz 486DX-based PC and a 66MHz 486DX2-based PC compatible.

**Boosted Booster**

BASED ON YOUR ARTICLE IN THE March 1994 issue ("CPU Boosters"), I mailed my Ilsi to Mac Experts in Santa Monica, California, on a Thursday and got it back the next Tuesday. I asked the company to do the boost ($89) and to fix the Ilsi's sound problem ($25). I sent the CPU via overnight mail for $40 and paid another $40 to have it returned overnight, for a total of $194 portal-to-portal.

The chunky of Ilsi that I love so much now has a new lease on life. It isn't an 840AV (my dream machine), but it did not cost me 4000 bucks, either. My new machine will last me another year or two until I mortgage the house for a PowerPC. Now if I can just figure out how to slam a cache card into that overcrowded little Ilsi box.

Rob R. Butternfield via America Online

**Fab Four Make Fab Disc**

I N HIS REVIEW OF THE TOP TEN CD-ROMS in the March issue, James A. Martin lists the Beatles' film A Hard Day's Night (The Voyager Company) as one of the worst CD-ROMS that he tested.

The author admitted that A Hard Day's Night was "actually a decent product. " The only flaw he could point out is that the film "doesn't deserve such veneration" as would a movie such as Casablanca. In my opinion, A Hard Day's Night does deserve such veneration, since it is an important piece of the history of rock and roll. But my opinion of the importance of the film is beside the point, as is Mr. Martin's.

A Hard Day's Night is a great example of what CD-ROM technology can deliver when developers take the time to do it right. In addition to the 1964 full-length feature film, there is also the film's script (which plays along with the movie); the trailer from the 1982 re-release; an interview with the film's director, Richard Lester; and another short film by Lester that served as inspiration for A Hard Day's Night.

It would have been a much greater service to readers if Mr. Martin had warned them about CD-ROM titles out there with serious flaws in design and execution, instead of reciting his opinions...
Bye Bye Bernoulli.
See Ya SyQuest.
Hello Pinnacle!

3.5" Magneto Optical Drive
230 Megabyte
3600 RPM

Some technologies come and go... but optical is here to stay. Say hello to Pinnacle's new Tahoe™ 230 Portable 3.5" Optical Hard Drive.

The Tahoe™ provides ISO interchangeability and removable storage with multiple media sources, while Bernoulli™ and SyQuest® offer no standards support.

And there's no doubt that over time optical storage costs less than magnetic storage.

It's a perfect solution for both portable and desktop computing.

Thousands of graphic designers, pre-press facilities, multimedia creators and personal computer users are making the change to optical storage. So say hello to optical—and see ya later to magnetic technology.

For more information or to order call:

800.553.7070
Apple made it easy to use. We make it easy to do.

In fact, we'll do it for you. Introducing Open Sesame!, the world's first intelligent software assistant for the Macintosh. Open Sesame! observes how you work, learns your repetitive patterns, and then offers to do them for you. Automatically.

With a single click, Open Sesame! will open and close related sets of folders, documents and applications, create and manage multiple Apple Menu and Desktop items folders, and perform routine maintenance, like rebuilding your desktop...automatically. So you can do more with fewer clicks.

For example, suppose that every time you start up your Macintosh you immediately open your mail program. Open Sesame! will observe this and offer to do it for you. It will even find more efficient ways for you to use System 7.0, like making aliases and stationery automatically.

Here’s what the critics say: “One that knocks my socks off is called Open Sesame!...the simple fact is that Open Sesame works smarter for me. It might just herald a new wave in mac software...The more you use it, the better it gets.” The Mac Manager, MacWEEK

“Macintosh users who like the flexibility of System 7 but tire of ‘tweaking’ their desktop and Apple menu items will appreciate Charles River Analytics Inc.’s Open Sesame!” INFOWORLD

Open Sesame! is available at these quality resellers: MacWarehouse 800-265-6227, EGCHHEAD 800-EGCHHEAD, The Mac Zone 800-248-0800, ComputerWare 800-326-0092.

To order direct, call 1-800-913-3535.

For more information, call 617-491-3474 or fax 617-588-0780.

Charles River Analytics, 55 Whitter St., Cambridge, MA 02138. Open Sesame! is a registered trademark of Charles River Analytics. Macintosh and Apple are registered trademarks of Apple Computer, Inc.

Circle 18 on reader service card

LETTERS

Letters should be sent to Letters, Macworld, 501 Second St., San Francisco, CA 94107, via fax, 415/442-0766, or electronically, to ComputerServe (70307,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld), or via Internet (70307,702@computerserve.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.

about which movies should or should not be captured on CD-ROM. My advice to Mr. Martin is that he leave the job of reviewing movies to Siskel and Ebert.

Sem Chonsh
Columbus, Missouri

A community college in North Carolina at one time offered an accredited course on “The Andy Griffith Show.” While I'm sure it was an entertaining class, its subject struck me as not entirely worthy of academic scrutiny. But that's how I feel about A Hard Day's Night—it's great to have a movie to analyze on CD-ROM, and the Voyager product is nicely executed. But in my admittedly subjective opinion, there are hundreds of other films that would make for much more interesting examination, and that's why I included the disc among the "misguided and downright bad CD titles."—J.A.M.

MacTools Needs Fixing

I couldn't decide whether to laugh or cry when I read your four-star review of MacTools 3.0 in the March issue. I had ordered the upgrade, despite the excessive price for a current MacTools user, because I had been pleased with version 2.0; it had solved problems for me that Norton Utilities could identify but could not fix. I received the (supposedly) fixed 3.0a, but very little seemed to work well. In fact, I found the software to be so bad that I returned it for credit to the mail-order house from which I purchased it.

C P Anti-Virus simply would not run at all; every time I tried to use it, it would quit with a type I error. TrashBack was confusing to implement, and the Trash-Back folders somehow became visible on the desktop—much to the consternation of my spouse, who wondered what I was up to this time. AutoCheck caused a major degradation in performance even when it was supposed to be “sleeping” and had been set to run only once per day. And finally, CP DiskFix continually found problems in the desktop database that it could not fix and that Norton Utilities 2.0 and Disk First Aid 7.2 didn't even find. I am using a very typical Hci (32-bit clean, math chip installed, and so on) with System 7.1, and I experienced these problems even when starting up with all extensions and INITs turned off.

I will continue to use MacTools 2.0, since I have it, but I would not recommend version 3.0 to anyone until it undergoes a major overhaul.

Steve Parker
via America Online

Letters, Macworld, 501 Second St., San Francisco, CA 94107, via fax, 415/442-0766, or electronically, to ComputerServe (70307,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld), or via Internet (70307,702@computerserve.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.

Unicorn Fixes MIDI

In the March 1994 POWEBOOK NOTES, Cary Lu mentions problems with MIDI on 100-series PowerBooks and implies that Opcode Systems' OMS is the only solution. Mark of the Unicorn has a control panel called Unicorn Power that fixes both PowerBook serial ports (OMS fixes only the printer port) for our MIDI software. This fix is included with our latest versions and is free to registered users of our software.

Neal Listhen
Mark of the Unicorn
Cambridge, Massachusetts

Loyal Customer or Captive Audience?

I am getting upset about the constant upgrade notices I receive. In less than two years, I have spent $90 on upgrades for Aldus' SuperPaint, even though the program now sells new through mail order for $99. Would you believe $400 in 2½ years for Aldus FreeHand upgrades? And Aldus PageMaker is not far behind.

I understand the expense involved in programming and R&D. But why should those who purchased the programs and support the company be hit so hard for upgrades? I use all of the above programs and have upgraded every time I received a notice. Software companies should throw away the stamp that says “Sucker” and use one that reads “Loyal Customer: To Be Treated Fairly.”

Alan Ratzburg
San Jose, California

Letters should be sent to Letters, Macworld, 501 Second St., San Francisco, CA 94107, via fax, 415/442-0766, or electronically, to ComputerServe (70307,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld), or via Internet (70307,702@computerserve.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.

Letters should be sent to Letters, Macworld, 501 Second St., San Francisco, CA 94107, via fax, 415/442-0766, or electronically, to ComputerServe (70307,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld), or via Internet (70307,702@computerserve.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.

Letters should be sent to Letters, Macworld, 501 Second St., San Francisco, CA 94107, via fax, 415/442-0766, or electronically, to ComputerServe (70307,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld), or via Internet (70307,702@computerserve.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.
If you’re always looking for faster and better ways to get things done, take a look at the all-new IN CONTROL 3.0. It’s the complete planner and organizer for the Mac that can get you totally organized. (Honest!) You see, IN CONTROL is the only Personal Information Manager that combines the award-winning, multi-column Action Outliner™ with full-featured daily, weekly and monthly calendars. The result? You can throw away those little yellow stickies, make short work of long to-do lists and bury that dog-eared calendar.

1. Spend your time wisely. IN CONTROL is easy to use, so you can dig right in and start planning immediately. And with its fully integrated outline and multiple-view calendars, you can plan, organize and schedule — all at the same time!
   
   Plus, IN CONTROL’s handy Lookup feature gives you speedy access to FileMaker® Pro, Touchbase™ Pro, Now Contact™ and Dynodex™. IN CONTROL even dials the phone!

2. Plan smarter and better than ever before. IN CONTROL helps you prioritize everything — in as much detail as you need — so it’s easy to choose what’s most important to work on first.

3. Be adaptable to change. IN CONTROL’s flexible, intuitive interface makes changing your plans, reorganizing your day, shifting responsibilities and rescheduling your appointments a snap.

4. Keep your sense of style. Unlike many “get organized” products, IN CONTROL doesn’t force you to change your style. It works the way you work, and provides countless tools to help you get organized faster, better and easier than ever before. You can even print pages to fit the most popular paper organizers.

5. Don’t lose sight of the big picture — or the details. IN CONTROL’s daily, weekly and monthly calendars allow you to view your activities up to a year at a time, ensuring that all your plans fit with your long-term goals.

   With IN CONTROL’s new daily views, you can also focus on the details — like your schedule or to-do’s for one particular day.

6. Never let anything slip through the cracks again. IN CONTROL can automatically remind you of your most critical tasks, guaranteeing that you won’t forget anything. Plus, Auto carry-forward and recurring event features speed up scheduling.

7. Get the all-new IN CONTROL 3.0 risk-free. When you order, you don’t risk a penny because IN CONTROL is backed by our ironclad 60-day guarantee of total satisfaction.

SEVEN GREAT WAYS TO GET TOTALLY IN CONTROL™

60-DAY UNCONDITIONAL MONEY-BACK GUARANTEE. Through participating dealers.

For more information, or site license or volume discounts, call: 1-800-925-5615 or 617-776-1110.

To upgrade, call: 1-800-784-7388 ext. 300.
This is Bob, the new employee. Whether Bob works at home or is part of your office network, PowerTalk software makes it easy for him to collaborate with colleagues—without trusting his energy on lots of complex procedures or training. Plus, PowerShare makes network expansion easy for you. So easy, you can add 20 or 2000 more Bobs by simply adding more Powershare Collaboration Servers.

It takes a lot of effort to physically route paper documents between different departments. With PowerTalk and Digisign software, however, people can now approve things electronically—saving time and money (and, of course, trees).

Announcing conserve energy

PowerTalk, when used with any personal gateway, combines your voice mail, e-mail and faxes into a single universal mailbox. So you can check all your messages in one place (instead of going to the trouble of checking them separately, like you're used to doing).

You can spend your time and energy learning five different communications programs. Or, you can use PowerTalk, which lets you send faxes, e-mail or any other kind of message, all with one simple procedure—right from the program you're already working in.
In a world of immovable deadlines and shrinking bottom lines, you've got better ways to spend your energy than fiddling with passwords, enclosures and multiple interfaces. Recognizing this, the engineers at Apple created two of the most helpful networking innovations in the history of personal computing: PowerTalk™ and PowerShare® Collaboration Servers software. With these improvements, your Macintosh® now automatically does many of the tasks you used to do manually—so you can focus on working with your colleagues, instead of focusing on getting your computers to connect. PowerTalk is the first piece of software designed to make collaboration easier for individual users. Instead of bothering with separate voice mails, faxes and e-mails, all communications now reside in a single mailbox. And all messages are sent and received with the mere click of a mouse—no separate programs, no separate passwords. Plus, a catalog feature even lets people keep detailed information on their colleagues: numbers, addresses and instructions on how to send them information. PowerShare makes setting up a network equally simple. The software is easy to install and easy to maintain. Keeping track of people is easy, and adding new people is easy. To see how PowerTalk and PowerShare can help your company, call 800-732-3131, ext. 200, for the name of the authorized dealer nearest you. And discover the power that takes the work out of working together. The power of Macintosh. The power to be your best.

Introducing PowerTalk and PowerShare from Apple
You expect a scanned image to accurately reflect the color found in your original. Getting there, however, is usually no picnic. After scanning, precious hours are often spent adjusting the image in software to capture the truest blue, a faithful fuchsia, or for example, just the right kind of red in a ripe watermelon. But DCR™ has changed all that.

Now, when you purchase the **new, low-priced ScanMaker® II SP single-pass color scanner**, you also get DCR, Dynamic Color Rendition, an advanced, yet easy-to-use color calibration and correction system. DCR actually calibrates the ScanMaker II SP to a photographic industry-accepted calibration target, creating a custom color profile of your specific scanner, ensuring the most accurate color possible as you scan the image. But don't take our word for it. Here's what PC Magazine said in their February 8, 1994 issue: "...this mechanism (DCR) seems to have worked well, because the ScanMaker II SP's color output was clearly the best of any scanner in our survey."

So, even if you need to capture the bright yellow flesh of a Honeyheart watermelon, like the wedge on the left, the quickest way to do it is with the new ScanMaker II SP with DCR.

For more information about the ScanMaker II SP, DCR, your nearest authorized Microtek reseller, or a FREE copy of *The Scanned Image* — a scanning primer, call 1-800-654-4160 or fax (310) 297-5050.

---

**The ScanMaker II SP accurately captures millions of brilliant colors at resolutions up to 1200 x 1200 dpi through software interpolation (300 x 600 dpi optically). In addition to the DCR color calibration/correction system, the ScanMaker II SP is bundled with Adobe Photoshop 2.5 LE for either Windows or Macintosh. Windows users also get Corel's PageKeeper Portfolio document and image management software.**

---

**MICROTEK**

Better Images Through Innovation.

Get a hands-on demonstration of the ScanMaker II SP with DCR and find out more about accurate color scanning by attending Focus Seminars' "ColorRight, Color Correction & Reproduction Workshop." For dates and locations, call Microtek at 1-800-654-4160.

---

Circle 287 on reader service card
LC 575 Reborn as Performa  As expected, Apple is bringing out Performa models of its 33MHz, 68040-based LC 575 (see “Apple Ships First All-in-One 040 LC,” Macworld News, April 1994). The new all-in-ones are the Performa 575, which has a 250MB hard drive and 5MB of RAM; the 577, which has a 320MB hard drive and 5MB of RAM; and the 578, which has a 320MB hard drive and 8MB of RAM. All have an internal tray-loading double-speed CD-ROM drive and bundled software including ClarisWorks 2.0, Quicken 4.0, Macintosh PC Exchange, Best of Homeworks Templates, ClickArt Performa Collection, America Online, At Ease, American Heritage Dictionary, Mario Teaches Typing, Spectre Challenger, and SuperMunchers. Bundled CD-ROM titles include Grolier’s Encyclopedia, 1993 Time Magazine Almanac, Dinosaurs, and Wacky Jack’s CD Game Show. The new Performas should ship to mass-market channels by early May. Prices will vary by reseller.

Novell Acquires WordPerfect  Possibly creating a software behemoth to rival Microsoft, Novell is acquiring WordPerfect Corporation (a move that requires government approval) and has bought the Quattro Pro spreadsheet from Borland International. Novell gained the right to distribute 1 million copies of Borland’s Paradox database. This should heat up the software-suite battle, where Microsoft currently leads.

Some Slowdowns on Power Macs  Reports are circulating that the Power Macs’ SCSI and NuBus have flaws that make these Macs transfer data more slowly than Quadras. However, Macworld Lab’s investigation shows that the slowdown occurs only for very fast systems, such as some disk arrays and video cards, and in most cases is caused by the lack of an updated driver from the array or card vendor. Vendors we contacted planned to have updates shortly.

100MHz PowerPC  Upping the ante in the processor wars, IBM and Motorola plan to begin shipping a 100MHz version of the PowerPC 601 chip in large numbers in the fourth quarter. The chip is up to 25 percent faster than the speediest existing version (80MHz) and uses only 4w of power; the original 601 uses 8w. Motorola also cut prices on its PowerPC 601 chips.

Quark Extends PowerPC Upgrade  Quark has changed its PowerPC upgrade plan, which had drawn criticism from users. Previously, users had until July 1 to buy the PowerPC upgrade (due in early summer) of QuarkXPress 3.3 for $199; after that, the price would be $999. Now, Quark will offer the $199 price until October 1, raise the price to $229 until December 31, and go to $999 after that.

America Online Adds Capacity  After being swamped by new subscriptions, America Online said it has increased its computer capacity by about 50 percent. Many subscribers had reported being unable to get through. The company also now offers 9600-bps access from Macs. 800/827-6364.

Applied Engineering Collapses  Applied Engineering—vendor of upgrade boards and accessories—has gone out of business. Separately, Interex Computer Products said it had bought Applied Engineering’s remaining battery chargers for PowerBooks and will resell those and then make them under its own name. Interex, 316/524-4636.

Golden Triangle Folds  Disk-drive-utility vendor Golden Triangle is reorganizing and has already laid off most of its employees, making tech support “extremely difficult if not impossible,” according to the company. A Golden Triangle executive said the company has not charged any customer credit cards since January. 619/587-0110.
Apple Tells Its Software Future

Saying it intends to increase the Macintosh's market share, Apple recently detailed its upcoming system software offerings and outlined the future of Macintosh Operating Systems. The company said it plans to move from today's passive user interface to active assistance for greater productivity, from networks to collaboration for effective teamwork, from today's monolithic applications to component-based software (OpenDoc) for faster custom solutions, and of course, from CISC (680X0) to RISC (PowerPC) for improved price/performance.

Beyond the latest System version, 7.1.5, Apple expects to introduce the following:

- System 7.5, which should appear this summer in versions for 680X0-based Macs and Power Macs. System 7.5 will add Apple Guide (the first instance of active assistance), a scriptable Finder, drag-and-drop for fast printing and other automatic processing of files, the famously overdue QuickDraw GX, multithreading (a first step toward multitasking), PowerTalk collaborative communications software, MacTCP, file-synchronization management, and software for easier translation of DOS and Windows files.

- OpenDoc, once code-named Amber (see "Amber: beyond Applications," News, September 1993), started at Apple but later moved to Component Integration Laboratory (CILab), the consortium charged with making OpenDoc a standard across multiple hardware platforms. With OpenDoc, users will never have to leave the compound document they're working on. If a user decides to add a chart, OpenDoc will access a charting component. The obvious advantage is not having to open and close a lot of huge applications to make changes. The less-obvious advantage is that users can choose among competing charting components, for example, as well as mix components from different vendors in a way that's not possible now. OpenDoc may also encourage creative software, since a small developer could sell a clever component without building a huge monolithic application around it.
Current members of the CILab consortium include Apple, IBM, WordPerfect, Novell, Oracle, Sun, Xerox, and Taligent. CILab is encouraging Microsoft to participate in OpenDoc and Microsoft and Apple recently agreed to divvy up the tasks involved in building bridges between OpenDoc and OLE, Microsoft's equivalent of OpenDoc. OpenDoc software developers' kits (SDKs) are due this fall. Applications should take at least six months to show up after SDKs are available for a given environment.

- Copland, also known as "System 8," is expected in 1995. Copland will add improved active assistance; cooperative multitasking; memory protection to reduce conflicts from multitasking; and a "new I/O architecture," probably incorporating the newish PCI bus and/or FireWire, the high-speed serial bus that may replace SCSI, existing serial ports, and the Apple Desktop Bus (ADB).

- Gershwin is expected in 1996. The Gershwin operating system will mark the appearance—finally—of true preemptive multitasking on the Mac, but software developers will have to rewrite their applications to take advantage of that capability. Gershwin will also provide intelligent assistance, which observes what you do and makes suggestions, and advanced graphics with cut, copy, and paste. Apple is designing Gershwin to have a microkernel architecture, which means it will have core code designed for easy portability to various hardware platforms. Apple's microkernel will probably not be identical to IBM's proposed standard WARP microkernel, because WARP is too big to fit on an affordable entry-level system, according to an Apple representative. However, the Apple microkernel may be a subset of the WARP kernel, so that applications written for Gershwin would still run if Apple later decided to move to the full version of WARP.

- The object-oriented, platform-independent Taligent operating system from the joint venture of Apple, IBM, and Hewlett-Packard will be interoperable with OpenDoc but is probably still several years away.

- David Nagel, senior vice president and general manager of Apple's AppleSoft division, suggested that the high performance of PowerPC chips would make qualitative changes possible in the user interface, possibly including speech input and output or multiple 3-D graphics environments that would replace or supplement today's desktop metaphor.—T.M.

Adobe, Aldus to Merge

NEW PUBLISHING TITAN

Adobe Systems and Aldus Corporation—two leading makers of desktop publishing software—announced a definitive agreement to merge, subject to approval by shareholders in July and by the Federal Trade Commission.

The new company—still unnamed at press time—will become the fifth-largest software vendor, with $500 million in annual sales. Adobe chairman and CEO John Warnock and president Chuck Geschke will keep their positions, and Aldus chairman and president Paul Brainerd will serve on the board.

Both companies "plan to continue all of our products currently in the marketplace for the foreseeable future," said Brainerd, noting the overlap between Aldus FreeHand and Adobe Illustrator. However, outside sources speculate that the rights to FreeHand could revert to Aldys, FreeHand's developer. (For a comparison of these draw programs, see "FreeHand vs. Illustrator," in this issue.)

Jin von Ehr, president and CEO of Aldys, said a merger would not invalidate Aldys's rights to FreeHand, but that Aldys would not "sit back and let FreeHand become the number two product." Companies have shown an interest in acquiring FreeHand from Aldys over the years, he noted, saying only that "all possibilities are open to us now."—JAMES A. MARTIN

Apple 17-inch Display

MULTIPLE-SCANNING COLOR MONITOR

Since the days of the 9-inch display, the world has shrunk and monitors have grown. The midrange of Apple's monitor lineup is now the Multiple Scan 17 Display, the company's second multiple-resolution color monitor. Based on a 0.26mm stripe-pitch Trinitron tube, the Multiple Scan 17 can handle multiple resolutions from 640 by 480 pixels (standard 13-inch size) up to 1024 by 768 pixels at 75Hz. The monitor can also display a range of resolutions at 60Hz, including VGA and SVGA, and it ships with an adapter that connects it to PC-compatible systems.

Users can adjust everything from brightness and contrast to convergence and continues

The Apple Multiple Scan 17 Display offers a wide range of resolutions, including VGA and SVGA.

In Brief

Apple's Cheaper CD-ROM Drive

Apple has unveiled the AppleCD 300e Plus external CD-ROM drive and the 300i Plus internal CD-ROM drive, which the company says are as fast as the current 300e and 300i models and offer a motorized loading tray and a lower direct price. The price of the 300e Plus was expected to be about $349, while the 300i Plus was expected to be around $319. They replace the existing models. 408/996-1010.

Apple Speakers: The Sequel

Apple's new AppleDesign Powered Speakers II are about a third smaller than the company's existing speakers. Available now for $79 in black, the speakers also come in platinum with Apple's new Apple Multimedia Kit for Macintosh. When it ships in May, the $449 kit will include an AppleCD 300e Plus CD-ROM drive (see above), head­phones, Compton's Interactive Encyclo­p­edia, and a choice of three software titles.

DGR Cuts Optical Price

DGR Technologies has dropped the price of its 256REM 256MB removable optical drive to $1099. The drive ships with one 256MB cartridge, all cables, and CharisMac driver software. 512/476-9855, 800/235-9748.

24-Hour Tech Support

Digital Equipment Corporation's $149 Service-in-a-Box provides toll-free, 24-hour unlimited technical support for a year on more than 450 Mac and PC applications including ACl US's 4th Dimension, Adobe Illustrator and Photoshop, Aldus PageMaker and FreeHand, Claris FileMaker Pro, Lotus Notes, QuarkXPress, and just about any Microsoft app. Service-in-a-Box is itself intended as a first line of defense, but live operators are standing by at all times. 603/884-3034, 800/722-9332.
Adobe Premiere 4.0
SUPPORTS ROLLING EDITS

A new window here, a new filter there, and a raft of small improvements add up to Adobe’s 4.0 release of its Premiere digital-video-editing software. Accurately controlling the timing of a transition between two clips used to be a time-consuming chore, but a new Trim window makes it easier and more-precise rolling edits. Premiere displays the video clips side by side, and you can opt to see just the current frame or to simultaneously look forward or backward in each clip by one or five frames, for instance while you adjust the transition point.

Previews from the Construction window now appear almost instantly; clips with asset-unrendered effects appear with hash marks through them, but you can get a quick idea of what your work will look like without taking a forced coffee break while Premiere assembles a preview.

Premiere 4.0 users can look forward to filters that vary over time, as well as the availability of filters from Photoshop 2.5. And whether you’re previewing a project, a clip, an effect, or a trim edit, you can opt to send the output to the Preview window, which could, for instance, be moved to an NTSC monitor to more closely simulate final output. The Preview window is one of several windows that can be designated as floating, meaning that they remain in the foreground even when you click in another window.

Premiere 4.0 also features a laundry list of minor revisions, including a pop-up tool palette that’s available from the Construction window, autosave, batch processing, the capability to work at true 29.97 frames per second, and improved handling of audio edit decision lists. The software should be available now on CD-ROM disc only in fat binary format (a combined 680X0 and Power Mac version) from Adobe for $795. Owners of Premiere 3.0 will be able to upgrade their software for $129. Adobe Systems, 415/961-4400, 800/833-6687.
—CAMERON CROTTY

Big-Screen Multimedia Monitor

NEC Technologies introduced the MultiSync 4PP, a 27-inch monitor designed for multimedia and presentations. The display accepts input from Macs, PCs, VCRs, and video cameras, in VGA, XGA2, NTSC, M-NTSC, PAL, and S-Video formats. The monitor uses a flat-square CRT tube with several resolutions, ranging from 320 by 200 pixels to 1024 by 768 pixels (at 60Hz). The Energy Star-compliant monitor comes with a remote control and is available now. NEC estimates that the monitor’s street price will be around $3695, 708/860-9500, 800/632-4636.—T.M.

QuickTime Ready for Prime Time
OFFERS PRO VIDEO FEATURES

Apple plans a midyear update to its QuickTime multimedia extension that will offer improved performance for all Macs, new features for video developers, and support for interactive television.

QuickTime 2.0 will let Macs play movies twice as fast as the current version, 1.6.1, according to Apple, with a data-throughput rate that will be increased from 1 MBps to 3 MBps. With 2.0, an O30-based LC 475 should be able to play back a 320-by-240-pixel movie at 30 frames per second, or a 640-by-480-pixel movie at 15 fps. Apple will also add a MIDI-like Music Track along with built-in support for 60-field video and time-code.

QuickTime 2.0 will allow editable, searchable, MPEG-
Compressed video, and will support network distribution of movies. Apple hopes this capability will popularize full-length movies on CD-ROM discs, video servers, and the information superhighway. Apple Computer, 408/996-1010.—JIM FEELY

Clarís Weaves Safety Net

UTILITY SOFTWARE SERVES AND PROTECTS

Designed as a safety net for unsophisticated users, Clarís’s Safety Suite consists of 13 utilities that can preserve and recover data, guard against unauthorized access to files, and provide hard-to-remove identification for lost or stolen Macs.

Security-conscious users can password-protect their hard disk drive, encrypt selected files and folders, completely erase or “shred” files so they are completely unrecoverable instead of just throwing them in the Trash, and monitor and log network access to their Macintosh. While your Mac is on but you’re not there, a screen locker prevents busy hands from peeking at your data and provides a way for honest, upstanding visitors to leave messages for you. As part of the screen locker, a customizable message appears at the bottom of the display, identifying your machine in case of loss or theft.

Safety Suite can also protect your data from computer gremlins, automatically saving your files at intervals you specify and backing up your data when your Mac is idle (both features can be set to retain multiple versions of your documents). An undelete utility recovers those accidentally erased files, and a Crash Protection feature records your keystrokes for last-ditch data rescue. The What Happened utility maintains an audit trail of machine activity to help you figure out what caused the joint-cracking system lockup you just experienced. Safety Suite is currently available for $99 from Clarís Clear Choice; 408/987-7000, 800/325-2747.

—Cameron Crotty

Video Director

ASSEMBLE AND EDIT VIDEO CLIPS

Manually assembling an edited tape from source clips is a big pain, so Video Director for Macintosh 1.5, which uses a special cable that plugs into your Mac’s serial port to pipe commands to a camcorder (either LANC- or VISCA-compatible) and an infrared-controllable VCR. The VCR and the camcorder are directly connected with audio/video patch cords, and the camcorder acts as a source deck, while the VCR acts as a record deck. You control the source deck via a window that displays VCR-style controls. When you find a segment of video that you like, you mark its start and end points, and then Video Director remembers where it is and what tape it’s on. When you’ve identified your favorite—

Bugs & Turkeys

Aldus has posted online FreeHand 4.0a, a patch to 4.0 that fixes several problems users encountered with printing, conversions, and font handling.

Microsoft is working on an upgrade to FoxPro that will address problems users have had with out-of-memory errors and printing to QuickDraw printers. The upgrade will be FoxPro 2.5c, and Microsoft expected to release it by the end of April. Microsoft says a free maintenance fix should be available by the time you read this.

Apple’s $10,749 Professional Video Production Solution, a bundle of video-editing and software introduced in January, requires a PDS slot for its storage array controller board. But Power Macs don’t have PDS slots. And Apple’s PowerPC processor upgrade board for existing Quadras needs their only PDS slot. How will power-hungry video professionals move to PowerPC? Apple is aware of the dilemma.

When America Online users try to create private discussion rooms with titles containing the character sequence x, e, x (including, for example, Safe Sex and Escorts), they can’t; instead they get a message that vulgar room names can result in account cancellation. Responsible citizens and Anglophiles are out of luck.

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-shirt if we shoot your turkey in this space. See How to Contact Macworld.

In Brief

Cheaper Bernoullis

Iomega has lowered the suggested retail prices of its Bernoulli 90 removable storage drives and 90MB cartridges. The Iomega MacTransportable 90 Pro now lists for $419 (down 29 percent), and the MacTransportable 150 now lists for $589 (down 16 percent). Single 90MB removable cartridges are now available for $112, Tripacks for $323, and MultiDisk 150 Tripacks for $336. 801/778-1000, 800/456-5522.

500MB PowerBook Drive

Microtech International is shipping two high-capacity internal hard drives for PowerBooks and Duos. The RoadRunner 250i and RoadRunner 500i store 250MB and 500MB, respectively. The 250i lists for $389, and the 500i goes for $749. 203/468-6223, 800/626-4276.

Image Analyst

MathWorks’ MATLAB computation, data-analysis, and modeling environment now has a tool for analyzing, filtering, and enhancing images and other two-dimensional signals—MATLAB Image Processing Toolbox. The $895 toolbox includes more than 100 functions for linear and non-linear filter design; filtering and image restoration; image enhancement; image analysis and statistics; D-D transforms; and color, geometric, and morphological filtering. 508/653-1415.

fied all the clips you want on your final tape and arranged them on the event list, you click on Make Tape, and Video Director assembles your final tape, prompting you for different source tapes as necessary.

You can save event lists, and logging a clip automatically adds it to your clip library, from which you can recall it at any time. Video Director 1.5 for Macintosh is available for $199.95 from Gold Disk; 408/982-0200, 800/465-3375.

—CAMERON CROTTY

Pinnacle’s Optical Array
STORES UP TO 5.2GB

The Orray optical array from Pinnacle Micro is an optical array that works more like a fast hard drive than a collection of optical drives. The Orray comes in models that have two or four drives: each high-speed erasable optical cartridge functions like a platter in a hard drive. Data is multiplexed through custom ASIC chips to each disk surface by a RISC processor-based master controller. According to Pinnacle Micro, the data is simultaneously read from or written to all the surfaces by using a large data cache. The company said it has applied for a patent on the multiplexing technology. A different mode accepts any 5.25-inch standard optical media cartridge up to 1.3GB. Estimated prices for the Orray optical drive array without media are $7995 for two drives, and $14,000 for four drives.

The company recommends using an uninterruptible power supply. Pinnacle Micro, 714/727-3300, 800/553-7070.

—TIM WARNER

Macromedia
Director 4.0

IMPROVED SECURITY AND AUTHORIZATION TOOLS

Macromedia has announced Director 4.0, the first upgrade to the company’s popular multimedia authoring product since 1992. Expected to become available at the end of March, Director 4.0 now offers improvements in memory management, a revised user interface, added support for up to 32,000 cast members and up to 48 channels, and increased security features. The company has revised Director 4.0 so that users cannot use ResEdit to break into the player files as had been possible in previous versions of the software. The authoring program’s file-size limit (previously 16MB) has been eliminated, and Lingo, the built-in Macromedia scripting language, also now includes object-oriented commands and expanded mathematical functions.

Director 4.0 has a suggested list price of $1195, and current registered users can upgrade to the new version for $199 until August 31.

Macromedia expects to ship the first-ever Windows version of Director sometime later this summer, and existing and future Director files will be compatible across both platforms. The company expects to introduce support for PowerPC Macintoshes in a future revision. Macromedia, 415/332-2000, 800/945-4061.

—JOANNA PEARLSTEIN

TREND
Fast 486 PC in Your Mac
ORANGE MICRO CARD FOR 680X0, POWERPC MACS

Orange Micro has revamped its OrangePC line of PC coprocessor cards to include Intel’s 66MHz 80486DX2 CPU, as well as its 33MHz 486DX and 33MHz 486SX CPUs. The CPU chips are user-upgradable, including to the new Intel DX4 CPUs, which run as fast as 100MHz. The cards work in any Mac that accepts 12-inch NuBus cards; this includes the Mac II series, all the Centris and Quadra Macs except the 610, and all the Power Macs except the 6100.

The OrangePC cards come in three models: all three support up to 64MB of system RAM via a standard 72-pin SIMM slot. The 210 offers one serial and one parallel port, as well as standard VGA video (640-by-480-pixel resolution at 16 colors). The Model 250 has one PCMCIA slot (which accepts Type I and Type II cards) and supports SuperVGA video (up to 1024-by-768-pixel resolution at 256 colors), while the Model 290 has a PCMCIA slot and parallel and serial ports plus SuperVGA video. You can access the PCMCIA slot through the Mac’s back panel, so you need not open the Mac’s cover to change peripherals, as previous OrangePC cards required. To use the serial and parallel ports on the Model 290 requires an optional cable.

Because the OrangePC is a PC running inside the Mac’s case, programs can continue to run in one system while the user has switched to the other system. The card does share video display and hard drives with the Mac, although a dedicated hard drive can be added via the PCMCIA slot for the Models 250 and 290.

The OrangePC software is in fat-binary format, so it works with both 680X0 and Power Macs in native mode. With the software, the card can access the Mac’s files through standard DOS and Windows commands. It can read virtual DOS hard disks created by Insignia Solutions’ SoftPC and Soft-Windows DOS emulators.

The OrangePC cards are shipped with MS-DOS 6.2; Windows must be purchased separately. Expected prices range from $999 for a 33MHz 486SX-based Model 210 with 4MB of RAM, to $2000 for a 66MHz 486DX2-based Model 290 with 16MB of RAM.

Orange Micro, 714/779-2772.

—GALEN GRUMAN
Should the New MiniCad 5 be your CAD Program?

Take the Quiz.

I want a full-featured, proven market leader which can handle any job: 2D, 3D, cost estimation and client presentations.

I want a program that runs on both the 68K-based Macintosh and the Power Macintosh. At no extra charge!

I want a CAD program that is tailored to my needs, with specialized tools for architecture, mechanical engineering and design.

I want an expandable CAD program which can be customized for specific solutions easily and inexpensively.

I don’t want to spend a lot for training or experience an enormous learning curve.

I want an established company with constant R&D funding, so that my investment stays safe.

3 Free Application Specific Modules
Mechanical, Architectural, & Advanced Design

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, Graphsoft is dedicated to aggressive investment in CAD R&D. Graphsoft customers stay more productive than their competitors because Graphsoft 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 multimedia training CD, or that you receive 18 months of free technical support with Graphsoft 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, multimedia training CD 18 months of free technical support and a no-hassles 30-day money-back guarantee through authorized dealers. Contact Graphsoft today for detailed literature. To order immediately, call MacWarehouse, MacConnection, or your local dealer. Demo! $19.00Buy MiniCad 5 and save!

Also from...

Diehl Graphsoft Inc.

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

Graphsoft

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

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 Graphsoft, Inc. Claris CAD is a trademark of Claris Corp.

Circle 46 on reader service card
You’re not seeing things clearly with the other guy’s digital video on a large screen, because they only support 8-bit color.

You’ll see much more with a RasterOps MoviePak2 Pro Suite: Full-motion video in true 24-bit color on up to 21-inch monitors. And all the stuff pros take for granted — QuickDraw™ acceleration, device control, RGB input — are not to be seen on Radius VideoVision Studio’s.

Affordable digital video with a professional focus

MoviePak2 Pro Suite™ is a turnkey solution for expert video: Full-motion, full-screen [60 fields at 640 x 480] compression/decompression, unparalleled RasterOps 24XLT V display technology and complete encoding capabilities for NTSC or PAL — all the features professionals look for most. And we’ll give you Adobe Premiere™ — the Macintosh® professional’s choice for QuickTime® video editing — for free.

If you’re just getting started in multimedia, MoviePak Presenter™ delivers 24-bit QuickTime capture and playback at half the price of the other guys. And we’ll throw in Avid VideoShop™ making this a spectacular value for multimedia presentations and CD-ROM authoring.

MoviePak Presenter provides quality video at matinee prices; MoviePak2 Pro Suite gives you millions of colors on large-screen displays. See for yourself: For a RasterOps reseller near you, call 1-800-SAY-COLOR.

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>RASTEROPS MOVIEPAK2 PRO SUITE</th>
<th>RADIUS VIDEOVISION STUDIOS™</th>
<th>RASTEROPS MOVIEPAK PRESENTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>True 60 field/sec (640 x 480) video capture &amp; playback</td>
<td>YES</td>
<td>YES</td>
<td>30-field capture 80-field playback</td>
</tr>
<tr>
<td>24-bit color on large screen displays up to 21-inch at 1152 x 870</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>QuickDraw acceleration</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Pro Features: Device control</td>
<td>YES</td>
<td>NO</td>
<td>Optional encoder with genlock for $449</td>
</tr>
<tr>
<td>SMPTE time code</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>RGB video input</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>$4199</td>
<td>$4469</td>
<td>$1749</td>
</tr>
</tbody>
</table>

If you’re using the other guy’s video editing system, there’s something wrong with your vision.
Next PowerPC Chip on the Way

IBM, MOTOROLA PRODUCE FIRST SAMPLES OF THE 604

IBM and Motorola have both produced the first units of the PowerPC 604 CPU, the eventual successor to the 601 used in the current PowerMacs. IBM expects full production from the two companies' fabrication plants by October. Apple has said that it will use the 604 in some second-generation PowerMacs, expected in early 1995.

The 604 will initially be available in a 100MHz version, although faster and slower variants are planned.

In low-level tests, the 604 is about 200 percent as fast as the 601, according to IBM. For floating-point calculations, it is only 120 percent as fast. IBM decided to focus on integer speedup on the 604 because that's the most common type of calculation a CPU makes.

The 604 consumes 10 watts of power, compared with the 601's 8w, the 68040's 5w, the 60MHz Pentium's 12w, and the 90MHz Pentium's 4w. IBM has also produced a 4w, 100MHz 601 CPU, which should ship in quantity this fall.—GALEN GRUMAN

90MHz Pentium

INTEL'S CHALLENGE TO POWERPC FALLS SHORT

A week before the introduction of the PowerMacs, Intel unexpectedly announced—almost three months earlier than originally planned—its power-efficient 90MHz and 100MHz Pentiums; and it began shipping them in limited quantity in early March.

Macworld Lab tests on a prototype 90MHz Pentium PC show that it is still slower than both the Power Mac 7100/66 and 8100/80.

INTEL'S NEW PENTIUM IS BETTER, BUT NO MATCH FOR POWERPC.

Code-named the P54C, the new Pentium 735 and 815 CPUs use 3 to 4 watts of power—that's less than a Motorola 68040 or IBM PowerPC 601. PC makers have already shown prototype systems based on the new Pentiums, but the CPUs' prices are high ($849 and $995, respectively; more than twice an 80MHz PowerPC 601's price. However, Intel plans to lower prices on a quarterly basis.

Intel also released clock-tripled S475 75MHz and S580 100MHz versions of its 486DX chip called the IntelDX4 319 and 435. Both the

new Pentiums and DX4s are designed to work in notebook as well as desktop PCs.

—GALEN GRUMAN

Power Watch

THE LATEST PRODUCTS FOR THE POWER MACS

Apple has announced prices for its Power Mac upgrades: The Power Macintosh Upgrade Card, which works in a IIX, IIXi, Performa 600, and all Centrises and Quadras but the AV models, costs $699. A motherboard replacement that changes a Centris or Quadra 610 or 660AV to a Power Macintosh 6100/60 costs $999 (to a 6100/60AV, $1399); to change a IIXx, Centris 650, or Quadra 650 to a 7100/66 costs $1499 (to a 7100/66AV, $1699); and to change a Quadra 800 or 840AV to a 8100/80 costs $1899 (to a 8100/80AV, $1999). A 256K cache card for the 6100 and 7100 costs $299. Apple, 408/996-1010.

• DayStar Digital has decided not to offer PowerPC accelerators for the Mac II, IIX, or Mac IIXx, saying the market is too limited. DayStar, 404/967-2077.


• Adobe Systems has new versions of Illustrator and Premiere for PowerPC and 680X0 Macs. Adobe, 415/961-4400.
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 — back ing 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 Lessr™ 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 Lessr are trademarks of Dantz Development Corp. Macintosh is a registered trademark of Apple Computer Inc. used under licence.

Circle 26 on reader service card
TCP/IP. The printer comes with five
These workgroup printers can print up to
The printers ship with 32MB of RAM
9320 55375; Ethernet interface cards
cost extra). All ports are simultaneously
active. and the print controller automat­
ered (Ethernet and Token Ring interfaces
supported by the product vendor
and have not been indepen­
dently verified by MACWORLD
All prices are suggested retail
Please call vendors for
information on availability

LaserLeader Mark 9315
and 9320
These workgroup printers can print up to
400 by 400 dpi on 11 ·by-17-inch paper
and are designed to exist in multiple-pro­
tocol network environments. Both sup­
port PostScript, HPGL, HPGL/2, and HP
PCL-4, and can be connected via Ether­
Talk, DECnet, Token Ring, LocalTalk,
Novell NetWare, Banyan VINES, and
TCP/IP. The printer comes with five
open interface slots—you tell the com­
pany how you want the printer config­
ured (Ethernet and Token Ring interfaces
cost extra). All ports are simultaneously
active, and the print controller automat­
kally senses and switches emulations.
The printers ship with 32MB of RAM
Software

AccuPrompt
Television personalities should never be at a loss for words, and this teleprompting software can help keep them speaking smoothly. Users can import formatted files from several popular word processors (via Claris' XTND technology), queue them up in the order they're to be read, and edit them with a built-in word processor. Dynamic sliding time processors can be smoothly joined with the skin command, and images may be loaded for rotoscoping or for use as modeling templates. 5MB min memory, requires Mac II, FPU $1095. Hash, 206/750-0042; fax 206/750-0451.

Afrocentric Klips Sampler
Library 1
Culturally specific clip art featuring African-Americans in business, at church, and at home. Includes black-and-white and color illustrations in EPS, PCX, and TIFF formats. Topics include Children, Black Church, Brothers, Black Families, Occupations, Kente patterns, Health, Sisters, and Couples, $79. Afrocentrix, 312/463-6269; no fax.

Animation:Master
A rendering-and-animation package based on Will Vinton's Playmation. The modeling interface is spline-based, and the package features channel-based motion for more realism than is traditionally available to animators, according to the manufacturer. Users can create custom textures and materials and animate them along with the object they've applied to. Also, hierarchical model segments may be smoothly joined with the skin command, and images may be loaded for rotoscoping or for use as modeling templates. 5MB min memory, requires Mac II, FPU $1095. Hash, 206/750-0042; fax 206/750-0451.

ComicBase
Leapin' lizard! This comic book encyclopedia and database includes color illustrations and information on nearly 300 titles in all genres from romance to war comics to superheroes. Market and appraisal information for the last four years are included, and you can create inventory reports, reports of the total value of your collection, plus checklists of issues needed to complete your collection. Selected words and titles are hypertext-linked to another, so if you're reading about Thor appearing in an issue of Spider-Man, you can click on Thor's name and go straight to his entry. A read-only Comic Show feature allows visitors to browse through your collection without making changes. Requires Mac SE $149. Human Computing, 408/774-9016; fax 408/774-9016.

Cron Manager
Let's say that every day at 4 p.m. you update the chart you're keeping on the number of trips you make to the coffee machine. When you place this control panel in your System Folder and restart, it creates a Cron Events folder and any file placed within that folder opens at the date and time specified in its name. You can tell a file (folder, document, or application) to open once at a specific date and time, or you can create recurring events: each day at a specific time, Cron Manager opens an appropriately named document. Requires System 7, $26.95. Orchard Software, 617/876-4608; no fax.

Doodle-mation
You mean you're still doodling with a pencil and paper? How low-tech. After you choose a set of shapes and lines, set their behavior controls, and click on Go, they fly around your screen, leaving trails, growing, shrinking, bouncing, and interacting with each other. You can change shapes' patterns as they fly, assign sounds to patterns and events, cycle the colors, and save your favorite patterns and animations as After Dark screen-saver modules. You can even doodle on your screen saver while it's running. 2MB min memory; requires Berkeley Systems After Dark to display screen saver. $29.95. Screen Magic, 415/648-8058, 800/336-2947; fax 415/647-2448.

Fast Pitch Pro
AHyperCard XCMD that lets users make multimedia presentations and control them (forward and reverse) with a single mouse-click. Presentations can include any combination of text, color, paint, sound, pictures, QuickTime movies, laser disc media (with VideoDisc plug-in sold separately), and audio CD media (with Pro AudioCD plug-in sold separately). This XCMD includes a runtime option so that users can create stand-alone slide stacks. Requires HyperCard 1.1 or HyperPlayer. $79.95. Object Systems, 317/898-4017, 800/859-9543; fax 317/898-4017.

Icon Mania
It may be hip to have a customized desktop, but tweaking those tiny icons can be less than rewarding. This application helps users create and apply icons to both folders and files in several ways. For instance, users can drag a graphics clip to an icon and change the appearance of all icons in one folder with one click. Requires System 7.5. $99 SRP with a 30-day moneyback guarantee. Available from PowerMac Version, available soon!

Connectix
800-950-5880 ext. 37
or 415-571-5100, fax 415-571-5195

RAM Doubler
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.
Point, shoot, plug it into your computer. With Apple digital photography, you're minutes away from a more credible credentials presentation, a report that feels important or a staff memo that sings. No film. No waiting. You get great 24-bit color images in next to no time.

The Apple® QuickTake® 100 digital camera comes with everything you need. It only weighs a pound. And at $749; just about any business can build a case for one. To locate your authorized Apple reseller, call 800-732-3131, ext. 550.

And add a new dimension to your work.

The New Apple QuickTake 100 Digital Camera
file onto the application, and Icon Mania changes the file's icon to a thumbnail of the graphic in the file. Icon Mania can also create custom folder and button icons based on any other icon. A color icon editor is also included, as is a library of over 800 icons. Requires System 7. color. $69.95. Dubl-Click Software, 818/888-2068, 800/266-9525; fax 818/688-5405.

MacSpeakerz 3.0
The latest version of this loudspeaker-design application can analyze six different box types as well as Isobank variations on each of these. Specifically, the software can now analyze third-order closed-box types, as well as fourth-, fifth-, and sixth-order band-pass box types. MacSpeakerz suggests enclosure volumes and tunings for each box type, and the manual currently includes a tutorial for those who are new to speaker design. $299. True Image Audio, 619/480-8961, 800/621-4411; fax 619/480-8961.

MasterCook II
In addition to containing more than 1000 recipes, this software has nutritional information ranging from fat content to sodium level on every ingredient in its database. Users can search for foods or recipes based on several criteria, including ingredients, nutritional information, and time needed to prepare a dish. Users can recalculate recipes to feed up to 999 people, and can generate menus or diet plans with four meals a day for up to 31 days. MasterCook software also generates shopping lists. $29.95. Alien Software, 512/327-9573, 800/444-8104; fax 512/327-3786.

MicroExpressionist
Designed for users who need math equations in their documents but don't need a full-blown equation editor, this package is a slimmed-down version of Prescience's Expressionist. The smaller package features simplified patience and menu choices; and it lets users cut and paste equations directly into word processing, page-layout, or presentation software. $79. Prescience Corp., 415/543-2252, 800/827-6284; fax 415/882-0530.

The Multimedia Workshop
Here are some tools for the younger generation—this three-part package lets kids create and edit multimedia presentations encompassing text, still images, audio, and video. In the Writing Workshop, kids can lay out, edit, and print traditional text and graphics documents; optionally, the Mac can read all text aloud. The Video Workshop has basic video-editing tools: users select a background and a video clip, add narration, and assemble their clips in the Sequencer. Finally, the Paint Workshop is for creating illustrations or customizing photos or clip art. Libraries of photos, sound effects, music, QuickTime movies, and clip art are also included. 4MB min. memory; requires Mac LC, System 7. $79.95. Davidson & Associates, 310/793-0600, 800/545-7677; fax 310/793-0601.

PMcopyFit
Instant, automatic, vertical copyfitting of within PageMaker can be yours with this PageMaker Addition. You set justification points between text lines, above and below heads (multiple heads are respected), above and below paragraphs, and above and below horizontal rules. Once you've got it just the way you want it (including the order of precedence for these operations), you select the text you want to justify, sit back, and let your Mac do the dirty work. Requires PageMaker 5.0. $99. EDCO Services, 813/962-7800, 800/523-8973; fax 813/960-2356.

PMcopyFit

Scene Generator
Using data from the U.S. Geological Survey, this software renders 3-D landscape scenes both real and imagined. Visit Yosemite, the Grand Canyon, Hawaii, Mount Saint Helens, and a lunar landscape—other landscape models are also available. Users can create pictures from any perspective, or draw a flight path for animation. Light levels, landscape color, cloud levels, and snow level are all continuous.

TRY STUDIO PRO FREE

Now you can create sizzling Hollywood-style movies on your Mac! The exclusive special effects Explosion, Shatter, and Atomize are only one part of Studio Pro's incredible power. It offers fully integrated advanced spline-based modeling, award-winning rendering technology, and a sophisticated Event-Based Animation System. Plug in Studio Pro in a class by itself. Along with these powerful features, StudioPro's graphical interface and dialogues are easy to use, making it a breeze to create stunning 3-D designs and animation's. If you're looking for professional 3-D tools you've found them in StudioPro. Call now to order StudioPro.

1-800-869-6855
Point. Shoot. Plug it into your computer.

There's no faster way than Apple digital photography to make a flyer really fly. No film. No waiting. In minutes, you have vivid 24-bit color pictures that can help you promote anything from a big idea to a big sale.

The Apple QuickTake 100 digital camera holds up to 32 photos. It comes with everything you need. And at $749, it actually costs less than comparable digital cameras. For an authorized Apple reseller, call 800-732-3131, ext. 550. And start showing off your company's best side.

The New Apple QuickTake 100 Digital Camera
New Products

adjustable, and scenes may optionally include trees and lakes. Landscapes may be saved as PICT or TIFF files in up to 24-bit color, and animations may be saved as QuickTime, PICS, or separate PICT files. 4MB min. memory; requires 8-bit color. $149. Natural Graphics, 916/624-1436; fax 916/624-1406.

Spreadware Statistics Menu
Once this Excel add-in is installed, all you have to do is select the cells containing your data, choose the statistical calculation you wish to perform on it, and then pick a cell where you want the output. Version 3 of Statistics Menu features new nonparametric routines including Dunn's multiple comparisons, Kruskal-Wallis one-way ANOVA, and several chi-square routines. All routines are also available through Excel's macro language. Requires Microsoft Excel 4.0. $129. Spreadware, 619/347-2365; fax 619/347-6045.

Sword of Sodan
Talk about a job for Superman—you must avenge the death of your father, the king, and free the cities of the Northern Kingdom from the tyrannical reign of Zoras the evil. This fantasy role-playing game comes with castles and dungeons, a more than enough to unseat the foul friend that holds your land in thrall? 4MB min. memory; requires System 7, Mac II, 256 colors. $49.95. Bethesda Softworks, 301/926-8300, 800/677-0700; fax 301/926-8010.

Tree Professional
If only creating trees were as simple as modeling them on your Mac. This software renders and modifies trees, which you can then save as PICT or DXF files or use to save as PICT files. 4MB min. memory; requires 8-bit color. $149. Natural Graphics, 916/624-1436; fax 916/624-1406.

PowerTools
Just got to have shareware, but you don't have a modem to download it? This disc offers over 5000 pieces of shareware, freeware, and public domain software in 15 categories, including Applications, Arts & Graphics, Business, Communication, and Utilities. The disc ships with a browser to easily search out files. $79.95. Softbit, 714/251-8600; fax 714/261-7977.

Sound Library Pro
More than 1200 digitally recorded sounds in six main categories: Animals, Household, Instruments, Nature, Special Effects, and Voice. Each sound comes in 22kHz and 11kHz versions (both 8-bit mono), and all sounds are supplied without extensive copyright restrictions. A MacroMind Director-based navigator is included. $49. Wayzata Technology, 182/326-0598, 800/735-7321; fax 218/326-0598.

MACWORLD
Introducing the $139 investment no Mac user can afford to be without...

“Don’t take chances...Get the ultimate protection: Back-UPS from APC.”

Call for your FREE 60 page PC power protection handbook!

Blackouts, brownouts, sags... if you use computers, your bottom line is directly linked to your power line. The fact is, your data and hardware are vulnerable to problems that surge suppressors and power directors just aren’t equipped to handle.

Now there’s an Uninterruptible Power Supply (UPS) to suit any budget. Back-UPS® are perfect protection for LAN servers, personal computers, phone/fax systems, POS equipment, or any other device that can go when the power does. If lightning is a concern, Back-UPS are even backed by a $25,000 insurance policy against surge damage to your equipment (see details).

So don’t wait for the inevitable power problem to rob your business. Protect your productivity with Back-UPS, available where quality computer products are sold.

APC Back-UPS provide instantaneous battery power during power disturbances, so your data and hardware are safe!
A simple demonstration of PhotoFlash software.

(A complicated demonstration isn't possible.)

1. Find a photo. The PhotoFlash Browser makes it easy to view and pick a photo — they're all stored here, whether you got them from a CD, scanner or digital camera.

2. Enhance it. Crop, rotate and resize a picture with easy-to-use tools. Dust and scratch removal is automated, too. You can instantly preview adjustments you've made.

3. Place it. With a point and click, PhotoFlash automatically places the picture in your work. You can also record and automate the tasks you do most often.

You used to have to spend a lot — and then learn a lot — before you could work with photos on your computer. Now there's PhotoFlash software from Apple. PhotoFlash is easy to use. It helps you organize pictures, enhance them and drop them into your work. It's fast (screamingly fast on a Power Macintosh®). It's memory efficient. And it's just $279. Call 800-538-9696 to locate your authorized Apple reseller. You'll get the picture right away.

Apple®
With Inspiration’s Diagram view, quickly brainstorm ideas and transform your ideas into effective visually communicate even your most complex processes. Flip to the integrated Outline view to transform your ideas into effective written documents.

Inspiration—think of it as your electronic napkin...Plus!
It’s the Quickest Way to Develop Ideas and Plans.

With Inspiration’s Diagram view, quickly brainstorm ideas and visually communicate even your most complex processes. Flip to the integrated Outline view to transform your ideas into effective written documents.

Call today for your FREE DEMO!
(800) 877-4292

SunPack PB

SunPack PB
A sunny day at the beach—just perfect for catching up on a little work on your PowerBook, right? It is if you’re using this pair of solar panels for power. Together the panels measure 23 by 16.5 inches (11.5 by 16.5 folded for storage), and you get three of them: one green, one yellow, and one magenta. $14.95. CoStar Corp., 203/661-9700, 800/426-7827; fax 203/661-1540.

SunPack PB

SunPack PB

The Online User’s Encyclopedia: Bulletin Boards and Beyond
This comprehensive reference covers everything from the Internet to BitNet to FidoNet. Readers can learn how to connect to global networks, and the book includes comprehensive listings of bulletin boards and Internet service providers.

The Online User’s Encyclopedia: Bulletin Boards and Beyond

To have your product considered for inclusion in New Products, send an announcement with product name, description, minimum memory, peripherals required, price, company name, and phone number to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107. Macworld reserves the right to edit all product announcements.
MacLinkPlus Prevents PC File Incompatibilities From Popping Up On Your Mac.

We Don’t Make The Applications You Use. We Make Them Compatible.

With MacLinkPlus on your Macintosh, everyday applications are more compatible with the rest of the computing world. Use DOS and Windows files within Mac applications like Word, WordPerfect, ClarisWorks, SuperPaint, Excel and more. And if a PC user “pops up,” you can turn Mac files into DOS or Windows files for them in seconds, all with original text formatting and graphics intact.

No More Surprises.
When you’re trying to open DOS and Windows files on your Mac, the last thing you want is a big surprise. Now you can put an end to file incompatibility by simply installing MacLinkPlus. Our vast selection of translators and Macintosh Easy Open let you open and edit almost any DOS or Windows file just by clicking on it. No fooling!

Choose The MacLinkPlus Solution That’s Right For You.

Whether you share files via disk, by modem or over a network, there’s a MacLinkPlus product that’s right for you. They all include over 1000 translation combinations and Macintosh Easy Open. Some also contain Macintosh PC Exchange from Apple for accessing DOS disks, and a serial cable for PC connections. So quit clowning around with half-baked solutions. Get MacLinkPlus. And get the last laugh on file incompatibility.

Only MacLinkPlus Gives You The Complete Solution.

Call 800-254-1116 For More Information. Multi-packs and site licenses available.
Introduced One World Fax Network Fax Server

Talk about perception versus reality. Like something out of a science fiction movie, faxing came into being to move documents along at the speed of light. But in reality, “moving” hasn’t been the activity most associated with faxing. “Waiting” has. Waiting for the document to print. Waiting in line. Waiting for the fax to go through. A situation where things can get so bottlenecked, an entire office can be reduced to a crawl.

Well, at Global Village Communication, we’re happy to report a way to get everyone up to speed again.

And because OneWorld Fax sends faxes in the background over the network, you don’t tie up your computer when faxing. You keep right on working.

You save money, too: Printing costs fall when you fax from your computer. Phone bills can be reduced since faxes can be scheduled to take advantage of off-peak phone rates. And, of course, you save valuable time.

And if all this news weren’t good enough, OneWorld Fax is easy to install. Everything you need—all the hardware and software—is built into a single, self-configuring package smaller than a toaster. Anyone can install it, in a matter of minutes.

But, before you go, here’s something else to consider: OneWorld Remote Access—a complete, easy-to-use ARA server for providing access to AppleTalk networks from remote Macintosh and PowerBook computers.

So. There you have it. Two ways to get everyone in your office up to speed again. Now isn’t it time you got moving? For more information and for the Global Village dealer nearest you, call 1-800-736-4821, ext. 2246.

Global Village Communication

©1994 Global Village Communication, Inc. Global Village Communication, the Global Village Communication logo, GlobalFax, and OneWorld are trademarks of Global Village Communication, Inc. AppleTalk® Remote Access is licensed from Apple Computer, Inc. All other brand names are trademarks of their respective companies. A special thank you to the folks who graciously let their shirts, and the Wise-End Clothing Outfitters for their ingenious turtleneck sweaters which kept the snails warm until their homes were returned.
HEY'RE FINALLY HERE. APPLE HAS released the long-awaited Power Macintoshes, with the initial emphasis on the 6100/60 model. The 6100/60—which looks like a Quadra 610 and has the widest initial availability—uses a 60MHz PowerPC 601 CPU, the first in a new series of chips to which Apple will migrate the entire Macintosh line over the next two years (see "The Power Macintosh Arrives," Macworld, May 1994).

Performance Breakthrough
Macworld Lab tests clearly show that, using native PowerPC software, the entry-level Power Mac 6100 surpasses the performance of a 60MHz Pentium 510-based PC, which had put even Apple's Quadra and 840AV to shame. Not only has Apple finally regained the performance lead it lost about eight years ago when PCs appeared using Intel's 80386 CPU, but it has pushed far ahead. The Power Mac 6100/60 with no cache is about 5 percent faster than a 60MHz Pentium PC (which includes a cache), and the 6100 is the slowest of the three new Power Macs.

But there's a big "but" about Power Mac performance: you need to have PowerPC software to get it. Using your existing 680X0 software, you'll get significantly less performance on a 6100, roughly equal to that of a IIci. This is not Apple's fault: it's up to developers to deliver PowerPC software, something that should start happening in great degree by fall. In the meantime, those who own 040-based Macs should wait until their key programs are available in PowerPC versions to switch; otherwise, they'll see a slowdown. Owners of 030-based Macs—except for IIix and IIvx owners—have no reason to delay; their current programs will be a little faster on a Power Mac 6100.

Near-Perfect Compatibility
The Power Mac 6100 looks a lot like a Quadra 610 or Centris 610 for good reason: Apple decided that the Power Macs should be as compatible as possible with the previous lineup. Macworld Lab tested more than 100 programs and found that only a very few 680X0 programs don't work on a 6100. They include Kent Marsh's CryptoMatic, Kiwi Software's Power Menus, Connectix Corporation's RAM Doubler, and Jump Development Group's OptiMem—all work with low-level system software and hardware, making them the kind of program that will have incompatibilities with a new generation of Macintosh. Note that any 680X0 software that requires a math coprocessor won't run on a Power Mac; although the PowerPC has a built-in FPU, it's not compatible with the 680X0 CPUs' FPU.

Concerns over program compatibility should not dissuade you from getting a 6100. In fact, the degree of compatibility is better than what Apple achieved in its last three major transitions: first to 32-bit-clean systems, then to System 7, and finally to the 68040.

However, if you use accelerated video cards or similar INIT-enhanced hardware, you may lose some features. For example, accelerated 24-bit video cards need new INITs to run in accelerated mode, as well as to use some advanced features like on-the-fly resolution switching. SuperMac Technology and Radius have free INIT upgrades for current
products; SuperMac also provides new ROMs for free, while Radius charges a nominal fee. Other developers had not finalized their plans at press time, so check first.

What the 6100 Offers
Because of Apple's desire to make the Power Macintoshes look, feel, and behave like earlier Macs, the 6100 offers no revolutionary technology outside the PowerPC itself. But there are some differences, such as a video connector that's both old and new.

What's new is that the Power Mac has built-in resolution switching, so if you have a multisync monitor with the right kind of cable adapter (such as in Apple's new 17- and 19-inch monitors or NEC Technologies' adapter for its current monitors), you can have the Mac expand or reduce the desktop view without restarting. Also new is a video port that doesn't use the standard Mac video connector; instead, it uses an AV-style connector. Apple includes an adapter cable so you can use existing Apple or multisync monitors. (The AV version of the 6100/60 includes a standard Mac-style video port as part of the AV card that goes into the 6100's PDS. You can use both ports simultaneously to connect two monitors.)

What's old is the return of RAM-based video—there's no video RAM in the 6100. That keeps Apple's costs down. There's also a cache slot in which you can include a standard Mac-style video 6400-bps faxing through the GeoPort without a fax modem.

However, Apple engineers admit that some necessary operating-system extensions are needed to make telephony on the Mac a reality, and Apple's speech recognition still has a ways to go before it's practical. The real advantage of incorporating these AV technologies is the support for 16-bit audio.

Like all Power Macs, the 6100/60 includes an Ethernet port (you'll need a transceiver to connect to a network), a SCSI port, and a printer port. Apple offers models of the 6100 with CD-ROM drives (the type introduced in the Quadra 605 that has a built-in CD-ROM caddy). There's also a cache slot in which you can put a 256K cache SIMM—something that boosts performance by about 10 percent.

Goodies
Apple has added some interesting software onto the Power Macs' hard drive. One is a graphical calculator that does the kind of math you'd associate with rocket science—and it can even display the results graphically, which will make scientists and engineers happy. The Power Macs now also come with Macintosh PC Exchange 2.0, so your Mac can read PC drives ( horny drives, removable, and new to this version, hard drives), as well as AppleScript, so you can automate actions in programs like QuickQuark that are scriptable. The AV version also comes with VideoFusion's VideoRecorder software, which lets you watch input from a TV or VCR in a window.

Good Deal
Apple says that a capable Power Mac 6100/60—with a CD-ROM drive, 8MB of RAM, and a 250MB hard drive—should go for about $2300, which is a great price. With a good multisync monitor, third-party extended keyboard, and another 4MB of RAM, you'll spend more like $3300 for a system that should give you power to spare for several years. (Not that you won't feel some envy when faster Macs appear, as they inevitably do every six to nine months or so.)

The 6100 is hard to resist, given its price and performance. The limited expansion won't affect most users, and those for whom it is an issue (mostly graphic artists and publishers) will want a faster Mac anyhow. When developers offer in PowerPC format the software that most business users run daily, it'll be time to get a Power Mac 6100/60.

—GALEN GRUMAN

---

**Power Macintosh 6100/60: How Fast Is It?**

**CORE PERFORMANCE INDEX**

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

<table>
<thead>
<tr>
<th>Product</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Mac 6100/60</td>
<td>5.6</td>
</tr>
<tr>
<td>iI</td>
<td>5.7</td>
</tr>
<tr>
<td>Centris 610</td>
<td>4.6</td>
</tr>
<tr>
<td>Centris 650</td>
<td>2.8</td>
</tr>
</tbody>
</table>

**BUSINESS-SYSTEM PERFORMANCE TIMES**

<table>
<thead>
<tr>
<th>Task</th>
<th>Time (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-bit math</td>
<td>1.6</td>
</tr>
<tr>
<td>32-bit math</td>
<td>2.3</td>
</tr>
<tr>
<td>File copying</td>
<td>1.2</td>
</tr>
<tr>
<td>Screen redraw</td>
<td>1.1</td>
</tr>
</tbody>
</table>

---

A Using 680X0 programs, since PowerPC versions were not yet shipping for our test programs. B Using the AV card's video connector. C Could not perform Infini-D test because the 6100's 680X0 emulation includes no FPU, which Infini-D requires.
**Macintosh LC 575**

**Macintosh Computer**

**PROS:** Fast CPU; speedy 16-bit video; convenient, all-in-one cabinet. **CONS:** Limited expansion options. **COMPANY:** Apple Computer (408/996-1010). **COMPANY’S SUGGESTED PRICE:** $1699 with 5MB of RAM, 160MB hard drive, and internal CD-ROM player.

---

**K. LET’S MAKE A SHOPPING LIST.**

How about a Macintosh with a 33MHz 68040 CPU, built-in CD-ROM player (with a slide-out tray), 14-inch color monitor, 16-bit-color capability, a hard drive of at least 160MB, stereo speakers, and a microphone. Of course, a keyboard should be included in the box as well. And an upgrade path to Power Mac is also a must.

What’s that, you only have about $1700 to spend? Before you hit that buzzer, let me tell you that there is indeed such a Macintosh out there, available through Apple’s educational distribution channels as the LC 575. (There are also consumer versions, the Performa 575, 577, and 578. For more on these, see Mac Bulletin, in this issue.)

The LC 575, despite its larger size and hefty form (some 40 pounds’ worth), should be considered a direct descendant of the original compact Macs, since it offers the same all-in-one solution.

The front of the LC 575 has a somewhat busy, high-tech appearance that I would label functional rather than attractive. At the top of the monitor is the microphone. The CD player is just beneath the monitor, on the left of the front faceplate. At the right is the floppy drive. The plastic grilles for the stereo loudspeakers occupy most of the recessed bottom portion of the faceplate. Controls for screen brightness and volume are situated between the speakers, along with a headphone jack and power-on light. The main power switch and the standard Macintosh connection ports are at the rear.

You can snap out the logic board by holding down two plastic tabs on the computer’s back panel, then sliding out the board itself, making expansion simple. Unfortunately, other expansion opportunities are few. You can only add one 72-pin SIMM (it will address up to 36MB of RAM). There’s a single PDS connector and a special 2-by-6-inch communications slot where you can add either an Ethernet card or a specially designed version of the Apple Express modem. There is no provision for NuBus expansion.

The key expansion issue on the minds of many these days, though, is a Power Mac upgrade option. Apple has promised a Power Mac upgrade path for both the LC 575 and the LC 550 (which uses a 33MHz 68030 CPU), as well as other LC and Performa models later this year.

The internal CD-ROM player is the new Apple CD300 Plus, which is a multispeed, multisession drive with essentially the same performance specs as the older CD300 model. The biggest difference between the new design (which uses a Matsushita mechanism) and the previous model (which uses a Sony mechanism) is that those plastic CD caddies are history. The new player has a slide-out tray, just like an ordinary audio–CD player. It’s a welcome change in my book.

The integrated monitor offers a bright, crisp, color picture, enhanced here by the internal video’s 16-bit-color capability. The monitor is Energy Star-compliant, and a screen control panel can be set to power down the monitor after a preset interval. Clicking the mouse or pressing a key is all that’s necessary to bring the screen to life.

Macworld Lab tests showed the LC 575 to be a brisk performer indeed. It is much faster than 68030 models and is clearly in Quadra territory, excepting the LC 575’s inferior floating-point performance (it doesn’t have an integrated FPU). Most Macintosh programs (excluding math and 3-D rendering) don’t make FPU calls, so for most users, the lack of an FPU isn’t a problem.

The integrated stereo speakers have a pleasant sound that’s rather bass-shy—how about a bass-boost switch, Apple? The internal amplifier produces a reasonable volume, though it’s far short of stereo levels.

The LC 575 (and its Performa equivalent) is an ideal choice for the student and for the small-business professional who wants high power and the convenience of having everything integrated into a single case. Even the power user in an office crowded with assorted Mac goodies might like having one of these around as a second computer. Either way, especially considering its low price, the LC 575 is hard to beat.—G. Steinberg

---

**MW LAB**

**Macintosh LC 575: How Fast Is It?**

<table>
<thead>
<tr>
<th>Macintosh LC 575</th>
<th>Macintosh LC 550</th>
<th>Macintosh LC 520 with FPU</th>
<th>Macintosh LC II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CORE-PERFORMANCE INDEX</strong></td>
<td><strong>ENTRY-LEVEL-SYSTEM PERFORMANCE TIMES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Times as fast as a Classic (Classic = 1.0). Use these standard ratings of overall performance, based on a core test suite, to compare systems across classes.</td>
<td>Times are in seconds. Shorter bars are better. Use these results to compare the performance of systems for different types of real-world tasks. For each type of system, results can be compared with other Macworld Entry-Level-System Performance Times.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Common</strong></td>
<td><strong>Scientific</strong></td>
<td><strong>Processor</strong></td>
<td><strong>Drive Access</strong></td>
</tr>
<tr>
<td>Typical business tasks in Microsoft Excel and Word that use the Mac’s processor, drives, and video display.</td>
<td>We added to the common tasks several scientific calculations (which use floating-point math).</td>
<td>Several tasks in Claris FileMaker, Claris Works, Deneba UltraPaint, and Microsoft Excel and Word.</td>
<td>File opens in Microsoft Excel and Word, and disk-based sorts in Claris FileMaker.</td>
</tr>
<tr>
<td>11.5</td>
<td>12.6</td>
<td>68</td>
<td>28</td>
</tr>
<tr>
<td>51</td>
<td>52</td>
<td>168</td>
<td>47</td>
</tr>
<tr>
<td>46</td>
<td>50</td>
<td>202</td>
<td>57</td>
</tr>
<tr>
<td>45</td>
<td>44</td>
<td>268</td>
<td>68</td>
</tr>
<tr>
<td>41</td>
<td>42</td>
<td>320</td>
<td>62</td>
</tr>
</tbody>
</table>
silentwriter 640

personal laser printer

pros: supports postscript level 2; attractive price; good quality and performance. cons: does not handle single sheets well. company: nec technologies (508/264-8000).

company's suggested price: $800.

we remember when people were impressed by the newsletters and fliers that you cranked out on your loud but reliable image writer printer? now even your kids' little league schedule is probably output on a laser printer. these printers have become more affordable, but until recently only quickdraw printers were available for less than $1000. today, you can buy a postscript level 2 printer for well under a grand.

the nec silentwriter 640 is a new member of the under-$1000 ps level 2 ram stores the rasterized fonts for the file being printed, so printing is faster the next time you use those fonts.

a solid performer

using a 6-ppm nec proprietary engine (the 640 is nec's shift away from minolta print engines) and a custom, application-specific integrated circuit (asic) that includes an embedded Motorola 68000 processor, the 640 is a capable performer. as macworld lab tests show, it's not in the same speed category as apple's personal laser writer 320 (which uses a 4-ppm engine but has a risc processor that speeds printing of complex files). however, the 640 is considerably faster than dec's dec laser 1152. as it turns out, the timing results line up with the pricing of the three printers. the apple printer costs slightly under $1000, while the dec goes for about $700.

overall, the laserwriter 320 outperformed the silentwriter 640. but in

how fast is the nec silentwriter 640?

multiple fonts

- print speed for a typical 7-page microsoft word 5.0 document with a variety of fonts, sizes, and styles.

<table>
<thead>
<tr>
<th>printer</th>
<th>multiple fonts</th>
</tr>
</thead>
<tbody>
<tr>
<td>apple personal laser writer 320</td>
<td>182</td>
</tr>
<tr>
<td>nec silentwriter 640</td>
<td>148</td>
</tr>
<tr>
<td>dec dec laser 1152</td>
<td>148</td>
</tr>
</tbody>
</table>

single font

- print speed for a 20-page word 5.0 document with double-space, 12-point courier text in plain, bold, and italic.

<table>
<thead>
<tr>
<th>printer</th>
<th>single font</th>
</tr>
</thead>
<tbody>
<tr>
<td>apple personal laser writer 320</td>
<td>257</td>
</tr>
<tr>
<td>nec silentwriter 640</td>
<td>235</td>
</tr>
<tr>
<td>dec dec laser 1152</td>
<td>232</td>
</tr>
</tbody>
</table>

macdraw pro

- print speed for a complex drawing with few special effects over 2000 simple objects, and several lines of helvetica text.

<table>
<thead>
<tr>
<th>printer</th>
<th>macdraw pro</th>
</tr>
</thead>
<tbody>
<tr>
<td>apple personal laser writer 320</td>
<td>200</td>
</tr>
<tr>
<td>nec silentwriter 640</td>
<td>200</td>
</tr>
<tr>
<td>dec dec laser 1152</td>
<td>200</td>
</tr>
</tbody>
</table>

freehand 3.1

- print speed for a complex graphic with special postscript effects, illustration had non-linear blends and bezier curves.

<table>
<thead>
<tr>
<th>printer</th>
<th>freehand 3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>apple personal laser writer 320</td>
<td>176</td>
</tr>
<tr>
<td>nec silentwriter 640</td>
<td>176</td>
</tr>
<tr>
<td>dec dec laser 1152</td>
<td>176</td>
</tr>
</tbody>
</table>

page maker 4.2

- print speed for a 4-page newsletter with several fonts, a mac paint image, and 3 gray-scale tiff images.

<table>
<thead>
<tr>
<th>printer</th>
<th>page maker 4.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>apple personal laser writer 320</td>
<td>176</td>
</tr>
<tr>
<td>nec silentwriter 640</td>
<td>176</td>
</tr>
<tr>
<td>dec dec laser 1152</td>
<td>176</td>
</tr>
</tbody>
</table>

true type

- print speed for a 1-page word 5.0 document containing 4 true type fonts in various sizes.

<table>
<thead>
<tr>
<th>printer</th>
<th>true type</th>
</tr>
</thead>
<tbody>
<tr>
<td>apple personal laser writer 320</td>
<td>96</td>
</tr>
<tr>
<td>nec silentwriter 640</td>
<td>96</td>
</tr>
<tr>
<td>dec dec laser 1152</td>
<td>96</td>
</tr>
</tbody>
</table>

*with fine print and photo grade off. **only 4 of 7 fonts required for our test were included. some of the fonts were printed as bitmap fonts instead.

behind our tests

the printers were tested with a macintosh lci with system 7.1, 8mb of ram, a quantum lps230 hard drive, apple talk on, and background printing off. the dec laser printer tested for comparison.

pack. for a street price of about $800 you get a 300-dpi, 6-pages-per-minute laser printer with 3mb of ram. it is 18 pounds and about the size of a centris box.

designed for the mac, the silentwriter delivers plug-and-play simplicity. it connects to one or more macs through its apple talk interface. it took me only a few minutes to connect the printer and install the drivers and postscript printer description files. the manual is also mac-specific, so all the references are relevant. in this cross-platform world, that isn't always true.

the silentwriter 640 comes with 17 resident type 1 fonts and 33 downloadable true type fonts, as well as type 1 and true type rasterizers. the built-in rasterizers speed performance by taking the burden of rasterizing fonts away from the computer. also, the silentwriter's test designed to measure performance in printing a fairly large (20-page), single-font microsoft word document, the 640 was faster than the 320 and the 1152. this speed increase is attributable mostly to the 640's faster engine, which, aided by nec's forward memory technology, increases throughput by processing a page while another page is printing.

just as the nec's speed is respectable but not blazing, its output quality is pleasing but not spectacular. the 640 uses nec's proprietary sharp edge technology (set) for resolution enhancement, as well as microfine toner for producing crisper blacks. nec's set resulted in crisp text and lines; even our complex aldus free hand tests produced good-quality images. however, if you print many complex illustrations, you'll probably want a 600-dpi printer.

paper handling

generally, the silentwriter 640 represents hassle-free printing. but one problem area is paper handling. the silentwriter's paper tray holds a respectable 200 sheets of paper and accepts single sheets fed manually. i tested the 640 with transparencies, envelopes, and a variety of paper weights. feeding single sheets manually was tricky; it was difficult to tell when i had inserted a sheet properly. i endured about half a dozen error messages. and when i did get it to feed correctly, i wasn't sure exactly what i had done right. also, the heaviest stock the 640 accepts is 28-pound.

the 640 adheres to the epa's energy star specification for power consumption. in standby mode, the 640 consumes less than 50 watts of power; however, it needs to warm up before you can print.

you can specify when the 640 powers down, through the printer's on-screen dialog box; the default is after idling 15 minutes, or you can specify 5- or 10-minute intervals. you can also instruct the printer not to use the power-saving mode.

with 3mb of ram, postscript level 2 support, and a 6-ppm engine, the nec silentwriter 640 deserves a spot on your shopping list. just remember that this is a crowded category and the players and prices are changing all the time, so shop wisely.

--dan muse

macworld june 1994 59
DOS Compatible Card

**PC Coprocessor Card**

**PROS:**

- Inexpensive; runs faster than some stand-alone PCs.
- Works in only Centris 610 and Quadra 610; has no PC expansion or networking options.

**CONS:**

- Works in only Centris 610 and Quadra 610; has no PC expansion or networking options.

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

**COMPANY'S SUGGESTED PRICE:** $399.

---

Mac purists may hate the idea, but Apple has made it clear that compatibility with the PC universe is part of the new Apple. The DOS Compatible Card for Quadra/Centris 610, unannounced name aside, is proof that Apple means what it says. With this card, you can add a PC into the Processor Direct Slot (PDS) on a Centris or Quadra 610.

The card uses the Mac's video, drives, keyboard, and mouse; a control panel lets you switch between the PC and the Mac, or you can show both systems simultaneously if you have two monitors. The PC card comes with Microsoft DOS 6.2 but not Windows 3.1. This is the real thing—not emulation, like Insignia Solutions' SoftPC for 680X0 Macs or SoftWindows for Power Macs.

The card uses a 25MHz Intel 80486SX CPU (one with no math coprocessor), which is comparable in performance to the 25MHz 68LC040 used in a Centris 610. Macworld Lab tests show that the performance of Apple's PC card is about 16 percent faster than a typical 486SX-based PC from Zeus International that we tested, even though the Apple card can't take advantage of Windows optimizations, such as 32-bit disk access. And it matched the performance of the Tandy 486SX PC we used as our basis for comparison. In fact, the PC card's performance matches that of a Quadra 610.

But in several ways, Apple has crippled the PC card. First, it doesn't work in Power Macs, so if you upgrade your 610 to a Power Mac 6100/60, you can't use the card. Second, there is no networking support, so you can't connect the PC to your office network, except for printing. (You have to connect the Mac to the network and then transfer files between the Mac and the PC card.) Third, it works in only the Centris and Quadra 610.

The PC card lets you connect to external PC SCSI drives—at least in theory. We found that, even using two of the most common PC SCSI cards (one from Adaptec and the other from Future Domain), the Apple PC card read files unreliably, sometimes even causing file corruption. While PC SCSI is not as stable as Mac SCSI, we had this problem with only one PC (a Compaq 486SX) of the half dozen PCs we used the cards and drives with.

Apple bundles the DOS Compatible Card with a Quadra 610, but beware: this $1579 Quadra 610 has no math coprocessor, unlike the regular Quadra 610. The bundled 610 also has too little RAM (8MB) and hard disk space (160MB) to run both System 7 and Windows comfortably, especially if you have multiple programs open in each environment. (You'll want 8MB on the PC card and 8MB on the Mac.) You're better off buying a regular Quadra 610 and the PC card separately.

There are a few bright spots. The new version (2.0) of Apple's Macintosh PC Exchange PC-disk-mounting software adds support for PC SCSI hard drives, so you can mount them on the Mac's desktop like a Mac drive. And the control panel that manages the PC card's settings is well designed. The PC card can use the Mac's memory, but only if there is no RAM in the card's SIMM slot.

If you want to integrate a PC into your Macintosh, the best option is to use Orange Micro's Orange PC cards (see Reviews, October 1993), which are available in speeds from 25MHz 486SX to 100MHz IntelDX4, and which support external PC networks and expansion cards. The OrangePC cards are more expensive, but they offer more. Plus, they can be used in Power Macs (except the 6100/60).

All in all, the PC card is essentially limited to people who, say, use a Macintosh at work but need a PC at home for their kids' homework. Clearly, Apple needs to make a more convincing product to fulfill its commitment to working in a multiprocessor environment.

---

**Which Windows Option Is Fastest?**

<table>
<thead>
<tr>
<th>CORE-PERFORMANCE INDEX</th>
<th>TIMES AS FAST AS A CLASSIC (CLASSIC = 1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>Scientific</td>
</tr>
<tr>
<td>Average of results</td>
<td>Average of results from standard</td>
</tr>
<tr>
<td>from standard business tasks</td>
<td>business and scientific tasks.</td>
</tr>
<tr>
<td>66MHz 48DX2 (Gateway 2000 4DX2-66V)</td>
<td>21.0</td>
</tr>
<tr>
<td>33MHz 48DX (Amiga 486/33)</td>
<td>12.4</td>
</tr>
<tr>
<td>25MHz 48DX (Tandy 3100 Model 10)</td>
<td>11.9</td>
</tr>
<tr>
<td>Apple DOS Compatible Card (25MHz 486SX)</td>
<td>11.9</td>
</tr>
<tr>
<td>Timbuktu Pro 1.0 controlling the Amiga 486/33 SoftPC 3.1 on Centris 650</td>
<td>1.6</td>
</tr>
</tbody>
</table>

**Which Windows Option Is Fastest Summary**

- **Best result in test.** Products are listed in decreasing order of overall performance.

**BEHIND OUR TESTS**

Macworld Lab tested three options for running Windows programs on Mac—Apple's PC coprocessor card on a Quadra 610, Insignia Solutions' SoftPC on a Centris 650, and Fauston Computing's Timbuktu Pro 1.0 running a 25MHz 486SX-based PC on a Centris 650 over a LocalTalk network—against three business-level Windows PCs. All systems but the Apple PC card and SoftPC use moderately accelerated 8-bit color (because these two Mac products use just standard VGA, they run in 4-bit color).

---

**Reviews**

**June 1994**

---

**Galen Gruman**
There are dozens of great software products on this CD.

And you can try them all, free.

Immediate access to popular software.

Shopping for software has never been easier. With your Software Dispatch CD, you have demonstrations, trial versions, and information for a wide variety of products at your fingertips. So you can sample them anytime. Then, when you’re ready to order, a simple phone call unlocks the complete program, including electronic manuals—right from the CD.

With Software Dispatch, there’s no more waiting for delivery. Dozens of products are already on your free CD, and when you call to order, you’ll receive the “keys” to access your selections—instantly.

Try them when you want.
Buy them when you’re ready.

From powerful applications to handy utilities, innovative games, and more, the Software Dispatch CD brings an entire software store to your desk. And complete demos and information mean you can buy with confidence as you enjoy unmatched convenience. So send for your free Software Dispatch CD today. And see how easy software shopping can be.

Yes. Send me my free CD.

☐ I own a CD-ROM drive. I will be using my CD with:
☐ Macintosh®
☐ Windows
☐ Power Macintosh

☐ I do not own a CD-ROM drive, but I plan to purchase one soon.

Name:
Company Name (if applicable):
Address:

Apt./Suite #
City
State
ZIP
Telephone ( )
Fax ( )

Please allow 4-6 weeks for delivery.

Mail to:
Software Dispatch
PO Box 1745
Brea, CA 92622-9894

©1994 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, and Macintosh are registered trademarks of Apple Computer, Inc. Software Dispatch and the Software Dispatch logo are trademarks of Apple Computer, Inc. Offer and product availability are subject to change. Offer and CD are valid only in U.S.A. Offer expires 12/31/94.
What have you got to choose?

Comp
Choose the thermal wax mode for fast, inexpensive color comps, layouts and drafts.

Final
Choose the dye sublimation mode to output photo-realistic proofs right from your desktop.

Introducing The Only Photo-Realistic Printer That’s Actually Two Printers In One.

You want accurate photographic-quality prints to show your work at its best. And you want bright saturated color that won’t cost you an arm and a leg for each page you print. Does that mean you need two color printers?

Not if you have the multi-technology Professional ColorPoint 2 PSF. The only 300 dpi full-bleed tabloid sized color printer with two printing technologies in one.

When color accuracy and realism count, you can choose the dye sublimation mode. You can output full-bleed tabloid pre-press color proofs, digital photographs or final color comps in sharp 24-bit continuous tone color. Without wasting time at a service bureau. But that’s just the beginning.

This printer is also a low-cost thermal wax transfer printer. Just swap the media and ink sheet and you can output color layouts and quick comps in vivid color for about one-sixth the cost of dye sub prints. And the Professional ColorPoint 2 PSF comes standard with features like embedded Adobe PostScript Level 2 software, a fast Intel RISC processor, a 160 Mb internal hard disk, automatic page cutting and more.

So whether you’re in graphic design, architecture, science or medicine, the Professional ColorPoint 2 PSF has the power and flexibility you need. Because for high-quality dye sublimation and low-cost thermal transfer technologies in one printer, it’s more than the right choice. It’s the only choice.

Call now for more information 1-800-888-0817.

© 1994 Seiko Instruments USA Inc. Professional ColorPoint 2 PSF and It’s The Choice are trademarks of Seiko Instruments USA Inc. PostScript Level 2 is a registered trademark of Adobe Systems Inc. All other trademarks are the property of their respective companies.

Circle 149 on reader service card
Deck II 2.1
Digital-Audio Recording Software

PROS: Records and plays up to eight simultaneous tracks on a Quadra 840AV (up to six on a 660AV); attractive, elegant interface; excellent automation, MIDI, and QuickTime support. CONS: No equalization features; copyright protection. COMPANY: OSC (415/252-0460). LIST PRICE: $399.

When Apple introduced the AV Macs last year, multimedia producers and musicians thrilled at the notion of recording and playing back CD-quality audio without paying a four-figure price for a board such as Digidesign’s Audiomedia II.

OSC’s Deck II lets an AV Mac strut its stuff. The original Deck was marketed by Digidesign and worked with that firm’s sound hardware. Deck II is sold by OSC and works with the AV Macs as well as with several Digidesign cards; with RasterOps’ MediaTime card; and with Spectral Innovations’ NuMedia card, which uses the same AT&T 3210 digital signal processor (DSP) chip as the Quadra 660AV and 840AV.

Deck II turns a Macintosh into a multitrack digital-audio workstation that enables you to record, mix, modify, and play back CD-quality sound. Many of Deck II’s windows mimic common recording tools: there’s a Mixer window with sliders and volume meters for adjusting sound levels, and a Transport window with play, pause, record, rewind, and fast-forward buttons.

After you’ve recorded one track, you can add material to other tracks. For example, you can add background music to a narrative. When you’ve filled seven tracks on an 840AV, for instance, you can combine (or bounce) them onto the eighth track, thereby freeing the original seven for still more overdubs. You can do all this with a multitrack tape deck, of course, but sound quality suffers when you bounce tracks on analog tape decks. Not so in the digital world, where you can bounce until you run out of disk space without compromising sound quality.

Deck II can record at either of two sampling rates—44.1kHz (the standard compact disc rate) or 48kHz (used by some digital audiotape decks)—with 16 bits of resolution. You can convert a track or combination of tracks to 11kHz or 22kHz with 8 bits of resolution; you might do this when exporting a finished recording you’ll use in a program such as HyperCard, Adobe Premiere, or Macromedia Director.

Deck II provides all the goodies you would find in a high-end digital-audio recorder. A punch-in-punch-out feature lets you rerecord portions of a track by switching into and out of record mode at specified times. You can create audio bookmarks to quickly jump to specific sections of a recording. And you can scrub a recording—slowly play it forward or backward to locate an exact point, such as the start of a sentence.

With Deck II’s Mixer window, you can pan recorded sounds to make them come from the left channel, the right channel, or anywhere in between. You can even pan during playback to make a sound whoosh across the stereo field. You can adjust the playback levels of each track—to boost the background music during a pause in the narration, for example. And you can record your panning and volume adjustments so that they repeat each time you play the recording. None of these adjustments alter the original recording—this technique is called nondestructive editing—so you can punch in multiple takes and create as many mixes as you like.

Deck II also provides several destructive editing features that adjust volume levels and fade tracks. But the program can’t edit sound at the waveform level; you can’t, for instance, remove a sneeze in a narration. For jobs like this, you’ll need a waveform editor such as Digidesign’s Sound Designer II (which at this writing works only with Digidesign’s hardware).

Deck II provides no equalization (EQ) features, which would let you boost or attenuate certain frequencies to improve a recording’s tonal qualities. A forthcoming multitrack digital-audio program, Alaska Software’s Digitrax (408/738-3320), offers EQ and supports up to six simultaneous tracks, but the prelease version I examined lacked Deck II’s extensive automation capabilities.

Deck II offers excellent support for MIDI sequences and devices. You can import MIDI files so that Deck II plays them back while you record audio tracks—great for combining vocals with a MIDI sequence.

I found Deck II to be more robust than most digital-audio programs, many of which require you to disable all but the essential extensions and can be unreliable if you don’t. Deck II coexists happily with other programs—indeed, as I’m writing this in Microsoft Word, Deck II is playing eight tracks of audio in the background.

Deck II uses a relatively unobtrusive form of copy protection. You can install the program on up to two hard drives by “authorizing” the drives with the installation program. (If you simply copy Deck II’s icon to your hard drive, the program will ask you to insert the master floppy each time you start it.) Unlike some early authorizing schemes, Deck II’s system is not affected by disk-defragmenting programs.

OSC’s Deck II is a dream come true for AV Macintosh users. It is able to handle nearly any audio task you can throw at it (the exceptions being waveform editing and equalization), and it’s the best tool available for doing QuickTime audio postproduction work. Seeing this program running alongside the likes of Word and Excel illustrates just how wonderfully versatile the AV machines are.

—JM Heid
Introducing The New SQ5200C Drive. The Biggest Reason Yet To Join Our 5.25" Family.

The SQ5200C delivers big in data-intensive applications such as desktop publishing and multimedia, with 200MB of storage, hard drive performance, and full read/write compatibility with all SyQuest 44MB and 88MB cartridges. Plus all the advantages of removability, like unlimited capacity, off-line storage, system sharing, fast backup, and unbeatable data security and transportability.

If you’re a SyQuest user, it’s the best way to migrate to the next level of storage. If you’re looking to SyQuest for the first time, it’s the biggest reason yet to join the world standard. To find out how to get more mileage out of your demanding applications, call 1-800-245-2278.
WriteNow 4.0.1

Word Processor

PROS: Fast and small with intuitive interface; elegant new table capabilities; graphics now easily imported, sized, and cropped; Merge Helper facilitates creation of merge documents. 

CONS: Tables limited to single page; fonts in EPS graphics aren't downloaded to printer; difficult to reach technical-support staff. 


WriteNow has long had its enthusiastic supporters. The tidy word processor boasts speed, modest memory requirements, strict WYSIWYG display of pages, and a relatively uncomplicated interface. But a few missing features—the ability to insert and customize tables and to easily import, size, and crop graphics files, chief among them—have kept WriteNow out of the big leagues. With this release, both longtime users and those interested in switching to a more memory-efficient word processor are in luck.

Tables are the splashiest new feature. Creating a table is easy. You choose Insert Table from the Format menu, and a dialog box displaying eight predefined table types appears. Choose a style, enter the number of rows and columns you need, and voilà, the table appears in your current document at the point you last left your cursor. A narrow, vertical Table Tool palette makes it easy to add or delete rows or columns; divide or merge adjacent cells; and define single-, bold-, or double-line borders.

Additionally, creating a table from imported tab-data couldn't be easier. You simply import the file in tab-delimited format, select the appropriate range of data, and then choose Text to Table from the Format menu.

The new table features are well designed. Cells expand to accommodate text or graphics. Selections are limited to rectangular arrays of cells, but the process is straightforward: hold down the shift key and click on the first and last cells in your selection; you can also click and drag to select cells.

Formatting is a cinch. An inserted table automatically expands to fit within the margins of the document. To change individual column, row, and cell widths, you select an array of cells and drag a corner or an edge to the desired position. Customizing font display is as easy as changing or creating Table Styles. And you can use WriteNow's expanded palette of 88 colors to enliven table fonts, borders, and cell backgrounds.

The biggest drawback to WriteNow's implementation of tables is that they can be no larger than a single page. You can't split a table across pages without physically creating another table. This option is most inconvenient if you need to change styles and layout midstream. The fact that WriteNow can import Microsoft Word tables is wonderful—unless the table is larger than a page, of course. In this case, you simply lose any data beyond the first page.

WriteNow 4.0.1 offers improved handling of graphics. Besides importing EPS, PICT, and MacPaint graphics, you can now size, crop, and reposition them for better display within a document. Once again, though, graphics files are constrained to the size of your page.

One serious problem with the handling of EPS files is that PostScript fonts included in a file are not downloaded and so do not print correctly. Sophisticated users may think to include an invisible character in each needed font in a text line preceding the graphic; this ensures that the font is downloaded, but it's an awkward workaround.

The new version greatly simplifies the creation of merge documents. You first generate a data document that lists the fields you want to include in your template document. Then, while you're working on the template document, the Merge Helper window offers two pop-up menus. The first lists merge commands (IF, IF ELSE, ASK, and NEXT, for instance). To generate the list in the second pop-up menu, WriteNow scans your data document and offers field choices. When you choose options from Merge Helper menus, WriteNow inserts them into the template document with the appropriate cue markers.

PowerBook users will find several useful new features. A memory-optimization scheme reduces the number of times WriteNow must go to the hard disk. A Battery Indicator extension keeps you posted on the status of your battery. And perhaps most important for those using passive matrix screens, the Large Text Cursor option fattens the often-hard-to-find I-beam.

Those who upgraded early to version 4.0 faced several bugs. WriteNow icons, both application and document, sometimes switched to generic icons. Lines of type flickered in a most annoying manner. Using the WriteNow-to-RTF filter sometimes caused crashes. And users employing system enablers such as Connectix Mode 32 had printing problems. Version 4.0.1 neatly wipes out the bugs. Plus, it adds the ability to save 4.0 documents in version 2.2 format, a necessary workaround for QuarkXPress users.

There are still a few features that users may be pointing to on their wish lists. WriteNow includes no outlining, glossary, or annotation capabilities. To create outlines, you must tediously apply the Move Margin Right (or Left) to Tab commands. Many users want a separate user dictionary. Some formatting niceties, such as keeping lines together on a page or defining spaces before and after paragraphs, are still missing. A feature that would allow users to move text using a simple drag-and-drop option would be a blessing. And some users would like the option, say, when scrolling, to forgo the strict WYSIWYG display that shows headers and footers for each page. Finally, the sale of WriteNow to giant WordStar International means that users often wait endlessly for someone to answer the technical-support lines.

Still, WriteNow is more than adequate for many word processing needs; and as more and more users find themselves hauling around laptops, WriteNow's conservative use of memory (the application fits into a dainty 600K partition) and graceful interface will continue to win it enthusiastic fans.

—SUZANNE STEFANAC
Only VideoVision Studio™ lets you input, capture, display, edit, add special effects, mix sound and output full-screen video at 30 frames and 60 fields per second.

Radius’ VideoVision Studio gives you a complete, no compromise, professional quality, 24-bit, QuickTime™ compatible desktop video production system for less than $4,500.

And for that you get full-screen, full-motion, flicker-free videos directly from your Macintosh.

No other desktop system even comes close to offering you such an incredible array of capabilities, so incredibly priced.

And right now, VideoVision Studio comes specially packaged with the hottest video editing and effects software, Adobe Premiere™ and VideoFusion™.

VideoVision Studio is also available as an upgrade for current VideoVision users, at a very special price.

And it’s all backed by our Worry-Free Warranty and overnight replacement policy.

For complete details and the name of your nearest Radius reseller, call 1-800-227-2795 Ext. 11C. Or call us now at 1-800-966-7360 to receive faxed information.

Get VideoVision Studio. And get the true picture in desktop video production, without compromise.
ClarisImpact 1.0

OVER THE YEARS, INTEGRATED software has been the subject of so much marketing hype that it's easy to lose sight of its real potential. But when you think about it, the concept of consolidating applications to address a common purpose is a wonderful idea. And that's the key to ClarisImpact, a product designed to facilitate organizing and communicating information.

ClarisImpact integrates business graphing, project management, object-oriented drawing, word processing, and presentation functions. It lets you organize and illustrate data with a variety of charts and graphs, add graphical embellishments, incorporate textual descriptions, and disseminate the finished product as a paper-based report and visual presentation.

ClarisImpact blends its components into an exceptionally versatile graphics-production environment that is significantly more approachable and far more comprehensible than is juggling a similar collection of dedicated programs. So you don't have to be a graphics professional to master ClarisImpact quickly.

ClarisImpact lets you produce three document types. Report documents, which you produce in a word processing—style window, emphasize textual information and are appropriate for projects that require paginated output, such as business plans, annual reports, and newsletter articles.

You build draw documents in a MacDraw-like work space where it's possible to position graphic objects and text elements with precision. Draw documents are especially suited to projects that can grow beyond single-page boundaries, such as organization charts and project time lines.

Presentation documents are collections of sequential images built on a template or master slide. Naturally, these documents are intended for producing slides, overheads, and computer-driven productions. However, ClarisImpact provides the same tool palette and attributes bar regardless of document type, so you can always do the same kind of graphics and text work.

From the tool palette, you select the graphic models—organization charts, flowcharts, time lines (Gantt charts), calendars, outlines, data tables, and data graphs—that are the core of ClarisImpact. Select a model and drag out a frame in the document window, and that graphic model is available for immediate use. For example, when you choose an organization chart model, you can enter information in the formatted boxes of a basic hierarchy and, by pushing buttons on the model, alter and expand the organizational structure as necessary. Menus and tool bars, which contain the particular functions pertaining to each graphic model, toggle on or off as you select models.

ClarisImpact's graphic models are intelligent, so you can use them as more than illustrations. You can organize your schedule with a calendar model or manage a project with a time-line chart. For example, when you edit a time-line element to reflect a project delay, ClarisImpact recomputes the schedule of linked tasks and realigns the chart elements to reflect the alterations.

These models also apply some intelligence to the graphic elements themselves. For instance, when you reposition symbols in a flowchart, the program calculates the best routing for the connecting lines and automatically rearranges them. In addition, you can edit data graphs bidirectionally—change the data in the table, and the graph adjusts to match; reconfigure the graph, and the data updates automatically.

Overall, ClarisImpact's collection of charts and graphing models covers the business-graphics requirements of most users. Although they won't supplant dedicated programs, the individual models offer more than sufficient functionality. Many users will never need more.

An extensive implementation of styles makes it easy to customize graphics and charts. Similar to the styles functions found in word processors, ClarisImpact's style control every attribute that can be applied to a model, such as the type of graph, text size and font, colors and fill patterns applied to elements, and overall layout of the model. You can define, save, and apply styles either globally or to individual model elements. A filtering function lets you apply a subset of a style. The program comes with an extensive collection of styles ready for use or customization, and these canned styles share familial characteristics, making it easy to change from one layout to another or to combine several model types that share a graphic look.

Drawing tools can be torn off the tool palette for use with any ClarisImpact document. For the most part, they are fairly basic. Notable, however, are the Bezigon tool, which draws Bézier-curve shapes, and the Note tool, which produces editable Post-it-style notes you can attach anywhere on a document. In addition, a second tear-off palette holds 16 shapes, including polygons, stars, and arrows.
Upgrade to 2.5 and Get the
Power of Color!

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

Current owners of
PowerPrint can upgrade
for $35.

PowerPrint 2.5 is much faster, provides
access to color printers like the Canon
BJC-600 and the HP DeskJet 330C.
Plus, features like custom background
printing and better compatibility.

And get 24-bit color and grayscale
printing, print-preview and support for
new printers.

Now you can print from your Macintosh™
to over 1,000 PC-compatible printers.

You can have the power-to-print whether you're on the road with your
PowerBook™, at home using an old PC printer, or sharing PC printers on
a network. PowerPrint's cable-and-software package gives you instant
access to just about any laser, inkjet, dot matrix, color, or fast
wide-carriage printer.

PowerPrint Costs Less Than $150.
And includes features like built-in spooling, scaling, and custom paper
sizes. It's compatible with TrueType™ and Adobe Type Manager™ fonts.

Available in Network Versions.
PowerPrint/LT™ for LocalTalk™ networks. PowerPrint/NW™ for Novell®
NetWare® printing services.

Call 800-663-6222 for information,
or contact your dealer.
Clarislmpact's graphics libraries are accessible from floating palettes containing individual thumbnail images, which you can drag and drop. You can add graphics to existing libraries and create your own libraries. Library graphics traveling to the page pass through the Clipboard rather than a separate channel, so you must be careful not to overwrite the Clipboard's contents. Still, the library interface is well implemented, and the program comes with more than 3000 clip art objects.

Text handling is generally fine. When building report documents, Clarislmpact behaves like a well-appointed word processor that includes such page-layout features as columnar formatting, text wrap around graphic objects, and footnoting. Similar text-handling features are available in text-object frames created with the text tool in draw and presentation documents. You can link these frames to flow text over several locations.

You can also use text frames within report documents, as you might with a caption inside a balloon graphic object. But more complex juxtapositions, such as flowing text over linked frames inside that balloon—admittedly an uncommon situation—can confuse the program as to where the text goes. Still, Clarislmpact's integration of text and graphics is usually excellent.

Clarislmpact supports QuickTime, so you can include video clips in computer-generated presentations. However, the program should offer the ability to visually sort through a presentation using thumbnails. The name-oriented slide manager is flexible enough, but it requires that you christen each slide with a distinctive name and retain a mental picture of its content—not a problem with a half-dozen slides but cumbersome if you're producing a gross.

Program documentation is well organized, readable, and thorough. Novice users should have no difficulties getting started. And Clarislmpact runs even on a Mac Plus with 2MB of RAM. Mindful of such minimalist users, Claris has included a good selection of monochrome styles and clip art libraries.

Taken individually, Clarislmpact's components naturally suffer in comparison with dedicated programs. But the program's outstanding integration offers versatility that dedicated programs are pressed to match. And the components mesh so well that each enhances its companions, much as the members of a well-drilled basketball squad do. By emphasizing teamwork, Clarislmpact realizes the potential of software integration.

—CARLOS DOMINGO MARTINEZ

### Typestry 2.0

**3-D Renderer for Type**

**PROS:** Superb rendering; many new features; good QuickTime support; good documentation.

**CONS:** Can't access a font's stylistic variants if the screen font isn't installed; no canned positioning effects.

**COMPANY:** Pixar

**LIST PRICE:** $299.

**PIXAR TYPESTRY'S APPROACHABLE interface, animation support, and outstanding RenderMan rendering technology have made it a popular choice among graphic designers and QuickTime movie producers needing to create 3-D text effects.**

Typestry 2.0 improves on the original version's straightforward operating style and adds some significant new features. Typestry 2.0 can import images in Adobe Illustrator 3.0 (and later) format, enabling you to add 3-D effects to logos and the like. New object-building options let you place letters on tube shapes and on "rubber sheets," which bend and flutter in a variable digital wind. Typestry's animation capabilities let you animate flags that flutter, distorting their text as they wave. The new particle system simulates everything from fireworks to bubbles to falling snowflakes.

Like its predecessor, Typestry 2.0 opens with an untitled window and a tool palette for creating new text objects and for moving, rotating, and resizing them. Creating a text object involves clicking on the text tool to display the text dialog box, which lets you specify the depth of the text and choose a font from a pop-up menu. Typestry's biggest limitation—one that I pointed out when I reviewed version 1.0—is that you can't access stylistic variants of a font (italic, bold, bold italic) unless you've installed the screen fonts for those variants. Most PostScript Type 1 fonts include screen fonts for style variants, but TrueType fonts don't, so you're limited to using the plain style of a TrueType font.

You can bevel type characters to produce a rounded, routed-out, or sharp-edged appearance, and you can now create and save custom bevel shapes. You can also now customize Typestry's *looks*—its library of dozens of surface properties such as chrome, bricks, and stucco. (Pixar One Twenty Eight, a CD-ROM containing 128 additional textures, is available for $299 list price.)

Typestry's already excellent lighting features—nine front lights and nine back lights—are largely unchanged in version 2.0, except for the inclusion of a new light that adds reflections to shiny objects. It's easy to experiment with coloring and repositioning lights and with adding gels, to cast shadows that simulate venetian blinds, spotlights, windowpanes, and more. Residents of London and Los Angeles will be glad to know that Typestry's electronic atmosphere now includes fog and haze effects.

Typestry 2.0's animation features, on the other hand, are greatly improved. You still alternate between moving objects and creating keyframes, letting the program tween the required intermediate frames. But the new Score window provides better control over keyframes and makes it easier to ungroup text objects so that characters move individually.

The new, full-color manual—loaded with step-by-step instructions, practical tips, and a detailed index—is a vast improvement over Typestry 1.0's friendly and informative but poorly organized and unindexed manual.

Typestry 2.0 requires roughly 5.3MB of free memory, but 10MB or more is better; an 8MB Mac can easily run out of memory when rendering an image at highest quality settings. Still, in my tests the program was rock-solid, even when I switched between other applications while rendering in the background. If you want to create 3-D text for a page layout, a multimedia production, or a QuickTime movie, you want Typestry 2.0.

—JIM HEID

---

**Typestry 2.0** To rotate and manipulate objects, you operate on them in the wire-frame view (top), and the rendered image appears below. (My Quadra 840AV rendered this one in about 12 minutes.) The Score window (bottom) controls animation and object grouping.

---

**CARLOS DOMINGO MARTINEZ**
- Outperforms 486 and Pentium, check.
- Macintosh software runs fast, check.
- Power Macintosh software screams, check.
- Works with MS-DOS, check.
- Works with Windows, check.
- Built-in Ethernet, check.
- RISC performance at a non-RISC price, check.

DOS Bigots will drool.
What would you think of a computer that's more powerful than a PC, more human than a Macintosh and designed to work with both?
PCs and Macintosh computers you already own.

RISC also provides a foundation for a wide range of capabilities you'll need in the future — including speech recognition, integrated voice mail and desk-to-desk videoconferencing — plus significant improvements in image quality for QuickTime videos.

It's more room to grow.

You don't need a new computer to take advantage of Power Macintosh performance.

Many Macintosh models are upgradable to Power Macintosh immediately — quickly and inexpensively.

This not only means your current investment is protected. It also means you can buy a Macintosh Quadra today and upgrade whenever you need to.

Of course, Apple's plug-and-play philosophy of personal computing makes moving to Power Macintosh as easy at the hardware level as it is at the software level.

A Power Macintosh can use the same keyboards, expansion cards, monitors, printers and external peripherals as your current Macintosh system. And of course, you can connect Power Macintosh and Macintosh computers and Apple Workgroup Servers together on the same network.

It's as little as $1,819:

As you might expect, a Power Macintosh computer is not a stripped-down Macintosh.

In the Macintosh tradition, all sorts of features that would normally cost you extra on ordinary PCs come as standard equipment: high-speed Ethernet networking, file-sharing software and CD-quality sound.

Of course, nothing beats a hands-on demonstration, something your authorized Apple reseller will be happy to arrange. For the name of the one located nearest you, call 800-732-3131, ext. 600.

And discover even more of the power that has made Macintosh computers the most imitated personal computers in the world. The power to be your best.

Introducing Power Macintosh.
Think of it as the Macintosh for people who can’t get enough Macintosh.

It starts with the thunder of a new start-up sound. A sound that offers both comforting familiarity and a signal that something has changed dramatically.

Introducing Power Macintosh® personal computers.

A new chip. A new architecture. A new standard of performance and value — not just in Macintosh®, but in all of personal computing. Yet it was designed to make your current Macintosh investment more valuable than ever.

It's more powerful.

At the heart of Power Macintosh is the PowerPC™ 601 microprocessor: the first of a new family of ultra-high-performance RISC chips developed in a unique three-year collaboration between Apple, IBM and Motorola.

RISC technology brings a whole new level of performance to personal computing. Software written to take advantage of its unique capabilities, in fact, will blow the doors off the same programs written for 486 PCs — and can run significantly faster than programs for Pentium processor-based PCs.

The difference in Macintosh applications rewritten to take advantage of RISC is equally dramatic. Adobe Photoshop 2.5, for example, can run up to 4 times faster than it can performing the same tasks on a Macintosh Quadra.

From left, the Power Macintosh 8100/80, Power Macintosh 7100/66 and Power Macintosh 6100/60.
Resampling Stats 1.0

**Statistics/Probability Software**

**PROS:** Innovative, easy-to-understand statistics program; efficient programming language.  **CONS:** Needs more graphics features.  **COMPANY:** Resampling Stats, Inc. (703/522-2713).  **LIST PRICE:** $225.

Resampling statistics (also known in the physical sciences as the bootstrap method) is a revolutionary technique in a field that's overdue for a revolution. Many students dread taking the required statistics course. In many cases, the course starts out mildly confusing and ends up thoroughly baffling, leaving students with a repertoire of complex techniques that they often misapply.

Dr. Julian Simon, a rather controversial economist (he annoyed many environmentalist colleagues by correctly predicting that the world would in fact not run out of mineral resources by the early 1990s), suggested in the 1970s that computers offer a way to calculate quantities in statistics directly. Rather than produce statistics by calculating standard analytical formulas, he devised a simple simulation language that treats questions in probability and statistics as experiments.

An example of this is the solution of the notorious birthday problem. The question is, How many people do you have to poll, on average, before you find two that have the same birthday? There's a formula for computing cases such as this, but the resampling method is formula-free. The computer makes up random birthdays in a set, and records the number of trials it took to produce a match. Have the computer do this 1000 times or so, average the number of trials, and that's your answer.

In principle, any problem treated by traditional statistical methods can be treated by a resampling approach, and resampling has a conceptual advantage in that it makes no a priori assumptions about underlying distributions of the quantities involved. Resampling Stats provides a compact, BASIC-like language for programming—most problems, including the resampling versions of ANOVA and hypothesis testing, can be solved with fewer than a dozen lines of code. The program includes a tutorial and a large assortment of samples, and you can modify the samples to fit your own statistical problems.

SerePlot 2.12

**Scriptable Plotting Software**

**PROS:** Automates batch processing of data; good set of math tools; examples of scripting common applications.  **CONS:** Limited graphing types; a few glitches.  **COMPANY:** Scientific Visions (301/593-0317).  **LIST PRICE:** $135.

SerePlot is a unique Macintosh charting and graphing program. It offers only the plainer two-dimensional line charts; its strength lies in its AppleScript support. For example, you can automatically load and analyze three months of stock-market data on 1000 stocks—looking for signs of statistical trends—and then print charts only for stocks that meet your preassigned criteria. In the scientific realm, you can, for example, have SerePlot sift through files of near-infrared spectra of compounds looking for maxima and minima at selected points. If you have any kind of data that can be visualized in a 2-D plot, SerePlot has the machinery to crunch it.

SerePlot's plotting facility is easy to use and lightning fast. SerePlot wants you to keep your data in tables (the choices are X-Y, X-Y-DY, and X-Y-DX-DY) and provides plenty of help (including sample Microsoft Excel file-conversion scripts) for getting data into Excel. The main plot dialog box shows which data tables are open, and an Objects menu specifies plot data elements. You can alter plot axes, labels, and titles, but SerePlot features such intelligent defaults and autoscaling that routine work may only need its built-in choices.

The Tool window is your introduction to SerePlot's math capabilities. Besides tools for locating X-Y values on your plot, this window includes a derivative tool, an integral tool, a minimax tool, and a special tool that gives statistics (mean, standard deviation) on the data between selected x-axis points. You can cut data from a graph and paste it into a table, and you can define your own functions using an extensive list of built-ins, ranging from the usual trig/ transcendental to error and Bessel functions. The Math menu features calculus (it generates tables of numerical derivatives and integrals), binning, smoothing, interpolating, curve fitting to arbitrary functions, and fast Fourier transforms. SerePlot performs math functions impressively fast—an order of magnitude faster than analogous functions in Excel.

And AppleScript-based batch processing is SerePlot's glory. SerePlot uses the Userland Frontier dialect and includes scripts for likely chores such as importing data or specifying plot parameters. You can learn to do something useful in an hour just by studying the examples provided. Support for SerePlot exists mostly on BBSs.

Version 2.12 contains an undocumented curve-fitting feature in the Tool window and doesn't implement the documented QuickFit version of curve fitting, but the company says that these glitches will be corrected by the time you read this.

SerePlot is quick, intuitive, includes a good tutorial, and is modestly priced. If you have piles of data and don't need animated, exploding bar charts in 24-bit color, SerePlot should be part of your analysis tool kit.

—Charles Seiter
Way to go, Apple.

Apple's new Power Macintosh® computers are here. Based on the new PowerPC™ microprocessor, they truly have the power to change the course of computing. So congratulations, Apple. Way to go, go, go.

**PowerPC Microprocessors.** *A change for the better.*
Without training, thousands of dollars already spent on computers and software is needlessly wasted.

$3,800 Wasted Without TRAINING!

"...just one short-cut on your Word video saved me 20 minutes of set-up time, not to mention frustration..."  
Harland Anderson - Computer Consultant

$1,800 Wasted Without TRAINING!

"As a result of your videos my Mac is running lean and mean..."  
J.J. Johnson - San Jose, CA

Guaranteed Results
Each MacAcademy Training Video carries an iron clad, money-back guarantee. If, within 30 days, you are not totally satisfied with every video you purchase from MacAcademy you may receive a full refund...no questions asked!

MacAcademy Videos Work
MacAcademy training videos have helped over 100,000 people learn new Macintosh skills. By using the videos new users can cut their learning curve by up to 75%.

To Order
To order with a credit card call 800-527-1914 Dept. MW694. Purchase orders, checks, and credit card orders may be mailed to the address listed below. Please add $3 plus $1 per video shipping and handling. FAX number is 904-677-6717, International 904-677-1918.

MacAcademy
477 S. Nova Rd.  
Ormond Beach, FL 32174

Circle 106 on reader service card
TrafficWatch II 2.0

TrafficWatch II scans your network and can be used for data analysis. It supports both LocalTalk and Ethernet protocols. It includes features such as printouts, alarms, triggers, and user-defined filters.

PROS: Supports both LocalTalk and Ethernet; prints out saved data. CONS: Limited documentation; no print capabilities; no alarms or triggers.

COMPANY: Neon Software. LIST PRICE: $495.

VIP BASIC 1.0.1

VIP BASIC is an interpreted language that allows you to program in a Mac environment. It supports multiple protocols and provides a simple structure for writing applications.

PROS: Great tool for development; supports object-oriented programming. CONS: Limited debugging tools; no easy way to compile.

Apple-events link to Symantec’s Think Reference provides instant Mac-feature documentation (assuming you have a copy of Think Reference).

Two key points, however, make this product less valuable than VIP C. The source code generated in VIP C can be compiled without much modification either by the Think C or MPW C compiler. There’s no corresponding compilation route in BASIC. If you use a minimal set of BASIC keywords, you can export a VIP BASIC project to QuickBASIC and compile the code, but it isn’t easy to do an impressive application using this method. I had no success in compiling VIP BASIC projects under FutureBASIC—a disappointing result, since FutureBASIC produces smaller, faster compiled code than QuickBASIC.

The other drawback has to do with the notion of using BASIC for large-scale Mac programming. In the VIP approach, BASIC is treated as an alternative to C—throughout large patches of VIP BASIC documentation, C keywords have simply been replaced with BASIC keywords, and the sample programs are equivalent in both products. Given that most of the code in a typical Mac program deals with interface management rather than computation, BASIC programmers should just bite the bullet, learn a minimal version of C, and work in VIP C with a view toward compiling programs easily. If you insist on using BASIC, the combination of FutureBASIC and Staz Software’s PG:PRO is simpler to use and produces respectable compiled code.

Nonetheless, VIP BASIC is a popular product because it lets programmers who know only BASIC get started producing real, if interpreted, Mac programs. If your background is in BASIC and you want to learn the Mac Toolbox, VIP BASIC is an excellent choice; as a serious developer’s tool, it’s not on the same footing, despite its considerable virtues, as Mainstay’s VIP C.—CHARLES SEITER

Managing Your Money 6.0

**Pros:** Good tax-planning and investment features.

**Cons:** Data entry can be a chore; technical support is hard to reach. **Company:** Meca Software (800/820-7457). **List Price:** $79.95.

Meca Software’s Managing Your Money (MYM) 6.0 is a good program for managing your personal finances, but overall it fails to topple the market leader, Intuit’s Quicken 4.0. People who need extensive tax-planning and investment-tracking features should give MYM serious consideration, however. New to version 6.0 are updates for the 1993 tax code, new printed-check formats, financial-report customization features, and security-price updates via CompuServe.

Ease of data entry is important with financial programs, and MYM comes up short. On the plus side, when you choose one of the five tools—Remind, Money, Tax, Invest, and Plan—MYM’s navigation palette, a Bowehartlike diagram shows the tool’s functions. But, unlike Quicken and Survivor Software’s MacMoney, MYM doesn’t let you enter all of your transactions on one screen. Within the Money tool, there are separate screens for writing checks, making deposits, and transferring money. You enter a check in the Write Checks screen by using the mouse to select from a pop-up menu the account from which you are drawing funds, then type in the information about payee and expense categories. (Having to take your hands off the keyboard gets quite annoying.) To enter an ATM withdrawal (which other programs handle as if it were a check), you use the Transfer Money screen to specify the account the money is coming from (for example, a checking account) and the expense categories on which you spent the money.

Another frustrating thing about MYM is that you must remember to use different screens for different cases of the same transaction type. The Make Deposits screen can handle only one income category per deposit, so if you make deposits that you want to allocate to different income sources, you have to use the Transfer Money screen.

MYM really stands out in its depth of tax-planning and investment features, however. You’re encouraged (but not required) to assign each expense category to a tax category corresponding to the IRS’s 1040 form or schedules A through F. Using the Tax tool, you can then estimate your tax liability at any time and print out reports of your tax position or perform “what-if” analyses. It exports data in TXF format to Meca’s companion tax program, Andrew Tobias’s TaxCut, or to Chipsoft’s MacnTax, and it handles investments exhaustively through the Invest tool, which lets you track stocks and bonds, options, mutual funds, and other securities. MYM handles financial portfolios linked to cash-management accounts, and it tracks IRA positions.

Navigation and Entry

Selecting the money tool from MYM’s navigation screen yields the Transfer Money screen for tracking a deposit with multiple income sources.

But MYM needs better technical support. Over the course of this review, I made many (toll) calls, and all I got were busy signals; I never did get through to Meca’s support. Sending a fax with my questions provided a slightly better response: I sent the fax on a Wednesday and got an accurate faxed reply the following Monday. The best support response came when I posted questions on Meca’s CompuServe support forum; I received overnight replies that were complete and concise. Meca does offer a support plan ($49.95 per year) that provides access to priority support lines with extended hours, a free annual upgrade of MYM, and other benefits; but Meca clearly needs to improve the level of its free support.

Managing Your Money 6.0 does a good job if somewhat roundabout job of tracking your total financial picture. MYM isn’t as easy to use as Quicken or MacMoney, but it excels in tax, investment, and financial planning, with features that beat any of the competition. If these areas are important to you, then MYM is your best bet. But if you just need an electronic checkbook, you might be more satisfied with another program.—TOM NEGRINO
**From Newtons to PIMs,**

Since 1984, the original Macintosh mail-order source. Over 3500 products.\* Denotes Money Back Guarantee.

**POWERBOOK/NEWTON**

| Apple Computer | 1352 Newman Mosesfilm 1/90—The second generation is here. Sleeker, more compact, better handwriting recognition, longer battery life, more memory. Weights just 1.2 pounds. | $599. |

**DAILY BUSINESS**

| Call for our latest catalogs. |

| Creative Whack Pack—Improve your creative thinking! Interactive software designed to open mental blocks, gain insight into your own creative thinking, and establish methods for encouraging innovative ideas. Includes best-selling book, A Whack on the Side of the Head. | $29. |

<table>
<thead>
<tr>
<th>Apple Computer</th>
<th>1332 MontegoPark 110 ...</th>
<th>$595.95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Engineering ...</td>
<td>30 day MBG</td>
<td></td>
</tr>
<tr>
<td>Auto Adap 99.</td>
<td>8800 Ball, Chargre ...</td>
<td>67.</td>
</tr>
<tr>
<td>8600</td>
<td>1800 S/W</td>
<td></td>
</tr>
<tr>
<td>15604</td>
<td>We Tools for PowerBook ...</td>
<td>$95.</td>
</tr>
<tr>
<td>Battery Tec. ...</td>
<td>30 day MBG</td>
<td></td>
</tr>
<tr>
<td>7576</td>
<td>1400 Telit, 10222 Charg ...</td>
<td>$45.</td>
</tr>
<tr>
<td>Connect ...</td>
<td>30 day MBG</td>
<td></td>
</tr>
<tr>
<td>8414</td>
<td>CPU 2.0 ...</td>
<td>$55.</td>
</tr>
<tr>
<td>4121</td>
<td>Cool Village ... 30 day MBG</td>
<td></td>
</tr>
<tr>
<td>7720</td>
<td>PowerPent/Silver 269.</td>
<td>$710.</td>
</tr>
<tr>
<td>4121</td>
<td>710/Gold 299.</td>
<td></td>
</tr>
<tr>
<td>8217</td>
<td>PowerBook S ... 47.85 8133 EX ...</td>
<td>59.</td>
</tr>
<tr>
<td>15016</td>
<td>Kensington Cases ... 30 day MBG</td>
<td></td>
</tr>
<tr>
<td>41016</td>
<td>Notebook 35.95 19558 Executive 115.</td>
<td></td>
</tr>
<tr>
<td>14281</td>
<td>Lind Electronic Design</td>
<td></td>
</tr>
<tr>
<td>14527</td>
<td>SDC 3 129. 14411 BL-200 ...</td>
<td>$179.50</td>
</tr>
<tr>
<td>7410</td>
<td>Sophisticated Circuits ... 30 day MBG</td>
<td></td>
</tr>
<tr>
<td>7410</td>
<td>PowerPad Graffiti with QwicKeys ...</td>
<td>$109.</td>
</tr>
<tr>
<td>7425</td>
<td>(giant) 69.95 7657 (platinum) ...</td>
<td>$69.</td>
</tr>
<tr>
<td>14281</td>
<td>Targus Cases ... 30 day MBG</td>
<td></td>
</tr>
<tr>
<td>11207</td>
<td>Leath. Pad Case 95.</td>
<td></td>
</tr>
<tr>
<td>1305</td>
<td>Universal ...</td>
<td>69.</td>
</tr>
<tr>
<td>3836</td>
<td>RleMaker Pro 265.</td>
<td></td>
</tr>
<tr>
<td>14732</td>
<td>MWrite Pro 95.</td>
<td></td>
</tr>
<tr>
<td>3903</td>
<td>ClarisWorks 2.1 for Mac ...</td>
<td>$99.95</td>
</tr>
<tr>
<td>7106</td>
<td>StatView 4.01 ...</td>
<td></td>
</tr>
<tr>
<td>8465</td>
<td>In Control 85.</td>
<td></td>
</tr>
<tr>
<td>11545</td>
<td>w/Dynosys 99.95</td>
<td></td>
</tr>
<tr>
<td>2636</td>
<td>ThinkPack Plus ...</td>
<td>$269.95</td>
</tr>
<tr>
<td>15864</td>
<td>Wiz Tools for PowerBook ...</td>
<td>$59.95</td>
</tr>
</tbody>
</table>

**GRAPHICS & DESIGN**

<table>
<thead>
<tr>
<th>*Abracadala, Ltd ... 30 day MBG</th>
<th>12033</th>
<th>Design Your Own Railroad ...</th>
<th>$39.95</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Aldus ... 30 day MBG</td>
<td>11956</td>
<td>TeachType or 11957 DateBack Pro ea ...</td>
<td>49.95</td>
</tr>
<tr>
<td>*Aldus ... 30 day MBG</td>
<td>11359</td>
<td>CharisPro/Datalight Pro ...</td>
<td>89.95</td>
</tr>
<tr>
<td>*Altair Corporation ... 60 day MBG</td>
<td>8456</td>
<td>In Control ... 11545 Dynosys ...</td>
<td>99.95</td>
</tr>
<tr>
<td>*BestWare ... 30 day MBG</td>
<td>14187</td>
<td>M.Y.O.B. 55. 14188 w/Payroll ...</td>
<td>109.95</td>
</tr>
<tr>
<td>*Cambridge Sel. Comp. ... 30 day MBG</td>
<td>15914</td>
<td>CT ... 30 day MBG</td>
<td></td>
</tr>
<tr>
<td>*Charis ... 30 MBG</td>
<td>5803</td>
<td>Multitool 229. 5804 Payroll ...</td>
<td>169.</td>
</tr>
<tr>
<td>*Claris ... 30 day MBG</td>
<td>3953</td>
<td>ClarisWorks 2.1 for Mac ...</td>
<td>199.95</td>
</tr>
<tr>
<td>*ClarisWorks 2.1 for Mac ...</td>
<td>3836</td>
<td>FinderMaker Pro 265. ...</td>
<td>14732 MW/Write Pro 95.</td>
</tr>
<tr>
<td>*Creative Think ...</td>
<td>14540</td>
<td>Creative Whack Pack ...</td>
<td>29.</td>
</tr>
<tr>
<td>*DellatPlot ... 30 day MBG</td>
<td>12974</td>
<td>DellatPlot Pro 3 ...</td>
<td>139.95</td>
</tr>
<tr>
<td>*DellatPlot Pro 3 Comp. Upgrd ...</td>
<td>13819</td>
<td>DellatPlot 35 ...</td>
<td>79.95</td>
</tr>
<tr>
<td>*Gold Disk ...</td>
<td>12277</td>
<td>Astound ...</td>
<td>249.</td>
</tr>
<tr>
<td>*Inspiration ... 30 day MBG</td>
<td>11298</td>
<td>Inspiration 4 ...</td>
<td>165.95</td>
</tr>
<tr>
<td>*Inthul ... 30 day MBG</td>
<td>11845</td>
<td>Inthul 30 day MBG</td>
<td></td>
</tr>
<tr>
<td>*QuickEn 4.0 ...</td>
<td>39.95</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ALWAYS**

| Allday Consumer | 3366 Always Proware for Macintosh—Includes SuperPaint 3.5 and HyperDraw 2.0. Here's all the tools you need to draw, paint, write, design, and publish everything from greeting cards to brochures. Easy to learn, fun to use. | $849.95 |

**MacConnection**

800-800-3333 694MW

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

**VST Power Systems**

Run your PowerBook for 5 hours with the Thulip Compax. Includes ThinkPad rechargeable battery, utilities software, cable, and more. Thulip Plus packs twice the power! Ideal for color PowerBooks. 2664 VST Thulip Compax/Pack $189.95 2676 VST Thulip Plus/Pack 269.95
CD-ROMs to Mods
It's been a long time since Norton Utilities really improved its software for the Mac. Too long. Now Central Point Software introduces a newer, faster, smarter Mac utility—new MacTools 3.0. How much smarter is it? It retrieves accidentally trashed files in one step. (With Norton, it takes seventeen.) It continuously checks for disk corruption in the background, so small problems don't become disasters. (Norton doesn't.) MacTools 3.0 also finds and fixes Desktop file damage. (Norton can't.) And unlike Norton, it includes complete anti-virus protection, with network support. But that's just scratching the surface. For a detailed comparison of MacTools 3.0 vs. Norton, call FAXBACK at 1-800-847-8766 and ask for document 97532. For all upgrades, just call 1-800-277-3873. And stop living in the past.

Upgrade from MacTools, Norton, SAM or Virex only $49.95* 1-800-277-3873

*Upgrade from MacTools, Norton Utilities, SAM or Virex. Offer good only in U.S. and Canada. Shipping and handling extra.
WillMaker 5.0

Legal Software

**PROS:** Quickly and easily automates the creation of wills, health-care directives and proxies, and final-arrangements documents; offers excellent supporting explanations, examples, and background. **CONS:** No way to search for topics or navigate within online help.

**COMPANY:** Nolo Press (510/549-1976).

**LIST PRICE:** $69.95

RIGHT AT THE TOP OF MOST PEOPLE'S LIST OF THINGS TO DO is planning for the inevitable. When you're ready to take charge of your affairs, you can prepare your will, health-care directives, and final arrangements documents with WillMaker 5.0. With its help screens specific to the task at hand, you can easily understand its questions and respond. WillMaker's own Print options allow you to set margins, typeface, font size, and line spacing—but are adequate to the task. Final documents include instructions on signing, witnessing, and notarizing. There's even a set of legal-style storage envelopes for each type of document.

WillMaker tailors your documents to the laws of the state in which you reside, and the documents it creates are valid in all states except Louisiana. Although its range of testamentary possibilities is not adequate for very large or unusually complex estates, WillMaker's will-writing abilities should be more than sufficient for most people. Its other features are appropriate for everyone, however, and the program now takes immediate action if a user is not present.

Overall, I can't imagine an easier and more economical way of planning for the inevitable.—ROBERT C. ECKHARDT

Snap Mail 1.01

Electronic-Mail Software

**PROS:** Inexpensive; easy to install, definable message forms; Talk mode. **CONS:** Fixed-size window; displays only one item at a time; no font selection. **COMPANY:** Casady & Greene (408/484-9228).

**LIST PRICE:** 5-pack $200; 10-pack $320; 50-pack $1440.

OFFICE ELECTRONIC-MAIL SYSTEMS can be a bear to set up, with servers, system administrators, and gateways to worry about. Snap Mail, designed for easy setup and administration on AppleTalk networks, is easy to set up and use. Snap Mail's message forms and Talk mode allow you to communicate easily and efficiently.

The latest version of WillMaker also helps you prepare legal documents regarding health care and final arrangements. Health-care documents include a health-care directive (more commonly called a living will), which specifies the medical treatments you want either provided or withheld should you be unable to communicate your wishes; and a health-care proxy or durable power of attorney, which gives another person the authority to see that the instructions in your health-care directive are carried out, should that become necessary. WillMaker's final-arrangements document indicates what you want in the way of burial, cremation, memorial service, and the like.

When you've answered all of WillMaker's questions, you can review and revise the resulting document, print it, or export it for printing in another program. WillMaker's own Print options are limited—you can set margins, typeface, font size,
The DrawingSlate manual is very brief, covering only the basics of operation and maintenance. Thankfully, a 24-hour BBS is available for more-esoteric issues as well as technical support and software upgrades. Most heavyweight graphics programs take advantage of pressure sensitivity. In paint programs, pressure can vary attributes such as paint opacity, color, and rate of flow as you draw, letting you create effects that are simply not possible with any other input device. A stylus takes some getting used to, but the advantages of pressure sensitivity far outweigh that drawback. And while it's not a deluxe package, the DrawingSlate is a good, compact, low-cost implementation of pressure sensitivity.—Matt Nielsen

The Notebook Printer II is a thermal-fusion printer that uses heat to bond ink onto the paper from a cartridge ribbon similar to that of a typewriter. Because the printer doesn't spray liquid ink onto the paper—as do its major competitors, Apple's Portable StyleWriter and Hewlett-Packard's DeskWriter 310—the type of paper you use doesn't greatly affect print quality. Even on thin, nonabsorbent paper (the kind provided at the hotels where I stay), the Notebook II produces crisp, black type that stays on the page even after repeated folding or rubbing.

The Notebook II also prints in color, with a special four-color ribbon and the included Citizen Notebook Printer II driver installed. I wouldn't use this as a color printer very often, though, because the process is wasteful (the ribbon advances through each of the four colors until it finds an area that it needs, wasting the rest); because it is slow (a 1-page Microsoft Word document with colored headings took more than 15 minutes to print); and because Hewlett-Packard's ink-jet DeskWriter printers do a much better job of printing good-looking color at a budget price. (The Notebook II's optional color ribbons are sold only in packages of five, and according to the company, the suggested price is $6.99 per ribbon.)

With the Notebook II's built-in 5-page sheet feeder, you can easily align sheets of paper, a task that can be a difficult on tiny printers. The Notebook II also has an ingenious design that stacks finished sheets on top of the printer so that they don't get in the way of the sheets being printed. To print envelopes, you stand the printer on its back and feed the envelopes manually through a slot in the back. This works well enough, but because they go in flap-first, aligning the envelopes can be difficult (you're feeding in an angled edge). An optional 30-page sheet feeder is available ($69), but the Notebook II is too slow to be effective when printing documents much longer than 5 pages. If speed is worth a few extra pounds to you, buy HP's DeskWriter 310. With the battery installed, it weighs 1.7 pounds more than the Notebook II, but it prints text nearly three times as quickly.

Moreover, if gray-scale or color printing on the road is what you care about, the Hewlett-Packard DeskWriter 310 does a better job on both types of graphics documents. Although you can recognize a photograph printed using the Notebook Printer II, the image is disappointing: all the dark tones blur together, and the light shades don't stand out. But if weight and size are your biggest concerns in choosing a portable printer, and if you print primarily in black-and-white, choose the Notebook II. Its text-print quality is sharper than that of its ink-jet brethren, and it's better at handling a wide variety of paper types. If there's any chance you'll need a printer where you're headed, pack this one. You won't regret it. I've packed shoes that were heavier and bulkier than the Notebook II.—Liza Weiman
WE'RE REDEFINING WHAT YOU SHOULD EXPECT FROM A PRINTER.
**Reviews**

**FlipBook 1.0**

**Animation Printing Tool**

**PROS:** Easy to use; fun; excellent output.

**CONS:** On the expensive side. **COMPANY:** S. H. Pierce (617/338-2222). **PRICE:** $89.

ONCE UPON A TIME, IN THE DAYS before computers talked and digitized video, people made movies using a pen and paper. These movies, called flip-books, consisted of a series of images drawn on paper that, upon application of an extremely technical thumb-and-forefinger method, appeared to move.

The ice-age period of filmmaking is long gone, but never fear—S. H. Pierce has come up with a software product that lets you return to the past. FlipBook lets users make their own flip-books out of Scrapbook files, QuickTime movies, and PIC's animations.

To create the flip-book pictured here, I used my highly developed artistic skills to draw several images in Adobe Photoshop. I then copied the images to my Scrapbook and opened the Scrapbook from FlipBook.

(Indeed in order to import correctly, the images in the Scrapbook must all be the same size.) Once I opened the Scrapbook in FlipBook, my eight images appeared as a movie that I could play.

You can also import a QuickTime movie. For both movies and line art, the type of image you use will affect your output. Images with minimal color contrast will not print as nicely as those with highly contrasting colors.

The FlipBook application enables you to open and play files and prepare them for printing. The software has no image-editing or animation functions, so to make the most of this product, you will need your own image-editing program. FlipBook's limited functions make its price of $89 seem a bit high—even its approximate street price of $60 is a little more than I would pay for this product.

FlipBook comes complete with 50 sheets of perforated paper for printing your flip-books, and S. H. Pierce also sells the paper separately (50 sheets with 10 cards a sheet for $16.95). The Flip Setup option allows you to select the paper type, add guidelines, and choose the side on which to bind the book.

FlipBook requires 2MB of RAM and about 900K of disk space. S. H. Pierce says FlipBook is compatible with both QuickDraw and PostScript AppleTalk printers. I printed samples on an Apple LaserWriter IONITX, and print quality was excellent. The product also comes with Lafe Locke's *Film Animation Techniques* (Betterway Books, 1992), a book for beginning animators that gives guidance on what types of images will create the best flip-book.

FlipBook doesn't do much besides help you make flip-books. It is good at its job, though, and if you want to make flip-books out of your digital images, you may want to shell out $60 or $70 for this product. Of course, you could also just print your images and arrange them into a flip-book yourself. For the bored executive or for parents who want to educate their children about the olden days, FlipBook is a good high-tech option for a low-tech task.

—JOANNA PEARLSTEIN

**UnderWare 1.0.1**

**Screen Saver/Desktop Enhancer**

**PROS:** Amusingly animates your desktop; can use most After Dark modules. **CONS:** Desktop animation can slow foreground processes; uses 5.8MB of disk space. **COMPANY:** Bit Jugglers (415/968-3908). **PRICE:** $59.95.

TERS LIKE WACKY AND SILLY ARE usually not what software authors hope to hear about their first product. But when applied to Bit Jugglers' UnderWare, they're a compliment. UnderWare is a control panel that adds three features to your Mac's desktop. It's a screen saver. It allows you to personalize your desktop with one of dozens of patterns. But UnderWare's unique claim to fame is its ability to run animations on your desktop, underneatb your icons and windows.

If these animations don't make you grin, you may need a humor transplant. Cartoon babies crawl across your screen in the Babies module, pausing briefly while thought balloons with text that you've defined pop up above their heads. With the Dragon module, a fire-breathing saurian burns holes in your desktop. Ballerinas pirouette; a T. rex stomps; and the Jungleman swings on vines across your screen.

Better yet, many animations interact with your desktop's icons and windows. The Robber skulks on screen, rummages through the icons, then gets chased off screen by the cops. The Jungleman is likely to slam into the side of an open window. And many of the modules act differently when used as screen savers. For example, Blastoff launches rockets from the bottom of your screen when used as a Desktop Animation; when it's a screen saver, your desktop's icons rise on a jet of animated flame.

The price you pay for this whimsy is mostly measured in disk space; full installation takes 5.8MB, and gives you 100 desktop patterns and 26 animated modules. If you have a 480-by-480-pixel screen running in 8-bit mode, UnderWare takes a moderate 80K of RAM. Also, the program is good about not slowing your Macintosh; the Desktop Animations halt when UnderWare senses your Mac is busy, such as with mouse, keyboard, or network activity, or when the serial port is receiving data from a modem.

UnderWare can also run Berkeley Systems' After Dark modules, except for the Star Trek and Disney module sets.

UnderWare has a few incompatibilities with older versions of some utilities. It doesn't work with Connectix's PowerBook Utilities 2.0 or Symantec's CopyDoubler 2.0.1; updating to the latest versions of these programs, 2.0.1 and 2.0.3, respectively, fixes the problem. As I was writing this review, Bit Jugglers released a free updater program (version 1.0.1) that fixes minor incompatibilities. The updater is available on America Online, CompuServe, and AppleLink.

There's no businesslike reason to have UnderWare running on your Mac. But don't underestimate the value of a smile while you work. UnderWare is inspired, silly fun for your Mac's desktop.

—TOM NERGINDO
Flexibility (fleks-əˈbil-ə-tə) n. 1. A feature previously not found in this category. Example: For under $800, TI microWriter™ printers with Adobe® PostScript® give you more networking and paper handling flexibility than Apple and HP, at a lot lower price.

If you're looking for a PostScript printer with a street price well under $800, you'll have a hard time finding one with as many features as a TI microWriter.

Just look at the chart and compare it to our leading competitors, Apple and HP. Then, when you're ready for a full-featured printer that's truly flexible, at a price that's truly affordable, take a look at a TI microWriter. For more information or a dealer near you, call 1-800-TI-Texas (1-800-848-3927).

<table>
<thead>
<tr>
<th></th>
<th>TI microWriter PS23</th>
<th>Apple LaserWriter Select 320</th>
<th>HP 4ML</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Speed</td>
<td>5 ppm</td>
<td>4 ppm</td>
<td>4 ppm</td>
</tr>
<tr>
<td>Mac/DOS Compatibility</td>
<td>Standard</td>
<td>Mac Only</td>
<td>Standard</td>
</tr>
<tr>
<td>Paper Trays</td>
<td>(std.) 250 sheet</td>
<td>100 sheet</td>
<td>100 sheet</td>
</tr>
<tr>
<td></td>
<td>(opt.) 250 sheet</td>
<td>Not Avail.</td>
<td>Not Avail.</td>
</tr>
<tr>
<td>Auto Emulation Switching</td>
<td>Standard</td>
<td>Not Avail.</td>
<td>Standard</td>
</tr>
<tr>
<td>List Price</td>
<td>$799</td>
<td>$959</td>
<td>$1279</td>
</tr>
</tbody>
</table>

EXTENDING YOUR REACH WITH INNOVATION™

Texas Instruments

Specifications in chart are based on information as of 1994. List prices in chart may vary. microWriter and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. © 1994 TI.

Circle 265 on reader service card
SimCity 2000

Simulation Game

PROS: Lovely graphics; easy-to-use palette; complex yet straightforward; entertaining and engrossing. CONS: Minor bugs and annoyances. COMPANY: Maxis Software (510/254-9700). LIST PRICE: $69.95.

Some Maxis Simulations are so complicated that the learning curve is more like that of a 3-D rendering program than a game. But SimCity 2000 is both dazzlingly simple and fascinatingly complex.

In essence, the goal is to build a city and run it successfully. You need to develop a solid infrastructure, including a water system (new in this version), power supply, roads, and public transportation. You face urban problems, such as high crime and traffic. You also face natural disasters—and some that are unnatural, such as monsters and chemical spills.

An easy-to-use palette gives you all the tools you need. Its top 15 buttons provide the ingredients: zoning, landscaping, and city services. The zone tools now include libraries, museums, prisons, marinas, and zoos. You can tear other buttons off the palette, creating windows that provide detailed information about your city. The windows show charts, graphs, maps, and visual displays of everything from pollution levels to your city's budget and tax rates.

But playing the game is only half the pleasure; SimCity 2000 is also fun to watch. As you provide zones, the Sims (the people who live in your city) build. And their buildings are incredibly detailed. From quaint bed-and-breakfast inns to convenience stores, condos with swimming pools, and industrial thimgaams, these are buildings that real people could live in.

The detailed help system is easy to access. Hold down the shift key and click on any button; the help window explains what that button does. There is also a query tool for information about any building.

To completely describe the game would take about 140 pages—the length of the well-written and entertaining manual. Briefly, other features include arcologies—huge, enclosed cities within your city; new types of power, including wind power; newspapers giving the Sims' opinions; and a terrain generator that lets you develop a landscape to your own specifications.

Alas, SimCity's not perfect. Various minor bugs and misguided features are annoying. It's hard to plan a subway around your water system, and there's no way to view only one or the other. There's also no easy way to see the entire subway, as, unlike the roads and trains, it's not included in the map window. Ordinances get passed without your approval, and you may have to shell out thousands for energy conservation when a new power plant would be much cheaper. Furthermore, when your city gets big, some building descriptions no longer contain useful information. And finally, the newspapers all assume that the mayor is male—a minor, but depressing, sexism.

Overall, though, SimCity 2000 is marvelous. Maxis has done a superb job of improving on an already good thing.

—WENDY SHARP

Crystal Crazy

Arcade Game

PROS: Fun; challenging; great sounds and graphics. CONS: Zinkleflashoxicationizers are really nasty. COMPANY: Casady & Greene (408/484-9228). LIST PRICE: $49.95.

Crystal Crazy is a free-for-all bonus wave, which occurs after every third wave. In this free-for-all bonus wave, you collect point boxes, a few smart bombs, and sometimes ships—without worrying about the various Nasties. But you must select these points before two slowly moving doors smash your spacecraft.

Randomly appearing throughout the levels are five shields and five special guns that you can pick up to help defend yourself. The shields range from the rubber hat (protects against mines, portals, and gateways but doesn't keep you from crashing into Nasties or being hit by bullets) to the MacHead (obliterates Nasties but doesn't protect you from bullets). The special guns include a multigun (sprays four simultaneous streams of bullets) and the Captivator (captures Nasties and tosses them along).

But wait, there's more to Crystal Crazy than just great game-playing excitement. You can adjust the sound level from within the game, and pause play by hitting the tab key. All new games start with wave one, unless you save a game in progress. And large-monitor owners can expand the playing area to the full screen size.

The status bar at the top of the screen displays information about your current ammunition supply, points, and weapons status, among other things.

Nasties Battle Your ship (lower right, with spiked armor) is surrounded by dispensers, mines, and Dronefekus. As quick as your jets can jive, you can collect the smart bombs, bonus points, and crystals. Then unpaint the pictures before escaping through the portals.

Crystal Crazy is everything a computer game should be. It's challenging and fun without being impossible. Each level has some old elements, with a few new ones to keep you on your toes. It took five games to get a million points, pretty good for a Pong throwback like me.—MATT CLARK

---

**THE UNDER $1400 PRINTER, REDEFINED.**

When we set out to design the ideal 600 dpi printer, we asked thousands of users what they wanted most. And the result is the TI microLaser Pro 600. As you see from the chart, not only do we give you more, we charge you less. And if blazing speed for heavy graphics printing is required, check out our 40MHz PowerStep® upgrade. It's a great way to protect your investment as your processing needs become more complex. For more information or a dealer near you, call 1-800-TI-TEXAS (1-800-848-3927).

---

<table>
<thead>
<tr>
<th>Feature</th>
<th>TI microLaser Pro 600</th>
<th>HP LaserJet®4M</th>
</tr>
</thead>
<tbody>
<tr>
<td>True 600 dpi</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Speed/Processor</td>
<td>8ppm/RISC</td>
<td>8ppm/RISC</td>
</tr>
<tr>
<td>Emulations</td>
<td>PCL5/Adobe® PostScript</td>
<td>PCL5/Adobe® PostScript 2</td>
</tr>
<tr>
<td>40MHz Processor Upgrade</td>
<td>Optional</td>
<td>Not Available</td>
</tr>
<tr>
<td>Compatibility</td>
<td>Mac/DOS</td>
<td>Mac/DOS</td>
</tr>
<tr>
<td>Toner Cartr. Life</td>
<td>15K pages</td>
<td>6K pages</td>
</tr>
<tr>
<td>Paper Trays</td>
<td>250/250 sheet</td>
<td>250/100 sheet</td>
</tr>
<tr>
<td>List Price</td>
<td>$1998*</td>
<td>$2479</td>
</tr>
</tbody>
</table>

---

**EXTENDING YOUR REACH WITH INNOVATION**

---

**Texas Instruments**

---

*Specifications in chart are based on information as of 3/94. *Exterior and dealer price including manufacturer's rebate is under $1,400. Prices may vary.ados is a trademark of Adobe Systems, Inc. Windows is a trademark of Microsoft Corporation. Mac is a registered trademark of Apple Computer, Inc. LaserJet and PCL are registered trademarks of Hewlett-Packard, Inc. ©1994 TI.

Circle 266 on reader service card
Firefall Arcade

**Arcade-Style Game**

**PROS:** Brilliant graphics; easy to pick up.  
**CONS:** Mindless fun (if that really is a con); nothing new.  
**COMPANY:** Inline Software (203/435-4995).  
**LIST PRICE:** $49.95.

ARC BACK TO THE HEYDAY OF video arcades... remember Centipede? In Firefall Arcade, the centipede is called a fireworm, but the game is still a fun way to waste time. The fireworm races down the screen, bumping into barriers, changing directions, splitting into pieces, and plummeting toward your ship at high speed. Shoot it! See it pop and segment! Destroy six worms and you're on to the bonus round.

The screen is bordered by brick walls. A status box containing score, level, and number of lives is on the right. Destructible barriers, among which the fireworms career, and you maneuver, litter the screen. There are also everlasting barriers, which creep from the sidelines and float into position among the normal barriers. While they're mobile, they're vulnerable; once they're fixed they're (almost) indestructible.

The fireworm isn't your only target or danger: barrier droppers excrete destructible barriers and kill on contact; slide-worms—lethal spinning pasta—also destroy on contact; and prisoner cubes dog you, always trying to herd you toward disaster. If one touches you, you explode.

On your side are temporary power boosters called powerups. Powerups give you shields, double- and triple-shot guns, and free lives; they also freeze targets and dephase your ship (allowing you to travel through barriers). There are also several helpers—some might call them cheats—hidden in the game (just think of keys and developers' names).

To play Firefall Arcade, you need 256 colors and at least a 13-inch monitor, plus about 3.4MB of RAM. The game runs on anything from an LC up. On a 040 machine you can play in enhanced mode, with even more graphics and longer fireworms.

You won't need to read a manual or spend hours learning this game. There is, in fact, no manual, only a threefold card, which lists all the information you need to play: key commands, point values, the different powerups, tech-support numbers, strategy, and installation instructions.

The action on Firefall Arcade seems to change with the input device. I played it with the Apple Desktop Bus Mouse II, the Kensington Turbo Mouse trackball, and the Kensington Advanced Gravis GamePad, and found none completely satisfactory at first. I experienced restricted or slow movement or an irritating float factor that sent me coasting into death traps. However, a call to Inline's tech support set me straight on optimum settings (use the penultimate fast setting for the Apple mouse and the Deliverance game-set for the GamePad).

I wish Firefall Arcade had a save-as-you-go option, but in that respect it's very arcade-like: when you're outta lives, that's it. While the designers have really added nothing new to an old video game, if you loved Centipede or are just looking for a fun shoot-'em-up, Firefall Arcade will satisfy.

—SUZANNE COURTEAU

Spin Doctor

**Arcade Game**

**PROS:** Flexible environments encourage experimentation; play is challenging and engaging.  
**CONS:** Time limits need adjustment.  
**COMPANY:** Callisto Corporation (508/655-0707).  
**LIST PRICE:** $59.95.

SPIN DOCTOR ISN'T MERELY AN arcade game; it is part strategy game and part kinetic sculpture as well. In it, you are a wand rotating endlessly around a dot in a land of dots. You can hop from one dot to another, bounce off dots, and switch directions, but you can never stop. Meanwhile, you have to negotiate a variety of obstacles to arrive at the goal—a particularly shiny dot that takes you to the next level. The obstacles include walls, killer spikes, enemy wands, and puddles of acid that chase you around the screen.

The strategy comes in deciding when to move and when to use available resources, including door switches, fuses attached to bombs, and so-called hyperdots that transport you to different parts of the screen. For example, you can use a bomb to blow up a door switch; this holds the corresponding door open so you can pass through it at your leisure. But you might also have to blow up a bonus dot that would have boosted your score. Much to its credit, Spin Doctor doesn't require you to carry out any specific action. You can pass through a level simply by moving adroitly and cautiously, or you can take advantage of every resource around you. No single decision means certain success or failure.

To keep things interesting, Spin Doctor includes 106 playing environments and 4 levels of difficulty. The first 10 or so environments walk you through the elements you'll encounter, in effect, teaching you how to play the game. In fact, most folks will be able to set about playing without reading the slim manual. With the possible exception of the strange keyboard controls, Spin Doctor is totally straightforward.

The first level of difficulty lets you play very slowly with no time limit. At this level, the game feels more like solitaire than an arcade game. Each higher level increases the speed at which the wands rotate and limits the time you can spend in an environment. The time limits are usually appropriate, but every once in a while they seem either too long or too short. On rare occasions, I could meet the time limit only by recklessly ignoring every obstacle and hoping for the best as I hurled my wand toward the goal. At other times, I could easily reach the goal with more than half the time remaining.

If you're looking for a challenge, however, Spin Doctor delivers. Some environments look absolutely impossible at first glance and require a few minutes of study before you can even approach that, but after skill, the game takes frequent twists, forcing you to question the lessons you learn along the way; just as you master weaving between enemy wands, for example, the enemies slow down, completely upsetting the rhythm you've developed. In the tradition of the best Macintosh games, Spin Doctor tests your wits and your reflexes alike.

—DEKE MCCLELLAND
In the past year, we've introduced a whole new line of printers. And as you've seen in the previous pages, they're some of the most advanced printers on the market today. But now, we're also going to change the way you buy a printer.

When you buy one of these new TI printers, if you need any help at all, simply call us toll-free at 1-800-TI-TEXAS, and we'll work with you. Then, 30 days from date of purchase, if you're still not completely happy, call TI and we'll take it back.

It's as easy as that. That's how confident we are in each printer we make. And even after the 30 days, you can continue to call the 800 number for any help you may need.

For additional information about the TI microWriter™ or the TI microLaser™ Pro 600 printers, and for the name of a dealer near you, call 1-800-TI-TEXAS (1-800-848-3927). And see for yourself how TI is redefining what you should expect from a printer.

EXTENDING YOUR REACH WITH INNOVATION™

*Offer applies to all new microWriter and microLaser Pro 600 printers, if returned in good condition. microWriter, microLaser and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. ©1994 TI.

Circle 267 on reader service card
Mac Deal$:™ says:  
"Let me introduce you to CDW"
Macs in the Movies
With the right equipment, a high-end Mac or two become the heart of a film or TV studio's postproduction facility. The author's studio (shown here) uses a Quadra-based system to produce commercials and short films.
video-editing tools

How to find the Mac tools that meet pro standards

Although the Macintosh has brought revolutionary changes to diverse professional fields—publishing and music, to name but two—video production remains an elusive target. Barely a year ago, still in its infancy, video on the Mac meant watching a stuttering QuickTime movie the size of a Sony Watchman.

Now, thanks to better compression algorithms and dedicated compression hardware, the infant has grown into a precocious child—walking and talking full-screen (at 640-by-480-pixel resolution) in real time (30 frames per second, or fps). Equally important innovations are happening on the front end, as a growing number of sophisticated Macintosh editing and effects tools become available. Finally, high-quality I/O signal-processing technology is building a better gateway from the Mac’s RGB environment to the analog and digital video formats used by professional video editors.

The technology’s progress is so encouraging that even the high priests of traditional postproduction—the keepers of the broadcast waves—have finally begun to read the binary on the wall. And at less lofty levels, the benefits are here now for advertising agencies and others who need to produce video proposals quickly and at relatively low cost.

by AUI Hoffer
Many people don’t need the highest-level systems. For example, if you produce in-house video proposals, presentations, or the like—what we call corporate video—several lower-priced systems are available that offer decent quality. And you can expect the professional-level technology to migrate down to more affordable systems, so you’ll eventually get the high quality the pros have now.

Whatever your needs, chances are there is a tool that can help you. I tested three video-editing bundles—from Radius, RasterOps, and SuperMac Technology—by using them on real video projects to see what they can really do, starting from the simplest product to the most sophisticated. Because the promise of marrying computers and video production lies in the ability to manage video, I’ve covered only nonlinear systems—those that let you work with different video clips, in any order. (These random-access systems differ from linear systems in the same way that hard drives differ from sequential-access tape drives.) Most systems covered here are offline, which essentially means that the Mac records the instructions on how to assemble the video in an edit-decision list (EDL) and then assembles the completed video on tape based on those instructions. Offline systems require fewer resources than online systems, but online systems let you create high-quality video directly, without assembling on tape separately.

To see if there’s a system that matches your needs, read on.

**Presentation Video**
The establishment of the JPEG (Joint Photographic Experts Group) standard for image compression spawned the first generation of affordable NuBus compression cards for full-screen image capture and full-motion playback. These are particularly suited for presentations and other multimedia work where the image will be viewed on a computer screen.

JPEG technology is far from being a digital video panacea—the “standard” is not universal, and full-screen QuickTime movies don’t always play back with the codecs (coder/decoder) used in other companies’ products. (For example, a movie created with a SuperMac codec may not play back smoothly with a Radius codec.) Still, JPEG has a wide compression-ratio range, it can randomly access individual frames of video (letting the Mac deal efficiently with large quantities of time-based media), and it has become more economical.

SuperMac Technology’s Digital Film ($3799, 408/541-6100) was the first of the video-editing products with JPEG compression boards to ship. Plagued by early digitizing and playback problems, Digital Film version 1.5 has been retooled to deliver 60-field interlaced playback (in the United States’ NTSC IV standard, video has 2 fields per frame and 30 frames per second; the use of two fields per frame is called interlacing) and visual quality comparable to VHS videotape.

Just recently, RasterOps packaged the 60-field MoviePak2 Pro Suite ($4199, 801/785-5750), which includes the 24XLT display adapter, a MoviePak2 compression daughtercard, and the Video Expander II RGB/NTSC encoder box. (This suite replaces the earlier 30-field Editing Aces Suite.) Radius was the last to enter the video-editing fray, with VideoVision Studio ($4499, 408/434-1010). Apple also sells two video-editing systems that repack many of the products covered here (see “Apple Video/Media Bundles,” News, Macworld, April 1994).

With the appropriate software, these compression cards function both as offline, nonlinear editing engines and as video processing/compositing systems.

**Image quality** The Radius VideoVision Studio was the first product to deliver all 60 fields of interlaced video per second (earlier products captured every other field and interpolated the missing one), and it still maintains the best overall picture quality of the three systems I tested.

The MoviePak2 closely rivals the VideoVision’s picture quality, plus the MoviePak2 has the advantage of modular construction, better controls over and quality of JPEG compression, and support for 24-bit color on monitors as large as 19 inches. In fact, the MoviePak2’s software is simply better designed and implemented, which results in higher quality, more flexibility, and increased control. While the MoviePak2 Pro Suite doesn’t come with any on-board audio support, RasterOps assumes you will use the built-in 8-bit audio that comes with most new Macintosh models, you can configure the system with RasterOps’ $999 MediaTime or with a third-party board to get 16-bit, CD-quality audio.

SuperMac’s Digital Film falls behind both the RasterOps and Radius products in terms of picture quality (it is limited to 320-by-480-pixel capture and doubles the 320 horizontal pixels to 640). But it comes with a better software bundle—Adobe Premiere, Diaquest’s DQ TimeCoder, Macromedia’s Director, and GoSA’s After Effects 1.1 (the latest version is 2.0).

No matter which product you use, note that on-screen picture quality varies along a spectrum depending partly on the resolution of the source video and partly on the amount of compression chosen. Not surprisingly, color bleeding and signal noise visible in multigeneration video material is made worse by JPEG compression. The best digitizing results come from the first-generation Y/C output of SVHS, Hi-8, and newer Betacam video recorders, which reduces cross-talk distortion among colors. But better input, better output is the rule only up to a point: even at maximum quality settings, for example, output from the VideoVision Studio or MoviePak2 never exceeds the image quality of ¼-inch SP videotape (a format, often used by professionals, with twice the resolution of VHS videotape). The SuperMac card falls short of that mark.

Playback integrity fluctuates according to several factors, including hard drive speed, RAM allocation, and the number of enabled system extensions (INITS). Even with a Quadra 950, 64MB of RAM,
and a speedy 2.2GB disk array, frames drop out here and there. (This is most noticeable in lip-synced footage, which I've found tends to get the most reliable playback on the widest variety of Mac configurations when digitized and played back at 320-by-240-pixel resolution.) The MoviePak2 uses an adaptive compression feature called DynamicQ to get the best balance between visual quality and constant data flow; this minimizes the number of frames dropped.

Using these cards to send edited video back to tape hides some of the imperfections caused by compression; the artifacts around object edges and areas of saturated color tends to get masked by the videotape recorders' lower NTSC resolution. Of the three products, Video Expander II of the RasterOps MoviePak2 Pro Suite is the best NTSC encoder; its genlock capability, adjustable subcarrier, and horizontal phase settings help deliver a clean, stable output signal. The Expander's signal-timing adjustments also make it possible to integrate a Mac into a larger studio environment, which typically requires such fine-tuning controls.

The Radius VideoVision Studio's convolution technology results in flicker-free output, but the trade-off is a slightly softer focus and less horizontal and vertical blanking integrity—important considerations for broadcasting or tape duplication.

All this pixel-splitting aside, be advised that only under optimum conditions—low compression rate plus blazing CPU and hard drive speed—you can achieve more than decent VHS-quality output. Consequently, for professional video production, these products are mainly offline tools for organizing images and ideas.

Editing As editing systems, all three products suffer from the same malady: amateur editing software. All are bundled with Adobe Premiere, which—for all its popularity and excellent effects-generating features (see “Video Production Techniques,” in this issue)—cannot be considered a serious editing tool.

First, Premiere lacks the sophisticated trim functions and shot-management strategies that professional editors demand. For example, to cut matching action, editors need to see the outgoing and incoming frames on a cut and easily adjust the frame marker without waiting to build a preview. Premiere version 3.0 goes a long way toward accelerating preview and effects construction, but it still takes more time than professionals have to give.

Second, Premiere's insert and splice commands are click-and-drag oriented; there are no alternative ways to manipulate an edit with numerical keyboard trims, as professionals would expect. For

### Editing Video: Which Tools Do You Need?

**by Jim Feeley**

#### BASIC TAPE EDITING

<table>
<thead>
<tr>
<th>Your Goal</th>
<th>What You Need (cost: $1650-$3700)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To use your Mac as a control device to organize video footage into finished tapes. (You don't need to create special effects or add titles in the video.)</td>
<td>Mac SE with 4MB of RAM ($500-$1500)</td>
</tr>
</tbody>
</table>

**Recommended Products** Software: VideoToolkit (Abbate Video, 508/376-3712).

#### MULTIMEDIA VIDEO

<table>
<thead>
<tr>
<th>Your Goal</th>
<th>What You Need (cost: $1770-$3400)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To get video footage into a Mac for use in multimedia presentations or for creating CD-ROMs. (You don't need full-screen 30-fps video. You don't need to output the finished product to videotape.)</td>
<td>Mac ili with 8MB of RAM ($700-$9500)</td>
</tr>
</tbody>
</table>


#### CORPORATE VIDEO AND EFFECTS

<table>
<thead>
<tr>
<th>Your Goal</th>
<th>What You Need (cost: $10,250-$19,200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To use your Mac to produce videotapes with titles, sound, and special visual effects for use in training tapes, presentations, proposals, or other work requiring just moderate display quality.</td>
<td>Video-lcd with 32MB of RAM ($3000-$4500)</td>
</tr>
</tbody>
</table>

**Recommended Products** Hardware: VideoVision Studio (Radius, 408/434-1010) or MoviePak2 Pro Suite (RasterOps, 801/789-9750). Software: VideoFusion (VideoFusion, 419/891-1090) or After Effects (CoSA, 401/831-2672).

#### OFFLINE BROADCAST VIDEO

<table>
<thead>
<tr>
<th>Your Goal</th>
<th>What You Need (cost: $28,150-$105,300)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To produce programs, with a Mac-based system, for broadcast television. You need to control multiple audio and video sources while maintaining the high quality of those sources. You also need to see the results of your edits and special effects immediately, since you have large amounts of footage and a very tight deadline.</td>
<td>Quaxar 950 with 64MB of RAM ($5000-$7000)</td>
</tr>
</tbody>
</table>

**Recommended Products** Systems: Media Composer 400s (Avid Technology, 308/640-6769), Media 100 (Data Translation, 508/460-1600), or VideoCube (ImlMix, 916/272-9800).
example, split edits—transitions where audio from a clip comes in before the picture—are technically possible but not easy to manage in Premiere. Also, Premiere offers no simple methods for relocking audio sync after its link with the picture is broken.

Moreover, Premiere’s playback accuracy and time code addressing are often inconsistent, due to some frame-addressing anomalies within the application and to data bottlenecks in communicating with the compression hardware.

Still, the addition of time-code support in Premiere has at least made offline editing possible. When used with a videotape recorder’s control plug-in such as Abbate Video’s Video Toolkit Plugin Pack ($599, 508/376-3712) or Pipeline Digital’s ProVtr ($999, 808/235-0335), Premiere even supports batch digitizing with RS-422 serial port-compatible control and time-code capture for videotape recorders (in either SMPTE format for North America or EBU for Europe). This feature is important if you later want to export an edit list and assemble an edited master at an online editing facility.

Although Premiere is not ready for prime time from a professional-editing standpoint, it certainly has taken some of the mystery away from postproduction, and it has exposed more people to basic video-editing concepts than any other mass-market product.

**Special effects** Premiere really shines when creating effects. Its plug-in architecture offers ever-expanding possibilities for producing exciting digital video effects. When used with either CoSA’s After Effects (401/831-2672; version 2.0 costs $1995; version 1.1 is bundled with Digital Film) or VideoFusion’s VideoFusion (bundled with VideoVision Studio; $649, 419/891-1090), any one of the JPEG cards is transformed into a resolution-independent video-effects workstation featuring complex compositing tools, traveling mattes, alpha-channel compositing, multiple layering, filtering, and image distortion. All three effects packages introduce subpixel motion and field rendering, which smooths out a lot of the aliasing problems associated with quick movements in computer animation.

CoSA has increased the precision of the image and motion controls in After Effects 2.0, letting the user compose animation and effects as a sum of composited image layers; the layers can be matched, filtered, and altered independently with a powerful keyframe interface.

VideoFusion has a gentler learning curve, but it deals only with two images and one effect procedure at a time. It does, however, sport some unique effects, such as dynamic morphing, flex-warping, and time-based filter controls. VideoFusion also has fast thumbnail-image previewing, which lets you quickly set up effect parameters and get immediate feedback.

Even though After Effects seems to be aimed at advanced users and VideoFusion positioned as an entry-level product, I recommend both packages together as complementary production tools, despite the fact that some features overlap.

The only downside to all this digital manipulation is the rendering time involved in building an effect. Even on a Quadra 950, certain Premiere transitions can take 20 to 30 minutes to render; and a 10-second After Effects project using some rotation and multiple filters can take many hours. While this kind of rendering time is perhaps tolerable in multimedia production (where the total amount of motion video is relatively small), most video postproduction work demands even faster turnaround.

VideoFusion now supports Yarc Systems’ NuSprint graphics accelerator card ($2495, 805/499-9444), which increases performance up to 300 percent. CoSA is also working on better rendering strategies. But for the time being, unless more time than money is available, most professional effects will continue to be pro-
duced on higher-end, dedicated machines even at their exponentially higher cost.

**Corporate Video**

Companies seeking to produce in-house videotapes, or agencies seeking to create good-quality proposals and comps, can select from several professional-quality production facilities built around a Mac engine. These systems tend to be expensive from a typical computer user’s viewpoint, but they’re much cheaper than traditional video-editing systems.

**Avid Options**

The Media Suite Pro from Avid Technology ($9995, 508/640-6789) is a bundling of a NuVista+ JPEG card, an Audiomedia II card, and an ATTO Technology SiliconExpress SCSI-2 card with Avid’s highly regarded editing interface, excellent trim functions, digital/analog audio scrub, and shot organization features. It has a loyal legion of editors humming sweet songs of praise.

Media Suite Pro’s trim mode visually opens up the edit point, so that the editor can add or subtract frames while having constant visual feedback on how the end frames fit together. This feature makes it a pleasure to cut matching action.

Media Suite Pro is designed to edit nonbroadcast projects (such as corporate and promotional materials) from start to finish, exporting the final piece directly to tape. It supports A/B transitions and such effects as picture-in-a-picture and slow motion, it lets you edit four CD-quality audio tracks separately or locked in sync, and it fully automates the reestablishment of broken audio sync.

Media Suite Pro also has proprietary AVR5 (30-field) and AVR25 (60-field) image compression. The image quality is clean enough for most industrial use.

The recent addition of an EDL option ($995) makes Media Suite Pro viable as an offline system, although some of the most useful editing features found in the higher-end Avid systems are unfortunately missing. For example, the timeline uses only keystroke commands, while almost every competing interface (including Avid’s own Composer 5.0 software) also lets the user move clips around with the mouse. The lack of draggable clips seems peculiar, considering that the product is aimed at a less-sophisticated market that might prefer to work with clips graphically rather than with frame counts and in/out points.

A true offline system at the same price point is Avid’s Media Composer 400s ($14,995). Running on a Mac IICi or better, the 400s is an entry point to Avid’s popular Composer product line and is suited for most kinds of long- and short-format editing (such as music videos, documentaries, commercials, and features).

The basic configuration supports only AVR1 video compression (30 fields per second of low-resolution images). This means lower picture quality, albeit much smaller storage requirements: up to four hours fit on a 2.2GB drive. Beyond the core Avid editing features, the 400s offers EDL support and handles up to four video tracks for mixing complex images.

Another distinction is that the Media Composer series provides a modular upgrade path, while the Media Suite Pro does not. For $4000 to $5000 per module, you can add such features as 24 tracks of audio or AVR2 video compression.

The deluxe offline system is Avid’s Media Composer 800 ($49,995), which...
While nonlinear editing systems have been grabbing all the postproduction limelight of late, linear systems and hybrid systems will continue to have an important role for some time. To this end, a German company called Fast Electronics U. S. (508/655-3278) has created an important low-cost solution for lower-end professionals. Starting at $4995 (the studio version is $6995), the Video Machine is similar to NewTek's popular Amiga-based Video Toaster. The fast machine provides high-quality analog switching with editing and shot management.

Although the software (version 1.0) could lose some clutter in its interface, the openness of the system should make it very attractive to Macintosh users. In many ways, the Video Machine is what the short-lived Video F/X system made by Digital F/X should have been: it offers on-board time-based correctors, dual-frame buffering, six video inputs, multiformat support, and Y/C in/out—all in a cost-effective package.

In a radical departure from current trends, Fast has omitted character- and graphics-generating modules, opting instead to let users choose applications (such as Photoshop, Premiere, or Painter) for creating graphics. You can even design your own custom wipes (a CD-ROM containing many examples comes with the Video Machine) and bring them into the system.

Fast is also working on a nonlinear component to the Video Machine that promises to further enhance its flexibility. Keep watching this rapidly evolving product.

The other members of Avid's Composer line are the Film Composer ($69,995), the Media Composer 1000 ($49,995), the Media Composer 4000 ($75,995), and the Media Composer 8000 ($89,995). The Film Composer allows 24-ips editing and generates a cut list for negatives; the Media Composer 1000 is Avid's midrange offline/online system, positioned to compete against some of the lower-cost high-resolution systems while maintaining an upgrade path to the Media Composer 4000 and 8000 systems (two full-featured digital online systems that use 60-field AVR25 compression to preserve the highest image quality).

Real time, real value: Britain's Carlton Communications plc is no stranger to video; it owns several high-profile companies, including graphics innovator Quantel and analog-editing giant Grass Valley Systems. Carlton's foray into digital video has produced the ImMix VideoCube ($40,500; 916/272-9800), an online, nonlinear workstation that uses a Macintosh as a front end.

ImMix engineers have solved some of the daunting data-compression and throughput hurdles by bypassing the Mac entirely and using a proprietary RISC-based processing unit to crunch numbers at staggering speed. The VideoCube comes complete with video processor, storage module (enough for one hour of video and two hours of CD audio), speakers, and Quadra 650.

The result is the first truly high-quality, real-time effects processing at a price that most professionals will find very affordable. Relieved of the burden of pushing around all that video data, the Mac is free to do what it does best: manage the media in an editor-friendly environment.

The VideoCube uses a straightforward time-line approach—with one video track, one graphics track, and four audio tracks—with floating palettes for all the audio- and video-processing parameters. The system displays the video program as a full-resolution NTSC image so that the user can always monitor final output quality. The manual jog shuttle is a nice bonus for traditional editors (who tend to work faster without the keyboard and mouse), and the audio faders are great for making on-the-fly adjustments.

The VideoCube is powerful and easy to use, although in this early incarnation the hardware seems to be waiting for the software to catch up. It has a nice split-screen trim option, but the time line lacks some finesse; for example, it doesn't offer multiple video tracks or stronger split-edit support. Also, a second offline resolution option (like what Avid's Media Composer 1000 offers) would make the system amenable to a wider variety of editing situations. A more graceful keyframe system for audio mixing and effects would also be welcome.

The VideoCube's proprietary media-storage modules ($5000 per module) mean the cost per minute of storage is higher than the market rate—a tough swallow for the Mac hack used to choosing among several hard drive manufacturers.

Budget online: The dark horse to watch in this pack is Data Translation's Media 100 ($11,995; 508/460-1600). Although the product is fairly new, its price/performance analysis was very impressive in my testing, despite some shortcomings. The Media 100 is a two-card solution that offers four tracks of 16-bit audio and 60-field image quality that rivals that of the VideoCube.

The Media 100 implements optional support for Adobe Premiere plug-in effects technology, with some on-board acceleration to reduce rendering times (the effects option costs $995). The interface uses the multitrack time-line approach and source-bin metaphors common to most of the systems previously mentioned; but the Media 100's time-line interface benefits by always being in WYSIWYG mode, and its editor works with a full-screen, high-quality image on an NTSC monitor. These features go a long way toward making nonlinear editing a transparent experience for the editor's clients: all they know is that their program is being assembled very, very quickly.

The Media 100 has keyframe audio settings modeled after Adobe Premiere's so you can do sophisticated audio mixing right on the time line. The Media 100 also supports various digital resolutions within the same program—a useful feature that neither Avid nor ImMix has yet implemented. With multiple resolutions, the editor can work in a low-resolution offline mode but can digitize particular shots—wide vistas, for example—at higher resolution when detail is important. Offline use is more practical with the EDL option ($995), but the version I used produced erratic results.

Although the Media 100's layout is very approachable and easy to navigate, some precision-trim features are lacking. For example, the absence of any strategy for split-screen cutting makes matching action laborious, and the inability to edit using time lines (in analog editing, record time codes) in trim mode and the lack of auto-resync limit the 100's flexibility.

The Media 100 supports QuickTime better than other systems do. Another feature that will appeal to Mac-savvy bargain hunters is the flexibility of the storage media. The Media 100 will run with a variety of economical, off-the-shelf SCSI drives, as long as they have a sustained data throughput of 3MB per second and an access time of 1 lms or better.
From Disk to Airwaves

The difference between what is broadcastable (that is, legal under the Federal Communications Commission's RS-170A rules) and what is of professional studio quality is complicated. Broadcast producers ultimately expect a finished product with the most pristine image possible. Moreover, professional video engineers and the FCC are a picky lot. Walk into a TV station with a program produced directly from disk and you'll get a lecture in a seemingly foreign tongue about IREs, vertical blanking, subcarrier phase, and graticule amplitude—an ancient, analog lexicon that predates computer jargon.

Even at 60 fields per second, most of the systems covered in this article are not ready to handle the exacting standards of most commercial broadcast work—although that day is rapidly approaching. Today, Avid Technology's Media Composer 4000 and 8000 systems come the closest to meeting that high standard. For now, nonlinear online material is largely coming in through the back door—promos, infomercials, and other short-form work. But time-sensitive programming like news and sports are beginning to turn to Macintosh-based nonlinear solutions to meet their tight deadlines. Within a year or two, improvements in image quality and in media storage should be available to satisfy even the most demanding professionals.

The benefits of a complete Mac-based postproduction facility are many. The possibility of seamlessly combining audio, animation, graphics, text, and effects with video sources in a Macintosh environment is one attraction. This is certainly the vision implied by the Avid-led (and VideoFusion-supported) push to define an industry-standard Open Media Framework Interchange (OMFI) that not only provides protocols for porting various types of digital media among applications, but also includes descriptive data that represents how the media is organized and how a program is to be played. Using inexpensive networking technology, extremely fluid and efficient postproduction environments could be created, whereby projects flow from different workstations without ever leaving the digital nest. However, until the industry hammers out a true standard—be it OMFI or something else—QuickTime remains the de facto digital video conduit on the Mac.

Another attraction to Mac-based postproduction is economy. An integrated nonlinear online system costing between $100,000 and $200,000 can be more versatile and efficient than traditional analog setups that cost upwards of $500,000.

Making a Choice

Right now, choosing the Macintosh platform for video production work means bearing with some evolving technology. A Mac system may cost more up front than an Amiga- or PC-based product (such as NewTek's Video Toaster, TouchVision's D/Vision, or EMC's Primetime Editor). But the payoffs are usually more versatile product features; compatibility with a large, existing base of graphics and animation software; and in several cases, a superior interface.

For multimedia, the Mac is definitely the place to be, and producers have already discovered the benefits of relatively inexpensive JPEG compression cards.

For offline video postproduction, some real breakthrough products have been established, and more are on the way. The online solutions aren't as mature, but many corporate and industrial producers can't afford to wait.

For a multimedia company or an advertising agency roughing out ideas, a lower-priced JPEG card with Adobe Premiere may be completely adequate. A budget-minded documentary filmmaker will probably be happy with the flexibility of the Media 100. A large postproduction house might want to invest in various models in Avid's Composer line to maintain maximum compatibility, while a smaller postproduction facility, production company, or corporate-media department might be interested in the versatility and price of the VideoCube.

The best advice is the same given in any technology-intensive endeavor: stay modular, keep the upgrade path open, and maintain compatibility with established industry standards. Make sure you have adequate methods of getting your work back out to a variety of formats with minimum hassle. And make sure you have the storage capacity and horsepower to work effectively. Nothing will be gained by forcing a Mac IIci to process a special effect at film resolution. On the other hand, a PowerPC-based Macintosh may not be necessary to do low-resolution offline editing for cuts only. (Also note that most video-editing hardware vendors seem to be waiting for the second generation of Power Macs before adapting their products.)

While it may never truly become the video equivalent of PostScript in the desktop publishing world, QuickTime certainly has given birth to a more elastic media paradigm and opened a wide frontier. Traversing that vast territory is a challenge requiring fluency in both video and computer dialects. One thing is certain: just as Edison's infant kinetoscope matured into the motion-picture industry, we can count on the toddler QuickTime (the modern-day equivalent of the kinetoscope) giving way to enormous technological advances and the growth of a major industry. Growing pains aside, the future looks to be a wild ride on the crest of the telecommunications wave.

AVI HOFFER, who writes frequently about Mac-based video-editing systems, runs Red Herring Pictures, a postproduction house in Hollywood.

Additional reporting by JIM FEELEY.

PROFESSIONAL VIDEO EDITING

Because there are several distinct markets for video-editing tools, we chose the top products for each of those markets. To select the best, we focused on high-quality output and ease of use. Because broadcast-quality tools are just emerging, we have no Editors' Choice in that category.

Presentation Video

VideoVision Studio While other systems have a component or two that are better than those in VideoVision Studio, this Radius system delivers the best image quality overall and has a strong set of tools for capture, effects, and output. Company: Radius. List price: $4,999.

MoviePak2 Pro Suite This set of products offers high image quality. By substituting an Avid system board for the suite's video card, you also get 16-bit audio support. Company: RasterOps. List price: $4,199.

Corporate Video (Offline)

Media Composer 400s A good, core system, the 400s offers support for complex image mixing. Its modularity means it can be upgraded to Avid's higher-end video-production systems. Company: Avid Technology. List price: $14,995 (excluding cost of Mac).

Corporate Video (Online)

VideoCube Using a Quadra as the front end gives this system the horsepower to do professional work while offering the ease of use of a graphical interface. But beware the proprietary storage modules: they're expensive. Company: ImMIX. List price: $40,500.
"All he left me was this guitar, a hound dog, and a broken heart."

Why is it that some software companies remind you of country music? Is it because their love lies elsewhere?

Not so at WordPerfect.® New WordPerfect 3.0 says we’re completely faithful to the Macintosh® platform. In fact, when Apple® introduced the Power Macintosh, we were there—running native. That “Windows” company wasn’t.

We’re also committed to new features. Macintosh features. Like customizable button bars that put your most-used commands right in front of you. And new ruler bars that let you do everything from change layouts and styles, to create tables at the click of a mouse. They even give you direct access to our sophisticated drawing tools and grammar checker.

Now you can express yourself for just $99! Why such a bargain? Because we love the Mac. And we’d never leave it. Besides, our pickup truck is busted.

$99* (800) 526-7820
Competitive Upgrade. Visit your local reseller or call us.
Since its introduction in 1991, QuickTime video has been a featured Mac attraction. The list of products for capturing, editing, and adding special effects to video has grown to number in the hundreds. Used effectively, QuickTime video can add an element of interest to a presentation, offer real-world examples in a training application, or in some cases provide a replacement for tape-based video.

Whether you’re editing a full-motion, full-screen feature film or a postage-stamp-size window on the world, you can take advantage of production and editing techniques that make your work easier and make your results more professional looking.

To show you these techniques, I will use examples from Adobe Premiere version 3.0 from Adobe Systems (415/961-4400) as the video-editing software. This latest version of the popular Premiere adds several new features and enhancements, including support for third-party hardware accelerators for movie previews. For video capture and output, I used the Editing Aces Suite from RasterOps (801/785-5750), which includes a MediaTime card, a MoviePak JPEG accelerator daughtercard, and a Video Expander II breakout box for NTSC video output. This package allows real-time video capture and playback with 16-bit CD-quality stereo audio. The card set captures a 320-by-240-pixel image at 30 fields per second, which is good enough for most on-screen video and for many videotape presentations. (Editing Aces was recently discontinued. The feature “Video-Editing Tools,” in this issue, evaluates its successor and the range of video-production products.)

Whatever products you use, you’ll find the following step-by-step techniques helpful in producing top-quality video effectively.

Preview Your Source Material

- Make a story line Start by previewing your source material and roughing out a story line. It’s an old and oft-repeated suggestion that you should plan your production, and for a good reason: every story needs a beginning, middle, and end. Make sure you’ve got an idea of what material you’ll use for each of these elements.
- Check your drive space Also make sure you’ve got sufficient hard drive space for the material you’ll be digitizing. Running a test early to gauge the storage requirements that your video hardware and software will demand, can prevent a “disk full” alert while you’re on deadline later.
- Log segment positions If you’re using consumer video equipment to capture your source material, note the tape-counter positions for each segment so you can find them later. If you’re using more than one source tape, number each one and log that number in your notes.

Capture Your Video

- Capture more than you need Start capturing the images before the beginning of each logged tape-counter position to ensure that you get all of your segment. You’ll edit the
start and end points later.

**Expert technique** With professional gear, you can take advantage of machine control and time coding to grab just the segments you want. But you may want to grab more at the beginning and end and edit it later, particularly if you plan to use split edits.

**Check capture quality** Once you've digitized your clips, preview them. Check for dropouts, frame glitches, stutters, or other problems (see the screen image “Movie Analysis”). In Premiere, use the movie-analysis tool to check the average frame rate and to see if any frames have been dropped.

**Expert technique** You can cure dropouts by exporting the frame segments with dropouts as Filmstrips, retouching them in Adobe Photoshop, and then importing them back into Premiere. If a video-player head clog or massive dropout has trashed a frame, use Premiere’s razor tool to cut that frame out and then export the frame just before the damaged frame as a PICT file. Then import the PICT image back in, set its frame rate to 1/60 second, and insert it where the damaged frame was, as the screen image “Fixing Dropouts” shows.

**Piecing Together Clips**

- **Plan for transitions** As you preview each clip, think about its starting and ending point. In Premiere, you can trim your in and out points accurately using either the scrub wheel in the Clip window or the left- and right-arrow keys on the keyboard (see the screen image “Clip Trims”).

  Also, think about how you're going to get from the end of one clip to the start of the next. What kind of transition will you use: straight cut (an abrupt change from one clip to the next), some kind of wipe or fade, or another technique? Watching television for the production techniques used can give you a good background. Notice how most of the transitions are straight cuts. Overusing wipes and fades is the desktop video equivalent of using 30 fonts in a newsletter.

**Expert technique** One reasonably subtle technique is the split edit. This is an edit where the audio and video don’t make the transition at the same time. It's great for voice-overs, or for starting the dia-

---

**Movie Analysis** Premiere’s movie-analysis feature provides valuable information. For example, here it shows that the movie would not play well from a CD even though it plays at just 8 frames per second, because its data rate exceeds the 300K-per-second limitation of a double-speed CD player.
LOGEO in a new scene as the camera pans the scene, or to cover some unusable video at the end of a clip (the audio continues, but the video is replaced with something else). To create a split edit in Premiere, use the Break Link command to separate the video and audio portion of a clip. You can then edit the video and audio separately.

**Expert Technique** You can combine the split edit with a variant of the technique used to fix a damaged frame to add length to a video clip. Split a clip into video and audio, shorten the video to just the portion you want, and then export the last frame of the video as a PICT image. Now import that PICT image and add it to the end of the video segment (as a still frame), and set its duration to coincide with the ending of the audio. Use a transition to the next video segment that starts at the beginning of the still frame (such as a page turn or curtain), and you've got a great transition. The screen image “Advanced Transitions” shows how the tracks appear when this technique is used.

- **Create titles** You can use the Title window in Premiere to create titles for your movie (see the screen image “Creating Titles”). If you plan to export your movie to videotape, keep in mind that NTSC video has less resolution than your Mac’s monitor and that many colors or color combinations don’t hold up well once they have been moved to NTSC. Avoid gradient fills, saturated colors, and some types of drop shadows. Again, TV may provide good examples of titles that work.

**Prepare for the Audience**

- **Preview the final video** When your movie is finished, think about your viewing audience. If people will be viewing your creation on a Mac, consider whether the file will be played back from a hard drive, cartridge, or CD. The playback rates differ for each, and you should preview your movie on the slowest system it’s likely to be seen on. Don’t use a compression codec (the software coder/decoder used, for example, in QuickTime) that relies on hardware assistance unless you know that the same hardware will be available for playback.

**Expert Technique** If you plan to use the QuickTime codec (included with QuickTime 1.6), allow plenty of time for compressing in that format, since it takes much longer to compress than any other codec (although it does offer better playback rates). You might consider testing a portion of your movie compressed in that fashion first.

Producing great desktop video, just like desktop publishing, requires much more than merely developing technical expertise with hardware and software tools. Take the time to study the techniques used in TV and movies. You can use a tape deck with a good slow-motion and freeze-frame capability to analyze the methods practiced by the pros (a laser disc player is even better). You might also browse the magazine section at your local newsstand or public library for publications dedicated to cinematic technique.

MATTHEW LEEDS is the technical services manager for a major software developer and publisher.
There are really only two reasons to buy your next workgroup printer from Apple.
It's economical. In keeping with the EPA's Energy Star program, the LaserWriter Select 360 seriously cuts energy waste. In its "sleep" mode, it automatically reduces energy consumption by as much as 78%.

It's precise. The new LaserWriter Select 360 can turn cut graphics and text with 600-dots-per-inch clarity. So photographs are sharp, and even the smallest legal type is crisp and legible.

It's award-winning. The April 1994 Macworld just gave the LaserWriter Select 360 its highest rating. Cited as pro for the printer were its "excellent performance" and "low cost." Cited as cons: "None."

It's fax-capable. With the Adobe PostScript Fax option, any Mac or PC user on the network can send a fax. It's as easy as printing, and because it's PostScript, the quality of the fax is distinctly improved, even when it's sent to a regular fax machine. You can receive faxes at the printer, too.

It's compatible. The LaserWriter Select 360 works in Macintosh or Windows environments — or both simultaneously. It switches automatically between PCL 5 and Adobe PostScript Level 2 jobs, so users never have to think about reconfiguring.

It's fast. With a RISC processor at its heart, the LaserWriter Select 360 prints up to 10 pages per minute — faster than the Hewlett-Packard LaserJet 4M, whether you're printing simple Macintosh text or complex gray-scale documents.

It's flexible. Two paper trays (250-sheet letter-size and 50-sheet multipurpose) make printing first-page letterheads simple. Plus, you've got options for 250- and 500-sheet trays, as well as a 30-envelope cassette.
It costs less.

It's downright cheap. Today the LaserWriter Select 360 is only $1,599**
With its high resolution, high performance and highly useful features, that works out to more printer for less money. It's that simple.

The economical LaserWriter Select 360.
The overriding fear of most PowerBook users when they're on the road is that their battery will run out of power before they finish their work.

Advice on how to prolong PowerBook battery life abounds, much of it based on speculation rather than actual testing and measurements. To get definitive answers, Macworld Lab tested battery life under a variety of conditions to learn which steps really save power and which steps offer minor improvements or no improvement at all. Our tests simulate real-world use except in one area: we could not include sleep in the process, because our tests are automated through software for precise repeatability. (Once the PowerBook was in sleep mode, there would have been no way to wake it up.)

The results are in, and Macworld Lab found that only a few power-saving methods have a major effect on battery life. There are many steps that save a modest amount of power, but some may not be worth the compromise in your PowerBook's performance.

Our tests showed good consistency in results among batteries of the same type, but remember that battery mileage varies. In fact, batteries vary more than any other computer component. Every individual battery is a little different in its construction and its usage history. Unlike the CPU or RAM, batteries wear out through normal use. The way you use your PowerBook and the age of your battery also play a role in battery life.

Macworld Lab tests are based on the PowerBook 145B and 180c, but the suggestions and power-management principles apply to all PowerBooks and PowerBook Duos. In general, the Duos have a longer battery life than comparable 100-series PowerBooks. The Duos have a need a basic understanding of how your notebook uses power. I describe how much power various steps save on PowerBooks in milliamps (ma). Amps measure the current or the flow rate of electricity; a milliamp is 1/1000 of an amp.

With all internal circuits except a modem running, here is the current consumption of three PowerBook models: PowerBook 145B, 1320ma; PowerBook 180, 1650ma; PowerBook 180c, 2370ma.

To make your battery last longer, you must reduce the amount of current the PowerBook draws. If you can reduce the current by 100ma, for example, you can add about nine minutes to the battery life of a PowerBook 145B, eight minutes to an 180, and five minutes to a 180c. The times vary among the PowerBooks because 100ma represents proportionately less current for a 180c than for a 180 or 145B.
**Power-Saving Strategies**

Power-saving steps are executed in several ways. You can invoke some automatically by setting time delays through system software. If you don’t want to wait for the automatic steps to kick in, you can manually invoke a power-saving step. You can control other steps through software or hardware choices. For example, save power by turning off AppleTalk. All the software descriptions given here are based on System 7.1 with PowerBook Control Panel 7.2. (To see how different power-saving features affect battery life, see “How Long Do Batteries Last?”)

**Sleep**  The best thing you can do to save power (aside from shutting down your PowerBook) is to put the machine in sleep mode. During sleep a PowerBook draws almost no power—only 6–10mA. Even in sleep mode, its RAM remains alive, so you don’t have to be concerned with losing the contents of your work.

- Choose Sleep from the Special menu in the Finder.
- Click on the sleep icon in the Battery control panel (if the icon isn’t visible, click on the little flag at the right-hand end of the battery status bar).
- Use a PowerBook utility program. (For more on PowerBook utilities, see *PowerBook Notes, Macworld*, November 1993.)

I prefer a sleep F-key, which is quick and always available. However, this method requires practice: if you don’t hit the sleep F-key just right, the computer records a double keystroke, immediately waking itself up again.

When you start using a PowerBook, before you put it to sleep you should save any new or changed data to the hard drive, just in case something goes awry later. But once you have established over time that your software is stable, you may want to save the power you would lose to disk access and save less frequently. (Save my RAM disk files to the hard disk only every two or three days.)

You might be thinking, Why not save power by just shutting down the PowerBook when you’re not using it? Starting up a PowerBook cold typically takes about 30 seconds, depending on the start-up configuration, and you still have to open a document. Waking a PowerBook from sleep takes about 4 seconds from a RAM disk. Even waking up a PowerBook from the hard drive takes no more than 15 seconds. Unless you won’t be using it for several days, or you need to connect a peripheral or change batteries, there’s no reason to shut off your PowerBook.

An inactive PowerBook goes to sleep automatically after a duration that you can set in the PowerBook control panel. Apple uses two minutes of inactivity.

---

**How Long Do Batteries Last?**

First we tested each PowerBook with settings that use the most power (Optimum Performance). Then we tested with settings that conserve the most power (Optimum Conservation). We added back each power-consuming feature to the Optimum Conservation setup, one at a time, to find out how each feature affected battery performance.

![Battery Life Comparison](image)

**OBSERVATIONS**

- Running the processor at a reduced speed added only a few minutes of battery life.
- Enabling processor cycling proved more effective than reducing processor speed.
- Dimming the screen saves a significant amount of battery life.
- The hard drive doesn’t consume as much power as we expected.
- For short intervals between disk accesses, the benefit of spinning down a hard disk is offset by the need to spin it up again.
- The 180c did not dim the screen as much or as frequently as the 145B.

**BEHIND OUR TESTS**

To measure the real-world life of a battery, *Macworld* Lab wrote a set of QuicKeys macros to exercise different power-saving features of the PowerBook 180c and 145B. The macros simulated the way an actual user works: typing, pausing, and continuing to type. The lab didn’t include any sleep time because the macros were unable to wake up the computer once it entered sleep mode. To measure the actual power consumption of major components—hard drive, CPU, display, and so on—within the PowerBooks, we used MacAdvis, a portable data-acquisition device from GW Instruments, and programming laboratory-instrumentation-design software called SuperScope II (GW Instruments). *Macworld* Lab also built a special adapter to tap into the PowerBooks to connect to the data-acquisition device. All data collected by SuperScope II was then used to analyze the battery consumption of each computer component.

—*Macworld* Lab testing supervised by Mark Hurlow
before sleep as the default for battery operation. But if you are done with your work, you'll save battery life by putting the PowerBook to sleep right away.

Sleep is the most effective way to manage power, but a PowerBook will not go to sleep under any of the following conditions:

- You choose Stay Awake or Don’t Rest in a control panel or from a PowerBook utility program.
- You have your PowerBook connected to a network.
- File sharing is on.
- AppleTalk is active on AC power.
- Apple Remote Access is running with the Answer Calls option on.
- An external monitor is connected.

Apple assumes that under these conditions you want to do something that requires at least intermittent CPU activity. Some utility programs can override Apple's settings that prohibit sleep under these conditions.

Screen The backlight takes more power than any other screen component. Even at minimum brightness, a PowerBook’s backlight draws 200mA (monochrome) or 300mA (color); at maximum brightness, a backlight draws either 400mA (monochrome) or 900mA (color). Obviously, you should set the backlight brightness as low as possible and turn it off altogether when you have sufficient light. Under bright ambient light or in daylight, you can turn off the backlight altogether on a monochrome PowerBook. You can’t do this with a color PowerBook because the screens are unreadable in bright light. The PowerBook control panel or a power-management utility can turn off the backlight automatically after a preset time—30 to 60 seconds works well.

Away from bright ambient light, you might want to shut off the backlighting at the same time system sleep kicks in. After all, if you can’t see the screen, a wide-awake PowerBook doesn’t do you much good. Setting the backlight to turn off before sleep mode kicks in does have one advantage, however: Reactivating the backlight takes much less time than waking up the system.

Another part of power consumption applies only to active matrix displays, which have 256,000 transistors (monochrome) built into the screen, consuming a total of 105mA; or 921,600 transistors (color), which consume 380mA. These transistors, along with the screen driver circuits in all PowerBooks, can be turned off only with system sleep.

If your PowerBook has a color or gray-scale display, you will save only a minor amount of power by switching to black-and-white. The computer will run a little faster, however, and therefore save you a little time. Similarly, setting the desktop pattern to all white does not save measurable power, but a white or nearly white desktop might encourage you to keep the backlight turned down.

Processor cycling Macintosh users’ fascination with CPU performance seems strange when you realize that most of the time a CPU has nothing to do: it’s waiting for you to do something—type a character, save a file, sort a database, and so on. PowerBooks normally take advantage of this downtime by cycling the CPU rapidly between run and rest states. When nothing happens for about a second, the CPU goes into a rest state; after another half second, it wakes up and checks for activity. If there is no activity, it goes to rest again and repeats the cycle every half second or so until some activity occurs. Occasionally, a program that performs lengthy calculations without user input from the keyboard or trackball will slow down with processor cycling enabled. If you notice that calculations take longer than they should, you may want to switch off processor cycling.

The Processor Cycling control is in the PowerBook control panel in the Custom settings. Set Allow Processor Cycling in the control panel. (The Portable control panel in System 7.0.1 calls processor...
External Batteries  The only way to get substantially longer battery life is to get a bigger battery. VST Power Systems (508/287-4600) and Technogg (513/321-1777, 800/305-7936) sell the most popular external batteries for the PowerBook 100 to 180. Two-pound external flat lead-acid batteries extend operation 3 to 7 hours. Four-pound double-battery packs extend the time much longer. You can use three-pound packs to extend operation to 6 to 12 hours. Flat-pack batteries work well when you stay in one place (on a transcontinental plane flight, for example), but the extra size and weight make them awkward to lug around. Pictured above are the VST ThinPak ($199.95) and the Technogg PowerPlate 5x ($299.95).

If you can't see the control, hold down the option key when you flip the switch from Easy to Custom. Switching on processor cycling puts a major reduction. Processor cycling also turns off the floating-point unit (FPU), if present, for an O30 CPU, saving another 30ma. Some PowerBook utility programs can change the duration of delay before cycling; however, the PowerBook's default setting is optimal for most users, so you shouldn't make any changes unless you have a specific reason.

Hard drive  In typical use, the hard drive consumes surprisingly little power, because it spends most of the time on standby. While spinning, the disk does draw significant power—typically 320ma, another 80ma during reading and writing, and an additional 40ma when the head is seeking. Typical head-seeks last for only a fraction of a second. Most applications don't demand sustained head-seeks, but some database managers do during sorting. When the hard drive is not in use (that is, when it stops spinning), it consumes only 40ma.

The PowerBook control panel puts the hard disk on standby automatically after one minute (the default setting). If you know you won't need your PowerBook for a while, you can spin down the hard disk immediately using an F-key. But once the hard disk has spun down, it takes time (5 to 8 seconds) and considerable power (1000ma) to spin the disk up again.

Modem  A PowerBook turns on a modem only when a communications or fax program is running, so simply installing a modem does not add to the power load. Once it's on, however, a modem draws 110ma to 150ma. You should always remember to quit any communications or fax program when you're not using it. Sometimes a fax program puts something into the System Folder that leaves the modem turned on. Check carefully any software that uses the modem for automatic-answer features.

A modem's power consumption does not vary significantly with its operating speed; that is, a 2400-bps modem uses about the same amount of power as a 14.4-Kbps modem. Of course, faster speeds minimize the time that the modem must be on and save power indirectly.

AppleTalk  If you are not connected to a network, turn off AppleTalk in the Chooser or via a utility program. The AppleTalk circuitry itself draws only 10ma. The power culprit is the CPU, which will not stay at rest with AppleTalk turned on; the CPU and associated circuits actually run a third of the time to monitor network activity. That 33 percent CPU duty cycle burns power, an average of 150ma. With AppleTalk turned off, a PowerBook also wakes up a couple seconds faster.

Limiting processor speed  Another way to save power is to limit the speed of the processor. Note that this is different than processor cycling. PowerBooks (both 25MHz and 33MHz) can be reduced to a speed limit of 16MHz. Reducing the speed saves only 90ma to 120ma, however, and processor cycling must be turned on to achieve those savings. Performance suffers, although the degradation may not be intrusive with many applications. In Macworld Lab tests, a PowerBook 145B at 16MHz ran for 230 minutes, compared with 217 minutes at 25MHz. (All other power conservation options were also in place.) A 180c ran at 16MHz for 97 minutes, compared with 92 minutes at 33MHz. You may not find about 5 percent longer battery life worth the slower performance.

RAM disk  In theory, a RAM disk saves some power by reducing or eliminating the need for a hard drive. In practice, however, it doesn't work that way. If your RAM disk contains only applications
Power-Saving Techniques

<table>
<thead>
<tr>
<th>Power-Saving Steps</th>
<th>When to Do It</th>
<th>How to Do It</th>
<th>Approximate Savings</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The big four</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn on processor cycling</td>
<td>always, unless you notice that calculations are slow</td>
<td>set Allow Processor Cycling in PowerBook control panel (automatic control only)</td>
<td>450ma (average); 480ma if FPU present</td>
<td>occasionally slows PowerBook performance</td>
</tr>
<tr>
<td>Reduce or shut down backlight</td>
<td>with sufficient ambient light</td>
<td>adjust backlight next to screen; set Screen Dims in PowerBook control panel (automatic or manual)</td>
<td>200ma-600ma (dim); 400ma-900ma (off)</td>
<td>harder to see screen</td>
</tr>
<tr>
<td>Set hard disk to spin down</td>
<td>when hard disk not needed</td>
<td>set Hard Disk Spins Down in PowerBook control panel or a PowerBook utility program (automatic or manual)</td>
<td>150ma-250ma</td>
<td>hard disk needs 5-6 seconds and uses considerable power to restart</td>
</tr>
<tr>
<td>Set system to sleep</td>
<td>during periods of inactivity</td>
<td>set System Sleeps in PowerBook control panel, or use a PowerBook utility program, or choose Sleep from Special menu in the Finder (automatic or manual)</td>
<td>1300ma-2200ma</td>
<td>can't use your PowerBook</td>
</tr>
<tr>
<td><strong>Three secondary steps</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn off modem</td>
<td>when you are not using communications or fax software</td>
<td>quit communications program</td>
<td>110ma-150ma</td>
<td>can't communicate or send/receive faxes</td>
</tr>
<tr>
<td>Turn off AppleTalk</td>
<td>when you're not connected to an AppleTalk network or printer</td>
<td>set inactive in Chooser or use a PowerBook utility program</td>
<td>150ma</td>
<td>can't access an AppleTalk network</td>
</tr>
<tr>
<td>Slow processor to 16MHz</td>
<td>when processing speed is unimportant</td>
<td>set Reduced processor speed in PowerBook control panel (to make setting visible, hold down option key while clicking on the Easy/Custom switch)</td>
<td>90ma-120ma</td>
<td>some applications may perform noticeably slower</td>
</tr>
<tr>
<td><strong>Three minor steps</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use black-and-white screen (don't use grays or color)</td>
<td>when grays or color are not essential to your work</td>
<td>set Black &amp; White in Monitors control panel</td>
<td>minor; slows video performance; less attractive screen; can't view color images</td>
<td></td>
</tr>
<tr>
<td>Save files infrequently</td>
<td>as infrequently as you feel comfortable</td>
<td>use manual control or automatic saving utility</td>
<td>minor</td>
<td>risk losing data</td>
</tr>
<tr>
<td>Turn off sound</td>
<td>when sound is not necessary</td>
<td>set built-in volume to minimum in Sound control panel (menu bar will flash in lieu of alert)</td>
<td>minor</td>
<td>can't hear cool Mac sounds</td>
</tr>
</tbody>
</table>

and files, your hard drive still has to come on for system functions such as fonts and file management. You can create a self-sufficient RAM disk complete with a System Folder, but only the PowerBook 100 (discontinued in 1992) can handle a RAM disk gracefully. On the 100, the RAM disk remains alive even after you shut down the computer. On all other PowerBooks, you lose the RAM disk when you shut down the computer.

Three programs let you install a persistent RAM disk by automatically saving the entire RAM disk to the hard drive when you shut down your PowerBook and automatically re-creating the RAM disk during start-up: Maxima ($99, Connectix Corporation, 415/571-5100, 800/950-5880), RAMDiskSaver ($69.95, Atticus Software Corporation, 203/348-6100), and Apple File Assistant ($79, Apple Computer, 408/996-1010, 800/538-9696). But you can't put the hard drive in the Trash, which would let you start up directly from the RAM disk, so occasionally you have to wait for the hard disk to spin up even when you don't need it.

The bottom line on RAM disks is that they don't save much power in most situations, since a hard drive draws so little power when it's resting. The main advantages of a RAM disk are faster response during operation (especially if the RAM disk has a System Folder) and not having to wait for the hard drive to spin up.

**Memory**  Adding RAM adds only a slight power burden. For example, adding 10MB to a PowerBook 180 (for a total of 14MB) adds just 10ma during operation, 2ma during sleep. RAM may not extract a heavy toll in terms of power, but you pay a heavy price for using virtual memory. Since virtual memory forces considerable disk activity, don't use it under battery power unless you desperately need it.

**Choosing Batteries**  Batteries are customarily rated by their energy capacity in amp-hours. Apple now ships 2.9-amp-hour batteries, the highest capacity available; the earlier 2.5- and 2.8-amp-hour batteries have been discontinued. If you buy a new battery, your first choice should be a 2.9-amp-hour unit. However, you might be able to find a 2.8-amp-hour battery for a more attractive price, in which case you must decide whether you are willing to live with slightly less battery capacity. Don't be fooled, though, by companies that claim their 2.8-amp-hour battery is "rated" for 3.0 or 3.1 amp-hours. This kind of wording is playing games with specifications. Several companies sell PowerBook batteries, but at this writing, all non-Apple batteries are limited to 2.8 amp-hours. In addition to amp-hours, battery capacity depends on how much resting or sleep takes place, the temperature of the PowerBook's environment, and of course, the condition and age of the battery.

**Prospects**  Everyone wants a magic battery technology, something that can provide 15 to 20 hours of life on an internal battery. No such technology seems in the offing. A laptop designed from the ground up for battery operation could offer better battery life and desktop power, but no company has yet taken on such a challenge. While you wait for the ultimate laptop and battery, Macworld's test results and power-management advice should help you wring every minute of battery life from your PowerBook.

Contributing editor CARY LU writes Macworld's PowerBook Notes column.

Macworld Lab would like to thank GW Instruments. Without its help and support, our tests would have taken a lot longer to complete.
17 inches of bright, sharp Trinitron color. This display is one of the best. It delivers a
maximum resolution of 1280x1024 with a 75Hz flicker-free refresh rate that's easy on your eyes.
A state-of-the-art video control panel, anti-glare screen, tilt and swivel base, power cable, and
Mac display adapter cable are all standard.

LapisDisplay 17" $1099

Affordable 24-bit accelerated color:
State-of-the-art design and our proprietary controller provide two
levels of acceleration: Dedicated Video or True
QuickDraw Acceleration. They work with all Lapis
color displays, and most of Apple's and
other Mac-compatible color displays.

LapisColor 24LC $399.99
LapisColor 24FM $199
LapisColor 24IN $419

Crisp, clear
monochrome or gray
scale graphics. Say goodbye to your
small 9-inch, or 13-inch display. The Lapis Full
Page Display shows you an entire letter-sized page with sharp 640x872
screen resolution. Great for newsletters and
spreadsheets comes completely plug and play.

Full Page Monochrome $349.99

Photo-realistic color
Sophisticated firmware and software in the core of
this UMAX design interpolates to a crisp
and accurate 1200, 1600, and 2400dpi.
Full version of Adobe Photoshop included with
LapisScan 840 and 1260 units. LP version comes
with the 630 "Plug-in" scanning module provid-
ed with all scanners.

LapisScan 630 $769.99
LapisScan 840 $1075
LapisScan 1260 $1599

They really do much more
Only FOCUS has color solutions for such a wide array of Macintosh
collectors from the SE and SE/30 to Quadras and the new LCs.
From 8-bit cards to 24-bit accelerated cards, we have what you need
to enhance the performance of all our displays. They are even compatible
with most other third-party or Apple displays. At FOCUS we offer more
than monitors and video cards. We have scanners, high-capacity or
removable storage drives, and high-speed Ethernet cards or trans-
cievers to complete your publishing system.

Color scanners at a price you've been waiting for
Our three 24-bit scanners capture color data accurately and consisten-
tly. The advanced Photoshop "plug-in" module is an excellent previewing
tool with lots of features. You scan it right the first time, saving time
and money. Add a transparency adapter and you can scan slides and
chromes. Lapis scanners and transparency adapters come with all
wires, a spare lamp, and the latest version of Adobe Photoshop.

WE DEVELOP A FULL LINE OF MACINTOSH ENHANCEMENT PRODUCTS
Local Talk • Ethernet • Graphic Displays • Graphic Cards • Scanners
FaxModems • Acceleration • Storage • Memory • Accessories • And MORE!

I N T E R N A T I O N A L
S A L E S

Italy: 39-50-87-86-88
UK: 44-81-241-555
Greece: 30-21-481-4378
Japan: 81-33-237-6670
Hong Kong: 852-857-7989
France: 33-16-79-31-12
Australia: 61-36-55-1111
Spain: 34-37-31-00-04

12 hour response guaranteed! FAX us: 1-617-936-0818

© 1994 FOCUS Enhancements, Inc. All rights reserved. All FOCUS Enhancements products are registered trademarks of FOCUS Enhancements, Inc. All prices and items are subject to change and availability.
We cost less.

20 inches of pure 24-bit color. With the Trinitron 20mm dot pitch you have the best color resolution on the market. Or choose the 20" Invar Shadow Mask you get rich colors at an economical price.

Fully digital controls allow you to adjust the image to suite your needs. Multiple resolutions allow you to see the image in the size that you want.

If speed is what you want, combine our 20" monitor with our accelerated video card and you have the ultimate color machine.

Great color at a
great price!
We offer three large color monitors to meet the demands of today's
discriminating Mac users. Two 20 inch moni-
tors let you view your
double page spreads, illustrations, 3-D models or your biggest
spreadsheet. Our 21
inch invar monitor gives you that extra space for
tool bars or edge-to-
edge two page layouts.

LapDisplay 200
$1899
LapDisplay 201
$1999
LapDisplay 211
$2100

Top-of-the-line color and gray scale displays
Compare our line of displays with any of the "big name" vendors. You'll find that our image quality, display controls and other features are identical. We sell only the finest Trinitron and Invar Shadow Mask displays, built to the same exacting standards as our competition. The only thing you'll sacrifice is the high price.

We're here for you 7 days a week. Free.
Nobody knows our products better than we do. If you should have a question about your system give us a call. Even if it's Sunday. Our Customer Service and Technical Support departments are available 7 days a week.

Satisfaction guaranteed! Love it or return it!
When you purchase a Lapis graphics product, you are backed by a no-questions-asked 100% satisfaction 30-day guarantee. We are so sure of our quality standards and level of service, we are one of the few developers that can offer you such a guarantee.

High quality, outstanding service, great value
At FOCUS Enhancements we use compressed distribution and pricing models. And because we ship over 30,000 products each month, we can keep our costs very low. This allows us to pass on hundreds of dollars of savings to you without compromising our quality or level of service.

To Order And Get Your Free Catalog:
800-538-4888

Resellers And VARs Welcome!

All product names are trademarks of their respective holders. Buy It Today-Get It Tomorrow only applies to "in-stock" items under 25 lbs; orders must be placed by 4:00pm EST, Monday-Thursday.

Circle 201 on reader service card
A Mac owner wants to spend more money than necessary on new equipment. But to get your Mac to do what you need it to do, sometimes you have no choice. If you want to view full-color images or print high-resolution graphics, for example, there’s no way around buying a 24-bit graphics card or a 600-dpi printer. However, if you find yourself occasionally short on RAM, you can get around buying more SIMMs. You can use your Mac’s virtual memory capability. Many people don’t use this option, because if used improperly it comes at a high price—slow performance, since a disk drive can take 1000 times longer than a SIMM takes to transfer data. However, Macworld Lab testing confirms that you can use virtual memory effectively if you follow some simple techniques.

If most of the programs you regularly use fit within your current RAM space, consider using virtual memory to occasionally run a program that demands more RAM than you have. Likewise, if you normally have only one program at a time open, but use multiple programs in the course of your day, virtual memory is
a viable way to keep several programs available without buying extra RAM. Owners of PowerBooks and some older Macs may also have RAM-expansion limits that encourage them to consider using virtual memory.

For many Mac users, buying more RAM is the best approach. If each of your standard applications demands 8MB of RAM and you have just 4MB, get the extra RAM, since you will see a noticeable slowdown from using virtual memory constantly. (And remember, all those INITs and system fonts take up a huge chunk of RAM.) You can also consider two new products that promise to increase the amount of RAM through software techniques; see the sidebar, "Real Alternatives to Virtual Memory."

If you decide to use virtual memory, you have two choices. One is Apple's virtual memory scheme, which is built into System 7 and works on all 68030-, 68040-, and PowerPC-based Macs (you turn on virtual memory via the Memory control panel). Connectix Corporation sells Virtual and Compact Virtual ($99 each, 415/324-0727, 800/950-5880), which work on 68030-based Macs running either System 6 or System 7. (Compact Virtual is designed for Mac Plus, SE, and Classic models enhanced with a 68030-based accelerator card.) Neither Apple's nor Connectix's solutions support 68000- or 68020-based Macs, which lack

can save you from buying unneeded RAM

The True Story
Many people have misperceptions about virtual memory that inhibit its effective use. Slowdown Concerns
The common belief is that virtual memory is worth using only as a last resort—in a memory pinch—because it slows down the Mac so much. The fact is, however, that virtual memory barely slows down work within the program you’re working in. (Your system will slow down if you use virtual memory improperly—for example, if you switch frequently between multiple applications. In this scenario, virtual memory continually and frantically swaps information, setting aside what’s currently in RAM and taking from the disk the information virtual memory needs next.)

To help manage the exchange of data between actual RAM and virtual memory, the Mac creates an invisible file, a swap file, on the hard drive. This reserved chunk of disk space acts as faux RAM.

The critical point: if you have enough RAM for a program to run without virtual memory, it won’t run any slower with virtual memory enabled. For example, on a Mac with 5MB of RAM, Microsoft Word (which reserves 1200K of system memory) runs at the same speed whether or not you use virtual memory. And why wouldn’t it? It fits completely into system RAM, with or without virtual memory.

There are only two times when virtual memory slows down the works. The first is when you try to run a program that doesn’t normally fit in your Mac’s RAM. If your Mac has 4MB of memory, and you run a program that requires 7MB, virtual memory lets you run it—but you notice a painful slowdown. At this point, the Mac must thrash data back and forth, as needed, between the disk and RAM while you are using the program.

The second slowdown occurs when you change from one program to another. Again, you pay the virtual memory penalty. Virtual memory must return the RAM-based information of the current program to the hard disk, then immediately read the disk to load the necessary information for the next program. Nonetheless, it’s difficult to consider this slowdown in performance, since even this process isn’t nearly as time-consuming as quitting one program and then launching another.

There’s one final exception to the no-slowdown rule: background programs.

Realities
by David Pogue and Galen Gruman

the foreground application uses all the Mac’s RAM, then a background program (such as a telecommunications program downloading a file, or PrintMonitor printing) will indeed slow down, as virtual memory shuffles program code between RAM and the disk. Therefore, to escape sluggish response, your Mac needs enough system RAM for both the active program and any busy background programs.

The secret to effective use of virtual memory is to keep the active programs and data in RAM all the time. To gauge the amount of system RAM needed to ensure that your active programs and data fit into it, follow these steps.

• Choose About This Macintosh from the Apple menu to see how much RAM the System uses. (You may want to get rid of any INITs and fonts you don’t need at this point, to reduce memory usage.)

• For each program you use, call up Get Info from the File menu (or just press ⌘-I) to see how much memory is allocated to the program in the Preferred Size field. (You can actually change this value, as long as it does not fall below the Minimum Size setting. Most people adjust it upward to give the program more breathing room, particularly for programs—like QuarkXPress, Aldus PageMaker, and Adobe Photoshop—that support plug-in software modules.)

• Use Get Info to see the size of the biggest file (such as a spreadsheet, database, or word-processing document) that you expect to open routinely. As you’re searching for your largest data file, don’t include Photoshop and FileMaker files. These programs’ data files can be huge—so huge that each program has its own type of virtual memory. (More later on how to deal with conflicting virtual memory techniques.)

• Add the amount of memory used by the System, the program with the largest Preferred Size value, and the largest file. That’s how much system RAM you should have. If you use virtual memory in addition to that RAM, you’ll see little or no slowdown in day-to-day work, and you’ll retain the advantage of having virtual memory when you need it.

Virtual Memory Limits
When you open your Memory control panel to turn on virtual memory, you have to decide how much total memory you want to wind up with. Apple and many Mac gurus
generally advise you not to get greedy. Set your total memory (RAM plus virtual memory), they say, to no more than twice the amount of real RAM in your machine. That may be a convenient rule of thumb, but it’s not accurate. In truth, the amount of virtual memory you can comfortably use increases exponentially with the amount of real memory.

For example, if you have a Mac with 2MB of RAM, you can use Apple’s virtual memory only if you make your system heap—the memory used up by System 7 and all of your control panels and extensions—as small as possible. That means doing without extensions, turning down your Adobe Type Manager and disk-cache settings, and (if practical) turning off AppleTalk and file sharing. If you go to all that trouble, you can barely get virtual memory onto its creeky feet, at a maximum setting of 3MB to 4MB (RAM plus virtual memory). Even the addition of 512K makes a huge difference in these low-memory configurations.

In general, according to the developer of Apple’s virtual memory scheme, on a Mac with 4MB of RAM, a virtual memory setting of 8MB to 10MB is practical; on a Mac with 8MB, you can set virtual memory as high as 20MB; with 16MB of RAM, you can comfortably set virtual memory up to about 50MB. And if you have 32MB, you can set virtual memory as high as you want.

**Power Mac Usage** Apple recommends setting virtual memory to 1MB more than your physical memory, to free up memory used by the System for applications. Because so few PowerPC programs are shipping, we could not confirm how much of a benefit this technique actually provides. For 680X0 programs, we found that virtual memory on a Power Mac is no different than on a 680X0 Mac.

**PowerBook Usage** If you click the Virtual Memory On switch in the Memory control panel on a PowerBook, an alert message instantly appears, warning that the increased disk activity of virtual memory will run down your battery.

That’s true, of course—if the PowerBook is running on battery power. If it’s plugged into an AC adapter, however, virtual memory is ideal for these perennially low-memory notebooks. If you use Apple’s built-in virtual memory, the annoyance of having to remember to switch off virtual memory before taking battery-powered road trips may be more hassle than it’s worth, but Connectix Virtual can automatically shut itself off whenever the PowerBook is running on batteries.

**Hard Drive Considerations** Both Apple and Connectix agree that the effects of defragmentation have been overemphasized. Only if a hard drive is severely fragmented—say, it’s been nearly full for weeks—is virtual memory speed affected. Of course, with a drive that badly fragmented, you would notice performance problems with or without virtual memory enabled.

It is true, however, that a faster hard drive can make a dramatic difference in virtual memory swapping speed; a modern, fast hard drive can make virtual memory perform 50 percent better than, say, an ancient Mac II’s hard drive. In general, the higher the capacity of your hard drive, the faster the performance.

**Whose Virtual Memory Is Better?** Surprisingly, when you turn on Apple’s virtual memory, it doesn’t just create a swap file the size of the extra memory you want. It creates a file as large as the total memory: RAM plus virtual memory.

This strategy enhances speed. Yes, a virtual memory scheme could juggle data
Macintosh users have had only two choices: buy more RAM or use virtual memory. Now there's a third option: memory-boosting software. Two products—OptiMem ($129, Jump Development Group, 412/681-2692) and RAM Doubler ($99, Connectix Corporation, 415/324-0727 or 800/950-5880)—change how the Mac deals with memory to make more of it free to applications. Note that while we were able to install the current version of OptiMem on a Power Mac, it did not function correctly (it falsely reported low-memory conditions), at least on an early Power Mac that Apple loaned us. RAM Doubler will not install on a Power Mac; a native version is expected later this year.

**How They Work** The Mac normally allocates a fixed chunk of memory for an application—you can see what those values are and even change them via the Preferred Size field in an application's Get Info dialog box. Once allocated, that memory is unavailable for other programs, even if the allocated memory is not being used. Both OptiMem and RAM Doubler reallocate application memory dynamically, based on what each program needs at the time. RAM Doubler goes a step further by compressing the contents of memory as you work. This all sounds a bit scary, and I certainly felt uncomfortable trusting the Mac I use every day to them. But I did it, first for a week with OptiMem and then for a week with RAM Doubler. I tested them in a Centris 610 with 8MB of RAM running System 7.1, with all my usual INITs activated (which meant my System Look took about 3.5MB of the available 8MB).

**OptiMem** The latest version of OptiMem (1.5.4) fixed the erratic operation of previous versions (1.4.1) as reviewed in Macworld, March 1994), which often led to system lockups as the program tried to juggle memory for open applications as I repeatedly switched between them. (That's my normal working style, since I'm usually working on parts of a dozen projects in any one day.) If you come across programs that have problems with the latest version, you can set OptiMem so it will leave their memory settings alone.

If you use OptiMem, check with Jump periodically for updates, since it's likely that new and revised programs will introduce new memory-handling incompatibilities.

**RAM Doubler** Operation with RAM Doubler was similar (see Reviews, Macworld, May 1994). For example, using it resulted in frequent system lockups when I loaded both Adobe Photoshop 2.5 and any other program in memory; the system did not lock up if I added more system RAM to the Mac beyond the original 8MB. Macworld Lab also found that RAM Doubler 1.0 can cause a system lockup when a Mac without RAM Doubler accesses a Mac with it over the network or via a remote-access dial-up link. (The problem does not occur when going from a Mac with RAM Doubler to a Mac sans RAM Doubler.) Version 1.0.1 fixes the problem.

RAM Doubler added about 20 percent to the time it took a Centris 610 to load programs due to the time RAM Doubler needs to compress the data into memory as programs load. The relatively slow speed of the 610's CPU (20MHz) and its lack of an FPU, which aids compression, account for that slowdown. On one of Macworld Lab's Quadra 650s (which uses a 33MHz 040 with FPU), the delay for compression was not noticeable. The slower your Macintosh, the more likely you are to come across this performance penalty.

**Virtual** Virtual also has an impressive option called DiskSaver that uses less of your hard disk space for virtual memory. When DiskSaver is on, the invisible swap file isn't the size of the combined memory—it's only the size of the additional memory you want. You pay a price in speed because of the extra bookkeeping Virtual has to do. But even with DiskSaver turned on, Virtual is slightly faster on average than System 7's virtual memory scheme, according to Macworld Lab tests.
VIRTUAL MEMORY REALITIES

Virtual also beats System 7 because it gives the Mac more system RAM to play with. Apple's virtual memory scheme declares the entire System file off-limits to virtual memory swapping. On Macs with little memory to spare, such as a PowerBook with 4MB of RAM, that spoken-for 2MB of memory is a big loss.

The Virtual program, however, analyzes the system heap and declares only some of it important enough to keep in real memory (such as the all-important hard disk driver software). Virtual can identify nearly 1MB of material the Mac doesn't need at every moment-data that's safe to store in the swap file. So with Virtual, that hypothetical PowerBook has 3MB of real RAM, where it would have only 2MB using Apple's virtual memory feature. Remember, the greater the proportion of RAM to virtual memory, the faster the Mac's performance.

Finally, Virtual lets you change the page size. A page is the unit of memory that virtual memory swaps to the hard disk and back—under Apple's scheme, a page is a 4K unit. But data on hard drives larger than 256MB is stored in 8K or larger chunks called blocks; by letting you change the page size to 8K, for example, Virtual allows for faster data swapping on these larger disks.

When Not to Use Virtual Memory
All right, so virtual memory is wonderful, and Virtual is even more so. Why hasn't everyone stopped buying RAM chips and turned on virtual memory instead?

Frankly, more people should. But there are indeed times when virtual memory isn't an option. Running a program that's incompatible with 32-bit addressing (such as Microsoft Word 3.0) is one example. Most people turn on 32-bit addressing when using virtual memory because 32-bit addressing lets a Mac go beyond the 8MB limit imposed by 24-bit addressing used in older Macs. (Using virtual memory, you can go to 14MB with 24-bit addressing.)

There's another category of software that doesn't work well with virtual memory: programs that work with 32-bit color images. Because color images take up such a huge amount of RAM—more than is installed on most Macs—programs like Photoshop and Fractal Design Painter use proprietary virtual memory schemes.

For example, of the 4MB of memory required to run Photoshop, only a fraction is used for the program itself; the rest is reserved for storing the portion of your artwork that's visible in the editing window. The remainder of the artwork is stored in a swap file (which Adobe calls a scratch disk). This scheme lets you open a 100MB, full-color scanned image, for example, on a Mac with only 8MB of RAM. Each time you scroll the painting, Photoshop reads from the file on disk to throw the new part of the image onto the screen.

But suppose you're using a general-purpose virtual memory program (like System 7's virtual memory, or Virtual). You scroll. Photoshop grabs the information off the disk and feeds it into RAM, just as it always does. But in this case, you don't have real RAM; you have virtual memory, which means the information gets written back to the hard disk. In other words, using virtual memory with Photoshop is superimposing two virtual memory schemes. You wind up accessing the hard disk twice as much, and Photoshop's performance grinds nearly to a halt.

Of course, you could avoid this situation simply by turning off your general virtual memory whenever you use Photoshop or similar programs. But here's a more efficient trick: use the Get Info command on Photoshop's icon, and change the memory size to just under the amount of actual RAM in your Mac. When you launch Photoshop, it will load completely into real RAM; and the virtual memory feature will never kick in, since Photoshop will appear to be comfortable in its allotted true RAM. Photoshop will use its own scratch-disk virtual memory scheme—and you can still enjoy the benefits of general virtual memory for the other programs you may be running.

Other disk-intensive programs that may be too slow with virtual memory—even with the Get Info trick—are QuickTime playback programs. These programs have high data throughput, in which the data loaded into memory is constantly changing. Because virtual memory uses the hard disk, it is too slow to keep up with that fast stream of high-volume data.

Almost all popular business programs, however, are a match made in heaven with virtual memory.

Virtually Indispensable
The lesson in using RAM optimization of any sort is that you need enough physical RAM to handle your everyday needs—don't count on a Mac with 4MB and virtual memory doing work designed for a Mac with 8MB of real RAM. But you should take advantage of the extra memory you can get from virtual memory or memory-boosting software to handle the occasional need for more RAM (see "Real Alternatives to Virtual Memory").

The main benefit of virtual memory is to save you the time and hassle of quitting and relaunching programs. Therefore, force yourself to unlearn the habit of quitting when you're done with a task. Launch your programs into your new, yawning memory allotment, and leave them running all day.

Then count up all the real dollars you've saved on memory SIMMs, put your feet up on the desk, and treat yourself to a virtual Acapulco vacation.

Contributing editor DAVID POGUE is the author of Macworld's Desktop Critic column.

GALEN GRUMAN is a Macworld senior associate features editor.

MEMORY-ENHANCEMENT SOFTWARE

Fast access, no major compatibility problems, and automated operation—those are the factors we used to judge which memory-enhancement products are best. While more RAM is always good, it's even better to enhance your RAM, even if you still decide to buy more SIMMs.

Virtual Memory Software
Virtual 3.0 Its faster speed and more versatile configuration options make this program the best deal, even compared with the virtual memory Apple offers for free as part of System 7. Company: Connectix Corporation. List price: $99.

Memory-Boosting Software
RAM Doubler 1.0.1 On-the-fly compression of RAM may sound dubious, but it actually works very well and reliably, with little slowdown on many Macs. Company: Connectix Corporation. List price: $99.
We've built our reputation on professional publishers from around the world.

When it comes to plain-paper typesetting, LaserMaster's users really pile up! Every professional nows the physical appearance of their work is a direct reflection of their personal performance. That's why professionals who want to look their best choose LaserMaster.

**Oversized Typesetting**

The Unity™ 1200XL-0 offers all the features you'll need to get the job done right. Its 12"x19" paper upport lets you print 11"x17" documents with full bleeds, crop marks, and registration marks.

**200-dpi Camera-Ready Output**

Unity products use LaserMaster's patented TurboRes® resolution-enhancement technology to give you precise, 1200-dpi, camera-ready output—the highest resolution possible on plain paper.

### The Cost-Effective Choice

With LaserMaster's Unity line, you get quality output that's economical too. You'll find that Unity typesetters quickly pay for themselves. Unity's camera-ready pages only cost about 5 cents each. Compare that to the cost of imagesetter output that can cost as much as $9 a page.

**For More Information**

Your work speaks for itself. Call now for more information and some actual output. LaserMaster is "The Professional's Choice" for quality plain-paper typesetting.

### Unity 1200XL-0

**Plain-Paper Typesetter**

- Multi-platform, plug-and-play plain-paper typesetter for your Macintosh® or PC and most other computers
- 1200-dpi, camera-ready output
- 11"x17" paper handling (user upgradable to oversized 12"x19")
- 40-MB hard drive
- 135 premium Type I typefaces pre-installed

**Unity 1200XL-1**

**Plain-Paper Typesetter**

- Multi-platform, plug-and-play plain-paper typesetter for your Macintosh® or PC and most other computers
- 1200-dpi, camera-ready output
- 11"x17" paper handling (user upgradable to oversized 12"x19")
- 40-MB hard drive
- 135 premium Type I typefaces pre-installed

**Unity 1200XL-1 Personal Typesetter**

- The incredibly affordable bus-based personal typesetter for your Macintosh or PC
- 1200-dpi, camera-ready output
- 11"x17" paper handling
- 135 premium Type I typefaces

**LaserMaster 1200XL**

**Personal Typesetter**

- The incredibly affordable bus-based personal typesetter for your Macintosh or PC
- 1200-dpi, camera-ready output
- 11"x17" paper handling
- 135 premium Type I typefaces

### Features:

- Oversized Typesetting
- 1200-dpi Resolution
- Internal Hard Drive
- Multi-Platform Networking
- 235 Premium Type 1 Typefaces Pre-installed
- ClearCopy® Copier Enhancement
- 33-MHz Processor
- Gamma Correction
- Software Upgradable
- Direct-to-Plate Option
- TurboGray™ Technology

### Benefits:

- 12x19-inch pages allow for full bleeds with crop marks and registration marks—eliminates paste-up, saves time and money.
- For camera-ready text, halftones, line art, reverses, and screens.
- Stores thousands of fonts, eliminates font downloading.
- Provides high-quality typographic flexibility.
- Ensures halftones look crisp and clear after photocopying.
- Adjusts images to compensate for dot gain on press.
- Prevents obsolescence.
- Provides a cost-effective solution for short print runs.
- Improves the appearance of halftone images.

### Specifications:

- 12x19-inch pages allow for full bleeds
- With crop marks and registration marks—eliminates paste-up, saves time and money.
- For camera-ready text, halftones, line art, reverses, and screens.

### Price:

- **Unity 1200XL-0** $6,995
- **Unity 1200XL-1** $4,995

### Options:

- Includes Rebate

### Contact Information:

CALL 800-950-6868 or 612-944-9330 Fax: 612-944-0522

DEPT. 73L

Circle 43 on reader service card
Flavio Kampah heads KampahVisions, a broadcast design studio, directing and producing trend-setting, award-winning music videos and television graphics, including the U2 music video, *Even Better Than The Real Thing*. Flavio became a VideoVision Studio™ devotee while creating a new opening for the American Gladiator TV program and a series of promo spots for ESPN2 and Avirex Jeans.

“Until VideoVision Studio, it wasn’t quite there yet. The motion, in particular, wasn’t right. But with VideoVision Studio, we can use the Mac to produce work for broadcast television.”

VideoVision Studio gives full-screen, full-motion video directly from a Macintosh. It’s a complete, no-compromise, professional quality, 24-bit, QuickTime-based video production system under $4,500.

“After working for years with traditional high-end computer graphics equipment, I’m convinced the Macintosh and technologies like Radius’ VideoVision Studio are the most exciting designer tools in broadcast today. It puts control of the creative content back in the hands of the creator.”

© 1994 Radius Inc. Radius, the Radius logo, “How The Best Get Better” and all Radius product and service names are trademarks of Radius Inc. All other names are trademarks of their respective holders. 3/26/94
VideoVision Studio lets you input, capture, display, edit, add special effects, mix sound and output full-screen video at 30 frames and 60 fields per second. It comes with the hottest video editing and effects software, Adobe Premiere™ and VideoFusion.™ And VideoVision Studio is backed by our Lifetime Worry-Free™ Warranty and onsite, overnight replacement guarantee.

No other desktop system offers you such an incredible array of capabilities, so incredibly priced.

“The way the system works it’s very easy for anybody to create high quality videos without the cost of a high-end editing suite.”

Call 1-800-227-2795 Ext. 88C for more information about no-compromise desktop video production and the name of your nearest Radius reseller. For faxed information, call 1-800-966-7360.

Circle 146 on reader service card
Light Source Promises Consistent Color

Light Source has announced Colortron, a hardware-software system that the company says combines many of the color-accuracy and -correction capabilities of calibration devices, light meters, densitometers, colorimeters, and stand-alone spectrophotometers.

With an anticipated retail price under $1000, Colortron will enable photographers, desktop publishers, graphic artists, and other color-production specialists to easily capture the most accurate color data and maintain it throughout the production process, according to Light Source.

For example, Colortron could help recalibrate or correct the flesh tones in a scanned Adobe Photoshop image. You place and click the hand-held, battery-operated spectrophotometer on the original photograph or transparency, and the device measures the spectral data of the problem area and sends the color data to the Mac's Extended Color Picker (the spectrophotometer must be connected to the Mac's serial port). You could then apply that data to the flesh tones in the digitized image, so that the scan's flesh tones match those of the original.

Added to the image's EPS file, the spectral data provides a single, device-independent color reference for monitors, dye-sublimation printers, image-setters, offset printers, and other devices.

With Colortron, a designer, for example, could ensure that the colors on a restaurant's menu and table linen match in all lighting conditions. Although colors may appear matched under one viewing condition, they may have different spectral curves. As a result, those colors may not match when viewed at sunset by candlelight. By measuring the spectral data of the tablecloth, the menu paper, and the restaurant's ambient light, Colortron would allow the designer to specify an ink color that closely matches the spectral curve of the dyed cloth.

According to Light Source, no other product on the market offers all of these abilities. Densitometers, for instance, cost at least $1500, take three measurements of a color, and translate the measurements into an approximate color space. Colortron takes 32 measurements across the full visible color spectrum and always maintains the same precise color data as a reference. Colortron is the only single device that measures reflective, transmissive, and ambient light, the company says.

Colortron should be available in June; planned accessories include a monitor-calibration cup and a spherical light-diffuser. Final pricing wasn't available at press time. Light Source, 415/925-4200—Jim Feeley

Adobe Updates Illustrator for Power Mac

The latest version of Adobe Illustrator will ship with versions of the draw program for Power Macs as well as 680X0-based Macs. Illustrator 5.5 includes several new features as well—among them the ability to perform some color trapping and to open and edit files saved in Adobe's Acrobat format.

Through version 5.5's enhanced pathfinder capabilities, you can perform trapping on color objects but not on color...
Gradients or placed color-graphics files. Illustrator also now offers the ability to import, edit, and export files in a wide variety of formats (including TIFF, Microsoft Excel, and Microsoft Word) via support for Acrobat's PDS file format. Any file saved in PDS format can be opened and edited in Illustrator 5.5. The new Illustrator also includes improved text-formatting support, such as tabs; text blocks with multiple rows and columns; and a spelling checker.

Version 5.5 ($395) is scheduled to ship in May. Owners of 5.0 can upgrade with a CD-ROM that includes 961-4400, 800/888-0817.-J.A.M.

Tiling Patterns Emerge from Xaos

TERRAZZO, a $149 ADOBE PHOTOshop plug-in filter from Xaos Tools, lets you create repeating patterns from any PICT or native Photoshop formatted image in RGB, CMYK, and grayscale modes.

Using any of 17 geometric shapes to tile the pattern it creates, Terrazzo simulates a kaleidoscope. Moving the shape around an image produces dramatically different patterns. Controls include opacity, lightness, darkness, and hue/saturation/brightness. A Continuous Preview feature lets you see the effects as you create them. Blend Radius lets you blur tiles edges to minimize the tiling effect. Terrazzo is due by the end of April.

Xaos has also released Fresco, a $199 CD-ROM of 80 royalty-free textures and backgrounds created by artist George Lawson, as well as an optimized version of Paint Alchemy (1.0.2f) that uses the Mac's FPU to boost performance by up to 100 percent. Xaos Tools, 415/961-4400, 800/888-0817.—CATHY ABES

PaintBoard Turns Pro

RAS TEROPS HAS ANNOUNCED the PaintBoard Professional, a 24-bit graphics acceleration card that performs average QuickDraw operations up to four times as fast as the Quadra 950's standard internal video. Supporting large-screen displays up to 21 inches, the PaintBoard Professional features an extended desktop of 4000 by 3000 pixels for viewing oversized images. It also includes a 9-bit DAC (digital-to-analog converter) for improved color fidelity.

The PaintBoard Professional can accommodate an optional daughtercard, the RasterOps DSPro. The DSPro includes twin 66MHz DSP3210 chips to boost performance of Photoshop filters. The PaintBoard lists for $2199; together with the DSPro, it's $2999; the DSPro is $1099. RasterOps, 408/562-4200, 800/729-2656.—CATHY ABES

Beyond 24-Bit Scanning

TWO SCANNER MANUFACTURERS recently announced color flatbed scanner models (under $3500) capable of capturing images with pixel density beyond 24 bits.

With an optical resolution of 600 by 1200 dpi (2400 by 2400 interpolated), Microtek's single-pass ScanMaker III ($3499) captures color images at up to 36 bits and automatically samples them down to true 24-bit images.

Also new is the ScanMaker IIHR ($1699), a three-pass 24-bit scanner with 600-by-1200-dpi optical resolution (2400 by 2400 interpolated). Both scanners come bundled with Adobe Photoshop and include Microtek's Dynamic Color Reduction (DCR) color-calibration and -correction technology. Both scanners are due to ship in March.

Meanwhile, Umax Technologies has announced PowerLook ($3495), a 30-bit color flatbed scanner (10 bits per RGB channel) that supports scanning of transparencies.

The one-pass PowerLook offers an optical resolution of 1200 by 600 dpi, which can be interpolated to 1200 by 1200 dpi (in hardware) or 2400 by 2400 dpi (in software). It has a SCSI-2 interface and a 2MB input/output buffer for fast scanning. Photoshop 2.5.1 is bundled.

Potential buyers of scanners offering more than 24-bit capture should keep in mind that, aside from Photoshop 2.5.1, few programs available today support more than 24-bit color. Microtek, 408/297-5000, 800/654-4160, Umax, 510/651-8883, 800/562-0311.—J.A.M.
It's not surprising that the editors of Macworld, MacUser and MacWeek praise Mirror products, since we design and build them to please the toughest customer of all: you! Whether we are selecting a power cord or designing a new graphics processor chip, we sweat all the details, so you get consistently excellent products for a great price.

Macworld, December 1993
Nikon CoolScan

From our fast, dependable hard drives and our razor-sharp monochrome displays to our highly acclaimed color scanners and the amazing Tornado graphics systems, every Mirror product is designed to give you the most for your money. No other company offers you the selection, performance and value of Mirror Technologies.

MacUser 1993
Nikon CoolScan

Scanning The Possibilities
Whether you are scanning black & white photos to include in a simple newsletter, or are scanning 35 mm color slides for inclusion in a national magazine, Mirror offers a scanner that can get the job done.

MacUser November 1993
Nikon CoolScan

Coolscan Slide Scanner
For professional quality scanning of 35 mm slides (or negatives), nothing comes close to the performance and value of the Mirror Coolscan System. This remarkable slide scanner features 2700 dpi resolution, for brilliant reproduction of even difficult images. The Eddy Award-winning Coolscan is the first scanner to bring true, reproduction quality color scans to the desktop for under $2000!

MacUser UK
October 1993
Mirror 800 Color Scanner

MacHome Journal, November 1993
Mirror 600 Color Scanner

Driving A Hard Bargain
As one of the oldest suppliers of Macintosh storage systems, Mirror offers hard drives and SyQuest removable drives that you can count on. We know how valuable your data is, so we use only the finest drive mechanisms and associated components. Every drive is thoroughly tested before it leaves our factory, so you can rest easy.

<table>
<thead>
<tr>
<th>SyQuest 88c</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/a</td>
<td>$459</td>
</tr>
<tr>
<td>170MB</td>
<td>$229</td>
<td>$289</td>
</tr>
<tr>
<td>270MB</td>
<td>$299</td>
<td>$359</td>
</tr>
<tr>
<td>540MB</td>
<td>$565</td>
<td>$625</td>
</tr>
<tr>
<td>1080MB</td>
<td>$929</td>
<td>$989</td>
</tr>
<tr>
<td>1800MB</td>
<td>$1,239</td>
<td>$1,299</td>
</tr>
<tr>
<td>1900MB-Barracuda</td>
<td>$1,599</td>
<td>$1,659</td>
</tr>
<tr>
<td>2400MB</td>
<td>$1,749</td>
<td>$1,809</td>
</tr>
<tr>
<td>2400MB-Barracuda</td>
<td>$1,954</td>
<td>$1,999</td>
</tr>
</tbody>
</table>

Mirror Color Scanners

| 600 dpi w/Photoshop LE and Read-It | $749 |
| 600 dpi w/Photoshop 2.51 and Read-It | $899 |
| 800 dpi w/Photoshop 2.51 and Read-It | $1099 |
| 1200 dpi w/Photoshop 2.51 and Read-It | $1599 |
| Transparency Adapter for 600/800 models | $599 |
| Transparency Adapter for 1200 model | $699 |
| Mirror CoolScan Slide Scanner | $1999 |

Call 1-800-643-4142 for your free catalog

Exclusive MirrorScan software

Export to PDF

NEW LOW PRICE!
$749
WAS $1099

Award-winning Scanners
The Mirror Color Scanners are 24-bit flatbed scanners available in 600, 800 and 1200 dpi models. Scan reflective originals up to 8.5 x 11.

With the optional Transparency Adapter, you can scan slides and other film too. Our exclusive MirrorScan software makes scanning a snap, with powerful features like color preview, JPEG compression, interactive gamma controls, and more. We even include Photoshop for the ultimate in image control.
Displays Of Brilliance
The newest additions to our award-winning monitor line-up, the Mirror Color Portrait Display and the Mirror 21-inch Color Display, embody everything that the critics love about Mirror products: high quality, unbeatable features, and a great price.

Colorful Value
The Mirror Display line also includes our best-selling 14, 16, & 20-inch Color models, and our standard-setting 15 & 19-inch monochrome displays. Models are available for most Macs.

Big Color Performance
If you use a Macintosh for design, illustration or image-processing, the new Mirror 21-inch Color display is for you. It's brilliant color, superb sharpness and 1552 x 870 resolution will satisfy the most demanding user, and its low price make it irresistible. This display actually puts itself into low-power "sleep" mode when there is no user present!

Black & White Classics
Nothing beats a black & white display for image sharpness and value. Our monochrome and gray-scale displays (Full-page and Two-page models) are available for most Macintosh models, starting at just $399.

The Experts Agree
It's no accident that Mirror products get great reviews; we've spent the last 9 years striving to make them the best value in the business. But we don't do it to get good reviews, we do it so you will be happy with your new Mirror product. Not just today, but for years to come.

Order Direct Anytime
800-643-4142
Order by Fax at 612-832-5709

The best thing next to your Mac™
by Cathy Abes

Artist: Los Angeles-based illustrator and animator David Peters specializes in collage. His work has appeared in such magazines as Moveline Magazine, Electronic Entertainment, and New Media, as well as on album covers and movie posters.

How It Was Done: For the illustration that appeared in last month's feature article on copyright issues, "Are You Breaking the Law?," Peters began by taking two photographs of a torn-off magazine cover depicting Arnold Schwarzenegger—a close-up of his face, for placement on the canvas, and an angled shot of the whole cover, for placement on the floor. Peters cut the cover out of the photo with an X-acto knife and placed it on a white board to scan it. In general, he finds this technique to be faster than using the magic wand or the lasso to select parts of a scanned image in Photoshop, and it gives him more control over the image's edges. In this case, he cut out the image to maintain the cover's torn edge. After scanning the cover, he used the perspective tool to match the angle of the floor.

Next Peters scanned in the close-up shot of Schwarzenegger. As with each of the other scanned elements, he adjusted the image with the Levels command, moving the right-hand Input Levels triangle to the left to whiten the background and lighten the entire image. After selecting the head with the lasso, he deleted the background. Because the terms involved in using Schwarzenegger's likeness were so restrictive, Peters completely altered the image so that it was no longer recognizable as Schwarzenegger's face by substituting the eyes, mouth, nose, and ear from another photo. Because the illustration was meant to show how disparate elements from different sources can be combined to create a new image, Peters blended some of the facial elements more than others.

Peters scanned in a photo of his own car and then added a fin by stretching, scaling, and distorting the rear fender. Then he sized and posed the car over the canvas and saved it as a separate file.

The Tools

Hardware: Mac IIfx with 32MB of RAM; 170MB internal hard drive; 1.2GB external hard drive; SyQuest 44MB removable-cartridge drive; 128MB magneto-optical drive; 19-inch SuperMac RGB monitor with PDQ 24-bit accelerator board; Microtek MSF-6002S color scanner.

Software: Adobe Photoshop 2.5.1.
4 With the scale tool, he squeezed the eyes to make them fit the new face; then he used the airbrush and smudge tools to blend them with the rest of the face. He intentionally left the right eye's rough edges showing because he wanted the eye to look like what it was—a grafted facial element.

5 The scanned photo of the artist's car—a blue 1954 Nash Metropolitan convertible—destined to be altered in shape and color.

6 To make the fin, Peters cut out the rear fender, copied it, and stretched it vertically with the rectangular marquee (from the Effects submenu under the Image menu). Then, using the scale tool (Effects), he scaled the fin up vertically to elongate the selection, grabbed the top left corner, and stretched it out using the distort tool (using distort alone would have made the fin too fat).

7 Once he had correctly positioned the fin, Peters used the rubber stamp to clone the reflection from the fin onto the lower portion of the car to make it blend in.
The two top PostScript draw programs face off

BY DEKE McCLELLAND

Until recently, Adobe Illustrator and Aldus FreeHand seemed to be operating under some kind of pact. Illustrator clearly catered to the select, free-form drawing crowd, offering a dynamic pen tool, great text-manipulation capabilities, and a smattering of small-document-creation options such as automated charts and graphs. Meanwhile, FreeHand went after the more down-to-earth schematic artists by supplying grids, numerical object positioning, independent layers, and the ability to draw and edit in the preview mode.

Then, in late 1993, Adobe went for the jugular with Illustrator 5.0. The revised program offers multiple undos, object-alignment options, automated gradations, layers, and drawing in preview mode—in short, Adobe added just about everything Illustrator had been criticized for lacking in the past. Perhaps deciding that the best defense was an aggressive counterattack, Altsys (which writes FreeHand for Aldus) rebounded by bolstering version 4.0's text-handling and document-creation capabilities so they not only surpass those in Illustrator but in many ways outperform similar features in Aldus PageMaker and QuarkXPress.

Suddenly, things have gotten very exciting in the world of object-oriented graphics. In fact, FreeHand and Illustrator have become so powerful and well matched that it's more difficult than ever to decide which program is right for you.

(At press time, things had become even more exciting than we originally thought. On March 15, Adobe and Aldus announced a definitive agreement to merge. Both FreeHand and Illustrator will continue to be sold and supported by the newly formed company, at least for now. For more information on the merger, see News, in this issue.)

To help you sort it all out, the "Drawing Distinctions" table offers a detailed, side-by-side comparison of both programs in seven major areas. In this table the usefulness and implementation of over 100 features and tools that are found in both applications are graded from A to F. I have graded the programs only on
Tom Ward is a free-lance artist who originally created this illustration in FreeHand 3.1. He revised it using version 4.0. To create the stars in the background, Ward double-clicked on the polygon tool, then used the sliders to set the number of points and the acuteness (pointiness) of the stars. He created the stars by clicking and dragging: the more you drag a star, the larger it gets. Depending on the direction in which you want a star to rotate, you can drag it either clockwise or counterclockwise. After selecting a star, he opened the Inspector floating palette, clicked on the fill icon and used the slider to select a radial fill of purple at the edge to white in the center. For some stars, he dragged and dropped yellow onto the star's edge to change the fill to a yellow-to-white gradient. Then he used the Locate Center tool to change the center of the radial fill.

FreeHand 3.0 veterans may find themselves cursing 4.0's new interface nearly as often as they praise it. Perhaps for the better, FreeHand has shed such questionable features as numerical control-handle positioning and automated trapping spreads. However, it has also changed common keyboard commands, for example, %M, so that they produce different results; dropped items, such as kerning values, from the information bar; killed useful functions, like aligning existing objects to the grid; entirely abandoned support for such attributes as vertical text alignment; and randomly deposited hundreds of unrelated functions into the new, multipaneled Inspector palette—all of which is likely to throw longtime users for a loop.

By contrast, Illustrator has changed the way its masking feature works but has otherwise limited its interface changes to additions and enhancements. This is not to say Illustrator is without its share of interface blemishes. The Filters menu is as much of a mishmash as the Inspector palette. But at least the Filters commands represent new features, not changes to existing features, an important distinction.

### Drawing and Editing

When it comes to drawing and editing, Illustrator and FreeHand are cut from the same fabric. But striking differences remain. Illustrator offers the smoother pen tool, while FreeHand's new bezigon tool is slightly more functional, supplying access to the frequently useful connector point. FreeHand now provides a real tool for drawing regular polygons and stars, while Illustrator buries the function in a remote recess of the Filters menu. Both programs provide calligraphic freehand tools that react to pressure-sensitive input, but only Illustrator includes cap
## Drawing Distinctions

### Grade FreeHand 4.0  
Grade Illustrator 5.0

<table>
<thead>
<tr>
<th>Kompatibility</th>
<th>Grade FreeHand 4.0</th>
<th>Grade Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen display</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Interruptible screen redraw</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Preview selection only</td>
<td>D</td>
<td>A</td>
</tr>
<tr>
<td>Display preferences</td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td>Context cursor</td>
<td>F</td>
<td>D</td>
</tr>
<tr>
<td>Hide object</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Selection outlines show layering</td>
<td>D</td>
<td>F</td>
</tr>
</tbody>
</table>

### Navigation

<table>
<thead>
<tr>
<th>Grade FreeHand 4.0</th>
<th>Grade Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels of magnification (in percent)</td>
<td>125–8000; 7 increments, plus custom.</td>
</tr>
<tr>
<td>Scrolling</td>
<td>A</td>
</tr>
<tr>
<td>User-definable views</td>
<td>F</td>
</tr>
<tr>
<td>Levels of undo</td>
<td>A</td>
</tr>
<tr>
<td>Switch applications when dialog box is open</td>
<td>A</td>
</tr>
<tr>
<td>Interface consistent with previous version</td>
<td>A</td>
</tr>
</tbody>
</table>

### Tools, menus, and palettes

| Access tools from the keyboard | A                  | B                    |
| Access option keyboard equivalents | C                 | A                    |
| Options automatically highlight in palettes | C              | A                    |
| Collapse palettes | B                 | C                    |
| Maximum automatic size (in inches) | 55 x 55, 30 letter-size pages | 120 x 120, 154 letter-size pages |
| Page scrolling | A                 | B                    |
| Add, move, and duplicate pages | A                 | C                    |
| Mix page setups within a single document | A              | C                    |

### Importing and exporting

| Import/export competitor's formats | A     | B                    |
| Open its own file formats | C     | C                    |
| Paste PICT objects from Clipboard | A     | A                    |
| Export to PICT format | A     | A                    |
| Import and edit EPS files | A     | A                    |
| Import and modify TIFF images | A     | A                    |
| Import Photoshop paths and masks | A     | A                    |

### Drawing and editing

| Drawing tools | A     | B                    |
| Pen-tool performance | A     | A                    |
| Regular polygons and stars | A     | B                    |
| Regular polygon tool | A     | B                    |
| Graphing tools | C     | B                    |
| Reshaping paths | B     | B                    |
| Guides, rulers, and measurements | C     | B                    |
| Aligning objects | B     | B                    |

### Grade Key

- **A** = New or significantly altered feature.
- **B** = Works like a charm.
- **C** = Frustrating implementation; requires more work than it ought to.
- **D** = Barely usable; thanks to terrible implementation.
- **F** = Feature is absent.

- Turn off Area Select option or exit preview mode.
- Can't adjust corners once they're rounded.
- Can't set square to center.
- Can't set square to center; based on bounding box.
- Must build grids manually using guides.
- You can edit along a circle or irregular path.
- Better than FreeHand's.
and join options for specifying the appearance of ends and corners.

The tracing tool is the only real disappointment in either program. Although some minor controls have changed—FreeHand dropped some options between versions 2.0 and 3.0—the tools in both programs are nearly identical to their original incarnations. They detect only two shades (light and dark), and they always result in closed shapes, never open lines.

If you plan on converting many scans to drawings, you really have no choice but to buy Adobe Streamline ($199).

Transformations and Effects

In FreeHand 3.0, you could move an object numerically by pressing #-M, entering a couple of values, and pressing the return key. In version 4.0, you have to press #-M, click on the move icon in the Transformation palette, press #-tilde (→) to activate an option box, enter the values, and press return.

Meanwhile, Illustrator’s new plug-in filters provide access to several automated special effects, many of which FreeHand has not implemented. For example, Illustrator provides three filters that move control handles and points randomly to jazz up path outlines. You can even twirl a path around a central point, in much the same way as with the Twirl filter in Adobe Photoshop. Unfortunately, Illustrator requires you to double and even triple the number of points in the path to ensure the success of the filter, and even then it frequently disappoints.

Formatting Text

For more than six years, Illustrator and FreeHand have cut themselves off from a variety of capabilities because both programs lacked support for the modest tab character. To Illustrator, tabs are still taboo, and as a result, to create a simple hanging indent you must wrap text around a vertical line.

FreeHand 4.0, on the other hand, recognizes tabs, and it also allows you to divide a text block into rows and columns to create fully functioning tables complete with multiple-line entries. You have to go to three different places in the Inspector palette just to add a paragraph rule; otherwise FreeHand is a fantastic choice for creating lists and tables.

TEN TASKS FREEHAND DOES BETTER THAN ILLUSTRATOR

1. Navigate in the preview mode. FreeHand is significantly faster in preview mode, and you can scroll in single-pixel increments and zoom to precise view sizes.

2. Blend objects. After blending between two objects, you can edit one or the other, and FreeHand automatically recalculates the blend. In Illustrator, you have to delete the original blend and start over.

3. Design multipage documents. Except for a spelling checker and automatic page numbers, FreeHand has everything it takes to create small, graphics-intensive documents.

4. Create tables. Besides supplying a wide array of tab-stop options, FreeHand enables you to divide a text block into rows and columns, making it one of the most flexible programs for making tables.

5. Draw schematics. FreeHand is still the better program for precisely positioning points and objects. Most essential, FreeHand provides a grid; Illustrator does not.

6. Import and manipulate TIFF images. FreeHand satisfies TIFF fans by letting them not only import TIFF images but also control on-screen image resolution, adjust brightness levels, and colorize gray-scale and black-and-white artwork.

7. Assign colors to objects. FreeHand 4.0 lets you drag and drop colors to change a stroke or fill, adjust the direction of a gradient fill, and reposition the center of a radial fill, all without so much as selecting the affected object.

8. Print custom halftone patterns. Only FreeHand allows you to change the frequency and angle of halftone patterns assigned to selected objects.

9. Trace imported images. FreeHand’s automatic tracing tool is inadequate. But when it comes to tracing bitmap images by hand, FreeHand’s template controls leave Illustrator’s in the dust.

10. Design arrowheads. Unlike in Illustrator, where you select from a handful of predefined dingbat-like arrowheads and then scale them to size, FreeHand gives you the absolute freedom to draw your own arrowheads.
## Drawing Distinctions (continued)

<table>
<thead>
<tr>
<th>Grade</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position points numerically</td>
<td>+ Dropped control-handle coordinate.</td>
<td>F Must position points manually.</td>
</tr>
<tr>
<td>Drag path by its center point</td>
<td>F Snaps to stationary center point only.</td>
<td>A Great for snapping and aligning.</td>
</tr>
<tr>
<td>Align points and paths</td>
<td>A Align whole paths only.</td>
<td>A + Average command aligns points; Align Objects filter aligns paths.</td>
</tr>
<tr>
<td>Distribute paths</td>
<td>A Distributes according to sides, center, and width.</td>
<td>B + Center distribution only.</td>
</tr>
<tr>
<td>Lock and unlock objects</td>
<td>A Can selectively unlock paths.</td>
<td>B Must unlock all locked objects at once.</td>
</tr>
<tr>
<td>Align and snap to locked objects</td>
<td>A Can select locked objects and use them in operations.</td>
<td>F Anything locked is untouched.</td>
</tr>
</tbody>
</table>

### TRANSFORMATIONS AND EFFECTS

<table>
<thead>
<tr>
<th>Grade</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving, scaling, rotating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Move numerically</td>
<td>D No direct distance and angle options; also harder to use.</td>
<td>A Supports direct and indirect distance values.</td>
</tr>
<tr>
<td>Transform numerically</td>
<td>A + Can click in document to set origin point.</td>
<td>B Can't numerically specify origin.</td>
</tr>
<tr>
<td>Set transformation origin point</td>
<td>B Set origin point during drag; must reset each time.</td>
<td>A Click to set origin point; can then use repeatedly.</td>
</tr>
<tr>
<td>Scale and rotate multiple objects</td>
<td>F Must transform each object independently.</td>
<td>A + Via Scale and Rotate filters.</td>
</tr>
<tr>
<td>Free-form distortion</td>
<td>F No such option.</td>
<td>A + Must perform inside cramped dialog box.</td>
</tr>
</tbody>
</table>

### Clones and copies

<table>
<thead>
<tr>
<th>Grade</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transform and clone simultaneously</td>
<td>F Requires separate operations.</td>
<td>A Using the option key or the Copy button.</td>
</tr>
<tr>
<td>Paste behind or in front of selected object</td>
<td>B Paste behind only.</td>
<td>A Can do both.</td>
</tr>
<tr>
<td>Repeat series of transformations</td>
<td>A Repeats several transformations performed in a row.</td>
<td>C Repeats last transformation only.</td>
</tr>
</tbody>
</table>

### Automated effects

<table>
<thead>
<tr>
<th>Grade</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit object blend</td>
<td>A Amazingly useful capability.</td>
<td>D Can blend colors using filter, but that's it.</td>
</tr>
<tr>
<td>Blend between geometric shapes</td>
<td>C Must ungroup the objects before blending.</td>
<td>A + No ungrouping necessary.</td>
</tr>
<tr>
<td>Expand and contract segments</td>
<td>F Ditto.</td>
<td>A + Bloated and Puny filters.</td>
</tr>
<tr>
<td>Twirl path outlines</td>
<td>F Ditto, again.</td>
<td>C + Filter requires additional points but produces rough results.</td>
</tr>
<tr>
<td>Trace path around stroke weight</td>
<td>A + Converts to straight compound path.</td>
<td>C + Converts to single path, which is difficult to edit.</td>
</tr>
<tr>
<td>Offset path outline</td>
<td>B + Changes original.</td>
<td>A + Clones and offsets, keeping original.</td>
</tr>
</tbody>
</table>

### FORMATTING AND MANIPULATING TEXT

<table>
<thead>
<tr>
<th>Grade</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entering, importing, formatting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text tool responsiveness</td>
<td>C Program sometimes delays before responding to text entry.</td>
<td>A Always reacts immediately.</td>
</tr>
<tr>
<td>Single-line text blocks</td>
<td>B + Can avoid abrupt tabular layout by creating text on a path.</td>
<td>A Point text accommodates headlines and logos.</td>
</tr>
<tr>
<td>Em-, en-, and thin-space characters</td>
<td>A + Same keyboard equivalents as in PageMaker.</td>
<td>F Standard variable space only.</td>
</tr>
<tr>
<td>Insert line and column breaks</td>
<td>A + Same keyboard equivalents as in Microsoft Word.</td>
<td>F Hand returns only.</td>
</tr>
<tr>
<td>Import formats</td>
<td>A + Text only and RTF.</td>
<td>A Text only, Word, MacWrite II, WriteNow, WordPerfect, and RTF.</td>
</tr>
<tr>
<td>Search and replace</td>
<td>F No such function.</td>
<td>A Can search for whole words; feature is case sensitive.</td>
</tr>
<tr>
<td>Location of character options</td>
<td>C + Character options split between two palettes.</td>
<td>A Everything is in Character palette.</td>
</tr>
<tr>
<td>View kerning information</td>
<td>C + Hidden in Inspector palette.</td>
<td>A + Information bar is useful for monitoring progress.</td>
</tr>
<tr>
<td>Prohibit hyphenation of selected word</td>
<td>A + In character-level portion of Inspector palette.</td>
<td>F Must force the word to the next line with a carriage return.</td>
</tr>
<tr>
<td>Control letters before and after hyphen</td>
<td>F Not an option.</td>
<td>A + Useful for centering hyphens and avoiding isolated syllables.</td>
</tr>
<tr>
<td>Type on a path</td>
<td>B Characters can rotate or skew with path or remain upright.</td>
<td>A + Automatically avoids clipping and spreading characters.</td>
</tr>
</tbody>
</table>

### Paragraph-level formatting

<table>
<thead>
<tr>
<th>Grade</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change justification from keyboard</td>
<td>F Have to use commands or palette controls.</td>
<td>A Just as in PageMaker or QuarkXPress.</td>
</tr>
<tr>
<td>Justify last line</td>
<td>A + Conditional function affects only those lines that extend into Flush Zone.</td>
<td>B Function is either on or off.</td>
</tr>
<tr>
<td>Control ragged-line weight</td>
<td>A + Can specify minimum length of shortest lines.</td>
<td>F Ragged lines use standard spacing.</td>
</tr>
<tr>
<td>Hanging punctuation</td>
<td>C + Ignores parentheses and en and em dashes.</td>
<td>B Ignores parentheses.</td>
</tr>
<tr>
<td>Paragraph spacing</td>
<td>A + Before and after spacing supported.</td>
<td>B Can specify spacing before paragraph only.</td>
</tr>
</tbody>
</table>

### Lists and tables

<table>
<thead>
<tr>
<th>Grade</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanging indent</td>
<td>A + Same as in a page-layout program.</td>
<td>C Only via cumbersome text-wrap technique.</td>
</tr>
<tr>
<td>Table</td>
<td>A + Permits multiple rows of type between tabs.</td>
<td>F Usually treats tabs like carriage returns.</td>
</tr>
<tr>
<td>Paragraph rules</td>
<td>D + Three-step, nonintuitive process.</td>
<td>F Must be drawn manually.</td>
</tr>
<tr>
<td>Divide table into rows and columns</td>
<td>A + Automatic row and column controls.</td>
<td>F Columns must be separate text blocks; can't tab between them.</td>
</tr>
</tbody>
</table>

### Flowing text

<table>
<thead>
<tr>
<th>Grade</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link text blocks</td>
<td>A + Can link standard text blocks to text on a path.</td>
<td>B Cloning block with direct-selection tool is convenient.</td>
</tr>
<tr>
<td>Reflow text inside linked blocks</td>
<td>C + Must manually reflow links.</td>
<td>A Change stacking order; rear text block is first in link.</td>
</tr>
<tr>
<td>Cut any block from link with text intact</td>
<td>C + Cumbersome to separate an interior block.</td>
<td>A Cut and paste.</td>
</tr>
</tbody>
</table>

### Block-level formatting

<table>
<thead>
<tr>
<th>Grade</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format text by dragging handles</td>
<td>B Applies to standard text blocks only.</td>
<td>F Points around text block don't affect formatting.</td>
</tr>
<tr>
<td>First-line indent</td>
<td>A + Nice touch</td>
<td>F Tightly packed text may exceed top of text block.</td>
</tr>
<tr>
<td>Prevent widows at the top of columns</td>
<td>C + In multicolumn blocks only, doesn't work across links.</td>
<td>F Must eliminate widows manually.</td>
</tr>
<tr>
<td>Automatically shrink text block to fit content</td>
<td>C + Reduce text block (not rectangles) only.</td>
<td>F Not available.</td>
</tr>
</tbody>
</table>

**Grade Key**
- A = Works like a charm.  
- B = Lacking in some respect, though still quite useful.  
- C = Frustrating implementation; requires more work than it ought to.  
- D = Barely usable, thanks to terrible implementation.  
- F = Feature is absent.
Illustrator 5.0 introduced the concept of automatic copyfitting to drawing programs by allowing you to change the characteristics of a single-line headline set in a Multiple Master font so that the text fits onto a single line. Unfortunately, Illustrator doesn't warn you if the text block is too narrow or too wide for the function to work properly. FreeHand has a similar feature that expands and contracts letterspacing, but it's even less reliable than Illustrator's.

FreeHand 4.0 broadened the idea of copyfitting to incorporate an entire text block. FreeHand can automatically increase or decrease type size and leading to fit a block of text into the confines of a given space. You can also balance the number of lines of type between multiple columns. Unfortunately, this second function doesn't work across linked text blocks, an ability that might prove handy when formatting documents with two or more pages.

**Fills, Strokes, and Color**

Illustrator takes the cake when it comes to automated gradations. Using the gradient tool, you can position the first and last colors of the gradation inside a filled object. You can also drag a single gradient across multiple selected paths. And if you click with the tool, you can adjust the focus point of a radial gradation so that the center of the fill is closer to one side of the radius than another.

FreeHand 4.0 lets you drag and drop colors onto objects to change their strokes and fills even when they aren’t selected. Illustrator also lets you change the attributes assigned to deselected objects, but it means using a special tool (the paint bucket). Also, if you want to change fill and stroke attributes independently, you have to fiddle around with a bunch of dialog box options.

The good news about Illustrator’s paint bucket is that it makes it easy to copy all attributes from one object and immediately apply them to another, regardless of how involved the attributes are. In FreeHand, your best bet is to save the attributes to a graphic style, then apply the style to the second object—a four-step process.

In addition to providing outstanding gradient-fill options, Illustrator is alone in automating color adjustments. Using plug-in filters, you can blend colors across a series of objects, whether or not the objects were created with the blend tool. You can also invert the colors in an object, though the operation works by inverting cyan, magenta, and yellow values only; shades of black and white remain unaffected. And you can apply Pathfinder filters to combine paths so that it appears as if the colors of one object mix with those of the object behind it—a means of faking QuickDraw transfer modes with a PostScript printer.

Illustrator also provides filters for increasing and decreasing color saturation; at least, that’s what these filters are supposed to do. In reality, they merely increase or decrease CMYK values, alternately darkening or lightening the colors. If the filters performed as advertised, you could decrease the saturation of colors to convert them to gray values or bump up the saturation to bring out stronger hues. As it is, these options are a wash.

**Output**

Both FreeHand and Illustrator avoid PostScript printing errors by splitting
### Fills, Strokes, and Color

<table>
<thead>
<tr>
<th>Feature</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Defining fill and stroke</strong></td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Tile patterns</td>
<td>C</td>
<td>A + 32</td>
</tr>
<tr>
<td>Postscript and texture fills</td>
<td>C + Limited amount; don't display properly in preview mode</td>
<td>C</td>
</tr>
<tr>
<td>Arrowhead editor</td>
<td>A + Draw your own in fully functioning editing window</td>
<td>A + Scalable, predefined dingbat arrowheads</td>
</tr>
<tr>
<td>Location of fill and stroke options</td>
<td>C + Scattered throughout the program</td>
<td>A + Centrally located in Paint Style palette with room to spare</td>
</tr>
<tr>
<td><strong>Gradient fills</strong></td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Colors per gradient</td>
<td>2</td>
<td>A + 92</td>
</tr>
<tr>
<td>Edit gradient in single deselected object</td>
<td>A + Drag and drop color to change color, angle, or center</td>
<td>D + Can reassign only with paint bucket</td>
</tr>
<tr>
<td>Adjust midpoint</td>
<td>D</td>
<td>A + Full midpoint control</td>
</tr>
<tr>
<td>Create gradation between spot colors</td>
<td>F</td>
<td>A + Correctly outputs to color plates</td>
</tr>
<tr>
<td>Name and save gradations</td>
<td>C + As styles only, which includes stroke definitions</td>
<td>A + Program saves gradations with document</td>
</tr>
<tr>
<td>Share gradations between documents</td>
<td>F</td>
<td>A + Useful when working on related illustrations</td>
</tr>
<tr>
<td>Save gradations to library</td>
<td>F</td>
<td>A + Just draw one of each and save file</td>
</tr>
<tr>
<td>Position colors and focus point in radial gradation</td>
<td>C + Position beginning color only; no focus-point control</td>
<td>A + Via gradient tool</td>
</tr>
<tr>
<td>Draw gradation across multiple shapes</td>
<td>B</td>
<td>A + Select multiple objects, drag with gradient tool</td>
</tr>
<tr>
<td><strong>Assigning attributes</strong></td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>Fill open paths</td>
<td>A + Must clone path, close and fill rear path, stroke front one</td>
<td>A + Useful for creating indefinate boundaries</td>
</tr>
<tr>
<td>Assign color to deselected objects</td>
<td>A + Drag drop into fill or stroke of object</td>
<td>C + Using paint bucket; must specify which attributes are affected</td>
</tr>
<tr>
<td>Copy attributes from one object to another</td>
<td>C + Quickest method involves four steps</td>
<td>A + Two clicks with the paint bucket</td>
</tr>
<tr>
<td>Select objects according to fill or stroke</td>
<td>F</td>
<td>A + Can even select masks</td>
</tr>
<tr>
<td>Create a style sheet of attributes</td>
<td>B</td>
<td>A + Must have parent style</td>
</tr>
<tr>
<td><strong>Color management</strong></td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Color models</td>
<td>A + CMYK, RGB, HSL, and HSB (Apple)</td>
<td>B CMYK and HSB (Apple)</td>
</tr>
<tr>
<td>Brand-name color libraries</td>
<td>A + Pantone, Trumatch, Focoltone, Toyotone plus DIC</td>
<td>A + Pantone, Trumatch, Focoltone, Toyotone</td>
</tr>
<tr>
<td>Import color</td>
<td>A</td>
<td>B Must import entire library</td>
</tr>
<tr>
<td>Share colors between all open documents</td>
<td>F</td>
<td>A + Useful when creating multiple illustrations for one client</td>
</tr>
<tr>
<td>Save color list to custom library</td>
<td>B + Must use special library format</td>
<td>A Any illustration functions at library</td>
</tr>
<tr>
<td>Remove all unused colors</td>
<td>F</td>
<td>B Automatically select all unused colors, then delete</td>
</tr>
<tr>
<td>Color fillers</td>
<td>F</td>
<td>B + Blend colors according to position or stacking order</td>
</tr>
<tr>
<td><strong>Masks (clipping paths)</strong></td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>Mask retains fill and stroke</td>
<td>A</td>
<td>D + Restore with filter, though this complicates editing process</td>
</tr>
<tr>
<td>Edit paths inside masks</td>
<td>F</td>
<td>A Highly versatile feature</td>
</tr>
<tr>
<td>Add paths to existing mask</td>
<td>C</td>
<td>A Can paste in front or back of any element inside mask</td>
</tr>
<tr>
<td>Use editable text as mask</td>
<td>D</td>
<td>A Characters serve as mask</td>
</tr>
</tbody>
</table>

### Output

<table>
<thead>
<tr>
<th>Feature</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Printing paths and halftones</strong></td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Split long paths</td>
<td>A</td>
<td>C + Permanently splits paths in document</td>
</tr>
<tr>
<td>Flatness</td>
<td>A + Global flatness now saved with EPS file</td>
<td>C + Control indirectly using Output Resolution option</td>
</tr>
<tr>
<td>Custom halftone frequencies and angles</td>
<td>A + Specify on object-by-object basis</td>
<td>D + Apply to entire document using Separator utility</td>
</tr>
<tr>
<td>Control steps in printed gradation</td>
<td>A + Useful for printing quick drafts</td>
<td>F No draft setting</td>
</tr>
<tr>
<td>Tile large artwork</td>
<td>C + Must rely on less-satisfying Overlap options</td>
<td>A + Control exact placement of tiles</td>
</tr>
<tr>
<td><strong>Color separations and composites</strong></td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>CIE monitor and ink calibration</td>
<td>F</td>
<td>A + Borrows settings from Photoshop</td>
</tr>
<tr>
<td>Print color separations</td>
<td>A + All options available from inside FreeHand</td>
<td>B Must leave Illustrator and launch Separator utility</td>
</tr>
<tr>
<td>Move document on printed page</td>
<td>F</td>
<td>A + From inside Separator</td>
</tr>
<tr>
<td>Add and move crop, registration marks</td>
<td>C + Assign custom registration mark via Color List palette</td>
<td>A + From inside Separator</td>
</tr>
<tr>
<td>Transfer functions</td>
<td>B + Must customize by editing PPD</td>
<td>A Fully customizable, but lacks presets</td>
</tr>
<tr>
<td>Ships with LaserWriter driver 8.0</td>
<td>A + Ships with standard product</td>
<td>C Included in CD-ROM version only</td>
</tr>
</tbody>
</table>

### Documentation and Pricing

<table>
<thead>
<tr>
<th>Feature</th>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manuals and online help</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>Technical support</td>
<td>B + Two worthy voice-mail menus before entering queue</td>
<td>B Must go through exhaustive voice-mail menu system</td>
</tr>
<tr>
<td>List price/upgrade</td>
<td>A + $595/$150</td>
<td>A $595, $595 for CD-ROM/$199; $249 for CD-ROM</td>
</tr>
</tbody>
</table>

### Overall Grade

<table>
<thead>
<tr>
<th>FreeHand 4.0</th>
<th>Illustrator 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

**Grade Key**
- **A** = Works like a champ
- **B** = Lacking in some respect, though still quite useful
- **C** = Frustrating implementation; requires more work than it ought to
- **D** = Barely usable, thanks to terrible implementation
- **F** = Feature is absent
- **New or significantly altered feature**: +

---

Drawing Distinctions (continued)
Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

overly long paths and flattening out complex curves. While FreeHand splits paths in memory and never alters the original document, Illustrator breaks up paths for document, Illustrator breaks up paths for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.

Chris Spollen used Illustrator 5.0 to create this piece, titled “The Wonder of Innovation.” Spollen created a palette of gradients and saved them for later use. He experimented with all the different gradients, using multiple levels of undo to easily switch between them.

Spollen used a yellow-red gradient for each section of the lightning bolt. First he selected the lightning bolt and selected a linear gradient; after selecting the bottom section, he clicked on the bottom point and used the gradient vector tool to drag the gradient from bottom to top (red to yellow) and then did the same for the middle and the top sections. He customized the gradient inside the gear to blend from yellow to red to yellow.
"A valuable tool that should be on the "shelf of anyone who manipulates images on the Macintosh."

MacWEEK, January 24, 1994

Specular Collage lets you quickly combine high-res images, without using a lot of RAM. Each image is a separate object—even after it's been blended with others. Layout images with the convenience of rulers, guides, image grouping and layers. Enhance your composition with a rich selection of effects such as transparency, automatic drop shadows, feathering, and Photoshop filters. Anything you do in Collage can be changed at any time, giving you total creative freedom!

TextureScape gives you the control to design detailed and rich textures, while freeing you to play with color, light, and motion. TextureScape's files take up little disk space (under 30K each), yet textures can be rendered at any size or resolution needed. TextureScape can also morph between textures! Compose a QuickTime movie of a marble background morphing into your logo. Achieve astonishing effects for your next presentation, video, or multimedia project.

An unlimited collection of textures... for less than the cost of one CD-ROM.

CALL SPECULAR INTERNATIONAL AT 1-800-433-SPEC

Circle 41 on reader service card
PILLAR'S FYPLAN IS A CORPORATE-WIDE BUDGETING SYSTEM THAT STORES EVERYTHING IN A UNIFIED DATA REPOSITORY, THEREBY AVOIDING THE MESS OF HAVING NUMEROUS LINKED BUDGETING SPREADSHEETS SCATTERED THROUGHOUT AN ORGANIZATION. FYPLAN IS DESIGNED SO THAT MANAGERS CAN EASILY DRILL DOWN THROUGH PROJECTIONS OR ROLL THEM UP FOR A BIG-PICURE VIEW. NOW PILLAR IS DEVELOPING AN ADD-ON FOR FYPLAN, CALLED FYCONTROL, FOR ANALYZING FINANCIAL RESULTS AND COMPARING ACTUAL versus PLAN.

FYCONTROL SHARES THE FYPLAN DATABASE, WHICH DIVISION MANAGERS, LINE MANAGERS, PRODUCT MANAGERS, AND OTHERS CREATE AS THEY ENTER SALES AND COST PROJECTIONS. FYCONTROL IS ESSENTIALLY A REPORTING TOOL FOR CREATING VARIANCE AND EXCEPTION REPORTS; PROJECTING RESULTS OF FUTURE OR PARTIALLY COMPLETED PERIODS; EXTRACTING INFORMATION ABOUT COSTS AND PERFORMANCE OF REGIONS, PRODUCT LINES, AND SO ON; AND DOING OTHER KINDS OF FINANCIAL ANALYSIS. MANAGERS CAN CONTROL WHICH LINE-ITEMS THEIR STAFF CAN ACCESS. FYCONTROL PROVIDES SORTING AND SUMMARIZING CAPABILITIES AND CAN GENERATE "WHAT-IF" SCENARIOS BASED ON MULTIPLE SETS OF PROJECTIONS. THE PROGRAM CAN ALSO ACCOMMODATE CORPORATE REORGANIZATIONS THAT MOVE COST OR PROFIT CENTERS IN THE MIDDLE OF A PERIOD.

FYCONTROL PROVIDES A SOMEWHAT LIMITED SET OF CALCULATIONS, THOUGH PROBABLY ALL THAT ANYONE WOULD NEED FOR THE KIND OF ANALYSIS IT IS DESIGNED TO PERFORM: IT CAN ADD, SUBTRACT, MULTIPLY, DIVIDE, AND TAKE PERCENTAGES AND ABSOLUTE VALUES.

PILLAR EXPECTS TO SHIP FYCONTROL 1.0 IN MAY. BECAUSE FYPLAN AND FYCONTROL REQUIRE SEVERAL HIERARCHICALLY INTEGRATED PIECES OF SOFTWARE, THEIR PRICING STRUCTURE IS COMPLEX. FYPLAN COSTS ABOUT $20,000 FOR THE FIRST FIVE USERS AND ABOUT $500 FOR EACH ADDITIONAL USER; THE FYCONTROL ADD-ON IS SLIGHTLY LESS EXPENSIVE. PILLAR, 415/349-6200.

SOUTHBAY SOFTWARE'S POWERAGENT EXPANDS ON THE CONCEPT OF MAC-AUTOMATING AGENT-BASED UTILITIES PIONEERED BY NO HANDS SOFTWARE'S MAGNET AND CHARLES RIVER ANALYTIQUES' OPEN SESAME. POWERAGENT GOES BEYOND THE TWO OLDER PROGRAMS IN ONE VERY IMPORTANT WAY: IT CAN AUTOMATE NOT JUST THE FINDER, BUT ALSO APPLESCRIPT-AWARE APPLICATIONS. (FOR MORE ON MAGNET, SEE "AUTOMATING THE FINDER," NEWS, MACWORLD, JULY 1992; FOR OPEN SESAME, SEE "OPEN SESAME READS MINDS," NEWS, SEPTEMBER 1993.)

POWERAGENT DOESN'T PROVIDE OPEN SESAME'S ABILITY TO ANALYZE THE TASKS YOU PERFORM ON YOUR MAC AND THEN OFFER TO TAKE OVER DOING THEM FOR YOU; INSTEAD, YOU USE A POINT-AND-CLICK DIALOG-BOX INTERFACE TO HAND-TOOL WHAT ARE CALLED JOBS FOR POWERAGENT TO PERFORM. BUT VERSION 1.0, SHIPPING NOW FOR $159, HAS AN INTERFACE.
for including any FileMaker Pro feature in a Job, and SouthBeach is adding support for other AppleScript-savvy applications. Upgrade plans were not set at press time. SouthBeach Software, 305/858-8416, 800/492-7753.—D.L.

The Electronic Routing Slip

BlueRidge Technologies has upgraded its client-server document-processing system, Optix Workflow, with tools that enable a user to designate the route a document travels through an office using a point-and-click graphical route developer. Designed to replace the bottleneck-ridden flow of paper documents, Optix Workflow can send documents across a local or wide area network. Workflow 1.0 required command-line programming. In version 2.0, users can design routes by drawing lines between icons representing users; routes can be designed for such contingencies as skipping someone who fails to acknowledge a document’s arrival. Documents can originate in electronic format or be scanned into BlueRidge’s Optix Network, a document-archiving system.

Workflow pricing begins around $50,000 for an office; with Network, pricing begins around $75,000. BlueRidge Technologies, 703/675-3015.
—JOANNA PEARLSTEIN

Document Conferencing on the Network

Computer users who need to collaborate may find a solution in Crosswise Corporation’s Face to Face, document-conferencing software that lets Mac and Windows users create images of their documents with a special printer driver and then view and edit them together from different locations. Face to Face is $295 for a two-user pack and can connect two users at a time via high-speed modem, ISDN line, or AppleTalk network. Face to Face can also recognize a user’s PowerTalk directory.

Face to Face is $295 for a two-user pack and can connect two users at a time via high-speed modem, ISDN line, or AppleTalk network. Face to Face can also recognize a user’s PowerTalk directory.

Face to Face has tools for navigating, drawing, erasing, and creating text. Each participant’s comments are displayed on a separate transparency-like layer over the document. After conferencing is complete, participants can save, print, or forward the edited document.

Unlike videoconferencing, Face to Face requires no special hardware. Crosswise envisions Face to Face as a replacement for faxing or mailing documents that are later discussed by phone. Face to Face users can talk on the phone while viewing and editing the electronic files. Crosswise, 408/459-9060.
—JOANNA PEARLSTEIN

Control with Flexibility

Attain Corporation’s In Control outliner/planner is being upgraded to version 3.0, with support for modifying how information is presented, as well as a long list of incremental improvements.

In Control now has four views that can be reconfigured extensively—for example, you can display the weekly calendar and the new to-do list side by side under the outline. You can also set how many weeks appear in the weekly calendar, and how many months in the new monthly calendar. A new daily calendar allows you to schedule your time hour by hour. The calendar views also provide banners—icons running across multiple days or weeks showing the duration of an event.

In Control 3.0 allows users to create custom views that combine the structured, outline-based to-do-list manager with day, week, and month calendars.

In Control 3.0 should ship in May and will probably list for $129.95. Attain, 617/776-1110, 800/925-5615.—D.L.
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 prein- stalled, 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.

Insignia®

Windows Compatibility for the Power Macintosh.
Power Tips for LaserWriter 8

POSTSCRIPT PRINTER PERFORMANCE HAS improved dramatically over the last decade, thanks to faster print engines and faster processors. And the Macintosh's PostScript printer driver—the program that enables the Mac to communicate with a PostScript printer and that you access by clicking on its icon in the Chooser—has also evolved.

The latest driver, called LaserWriter 8 by Apple, and Adobe Printer Driver PSPrinter by Adobe Systems—Apple and Adobe collaborated on the driver's design—provides better all-around printing performance and supports PostScript Level 2 machines. (PostScript Level 2, which most new PostScript printers use, is faster than the earlier PostScript and manages the printer's memory better, among other things. But many of LaserWriter 8's special features are accessible even with older PostScript printers.)

Some of LaserWriter 8's enhancements are aimed at users of color printers and imagesetters, but many of its enhancements are also useful for the Macintosh in a gray flannel suit. For example, the driver can add options to the page-setup and printer dialog boxes that let you access special features found in many printers, such as enhanced resolution, support for multiple paper trays and fax-modem cards, and even duplex mechanisms (which flip paper inside a printer to print on both sides of a page). The key to LaserWriter 8's ability to support unique printer features is each printer's printer description file (PDF), a description of the printer's capabilities—its resolution, paper-handling features, and so on—which LaserWriter 8 reads. (PDF files, also called PPDs, or PostScript Printer Descriptions, reside in the Printer Descriptions folder inside the System Folder's Extensions folder. See the screen image "More Choices Dialog").

This month's column is a guide to the ways business users can take advantage of LaserWriter 8. The most recent version is 8.1.1; its primary improvements to version 8.0 include better TrueType support, better compatibility with Mac applications, improved support for Apple's ColorSync color-management system, and fax logging for fax-equipped printers. If you're using an earlier version of the driver, you can get the PSPrinter driver package with documentation for $24.95 from Adobe Systems (415/961-4400, 800/833-6687). The driver package includes PDFs for many printers; printer vendors usually supply only the PDFs for their own printers, so if you need additional PDFs—perhaps to create print-to-disk files for an imagesetter or other printing device that you don't have—you'll need Adobe's library of PDFs. The driver also comes with the CD-ROM versions of many Adobe products, including Photoshop, Illustrator, and Premiere. (If you don't know what driver version you have, select the driver—it's in the Extensions folder inside the System Folder—and choose Get Info from the File menu.)

Pick Your Paper

More and more PostScript printers include or accept optional multiple paper sources (see "Tray Chic: Paper-Handling Options"). LaserWriter 8 lets you tap these trays in several ways. Two or more trays make it easy to mix and match paper stocks without walking over to the printer and sliding trays in and out. In an office, multiple bins can help you avoid situations such as one person installing transparency stock just as another person begins a 48-page print job.

Here are several ways you can put two trays to work.

• **Multipage business letters** Put letterhead in the upper tray and second sheets in the lower one. Then, in the Paper Source area of the Print dialog box, choose Upper for the first page, and Lower for the remaining pages (see "Paper-Feeding Controls"). Here's a variation of this technique for a printer that has one paper cassette and one multipurpose tray, such as Apple's LaserWriter Pro series. Put second sheets in the cassette and letterhead in the multipurpose tray. Then select First From Multipurpose Tray and Remaining From Cassette. If the majority of your letters are only one page, you should reverse this scheme.

• **Printing rough proofs** Put el-cheapo copier bond in the upper tray and high-quality laser paper in the lower one. When you're proofing a document for typos and errors in the layout, use the upper tray. When you're ready for final output, use the lower one.

• **Paper and transparencies** Put laser stock in one tray and transparency stock in the other. (Check the box your transparency stock comes in to verify that it can be fed automatically—some transparencies must be manually fed.) If your
More Choices Dialog
This dialog box, which you access by
dicking on More Choices in the Printer Setup
dialog box, lets you manually select a different PDF
(also known as PPD). You might do
this when preparing a print-to-disk file using the driver for an
imagesetter or color printer that you don't actually have.

Paper-Feeding Controls
The Paper Source pop-ups in LaserWriter 8's Print
dialog box let you mix and match paper within a
print job. Here, the first page of a document will be printed using the
paper in the printer's upper tray, while the remaining pages will use the paper in the lower tray.

Printing Thumbnail Pages
LaserWriter 8's Page Setup
dialog box contains a pop-up menu called Layout that lets you
reduce two or four pages and print them on a single
sheet of paper with a black
border around each page. You can use this feature to save paper and toner when you're printing simple documents
such as text manuscripts or
E-mail messages. You'll be
surprised at how readable the
text remains when it's re­duced, especially with two-up
printing. Text printed in four-up mode is a bit small—if the bottom rows of an eye chart
give you trouble, don't go any
smaller than two-up.

The thumbnail option is
also a handy way to reduce
documented and save
room in your filing cabinet, and it's great for storyboarding
your presentations. And for you desktop publishers, two-up printing is a good
way to gauge how a two­page spread will appear when it's printed.

(Here's another slick Page
Setup feature previous Laser­Writer drivers lacked: You
can click on the graphic re­presentation of the-page—the
picture of the dogcow—to replace it with
a description of your printer's exact imageable area, that is, how close to the
dge of the page your printer can put
down toner.)

Print Power
I've already touched on the best new fea­
ture of the LaserWriter 8 Print dialog
box: the Paper Source options that enable you
to bounce between bins. Clicking on
the Print dialog box's Options button
reveals more options that you can use to fine-tune print jobs and save time in the process (see "Exploring Print Options").

If you're proofing a document that
contains scanned images or illustrations
with color or gray shades, you can shorten your printing times—often dramatic­
ally—by choosing the Black & White
option instead of Color/Grayscale. In a
similar vein, if your printer has a halftone­
enhancement feature such as Apple's
PhotoGrade, you can probably reduce
printing times by disabling it: click on
Options, locate the PhotoGrade pop-up
menu, and choose Off. (However, dis­abling a text-enhancement feature—for
example, Apple's FinePrint or Hewlett­
Packard's Resolution Enhancement techn­ology—generally does not save on printing
time. Here's another efficiency tip.
Some color printers still ship with Laser­
Writer 7.X because printer vendors know that the way LaserWriter 8 saves a job to disk before printing it temporarily uses
more disk space than LaserWriter 7.X.
To avoid running out of disk space when
printing huge files, you might want to keep the old driver installed, using the
Chooser to switch between it and Laser­
Writer 8 as needed. You can mix Laser­
Writer 8.X and LaserWriter 7.X on a net­
work without problems.)

Options you choose in the bottom
portion of the Print dialog box revert to
their original, printer-resident settings
after you print one document. For in­
stance, if you disable PhotoGrade to get
faster output of a given document, the printer remembers PhotoGrade after print­
ing the document.

What's Your Destination?
LaserWriter 8's Print dialog box has but­
tons in an area labeled Destination that let
you send a document to the printer or to
disk file. Desktop publishers often cre­
ate a raw PostScript disk file when they
plan to send documents to a service
bureau for high-resolution imagesetter
output—the process eliminates the need
for the service bureau to have the appli­
cation that created the document.

LaserWriter version 8.1.1 builds on
the print-to-disk feature with an option
to create an encapsulated PostScript
(EPS) version of a single page within a
document. You could use this to create a
page-within-a-page effect—for example,
to include a page from a report on a pre­
sentation slide. The print-to-disk fea­
ture makes it possible to export an EPS
image from programs that don't provide
EPS export.

In the Destination area of the Print
dialog box, click on the File button
(notice the Print button changes to read
Save). In the Pages area of the dialog box,
specify the page number of the page you
want to save as an EPS file. When you
click on the Save button, you'll get a Save
dialog box with two EPS Mac options (the
EPS Mac Enhanced option yields better
results but uses more disk space).

By the way, if your printer contains a
PostScript fax card, the Destination area
has a third button, for faxing the docu­
ment. LaserWriter 8.1.1 logs outgoing
faxes. (The LaserWriter Select 360 Post­
Script Fax Card sells for $309. The Laser­
Writer Pro 810 PostScript Fax Cartridge
sells for $309. For more information on
continues.

exploring print options
Clicking on the Options button in
the Print dialog box reveals another dialog box that lets you control features unique to each printer. Here, the PhotoGrade feature
that is provided by many Apple LaserWriters is being dis­abled.
Since 1987, when Canon introduced the world's first Color Laser Copier, our copiers have made a whopping one billion, two hundred million color copies.

It's no wonder Canon has been the unsurpassed leader in color copiers for six consecutive years, with equally unsurpassed color quality.

Today, Canon makes the most technologically sophisticated color copiers available, including copiers that can even connect to your computer. And because different work environments have different needs, Canon offers a choice of color copier solutions. One sure to fit your needs.

So if you want the experience of Canon color copiers behind you, start pushing:
1-800-OK-CANON. We'll immediately rush you a free Color Solutions guide.
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!

The Drive To Succeed

Chinon America, Inc., 615 Hawaii Avenue, Torrance, CA 90503  Toll-free (800) 441-0222  In California (310) 533-0274

IBM is a trademark of International Business Machines Corporation. Macintosh is a trademark of Apple Computer, Inc.
Here's an overview of special paper trays available for Apple's LaserWriter line; equivalent options are available for most third-party printers. Besides Apple, Hewlett-Packard, Texas Instruments, QMS, and Lexmark generally offer the widest array of paper-handling add-ons.

- For the LaserWriter Select 360, Apple offers the LaserWriter Select 250-Sheet Feeder w/Cassette ($149). Apple also offers the LaserWriter Select 30-Envelope Cassette ($89); the LaserWriter Select 250-Sheet Legal Cassette ($79); and the LaserWriter Select Multipurpose Tray Option ($25), which holds 50 sheets or 5 envelopes.

- The LaserWriter Pro 600 and 630 are complemented by the LaserWriter Pro 500-Sheet Feeder ($399) and the LaserWriter Pro Envelope Feeder ($399), which holds 15 envelopes.

- Apple's LaserWriter Pro 810 can shuffle paper better than a bureaucrat, boasting three 250-sheet trays as standard equipment. The optional LaserWriter Pro 810 Automatic Media Feeder ($359) holds 15 envelopes or 100 sheets of transparency media or card stock.

- The now-discontinued Personal LaserWriter NTR had one 50-sheet multipurpose tray. Apple still sells the Personal LaserWriter 250-Sheet Cassette Base ($99) as well as the Personal LaserWriter Letter Cassette ($69), the Personal LaserWriter Legal Cassette ($65), and the Personal LaserWriter Envelope Cassette ($75).

Datasource (404/451-0257, 800/676-3962) sells TowerFeed multibin add-ons for the LaserWriter Pro 600 series and the discontinued LaserWriter II line (the iINT, iINTX, III, and llG). The TowerFeed 444 is available in several configurations: the Model 33 ($1995 for LaserWriter II's, $2195 for the LaserWriter Pro 600s) provides three 500-sheet trays; the Model 44 ($2395 for LaserWriter II's only) provides four trays; the floor-standing Model 75 ($3745 for LaserWriter II's, $3945 for the LaserWriter Pro 600s) provides five trays in addition to two storage drawers. All include enhanced driver software for switching between several trays and giving trays descriptive names such as "Letterhead" and "Rough Drafts." TowerFeed models are available for other brands of laser printers, and Datasource also sells less expensive devices for such tasks as feeding large quantities of envelopes or stacking printer output.

PostScript faxing, see last October's Working Smart column.)

Modifying LaserWriter 8

While exploring America Online, I found a utility that can perform several modifications to the LaserWriter 8 driver. Printer Defaults 1.1.1, a free utility created by John Rawnsley, can modify the driver to not print page borders in the two-up and four-up modes; to limit the maximum number of copies you (or people whose Macs you administer) can print; to add a two-up or four-up pop-up menu to the Print dialog box; to not require AppleTalk to be active (for generating print-to-disk files when you aren't connected to a network); and much more.

If you're comfortable working with Apple's ResEdit utility (version 2.1.1, $29.95 with documentation; APDA, Apple, 716/871-6535, 800/282-2732; free online and from most user groups), you can perform several more modifications, including adding the ability to print more than four thumbnails on a page. (This can be handy if you have an 11-by-17-inch printer.) You'll find instructions in a file named LaserWriter 8.x Hacks & Patches 1.1, created by Don Markuszon. But don't modify your only copy of the driver. Make a duplicate and modify the copy instead—cheap insurance in case you do something to scramble it. Also, if you're in charge of a network, you might give all users a copy of the modified driver so that everyone has the same printing options.

You can locate Printer Defaults 1.1.1 or Don Markuszon's modification instructions using America Online's file finder (search for the text LaserWriter 8). Or just visit the Macworld Online forum on America Online. If you use either of the files—or if you come up with additional tricks for LaserWriter 8—drop me an E-mail and share your experiences. My AOL address is JIMHEID; on CompuServe, I'm 76174,556.

NEXT MONTH: Time Billing

June 14, 1963.
Cindy Smith plays with color.

Thirty years later her business
depends on it.

Introducing the QMS ColorScript Laser 1000.
Now your business has total freedom of expression.

For Cindy, communicating decision-critical information quickly, flawlessly and in brilliant color is now her livelihood. That's why she depends on the QMS ColorScript® Laser 1000 Print System. It frees her to print entire forms and letterhead with color logos, images and high quality text without changing paper. It saves her the cost of stocking special forms, letterhead and multiple sets of supplies and uses standard paper and transparencies. It improves her message by highlighting key data with color in multipage presentations and documents. Add direct connection to a variety of networks and anyone can realize both greater productivity and a per user cost that rivals personal printers. Plus, our easy software loadable upgrades virtually eliminate obsolescence.

Save money. Save time. Free yourself from limitations. Discover the advantages of the QMS® ColorScript Laser 1000 Print System.

• Laser color and monochrome printing • Compatibility with PostScript™ Level 2 and Level 1, HP PCL® 5C and HP-GL®
• TrueType font scaling • Automatic collation • Simultaneous input and automatic emulation switching • 65 resident type fonts • EiCColor™ and Colorimetric color dictionaries and Apple ColorSync™ device profile
• Supports DOS, Windows®, Macintosh® and Unix® applications • Software loadable system upgrades

Expression is a serious business.
Call QMS today at 800 392-7559 or 205 633-4300
for the name of a reseller demonstrating
the QMS ColorScript Laser 1000 in your area.

QMS
Q-Fax 800 633-7213 • Canada 800 263-5508

QMS, QMS ColorScript and the QMS logo are trademarks or registered trademarks of QMS, Inc. PostScript is a trademark of Adobe Systems Incorporated which may be registered in certain jurisdictions. All other product and company names mentioned are trademarks or registered trademarks of their respective companies.

InfoFAX
Please see page 199 for instructions.
Tips, Tricks, and Shortcuts

EVERYONE KNOWS HOW TO LOCK A FILE with the Finder's Get Info command, but how do you lock a folder? It's easy with System 7, says Marc Robinson of Philadelphia. Just select the folder you want to lock, choose Sharing from the Finder's File menu to bring up the folder's file-sharing privileges window, and in it check the box labeled “Can't be moved, renamed or deleted.” You don't have to actually share the folder or change any other settings in the privileges window. For this trick to work, System 7's file sharing must be on; the Sharing command tells you to turn it on with the Sharing Setup control panel if necessary.

Sound Improvements

Q How can I upgrade my Mac IIci to the same sound capabilities as the latest Mac models?

Frank A. Cuomo Gadsden, Alabama

A You can get the CD-quality audio input and output (stereo 16-bit sound sampled at 44.1kHz) that comes on the 660AV and 840AV as well as every Power Mac by installing the Pro Audio Spectrum 16 Mac, a $495 NuBus card from Media Vision (510/770-8600 or 800/845-5870). An LC version is also available for $395. These products include a multisource analog mixer, a 20-voice stereo synthesizer, and MIDI input and output; no Mac's built-in audio has these features.

You can also improve the operating system's handling of sound by installing Sound Manager 3.0 (available from online services or as part of Apple's System Update 2.0.1 from the Apple Order Center, 800/769-2775, ext. 6717, for $10). Sound Manager 3.0 includes a system extension and a new Sound control panel. You must have System 7.0 with QuickTime, System 7.1, or a later version of system software. It works on all Macs except the classic-style hardware such as the Macintosh Plus, SE, and Classic.

Here's a rundown of Sound Manager 3.0's main improvements according to Apple: Sound Manager 3.0 is more efficient than previous versions and makes audio sampled at 11kHz sound much better. As a result, applications can play more sounds simultaneously and QuickTime movies sound better. With Sound Manager 3.0 installed, you can boost the volume of a QuickTime movie by pressing the option key while adjusting the volume control in the QuickTime movie controller. On monophonic Macs like the LC, Sound Manager 3.0 blends the left and right channels of a stereo signal instead of playing only the left channel. A true square-wave tone generator lets you hear the Simple Beep alert sound the way it was designed to sound. You hear fewer clicks and pops in general, and other bugs have been fixed.

Disk-Space Wasters

Q I copied a folder with 2134 alias files from one hard drive to another. The Get Info command shows that the size of the folder doubled from 2.7MB to 5.4MB, while the byte count remained the same (1,028,378 bytes). What gives?

George Kopecky Honolulu, Hawaii

A Undoubtedly the folder size increased because the destination drive had a larger capacity than the source drive. The Mac file system allocates a minimum amount of disk space for each file regardless of its actual contents. The minimum file size for a particular disk is set when it is formatted (or when it is partitioned, if it has multiple partitions), and increases incrementally as disk (or partition) capacity increases. Most formatting programs set a minimum file size of 1K on disks with capacities of less than 64MB, 1.5K on disks with capacities of 64MB to 95MB, 2K on disks between 96MB and 127MB, and so on. Thus 2134 files would take at least 2.1MB (2134K) on a 40MB hard drive but 4.2MB (4268K) on a 120MB drive. Allocating disk space in smaller chunks than these would decrease hard drive performance.

The byte count doesn't change when you copy files because it measures the amount of space actually used, not the amount allocated. Typically an alias file uses less than the amount allocated even on a small hard drive; unfortunately the unused part of the allocated space is wasted. Your 2134 alias files, which use a total...
of about 1MB (1,048,576 bytes), waste 1.6MB on your smaller drive and 4.1MB on your larger drive. To reduce this kind of waste, use a disk-formatting program to partition your large drive, and then keep small files like aliases on partitions smaller than 64MB.

Avoiding Inverted Records

TIP 4th Dimension's Array to Selection command does not always work as you might expect. If you use the command to copy an array to an empty file (a file that has no records), the records created contain an upside-down image of the array; that is, the first record contains the value of the last array element, and so on. This behavior is undocumented. You can get around it with a 4D procedure that first creates a number of blank records equal to the number of elements in the array (using a For loop and the Size of Array function); then selects all records in the file (using the All Records command); and finally copies the array elements, in order, to the newly created blank records (using the Array to Selection command). Alternatively, you can simply reverse-sort the array before executing the Array to Selection command. This works only if the array is already sorted and you don't mind changing the order of the array.

Kabila Gomaa
Cairo, Egypt

While these methods may work for you, ACI US technical support warns that record order is never guaranteed in 4th Dimension, and record order is especially vague if you've deleted records to make a file empty, because 4D tries to reuse the space once occupied by deleted records. The only reliable way to arrange records in a particular order is to sort them. To achieve your goal, you would save the value of an array element in one field of each record and the corresponding index number of the array element in a separate sort-key field. Then you could sort the file by that sort-key field to arrange the records in the same order they had in the array.—L.P.

Rotating Oblong Images

TIP If you open a horizontal image in Fractal Design Painter 2.0a (with or without Painter/X2) and then rotate the whole image to a vertical orientation, Painter crops the now-vertical image to fit the original horizontal image area. This cuts off a lot of image! By following these steps you can get a perfectly rotated vertical image:

1. Open the image, check its dimensions with the Resize command, and note its horizontal dimension.
2. Open a new square document with dimensions slightly larger than the hori-

Once in a while in Microsoft Excel you may need a multiple pie chart of the type shown here. You could create two charts, copy them to a draw program, and assemble a composite there, but Shane Devenshire of Walnut Creek, California, has devised a trick for creating the compound chart in one chart document.

1. Start by entering two columns of data and including an extra row with dummy data whose values are much larger than the other entries. Then select the data and use the New command to create a new chart document.

2. Choose Pie from the Gallery menu, and in the dialog box that appears double-click pie chart style 5. This creates a pie chart for your first column of data, with each pie slice labeled.

3. Choose Add Overlay from the Chart menu, creating a line-type overlay chart for the second column of data. To change the overlay to a pie chart, choose Overlay from the Format menu. In the dialog box that appears, choose Pie from the Overlay Chart Type pop-up menu and click OK.

4. Select the dummy data pie slice from the overlay pie and drag it away from the pie center. This shrinks the overlay pie, revealing the main pie underneath. You can shrink the top pie more by dragging the slice farther out, or enlarge the top pie by dragging the slice closer to the center.

5. Remove the dummy slices from both pies by switching to the spreadsheet window and clearing the dummy data row. Switch back to the chart window and change the pie-slice colors on the overlay chart to match the colors on the main chart. (To change a slice's color, double-click the slice to bring up the Patterns dialog box, and then choose a color from the Foreground pop-up to match the slice for the same data category in the main chart.) Remove the slice labels on the overlay chart, which duplicate the labels on the main chart, by selecting each label in turn and using the Clear command. Finally add a chart title with the Attach Text command, and add a legend as unattached text.
Introducing Proxima’s Portable 10-Foot Monitors

With Proxima’s desktop projection products, you can now project computer and video images as large as 25 feet! And that means you can take advantage of the productivity-enhancing power of your personal computer to make your presentations, business meetings, training, and interactive workgroup sessions more effective.

Simply connect a Proxima Desktop Projector™ to your PC or Mac and instantly deliver dynamic color graphics...crisp data...brilliant video. Or place one of our LCD projection panels on an overhead projector; plug it into your computer, and—presto!—the benefits of the giant screen are yours.

From our MultiMode® and active-matrix Ovation™ projection panels to our dazzling new Desktop Projectors and our remarkable Cyclops® cordless-mouse pointer, Proxima has created a whole new way to showcase your ideas and imagination—starting at less than $1,600!

So call us for more information.

CALL NOW TOLL-FREE 1-800-447-7694

Proxima Corporation 9440 Carroll Park Drive, San Diego, CA 92121-2298. (619) 457-5100. In Europe: Horstweg 24. 6191 RX Beek, The Netherlands. +31-43-650-248. Proxima, MultiMode, and Cyclops are registered trademarks and Ovation, Desktop Projector, and Desktop Projection are trademarks of Proxima Corporation. Other trademarks are the property of their respective owners.

Circle 47 on reader service card
Although Adobe Illustrator 5.0's Paint Style dialog box doesn't allow you to paint a stroked path with a gradient for creating a trap, Evan Goldstein of Wantagh, New York, has devised an easy workaround. The following steps illustrate the method, with a hexagon that is filled with a red-to-yellow gradient on a rectangular background that is filled with a green-to-purple gradient. This method works with other objects (including type you have converted to outlines) and any combination of gradients.

1. Create a rectangle and fill it with a green-to-purple gradient. Then create a hexagon on top of it, fill it with a red-to-yellow gradient, and stroke it with a solid line for the trap (as always, the stroke should be twice the thickness of the trap).

2. Select the hexagon and choose Outline Stroked Path from the Objects submenu of the Filter menu. This filter removes the hexagon's original stroke and creates a new compound path that precisely outlines the hexagon's original stroke. You may find it helpful to enlarge the view so you can clearly see the new compound path. To understand what the filter created, use the selection tool in preview mode to drag the compound path out of position temporarily. Then undo to move the compound path back into position. This compound path will be the overprinting stroke for the hexagon.

3. Select the original hexagon and make sure it is not set to overprint. Then select the compound path, which can be filled, and fill it with the same red-to-yellow gradient as the hexagon. Set the compound path's fill to overprint. Now the edges of the original hexagon are covered by a compound path that extends into the green-to-purple background and overprints to act as a spread. In this example, the object is lighter than the background. If the background in your drawing is lighter than the object, fill the trap with the same gradient as the background. If you want to change the direction of the gradient, make sure to first select both the object and the compound path so that the trap's fill matches the object's fill. It's easier to select an individual object—the compound path, the object it traps, or the backdrop object—if you put them in separate layers. This is especially helpful if you want to use the gradient tool to change the angle of the gradient.

4. Rotate the selection to a vertical orientation, copy it, and then use the Paste into New Picture command to create a new document with the image vertically oriented.

John Allison
Vancouver, British Columbia, Canada

**Theft Recovery Aid**

**Tip** PowerBook owners, a custom start-up screen can help you recover your computer if it is ever stolen. Just create a PICT file containing the text “THIS POWERBOOK IS STOLEN!” and save the file in your PowerBook's System Folder in start-up screen format. Better yet, include digitized photos and vital statistics of yourself and other persons authorized to have the PowerBook (see “Authorized Carriers”). For even more security, use ResEdit or some other file-utility software to make the Startup Screen file invisible. Even a thief who knows where to look for a start-up graphic will conclude you burned it into ROM.

Kevin McKeown
Santa Monica, California

---

This tip is not mentioned in the ZTerm documentation, but is described in the ZTerm 0.9 FAQ by Leslie Jones. This document answers frequently asked questions (FAQs) about ZTerm and includes undocumented tips, ResEdit hacks, bug reports, and bug fixes. It is always available electronically on America Online and numerous internet FTP sites, and it is usually available on other commercial online services as well.—L.P.

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.

**Authorizing Carriers** A start-up screen like this won't keep someone from walking off with your momentarily unattended PowerBook, but just imagine the scene at the pawn shop.

310/782-8190, 800/228-5651 as well as the disk-locking options of many hard drive formatting programs prevent bypassing the password. For more information on PowerBook security, see PowerBook Notes, June 1993.—L.P.

**ZTerm Menu Separator**

**Tip** You can create a separator line in ZTerm 0.9's Dial menu by creating a new entry in the dial directory with a hyphen as the name. This is useful for me since I access two sets of BBS numbers, each set in a different area code: one from my home town and one where I attend school. I make an entry appear above the separator line by prefixing its name with a space, and I do nothing special to entries I want to appear below the separator. ZTerm evidently alphabetizes its Dial menu by the numeric codes that the computer uses to internally represent text, and a space has a lower code than a dash, which has a lower code than numbers and the letters of the alphabet.

Matt Brown
Columbia, Missouri

---

Many programs can save PICT files in start-up screen format, including Deneba's Canvas 3.0, Capture Viewer (bundled with Mainstay's Capture 4.0), Adobe Photoshop (all versions), and Deneba's UltraPaint 1.03.

Utility software such as Connectix PowerBook Utilities, Norton Essentials for PowerBook, and VST Systems' PTools can be set to require entering a password before allowing your PowerBook to wake up or start up, but these passwords are easily bypassed by starting up with a floppy disk. Disk-locking software such as SafeLock (Trend Micro Devices, 154 June 1994 MACWORLD
Divine the Future of Imaging

Thirty-three fantastic filters and extensions for Photoshop, Painter, Canvas, PixelPaint, PhotoFlash and others that accept plug-ins. Radiant gradients. Gorgeous textures. Awesome fractals. As the highest rated program ever reviewed in MacWeek, Kai’s Power Tools is unmatched. And now it’s a standalone solution because it includes Color-It!, Micro Frontier’s award-winning 32-bit image processing paint program—FREE!

“KPT is not only great for dazzling special effects, but it provides a wealth of tools for the nuts and bolts work we all do every day.”

Lee Varis
Digital Artist

ABOUT THE IMAGE: Renowned digital artist/photographer Lee Varis of Los Angeles, Calif., filled in the world of “The Hermit”, one in his series of haunting tarot card images, using Kai’s Power Tools. KPT’s Gradient Designer produced the glowing orb and its cascading rays. KPT Texture Explorer created the card’s border, while the KPT Sharpsh Intensity filter brought out details in the rock. To build the dream-like landscape on the horizon, Varis used a beta version of the awesome KPT Now World Explorer™ (codename “Bryce”), a powerful natural and supernatural 3-D landscape creation program—coming soon from HSC Software.
How can you maximize the potential of the Macintosh? See the latest and best Macintosh products and services? Learn how best to put the Macintosh to work for you? Discover all this and more at MACWORLD Expo.

With over 400 exhibiting companies presenting the latest in Macintosh technology, MACWORLD Expo 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, the world of Macintosh all comes into view.
Discover the Creative Possibilities

At MACWORLD Expo, make side by side comparisons of thousands 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 best products for your individual needs. We'll help you take your Macintosh to the max!

MACWORLD Expo/Boston; August 2-5, 1994

MACWORLD Expo/Boston will cover over 350,000 square feet of exhibit space at both the World Trade Center and Bayside Exposition Center. When you come to MACWORLD Expo/Boston, 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. You'll see all this spread out over both locations so plan to be in Boston from August 2-5 and experience the Macintosh at its absolute best!

Pre-Registration Savings!

Now is the time to pre-register for MACWORLD Expo. Return the attached pre-registration form with your payment by June 24 and save $30 on all conference sessions and exhibits ($120 now vs. $150 at the door). An exhibits-only admission saves you $15 ($25 now vs. $40 cash only at the door). And since your time is as valuable as your money, we'll send your admission badge early when you pre-register. Avoid the registration crowds and get a jump start on the exhibition!
Tomorrow's Innovations Today

MACWORLD Expo/Boston 1994 celebrates the 10th anniversary of the Mac's debut with a panorama of empowering opportunities and possibilities. From Apple's technological breakthroughs to the impact of digital convergence, you'll discover new dimensions to the Mac.

Here's a preview of MACWORLD Expo/Boston's 14 separate conference programs.

Create your own agenda:

1 The PowerPC Conference.
Everything there is to know about PowerPC — for users, vendors, and developers — including: What PowerPC Delivers; Apple’s Implementation vs. IBM’s; Compatibility; Upgrading; When/What to Buy; Native vs. Emulation; How Competitive is Power PC?; PowerPC Development Tools; and more.

2 The Design Conference.
Celebrated Mac designers share creative insights and power-user tips on: color management; creative imaging; prepresse; digital photography; mixing media; digital art; KPT; and more.

3 The Entertainment Conference.
The best in the business present tools and techniques for TV, films, and commercial applications, featuring: Interactive Cinema; QuickTime Movies; Digital Video; High-End Music; Innovative Effects; Interactive Erotica; Live Theatre; and Broadcast Quality Graphics.

4 The Connectivity Conference.
Enhance communications, maximize networks, and see what's in store for the future with: Connect-Anywhere Networking; Maximizing the Internet; Networking Newtons; TCP/IP; Client/Server; Network Management Tools; AppleTalk Networking.

5 The Small Office/Home Office Conference.
Your needs are different than giant organizations! Special SOHO tips on marketing, telecommuting, finance/administration.

6 The Science/Technology Conference.
The Mac as a critical tool in laboratory and scientific settings, including tips on visualization using Quicktime, scientific data analysis, and virtual reality.

7 The Programmer/Developer Conference.

8 The Education Conference.
Teachers at the elementary, secondary, and university levels share successful Mac experiences with multimedia, CD-ROM, HyperCard, QuickTime, BBS and Internet — and students demo their most outstanding Mac projects in science, math, social studies and desktop publishing.

9 The How-to-Get-Started Conference.
Learn the basics of Newton, Desktop Publishing, Music, Internet, Telecommunications, Design, Multimedia, QuickTime, Authoring, Interactivity, and using CD-ROM.

10 The Advanced User Conference.
Veteran users share their expertise on customizing your Mac, Resolving System Conflicts, Maximizing Fonts, and Powering Your Powerbook.

11 The Special Interest Group Conference.
Looking to compare Mac notes with others? Develop an invaluable "user network." Here you’ll find sessions on the Mac in the Law Office, Health Care, Real Estate, and IS; and the perennial favorite MUSE (Macworld Expo User Group Extravaganza).

12 Application Workshops.
Intensive training sessions by MacAcademy on: Beginning Macintosh; Advanced Macintosh; Macintosh Fonts; Beginning Mac Networking; Claris FileMaker Pro; Microsoft Word; Aldus PageMaker; Microsoft Excel.

13 The Multimedia Conference.
Create quality productions and presentations with both high-end and low-end multimedia tools. Share insights from the world's most successful multimedia experts on interactivity, desktop video, animation, interface design, authoring tools — and see the profitable impact in education, training, and museums.

14 The CD-ROM Conference.
Want to publish an entertainment or consumer CD? Start with the Mac. Learn about Photo CD; kiosks; building successful titles; developing interactive games; content licensing; document conversion and management; and marketing your CD.
PRE-REGISTER FOR MACWORLD EXPO/BOSTON BY JUNE 24, AND SAVE $15 TO $30

PLEASE REGISTER ME FOR:

- **Package One $120.**
  Conference sessions and exhibits. Preregister by June 24 ($150 at the door).

- **Package Two $25.**
  Admission to exhibits only. Preregister by June 24 ($40 cash only at the door).

**Check if Applicable.**
I’m an international attendee. Please ship my badge by Federal Express. Enclosed is an additional $45.

**Please choose your package and fill out the form completely. Incomplete forms will be returned. One form per person; make photocopies for additional people. Please do not staple check to form. Registration forms received after June 24, will be returned unprocessed. Purchase orders cannot be accepted. All registration fees are nonrefundable. A $20 fee will be charged for all returned checks. Send completed forms to:**

MACWORLD EXPO/BOSTON
P.O. BOX 4010
DEDHAM, MA 02027

U.S. BADGES: HELD ON-SITE. BADE PICKUP HOURS ARE:
Aug. 1, 11AM - 3PM; Aug. 2-4, 9AM - 6PM; Aug. 5, 9AM-4PM

**Please send my registration badge and further information to:**

**Please check one:**

- □ Home Address
- □ Company Address

**First Name __________________________ / Middle Initial ______ / Last Name __________________________**

**Street Address __________________________**

**City __________________________ State _____ Zip Code __________ __________ **

**Country (Other than U.S.) __________________________**

**Telephone __________________________**

**If mailing to company address: (If mailing to your home address, leave the next two lines blank):**

**Title __________________________**

**Company __________________________**

**Check enclosed (make payable to MacWorld Exposition) Amount $ __________**

**Master Card □ Visa □ American Express Amount $ __________**

**Account Number __________________________**

**Expiration Date (include all numbers) __________ / __________ / __________**

**Card Holder Signature (Signature necessary to be valid) __________________________**

**If card holder is other than registrant, please print card holder’s name below:**

**First Name __________________________ / Middle Initial ______ / Last Name __________________________**

**Cash only at the door. After June 24, you must register at the show.**

**Please send my registration badge and further information to:**

**Please check one:**

- □ Home Address
- □ Company Address

**First Name __________________________ / Middle Initial ______ / Last Name __________________________**

**Street Address __________________________**

**City __________________________ State _____ Zip Code __________ __________ **

**Country (Other than U.S.) __________________________**

**Telephone __________________________**

**If mailing to company address: (If mailing to your home address, leave the next two lines blank):**

**Title __________________________**

**Company __________________________**

**Check enclosed (make payable to MacWorld Exposition) Amount $ __________**

**Master Card □ Visa □ American Express Amount $ __________**

**Account Number __________________________**

**Expiration Date (include all numbers) __________ / __________ / __________**

**Card Holder Signature (Signature necessary to be valid) __________________________**

**If card holder is other than registrant, please print card holder’s name below:**

**First Name __________________________ / Middle Initial ______ / Last Name __________________________**

**Cash only at the door. After June 24, you must register at the show.**

**Please check the appropriate information:**

**Your industry or profession (choose only one):**

- □ Accounting/Finance
- □ Architecture/Construction
- □ Art/Design/Creative Services
- □ Arts & Entertainment
- □ Communications/Printing/Publishing
- □ Computer Software
- □ Retailer/Service
- □ Corporate/General Management
- □ Distributor/Dealer/Reseller/Service
- □ Engineering/R&D
- □ Government/Military
- □ Health/Medical Services
- □ College/University
- □ Elementary/High School
- □ Legal Services
- □ Manufacturer (Computer Industry)
- □ Manufacturer (Non-Computer Industry)

- □ Marketing/Sales/PR/Communications
- □ Other
- □ Does Not Apply

**Your Title (choose only one):**

- □ CEO/President/VP
- □ Controller/Treasurer/Accountant
- □ Director/Manager
- □ Network Manager
- □ Programmer/Analyst
- □ Engineer/Scientist/IT
- □ Manager/Department Head
- □ Professional (Lawyer, Doctor, etc.)
- □ Consultant
- □ Marketing/Sales
- □ Educator
- □ Art Director/Graphics
- □ Editor/Writer
- □ Student
- □ Other
- □ Does Not Apply

**Size of your organization:**

- □ Under 50
- □ 50 - 99
- □ 100 - 499
- □ 500 - 999
- □ 1,000 & over
- □ Does Not Apply

**Which personal computer(s) do you own/use? (Choose all that apply):**

- □ Macintosh Plus/SE/SE30
- □ Macintosh Classic Series/LC Series
- □ Macintosh PowerBook Series/Duo Series
- □ PowerBook Series
- □ Macintosh II Series
- □ Macintosh Performa Series
- □ Macintosh Centris Series
- □ Macintosh Quadra Series
- □ Macintosh Workgroup Series

**Yes □ No □**

**Do you recommend, buy, or approve microcomputer software and/or peripherals?**

**If yes, please indicate for how many Macintosh computers you have this involvement:**

- □ 1 - 10
- □ 11 - 25
- □ 26 - 50
- □ 51 - 100
- □ 101 - 500
- □ 501 +

**Note: 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 nonrefundable. Do not staple check to form. Send completed form, with check or money order under $50, MacWorld Expo, P.O. Box 4010, Dedham, MA 02027. For overnight packages ship to: 340 Milton Street, Dedham, MA 02027.**
### Services for the Physically Challenged.

We’re committed to ensuring that our physically challenged attendees receive all the services they need to make their show visit enjoyable. Call us at 800-945-3313 for details.

### Early Bird Registration.

Missed the pre-registration date? You can still register before the start of the show! On-site Early Bird registration is from 11:00 a.m. - 3:00 p.m. on August 1 at the full registration rates of $150 for all conference sessions and exhibits, and $40 (cash only at the door) for exhibits-only admission.

### Hotel Accommodations

<table>
<thead>
<tr>
<th>Hotel</th>
<th>Shuttle</th>
<th>Single/Double</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>57 Park Plaza</td>
<td>B/C</td>
<td>$150/$170</td>
<td>(617) 227-0800</td>
</tr>
<tr>
<td>Back Bay Hilton</td>
<td>C</td>
<td>$179/$199</td>
<td>(617) 424-7000</td>
</tr>
<tr>
<td>Boston Marriott Copley</td>
<td>C</td>
<td>$230/$250</td>
<td>(617) 227-0800</td>
</tr>
<tr>
<td>Boston Marriott Long Wharf</td>
<td>C</td>
<td>$242/$264</td>
<td>(617) 338-4400</td>
</tr>
<tr>
<td>Boston Park Plaza</td>
<td>B/C</td>
<td>$131/$151</td>
<td>(617) 426-2000</td>
</tr>
<tr>
<td>Colonade Hotel</td>
<td>C</td>
<td>$170/$190</td>
<td>(617) 424-7000</td>
</tr>
<tr>
<td>Copley Plaza</td>
<td></td>
<td>$179/$199</td>
<td>(617) 227-5300</td>
</tr>
<tr>
<td>Four Seasons</td>
<td></td>
<td>$242/$264</td>
<td>(617) 338-4400</td>
</tr>
<tr>
<td>Guest Quarters Hotel</td>
<td>H</td>
<td>$155/$165</td>
<td>(617) 833-0900</td>
</tr>
<tr>
<td>Harborview Hyatt</td>
<td>H</td>
<td>$175/$185</td>
<td>(617) 588-1234</td>
</tr>
<tr>
<td>Hilton at Dedham Place</td>
<td>H</td>
<td>$125/$125</td>
<td>(617) 329-7900</td>
</tr>
<tr>
<td>Holiday Inn Government Center</td>
<td>B</td>
<td>$149/$165</td>
<td>(617) 742-7630</td>
</tr>
<tr>
<td>Hyatt Regency Cambridge</td>
<td>H</td>
<td>$165/$185</td>
<td>(617) 492-1234</td>
</tr>
<tr>
<td>Le Meridien Hotel</td>
<td>B</td>
<td>$210/$210</td>
<td>(617) 451-1900</td>
</tr>
<tr>
<td>Lenox Hotel</td>
<td>C</td>
<td>$150/$170</td>
<td>(617) 536-5300</td>
</tr>
<tr>
<td>Logan Airport Hilton</td>
<td>H</td>
<td>$140/$160</td>
<td>(617) 569-9300</td>
</tr>
<tr>
<td>Omni Parker House</td>
<td>B</td>
<td>$145/$165</td>
<td>(617) 227-8600</td>
</tr>
<tr>
<td>Ritz-Carlton Hotel</td>
<td>B/C</td>
<td>$210/$220</td>
<td>(617) 536-5700</td>
</tr>
<tr>
<td>Royal Sonesta</td>
<td></td>
<td>$145/$145</td>
<td>(617) 491-3600</td>
</tr>
<tr>
<td>Sheraton Boston Hotel &amp; Towers</td>
<td>C</td>
<td>$155/$170</td>
<td>(617) 236-2000</td>
</tr>
<tr>
<td>Sheraton Tara Braintree</td>
<td>H</td>
<td>$119/$119</td>
<td>(617) 848-0600</td>
</tr>
<tr>
<td>South Bay Hotel (formerly Howard Johnson's)</td>
<td>H</td>
<td>$80/$80</td>
<td>(617) 288-3030</td>
</tr>
<tr>
<td>Swissotel</td>
<td>B</td>
<td>$159/$169</td>
<td>(617) 451-2600</td>
</tr>
<tr>
<td>Tremont House</td>
<td>B</td>
<td>$110/$125</td>
<td>(617) 426-1400</td>
</tr>
<tr>
<td>Westin Copley Place</td>
<td>C</td>
<td>$185/$205</td>
<td>(617) 262-8600</td>
</tr>
</tbody>
</table>

*Legend: (B) Hotel is within walking distance of Boston Common shuttle location, (C) Hotel is within walking distance of Copley Square shuttle location, (H) Hotel is providing its own shuttle to Macworld Expo.*
Global Village Introduces Fax and ARA Servers

GLOBAL VILLAGE COMMUNICATION, the maker of popular modems for the Macintosh, has taken the plunge into network hardware with its new OneWorld line of servers. The first two products, due to ship April 4, are the look-alike OneWorld Remote Access ARA server and the OneWorld Fax server.

The OneWorld Remote Access ships with either one or two internal V.32/32+ (19.2-Kbps) PowerPort Mercury modems and 1MB of RAM, with room for up to 9MB of RAM using 32-pin SIMMs. It can connect to either a LocalTalk or a 10BaseT network. The server supports Apple Remote Access (ARA) 2.0, taking advantage of the security enhancements provided by Apple, but ARA 1.0 clients can also dial in.

The OneWorld Remote Access will cost $1199 for LocalTalk and one modem, $1899 for Ethermet and two modems. The ARA client software must be purchased from Apple. The OneWorld Fax ships with one or two PowerPort Bronze 9600-bps fax modems.

The fax server sets up quickly and supports queuing and priority faxing. The GlobalFax for OneWorld software, which closely resembles the fax software bundled with the company's modems, graphically displays the fax queue and can play digitized audio of the call in progress. The software can also arbitrate between the fax server and an internal or external Global Village modem, so there's no need to open the Chooser each time you connect to or disconnect from the network.

The OneWorld Fax will list for $999 with LocalTalk and one modem. The two-modem Ethernet model will list for $1499. Both will include a license for 30 clients. Ten more users will cost $249; 50 more, $999. A site license will cost $3999.

Global Village's OneWorld Manager software manages all linked OneWorld servers. The administrator stores user and group information on individual servers in their flash ROM; OneWorld Manager downloads the information and uploads any changes the administrator makes. OneWorld Manager also displays current server activity in a window and maintains a running record based on logs kept by the individual servers. OneWorld Manager issues each user a "passport," which controls the user's access to all OneWorld servers on the network. The software can also import and export AppleShare and Shiva Net Manager users and groups.

Global Village has already announced upgrade plans for the new servers. These plans include adding dial-out capability to the OneWorld Remote Access by the end of this year, adding four- and eight-port models, and taking both products cross-platform. Global Village, 415/390-8200, 800/736-4821. - CAMERON CROTTY

Restarting Macs by Phone

FRUSTRATED BY TRYING TO DIAL INTO a crashed or shut-down Apple Remote Access server Mac? Mac Power On/Off + Aux ($199.95), from Server Technology, is designed to solve both problems.

Made up of two compact hardware devices and a system extension, the package can activate a Mac when remote users dial into it, shut it down after they log off, and remotely restart a crashed Mac.
The cigarette-pack-size Intelligent Power Module (IPM) acts as an intermediary between the wall outlet and the Mac. The IPM connects with phone wire to the Mac Power On/Off unit, which also connects to the Mac's modem using standard RJ-15 telephone jacks.

If the Mac is turned off when a remote user dials in, the Mac Power On/Off unit detects the ring of the incoming call and signals the IPM to turn on the juice and then power up the Mac, booting it up (the communications program on the awaiting Mac must also be set to start up automatically). A system extension monitors the serial port and issues a shutdown command after a specified period of inactivity. The IPM shuts off the power a few minutes later, which turns off compact Macs that don't power down from the shutdown command.

To reboot a crashed Mac, you call in once to turn it off, and again to restart it.

For computers that share a phone line, Mac On/Off + Aux offers a second, pass-through RJ-15 telephone port to which you can connect a telephone, an answering machine, or a fax machine. Server Technology, 408/745-0300, 800/835-1515.—MARGIE WYLIE

Portable LocalTalk for PCs

Most LocalTalk adapters for Windows and DOS PCs require you to open the PC's case and install the card in a free expansion slot, which some PCs either can't spare or, in the case of portables, don't have. Apexx Technology's handy external adapter lets you install LocalTalk in any portable PC without cracking a case. About the size of a pack of playing cards, Apexx's PCTalk adapter ($199) snaps into a PC's parallel port. The adapter requires more power than the parallel port offers, however. The adapter can draw this power either through the PC's keyboard port, using its own pass-through plug, or via a standard 5V AC adapter plugged into a wall outlet.

PCTalk comes bundled with Farallon's Timbuktu, a Mac client for Windows PhoneNet Kit, through which a PC user running Windows can remotely control any Mac. Apexx Technology, 208/336-9400, 800/767-4858.—MARGIE WYLIE

Comm Toolbox Helper

Thanks to the efforts of the small Russian software developer Stalker Software, Apple's Communication Toolbox (CTB) can finally work as advertised. With Stalker's PortConnector for Macintosh control panel ($49), any application that can use a modem can now use System 7's CTB Connection Tools to run protocols such as TCP/IP, X.25, and even ISDN.

The CTB in System 7 was supposed to make it possible for any communications program to use any connection method. Developers would write their software to work with CTB, other developers would write drop-in Connection Tools that supported different protocols, and all applications could communicate any way they pleased. It didn't work that way. Many applications (including Apple Remote Access) still don't support the Connection Tools capability.

The PortConnector enables any communications program—such as ARA, terminal emulators, and electronic bulletin board systems—to connect using any method for which you have a CTB Connection Tool. Third parties are currently shipping Connection Tools for ISDN, TCP/IP, and X.25. PortConnector works by creating virtual serial ports that accept data and respond to the programs as a modem would. Behind the scenes, the software translates commands and sends data through a CTB Connection Tool. For example, if you have the correct CTB Connection Tool and a copy of PortConnector running on both client and server machines, you could run ARA over TCP/IP, X.25, or ISDN, and the program would never know the difference.

PortConnector can also help CTB-compliant applications nest one connection method within another—for example, using one Connection Tool to reach a terminal server and another to control the modem as though it were connected locally. Stalker Software, 415/927-1026, 800/262-4722.—MARGIE WYLIE

Virus Hunting

With TechWorks' Gracelan Network Manager 3.1 ($795) and Datawatch's Vixen 5.1 ($99.95), administrators can run virus scans, receive scan reports, and perform virus repairs on all Macs on an AppleTalk network, without interrupting service to users. TechWorks supplies the upgrade free to 3.0 owners; 2.0 users pay $199. TechWorks, 512/794-8533, 800/680-6847; Datawatch, 919/549-0711.—MARTHA STRIICH
Networking Macs With Built-In Ethernet Is Now A Small Matter.

Very Small.

Power Macintosh 8100/80

EasyNet Transceivers. Small Size, Low Cost, Guaranteed.

When buying Power Macs and other computers with built-in Ethernet, don't overlook one small thing. The hot new EasyNet transceivers from Dayna. These clever little connectors are the easiest and most affordable way to connect devices with an on-board Apple Ethernet port to either thin Ethernet or 10BASE-T networks.

They're ideal for Power Macs, Quadras, LaserWriters and other Apple products with built-in Ethernet, as well as non-Apple devices that use the same mini-Ethernet port.

Part Of Our Complete Solution.

EasyNet transceivers are the smallest addition to Dayna's large family of Ethernet products. Our full line of adapters and SCSI connectors support all Macintosh models and all Ethernet cable types.

Getting Power Macs connected to Ethernet is no big deal. In fact, with Dayna, it's a very small matter indeed.

For more information on Dayna's Ethernet networking products, call 1-800-443-2962, ext. 831, or use our 24-hour FAX response service.

EasyNet transceivers provide plug-and-play connections to 10BASE-T and thin Ethernet networks.

FAX Response: 801-269-7340, Doc.#1250
Managing SCSI Devices

THE HARD DRIVE AND THE SCSI PORT ON a PowerBook behave pretty much like the equivalent features on a desktop Mac, but they aren't entirely the same.

Using Multiple System Folders
When you set up a PowerBook's hard drive, you can choose one of two completely different strategies. One is to install all the trappings of a typical desktop Mac's hard disk. The other is to install a lean, mean system; see PowerBook Notes, February 1993. In fact, you probably want both—one for the office, the other for the road. Or you may need to switch to a foreign-language system. You can switch between a rich and a lean System Folder with an extension-manager program that lets you change the active control panels and extensions at start-up.

There are two ways to install multiple System Folders. One is to simply put them all on the hard drive. Many people warn against this, but all Mac operating systems beginning with System 6 can handle multiple System Folders. However, one essential trick is required—you must choose, or "bless," the specific System Folder you want to use with System Picker, a free program by Kevin Aitken available from online services and bulletin boards (Blesser, an older program for the same function, apparently has not been updated since 1987). To change System Folders, use System Picker to bless another folder and then restart. You should give each System Folder a distinctive name, and you must keep track of which System Folder you are working with or modifying at any given time.

I prefer the second method: divide the hard drive into multiple partitions and install a different system in each one. The disadvantage is that each partition takes up a fixed amount of storage space; since you need to provide some extra space in each partition for possible changes to the System Folder, you might run out of storage space a little more quickly.

Apple HD SC can set up multiple partitions on a hard drive, but only one of those partitions can start up the PowerBook. To set multiple start-up partitions, try Drive7 ($79.95 from Casa Blanca Works, 415/461-2227) or Hard Disk Toolkit, Personal Edition ($79 from FWB, 415/474-8055). Drive7 can change the start-up partition more easily than Hard Disk Toolkit. You can't change the start-up partition with Apple's Startup Disk control panel, because it selects only the SCSI address, which is the same for all partitions on the drive.

Two start-up partitions offer some additional advantages. If you need to install system modifications or need to test a partition, you can start up from the other partition. Another plus is the ability to compress one partition.

What are the optimum partition sizes? There's no simple answer. A small partition can hold an alternate System Folder and a disk utility for emergencies, leaving a large partition for everything else. But if you plan to use compression on a partition, it should be big enough to make compression worthwhile.

SCSI Cabling Conundrums
Other ways to use multiple systems involve connecting the PowerBook to an external hard disk drive or to another Macintosh. One start-up partition can manage the PowerBook alone; a second can manage the resources on the external hard disk or the other Macintosh.

A PowerBook's SCSI port is more complicated than a desktop Mac's: it has a different connector, operates in two distinct modes, and often requires two terminators rather than one (see "Connecting Cables"). For an all-in-one PowerBook, you should have two terminators rather than one when connecting an external SCSI device; for details, see the PowerBook manual. By contrast, the Duo's SCSI port behaves like a desktop Mac's, using a single terminator. Some SCSI devices come with internal terminators. If you connect any PowerBook to a Mac IIfx, use the IIfx's special black terminator.

Depending on the SCSI device, you may need either a C-50 terminator or a DB-25 terminator. If you use an HDI-30/DB-25 adapter in SCSI disk mode, vendors such as APS Technologies say that no terminator is necessary to connect to most Macs, despite Apple's recommendation.
All SCSI ports built into PowerBooks use a squarish HD-30 connector, unlike the DB-25 female plug of the desktop Macs. (A few third-party docks for Duos come with a DB-25 connector.) Most SCSI peripherals—such as hard disk drives and scanners—have female 50-pin connectors, although some use DB-25 connectors.

The PowerBook functions in one of two SCSI modes, depending on which type of cable is used.

- In SCSI standard mode, the PowerBook typically connects to SCSI devices with a 29-pin HD-30 cable ending in a male C-50 connector.
- In SCSI disk mode, the PowerBook typically connects to another Mac with a 30-pin HD-30 cable ending in a female C-50 connector, which mates to a standard male C-50 cable ending in a male DB-25 connector that plugs into the other Mac. The PowerBook functions as an external hard drive for the other Mac. When in SCSI disk mode, the PowerBook should not be closed or it will overheat.

If you already have a lot of SCSI cables, the simplest way to connect everything to a PowerBook is to get an HD-30-to-female-DB-25 adapter, which costs between $30 and $50. These adapters come in two main styles; some turn the DB-25 connector vertically, so you can easily insert and remove the adjacent plugs (ADB and telephone cord for the modem). The more conventional horizontal adapters from APS Technologies (816/483-6100, 800/874-1428) work fine but can interfere with the adjacent plugs; that kind of adapter won’t work on a PowerBook 100 with a floppy drive. Some versions of both the vertical and APS adapters support (through a built-in switch) both SCSI standard mode (29-pin) and SCSI disk mode (30-pin). The SCSI-disk-mode setting creates a potential termination problem, however (see the main text). In the diagrams, SCSI terminators (except in the special case of the llfx) are omitted for simplicity, and because all-in-one PowerBooks require two terminators while Duos require only one.

If you haven’t already invested in cables, you’re better off getting one of the HD-30-to-C-50 cables; they’re more compact and simpler to use, but they don’t come with a mode switch.
Say goodbye to Trinitron. Mitsubishi's DiamondTron CRT is here to usher in a new era in high-performance monitor design for all high resolution Macintosh® II and Quadra® applications.

With a big 21-inch screen (20" viewable), the DiamondTron CRT is nine square inches larger than the largest desktop-size Sony® Trinitron.

The DiamondTron CRT also delivers superior performance. Its new hybrid design incorporates a vertically-flat, square-cornered screen with an aperture grille mask to minimize glare while increasing brightness. Plus Mitsubishi's proprietary NX-DBF™ (Dynamic Beam Forming) electron gun provides exceptional center-to-corner focus and brilliant edge-to-edge clarity. And the exclusive Diamond Control software (available August 1994) lets you set up the expanded array of monitor adjustment functions on-screen, including full-power management capabilities for auto-dimming or shut down.

Best of all, you can get all the benefits of advanced DiamondTron technology in our Diamond Pro 21T monitor for just $2,525 MSRP.

For more information about DiamondTron and the Diamond Pro 21T monitor, call us at 1-800-843-2515. In Canada call 1-800-387-9630. For immediate product specifications, call Mitsubishi Quickfax at 1-800-937-2094.
Attach any 4 serial devices including fax modems, MIDI, printers, even AppleTalk printers all to one Mac port and let Port Juggler deal with switching between them automatically.

Circle 238 on reader service card
"The best solution if you regularly need longer battery life"—MacWeek

Now use your PowerBook up to five times as long — without swapping and recharging batteries, dimming your screen, slowing your processor, or staying within six feet of an AC outlet.

Remember the day you first brought your new PowerBook® home? It was faster than a speeding bullet. More powerful than a locomotive. Able to leap tall buildings in a single bound. In fact, the two of you could do anything.

But then it happened... 

The Big Chill

Your first low battery warning. That's when everything changed. You quickly discovered that if you use all the performance your PowerBook offers, the battery just doesn't last long enough.

Finally, there's a solution.

Power Breakthrough

Introducing PowerPlate™ rechargeable power systems, designed specifically for PowerBooks. Quite simply, PowerPlates solve all your battery frustrations. (In fact, you may wonder how you ever got along without one.)

PC LapTop Magazine concluded, "This is the best computer purchase you'll make all year." And thousands of users agree. One even wrote to say his PowerPlate was "The best product I've ever purchased in the Mac world."

Call Toll-Free Today

See your dealer today, or for more information, just call us toll-free.

1-800-305-7936

Department G05

1018 Delta Ave • Suite 303 • Cincinnati OH 45208
Phone 513-321-1777 • Fax 513-321-2348

POWERPLATE mini3

"A bargain"—MacWEEK
Ultra-compact design provides 2.5 to 3 times the battery life of PowerBook battery alone. Only 9.4" by 5.6" — an easy fit in any carrying case. Our most cost-effective power solution. $169.95

POWERPLATE 3x

“The best solution if you regularly need longer battery life” —MacWEEK
PowerBook®-looptount design provides 2.5 to 3 times the life of PowerBook battery alone. Two-stage charging with LED indicators. $239.95

POWERPLATE 5x

“Almost an automatic purchase for color PowerBook users" —MacWEEK
The ultimate system: provides 4 to 5 times the battery life of PowerBook battery alone. Perfect for power-hungry color PowerBooks. $299.95
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.

This compact little set-up will save you big. Like Syquest, you put an external drive on-line and save your files to removable, rewritable cartridges. But unlike Syquest, you don't have to break the bank each time around.

With DynaMO, you can use 128 and 230 MB industry standard 3.5-inch cartridges. The cartridges aren't vulnerable to the everyday abuse that might otherwise do in your data. In fact, Fujitsu cartridges are so reliable we back them 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.
Multigrain Serials

What to do when one modem port just isn’t enough

Imagine that you were born with only one nostril. Imagine wearing sneakers with lace-holes on only one side. Imagine that you just purchased a $30,000 minivan—and it seats one.

That’s essentially the situation with your Macintosh. It has only one modem port. Into this single jack you’re supposed to plug not only your modem, but also your music equipment (MIDI synthesizers), your MacRecorder microphone, your Wacom drawing tablet, your miniaature label printer, your Sharp Wizard, perhaps your StyleWriter printer, and all manner of other Macintosh gadgetry. Can you say hopeless?

For thousands of Macophiles, the act of plugging and unplugging equipment from that solitary port and commuting with the dust bunnies behind the computer is an unpleasant daily ritual. It’s not exactly heaven for the machine, either; these little back-of-the-Mac jacks are among its more fragile components, never designed for such repetitive stress.

So wait a minute. They make faucets with a little hand sprayer coming out of the side. They make Y-connectors for telephone jacks. Why don’t they make one for the modem port? What’s the big hairy deal?

As I researched this column, assorted Silicon Valley engineers were laughing their heads off at my naiveté. Didn’t I realize that the plus-five volt power won’t support the minimum acceptable impedance for serial peripherals (or something to that effect)?

When the hilarity subsided, I managed to extract the following information. The Macintosh feeds a feeble drool of electricity into the modem port—just enough to power whatever’s plugged in there. Even adding one more gadget, even a simple Y-jack, reduces the current coming out of each half. When current is diluted, some of the most common modem-port pluggables—the MacRecorder and most MIDI interfaces, for example—don’t find the juice they expect. And they don’t work.

The challenge is not just to find a switcher; it’s to find one that works with everything.

Manual A/B Switch Boxes

The simplest solution is a little gray box with a knob, called an A/B switch box. You turn the knob to channel your modem port’s attention from one device to another. You can buy these things from electronics catalogs and such; Microcomputer Cable (313/946-9700) sells A/B, A/B/C, and A/B/C/D (two-, three-, and four-port) boxes for $22, $36, and $42, respectively. These prices don’t include the plain old StyleWriter cable you need to connect the box to your Mac.

In the coming paragraphs, you’ll find out about all kinds of fancy electronic solutions to the modem-port dilemma.

Axion Switch

The next step up from a manual box is the Axion Switch (Axion, 408/522-1900; $129). It’s the closest thing the Mac has to those multiplug wall-socket adapters. It’s a gracefully designed, T-shaped gray thing that plugs into our favorite jack. You can plug three devices into the T.Axion’s hassle-free idea: you switch your Mac from one device to another from the menu bar. The Axion Switch is subject to Ye Olde MR-MIDI Problemme. The Axion engineers, however, were savvy enough to foresee the trouble. For an extra $20, they will sell you a supplementary power cord that grabs a few fractions of a watt from, of all places, your keyboard jack. The power cord’s two dangling wires, combined with the incoming cords from your equipment, creates quite a cacophony of cables.

But hey—cords, schmords—the thing works!

Port Juggler

The Most Promising Technology That Doesn’t Quite Work award goes to the Port Juggler (Momentum, 808/263-0088; $99). Picture a compact, black plastic box about the size of a Sony Walkman. It seems designed to wipe Axion off the map: it’s less expensive, it’s got four ports rather than three, it requires no dangling power-cheater cord, and—here’s the piece of resistance—the Port Juggler switches from device to device automatically. You teach the thing which device each of your programs prefers: America Online wants the modem, Finale wants MIDI, ClarisWorks wants the StyleWriter, and so on. After that, the correct device gets activated automatically when you switch programs. Pure genius.

Most are simply glorified A/B/C/D boxes at ten times the price. To the certain disgust of electronics freaks everywhere, I maintain that it’s actually easier to turn a physical knob than to open a desk accessory and click on a selection.

Ah, but, for the same reason the hero never gets killed ten minutes into the movie, I wouldn’t start the column with this idea if it solved everything. The problem, of course, is the aforementioned MacRecorder-MIDI failure, hereafter known as the MR-MIDI issue: the A/B split saps the modem port’s tiny trickle of electrons. (MIDI interface models equipped with their own power cords are immune to the MR-MIDI problem.)
Well, on paper. In reality, the Port Juggler is not so much an Axion killer as it is a serial killer—it doesn’t work with MIDI. The kindly inventors at Momentum worked feverishly through the harsh Hawaiian winter to solve the problem; at this writing, they’re on the verge of unveiling version 2, which they say licks not only the MIDI nightmare, but the port-traffic problem, too (see the sidebar, “Ports in the Dark”). If this is true, the world will be a better place.

**MP-91 MultiPort**

A few Macintosh-accessory junkies are about to become very, very happy. This baby (Silicon Valley Bus, 408/623-2300; $229) has more openings than a Swiss-cheese factory: six serial ports and—here’s the twist—five keyboard/mouse jacks. These ADB ports accommodate an entire second-class of Mac add-ons: remote-control mice, some digitizing tablets, certain modems, and some other devices. (You can use only two of the serial ports simultaneously—your network or printer will almost certainly be on one of them—but you can use all of the ADB ports at the same time.)

 Whereas the Axion and Port Juggler boxes sit in the cable-crossed wilderness behind the Mac, the MP-91 MultiPort is groomed for public display. It connects to your Mac in three places—the modem, printer, and ADB ports—via thin, gray, 5-foot extension cords. The box itself is the size of a paperback romance novel and sits on your desk, making its 11 jacks immediately accessible.

 The MultiPort’s desk accessory for switching ports isn’t nearly as handy as the Axion’s menu-bar switcher. Otherwise, the thing works great.

**QuadraLink**

So far you’ve been reading about modem-port switchers. How would you react to finding out about a modem-port multiplier—a device that actually gives you four ports all working simultaneously?

Well, you know me. I went wild. I canceled my appointments and turned off the phone. I tore open the QuadraLink—a plug-in NuBus board—which, as though it were a shiny red sled I’d found under the tree, imagined: four ports at once! I could download while listening to the synthesizer! I could print labels while doodling on a Wacom tablet! I could—I could . . .

No, I couldn’t. It turns out that the QuadraLink’s multiport talents rely on a piece of Apple software (built into System 7) called the Communications Toolbox, or CT. This little module serves as a behind-the-scenes patch bay for Macs with additional serial ports. All CT-aware programs can use the QuadraLink’s ports simultaneously.

Except guess what? Other than modern programs, I can count the number of CT-aware programs in the universe on two toes. And without CT savvy, the QuadraLink (Applied Engineering, 214/241-0055; $219) is little more than an electronic switch box, just like the Axion or the Port Juggler—and one that suffers from MR-MIDI disease, at that. Worse, switching between ports requires a slog to your Control Panels folder.

Fortunately for MR-MIDI sufferers, the QuadraLink leaves your actual modem and printer ports empty. Brilliant idea: snuggle your MIDI and MacRecorder happily into those real ports, and plug everything else, including your printer or network, into the QuadraLink itself. Of course, you can still use only two ports at a time, exactly as you could before the QuadraLink, but at least it all works. (If you use high-speed modems on pre-Quatra Macs, you may prefer the port-speed goose-up provided by the $366 QuadraLinkDMA card.)

**Hurdler Serial Board**

The Hurdler is the QuadraLink’s blood rival. The pros and cons of this NuBus card are exactly the same as the QuadraLink’s except that you can’t plug your AppleTalk connector into this one. You can use the Hurdler’s four ports simultaneously only with CT-aware programs, the MR-MIDI problem persists, and you use a control panel—an ancient-looking one appropriated from those old Promethean internal modems—to switch ports. To top it off, Creative Solutions (301/984-0262) wants $379 for the four-port model. Unless you’re a techie running a BBS out of your home or something, I would pass it up.

**The Upshot**

If you have neither MIDI gear nor a MacRecorder, get yourself a manual switch box. It’ll save you a lot of money compared with the electronic solutions, and heaven knows, you’ll suffer fewer extension conflicts.

If synthesizers and microphones do, in fact, vie for a place at your serial trough, it’s a no-brainer: get the MP-91 MultiPort, with its festival of jacks. But what about the above-mentioned virtues of the Axion Switch and the QuadraLink? Get this: due to a freak alignment of the planets, at press time Applied Engineering was no longer in business. At the same time Axion’s message machine said the company was restructuring. Sorry if I got your hopes up.

Apple makes computers that scream at 80MHz, obey spoken commands, and fit inside your wallet. Yawn. Wake me when they add another modem port.
As a prominent leader in today's display technology, CTX proudly introduces its new GM Series of Macintosh compatible products that may change the way you think of monitors.

In sizes from 14" to 17", the GM Series provide features and capabilities that meet virtually any user's requirements for performance, resolution and price. Low Radiation (MPR II) and Power Saving Management are standard. As you may know, CTX monitors are built through stringent internationally recognized quality standards, such as ISO-9000. They offer crisp, steady and brilliant images as well as advanced features, while maintaining superb reliability and affordability.

To get a closer look at these true quality world-standard monitors, contact your nearest CTX dealer today.

Technical Support
1-800-888-2012
BBS: (909) 594-8973

End users circle 38 on reader service card
SEE US AT COMDEX BOOTH #1006
Dealers circle 39 on reader service card
Now Utilities has won so many top awards lately, the critics almost seem awestruck. But when they do speak, you'll find their comments echo those of author/consultant Bob LeVitus, who calls Now Utilities "a must have for any serious System 7 user." Why all the fanfare? Because Now Utilities makes your Macintosh so much faster and easier to use.

**Saves Time.**

Now Utilities saves time by giving you instant access to frequently used files and folders. No more time wasted digging through endless folders in the Finder. You navigate your hard drive faster because you can open items directly from submenus in the Apple menu, assign keyboard shortcuts to any menu item, and locate misplaced files in a flash. Even if they've been compressed or archived. What's more, you can reuse boilerplate items of any type in any application, and organize, view and store graphics, text, sounds and QuickTime movies.

**More Control.**

Now Utilities puts you in control. If you use Times the most, just drag it to the top of the Font menu. Fonts appear in their actual typefaces, so you choose the right font the first time. You can also arrange extensions and control panels in the order they work best, and link together extensions that require each other.

**Keeps You Going.**

No more lost work if you lose power: Now Utilities automatically saves your work at any interval you specify. You can even save every keystroke to a special backup file. If your Mac crashes at startup, Now Utilities turns off the culprit, so you get back up and running. It's even a one-stop source of system information, perfect for dealing with Tech Support questions for any of your software. To order Now Utilities today for just $89.95, a $40.00 savings off the list price, call us directly at 1-800-237-2078. Or see your local reseller. We're certain you'll become a satisfied critic yourself.

LAST MONTH I BEGAN TRACING the tale of the Power Macintosh's development. In 1990 not one but two groups at Apple were working to develop a powerful RISC machine that would position the company for greatness in the twenty-first century. The first team, originally code-named Jaguar and later Tesseract, was a well-supported group of some 30 engineers working on a sophisticated high-end machine that would be a clean break from the Mac's past. The other group, code-named Cognac, was a small but scrappy band that sought to design a low-end RISC computer that was an improvement on the Mac, not a departure from it.

In the summer of 1991, company execs kicked the ground out from under both teams by signing an agreement with IBM, the dark force that Apple had once opposed bitterly. One of the key components of the deal was the agreement to collaborate with Motorola on a new microprocessor based on IBM's RISC chip. This chip would be the engine to drive a new generation of mighty machines from both Apple and IBM.

Both the Tesseract and Cognac teams were stunned by the news. Not only did they have to meet a new deadline—January 24, 1994—but they had to create machines around a microprocessor that wasn't even designed yet! The first chips, based on an IBM design, were due from Motorola in the fall of 1992. Apple engineers were skeptical. After all, there had been all sorts of deadline problems with Motorola's 68040 chip, and Motorola was one unified company. How could a consortium attempting to combine such opposing cultures do better?

Culture Club
But in one of the first meetings between Apple and IBM engineers, a telling incident occurred. The IBMers dressed in blue jeans. The Apple corps wore ties. Each group had attempted to make the other one feel at home. And as it turned out, there was an ecumenical atmosphere at Somerset, the building in Austin, Texas, that was the design center for the PowerPC chip.

Motorola's original RISC chip, Cognac leader Jack McHenry and crew knew some of the basic structure of the low-end computer they were building. The tricky part was keeping close track of what was happening in Austin—any change in the PowerPC chip might have implications for the Apple machine.

The PowerPC 601 chip arrived in Cupertino on September 3, 1992, inside a package covered with Christmas wrapping. Cognac's prototype wasn't quite ready to go, but McHenry's team pounced on the chip anyway, immediately socketing it up to a NuBus card and hooking it into a Mac. "On Monday I got the card," says Gary Davidian, the team's emulation expert. "Tuesday we powered up. On Wednesday we were trying to boot the Mac ROM. That night we broke something, so on Thursday we got a new card. Thursday night we booted Mac software. And on Friday we demoed it."

Then the team got the chip into its box. On October 3, at approximately 5 a.m., the first prototype of a Power Macintosh using an actual 601 chip was booting the Finder.

Tesseract Axed
Things were not going as smoothly with the Tesseract team, which Apple execs had judged the more important project. Near Christmas of 1992, the Tesseract team realized it could not possibly ship in the early 1994 time frame. By March Apple concluded that the project was beyond redemption, and it pulled the plug on Tesseract. It was now less than a year from Apple's planned date for shipping the Power Macs, and as McHenry notes, "there was no high-end product."

"We had thought about that," says McHenry, revealing a coy political acumen that comes from ten years of computer design at Apple. "We'll win in the end, but it's not going to be something, just something."

McHenry's squad had designed its Mac so some of the basic structure of the low-end computer they were building. The tricky part was keeping close track of what was happening in Austin—any change in the PowerPC chip might have implications for the Apple machine.

The PowerPC 601 chip arrived in Cupertino on September 3, 1992, inside a package covered with Christmas wrapping. Cognac's prototype wasn't quite ready to go, but McHenry's team pounced on the chip anyway, immediately

PowerPC to the People
How Apple RISC'd all and won

Good thing, too, because there was a lot of work to do. IBM's 601 chip, the first in the PowerPC series, needed almost a "ground-up redesign," says Paul Nixon, whom Apple recruited from Texas Instruments to head its Somerset contingent. At the same time, engineers from three companies worked on the design for the next two chips, the more efficient 603 and the lightning-fast 604.

Back in Cupertino, the Cognac and Tesseract teams were working frantically to design the computers themselves. Since the consortium creating the PowerPC chips agreed that the microprocessor would fit the bus design planned for a more powerful, feature-laden model.
The high-end model was dubbed Cold Fusion. Then a midrange version was added and code-named Carl Sagan, perhaps in honor of the billions and billions of dollars Apple hoped to reap from it.

Brady’s Bunch

Once the hardware issue was settled, the PowerPC focus turned to software. In effect, Apple had to fast-forward into the next century with a successor to System 7. To manage the effort, Apple tapped Philip Koch, a RISC expert who had been doing research at Dartmouth College. But Koch had difficulty recruiting Apple’s top engineers for his team. “It was hard to get excited about building system software for a chip that was going to be in an IBM computer as well as Apple’s,” he says. “And it was also a case of 680X0 chauvinism.”

James Gable, who moved from the Tesseract team to manage the entire PowerPC effort, was worried. “The software estimations were overly optimistic. We had a prototype, but very little native code running.” His fears were confirmed when Sheila Brady, a brilliant and profane engineer, was recalled in late 1992 from a sabbatical at Harvard University to beef up the PowerPC software effort. She took one look at the massive chart with various projected delivery dates and judged the deadlines as unreliable.

Koch and Brady methodically gathered a team and began to resolve the key issues in the PowerPC operating system. The most important question was whether it would use the powers of the machine to integrate new features. Would it look different from System 7?

“Which comes first?” asks Jon Fitch, a hardware designer on McHenry’s team, by way of explanation. “Should we present a high-performance computer with a high-performance interface? We decided that the transition [to a new interface] would be too abrupt. After all, we’re building Macintoshes.”

Adding even one obvious new feature to the Power Macintosh interface was judged too drastic. “So we ended up burying the differences,” says Brady. But underneath the surface, the new OS was drastically rewritten. Gable ticks off some details: “All of QuickDraw is new, the memory manager is new, QuickTime is completely rewritten. But on screen the interface is largely identical to System 7.”

The software turned out to be a dual success. True to the intentions of the Cognac team, it ran the current Mac software at speeds comparable to Quadras. Meanwhile, its familiar trappings cleverly concealed the fact that this operating system would one day accommodate the innovations conceived of by the now-defunct Tesseract group—telephony, voice recognition, multimedia, and all sorts of exotic interface improvements.

“We began with a core of five to ten software people and turned the company around,” says Phil Koch. “It’s clearly obvious that this is going to be the future at Apple.”

Living Proof

The proof of this came when Apple began showing the PowerPC to developers. There were two sorts of tests developers were interested in: how would their current software run on the emulator, and how easy would it be to port a current application to the native code that would take advantage of the PowerPC’s RISC speed? The first question was answered at a developers’ conference in May 1993, when software companies were invited to test their applications on the PowerPC.

“We offered a bottle of champagne to anyone who could break the emulator,” says McHenry. At the end of the conference, not a cork had been popped.

The second question was resolved fairly neatly once developers discovered that they could port their applications to PowerPC’s native code with only a few days’ work. This surprised even Apple. “We thought we’d have zero native applications when we shipped the machine,” says Jon Fitch. Instead there were about 30 applications; the company expects hundreds by the end of 1994. Apple, obviously, had done something right.

There seems to be a common thread in the development of every important Apple computer: it is invariably the engineers, and not the top managers, who realize what is really needed. Apple’s hands-on wizards have always been able to come up with solutions before their leaders, wallowing in stock options and six-figure salaries, even understand what the problems are. The Power Macintosh is no exception. While the upper echelons at Apple struggled with boardroom coups and pink-slip distribution, Jack McHenry’s team coolly saved the company.

McHenry says only that he feels proud to have been associated with Apple’s new flagship product. After all, he came to Apple ten years ago for the sole purpose of designing new Macintoshes. “I remember the time of the Macintosh SE and the Mac II,” he says. “It was a time when Apple could remake itself in terms of market share. We’re there again with the PowerPC.”

STEVEN LEVY’s latest book is Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything (Viking, 1994).
Font Technology Breakthrough!

Now you can add your own handwriting to the Font Menu! Signature Software's Personal Font is a custom font which can reproduce your handwriting - including the exact way you shape and connect your letters. This unique patent pending technology will actually vary the shapes of your letters depending on the characters around them. No other font can do this!

PERSONALIZE YOUR CORRESPONDENCE

With your Personal Font you can join the personal impact of your own handwriting with the convenience and power of your personal computer. Imagine running your spell checker on your handwriting! Use your word processor's cut and paste features to polish up your handwritten letters. Add a friendly handwritten P.S. note to your business correspondence. Or even sign your fax-modern messages!

CREATE YOUR FONT TODAY!

For your own Personal Font, simply write the 96 words as well as the capital letters, numbers and punctuation found on the back of this page. From that sampling, Signature Software font designers will individually convert your handwriting into a custom font which duplicates the unique way you create each word - not just each letter. Your font will include your signature and will even have a name which you specify.

HANDWRITING FROM THE KEYBOARD.

Your font has the same style and character as your own handwriting - without the inconsistencies and inkblots! With your own Personal Font in the Font Menu you'll find yourself creating handwritten notes without hesitation - straight from your keyboard!

Since each order is custom, please allow two to four weeks processing time. If you're in a hurry, for an extra $20 Signature Software will ship your order within five working days.

ORDER YOUR FONT!

Send your completed form to:

Signature Software, Inc.
489 N. 8th St. Suite 201
Hood River, OR 97031

Because each order is custom please allow 2 to 4 weeks. Add $20 for 5 day processing. (48 hour processing is available). *5 day processing includes personalization disk, personal test document and copy of original form.

NAME

COMPANY

ADDRESS

CITY STATE ZIP COUNTRY

CARD NUMBER

CARD EXPIRATION PHONE

CARDHOLDER'S SIGNATURE

YES! Rush me my Personal Font in 5 working days for $20 extra

Special Cursive Handwriting Font Bundle

Receive BOTH Personal Font and SUPERscripts for the unbelievably low price of $139*
INSTRUCTIONS:

1. Name your font and write your signature (up to four parts).
2. Write the words shown within each box using the broken lines as a base.
3. Print naturally and consistently. Practice first on a separate sheet of paper. Remember, what you write here will become the final font.
4. Use a fine line rollerball or fibertip pen. Do not use ballpoint pens or pencils!
5. Use the grid lines in the boxes as an aid to maintain consistent height and slant. Be sure capital letters are proportional to lower case letters.
6. Write your capitals normally. Consider the appearance of capitals when at the beginning of words AND when words are all capitalized. Don't forget the punctuation!
7. Strike out mistakes and write corrections nearby. Signature Software can even make changes after you receive your font!
Avoiding Disaster

**You can't prevent the worst, but you can prepare for it**

Because disasters can kill businesses as well as people, it's critical to prepare for the worst. Several companies specialize in devising and testing business-recovery plans, as well as providing emergency replacement equipment and facilities. Comdisco (708/698-3000) of Rosemont, Illinois, and Sungard Recovery Services (610/341-8700 or 800/247-7832) of Wayne, Pennsylvania, both work often with government agencies and large companies that use mainframes or Intel-based PC networks: but they also offer some services for Mac-reliant firms. For a monthly subscription fee, Sungard's QuickShip program, for example, provides replacement Macs.

I asked these two companies, experts, and Mac developers who have survived disasters for advice that could benefit small companies as well as large ones.

According to Comdisco, it takes three critical components to survive a disaster:

- A plan that highlights the people, equipment, and supplies that are essential to a company's function. A magazine like *Macworld*, for example, needs a way to prepare editorial copy, accept advertising for upcoming issues, and deliver editorial and advertising material to a printer. A sales-driven manufacturing company, on the other hand, needs to consider how it could continue to accept orders, build products, and deliver merchandise. After the earthquake, Dataproducts was able to function by temporarily shifting sales activity to field offices outside L.A.
  - A place where a company can continue conducting its business. That might be a regional office, employees' homes, or another business that is willing to offer aid in the case of disaster. Some companies, for example, make mutual-aid agreements to share office space and equipment in case of emergency.
  - The information that supports the company's business. Employee phone lists, supplier contacts, outstanding orders—anything and everything critical to maintaining the company, on disk or on paper, needs to be identified and accessible. Remember that a lot of vital information lives outside networks on the hard drives of individual employees.

**HSC's Experience**

Many small companies don't have disaster-recovery plans, but HSC Software had most of the bases covered after the shaking stopped in Southern California. As part of its disaster plan, the Santa Monica-based developer of Kai's Power Tools requires that its staff have home access to online services. All HSC employees have computers and modems at home, along with accounts on America Online and AppleLink, according to HSC chairman and CEO John Wilczak. As a result, HSC employees knew how to respond in the wake of the earthquake.

Thanks to functioning local phone lines, HSC could operate in cyberspace. Wilczak established a live private chat room within HSC's AOL forum for real-time business communications among staffers. Because he (and other managers) keep a list at home of HSC's 50 employees and their online accounts, Wilczak could send messages within a few hours of
the earthquake asking all employees to work via AOL. "I did file sharing with about 20 people," says Wilczak.

Critical business information was also available to HSC shortly after the quake, thanks to rigorous backup procedures. "All of our machines get backed up every night, whether it is marketing, accounting, or code," says Wilczak. HSC uses an 18-gigabyte DAT drive for data backup, and individual employees are held responsible for this critical task. "It's the kind of thing that's taken very seriously in the company," says Wilczak. "This is your work. If you don't back up and it's lost, it's very serious." Every day one backup tape goes into a bank safety-deposit box for security; HSC’s technical-services director keeps a duplicate tape off-site.

Checklist for Action
To protect your company and its business, you need to develop a plan, test it, and update it as the company grows or changes. Testing is critical; give yourself time before a disaster occurs to discover if your backup media is unreliable or time allotted for restoring a network is unrealistic. And if you undergo an emergency, apply what you learn to your disaster plan.

Dataproducts, for example, lost equipment and engineering documents to water damage from a sprinkler system that broke in the quake. Now the company plans to put engineering drawings away in a waterproof, fireproof container at the end of each day.

Working Software, a Macintosh developer in Santa Cruz, California, survived Northern California's 1989 Loma Prieta earthquake relatively unscathed. Still, the company learned several lessons. Company president Dave Johnson recommends placing rubber mats between Macs and desks so the machines won't slide off during tremors, and showing employees emergency exits (and giving them flashlights to find them should the electricity go out). Johnson also suggests stashing an inexpensive, standard phone somewhere in the office. Working Software's phone system needs electricity to function; the earthquake knocked out the region’s power, but a standard home phone would have let him receive calls and call out.

Creating a disaster plan won’t work unless you follow through. Disseminate the plan. Safeguard your critical business information. Share the disaster plan with employees. Make sure that your staff knows where to meet and what to do in case of emergency. Ask key managers to keep backup copies of the disaster plan at home; keep another copy in a bank’s safety-deposit box or another secure place off-site.

And if you do nothing else to protect your company, keep your Macs backed up (see Working Smart, April 1994, for tips). Maintain at least two sets of backup data, and store one off-site in a safety-deposit box or another secure place.

"Don’t wait," advises Wilczak. "You never know when disaster is going to hit or why."
It used to be that unless you had a lot of money to spend, a scanner was simply out of the picture. But now there's Agfa StudioScan, the new feature-rich scanner that's wonderfully affordable.

StudioScan offers the speed and efficiency of one-pass scanning for both black-and-white and color images. Its flatbed design accommodates sizes up to 8.5" x 14", and an optional transparency module scans 35mm slides up to 8" x 10".

What's more, StudioScan comes with a complete software package, including Agfa's proven labor-saving FotoLook, FotoTune LE, FotoSnap programs, and Adobe PhotoShop LE. Compatible with both Macintosh and PC systems, StudioScan actually guides an entry-level user through the entire scanning process.

To find out more about StudioScan's high-quality imaging for your layouts, in-house publications, illustrated reports, and more, call 1-800-685-4271 today. And discover the Agfa scanner that offers first-class features at an economy price.

AGFA
The complete picture.
Your PowerBook Printing Partner.

At home, at the office, or on the road, the Citizen Notebook Printer II works where you work. With laser-quality text, graphics, and special-image color, the Notebook Printer II is your small-business printing partner.

The best thing next to the Macintosh.

When we say Citizen works where you work, we mean it. On your desktop or on the road, the Notebook Printer II is the perfect companion to your Macintosh! With its built-in, 3-page sheet feeder or optional 30-page sheet feeder and NiCad battery, you’ll get laser-quality text and graphics wherever your work takes you. You’ll also get two pages per minute output and Special-Image Color. All for a surprisingly low price.

Think of it. Now you can use your printer at your desk or in just about any location, use color when you need it, and produce professional-looking results. The Notebook Printer II really is the perfect plug and play companion to your Macintosh. And all Citizen printers come with Citizen’s two-year warranty and exclusive Service Select Program. For information on the printer that works where you work, call 1-800-4-PRINTERS for a Citizen Notebook Printer II dealer near you.

©1993 Citizen America Corporation. Citizen America Corporation, Citizen logo, The Citizen Notebook Printer II and Special Image Color are registered trademarks of Citizen America Corporation. All other trademarks are the property of their respective owners. Printer shown with optional 30 page sheet feeder.

Circle 185 on reader service card
BUYERS' TOOLS

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Susan Grant-Marsh

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.

Hardware

MONITORS

BLACK-AND-WHITE MONITORS, May 93

Portait monitor: 15-inch Gray Scale Portrait Display; Mirror Technologies, 612/633-4450; $399, with video-display board $149.

Two-page monitor: L-View MultiMode; Sigma Designs, 510/770-0100; $1099, with video-display board $1399. MD 202 Two Page Display; Mobius Technologies, 510/654-0556; $699, with video-display board $798.

COLOR MONITORS, Oct 93

16- and 17-inch: ErgoView 17; Sigma Designs, 510/770-0100; $1399.

MuSync 5FC; NEC Technologies, 708/860-9500; $1355 (NEC's estimated dealer price).

GRAY-Scale MONITORS, May 93

Portait monitor: Pivot Display; Radius, 408/434-1010; $849, with video-display board $1148.

Two-page monitor: MultiMode 120, SilverView Pro; Sigma Designs, 510/770-0100; $1099, with video-display board $1299.

SMALL COLOR MONITORS, Jan 94

14-inch display: Sony CPD 1420; Sony Corp. of America, 800/222-7660; $779.95. Nanoo FlexScan F340W; Nanao, 800/800-5202; $799.

15-inch display: NEC MultiSync 4FG; NEC Technologies, 708/860-9500; estimated street price $755.

NETWORK HARDWARE

HARDWARE ROUTERS, Jul 93

Under $1500: EtherRouter; Compattible Systems, 303/444-9532; base model $1495 (+o TCP/IP support).

Between $1500 and $3500: InterRouter/F, Farallon Computing, 510/814-5000; $2999 to $3499.

HIGH-SPEED FAX M0D3S, Oct 93

Teleport Gold and Silver with Global Fax; Global Village Communication, 415/390-8200; Gold $499, Silver $429.

POWERB00K TOOLS

DUO DOCKING CONNECTORS, Feb 93

PowerLink DeskNet; E-Machines, 503/648-6699; $699.

EXTERNAL HARD DRIVES, Feb 93

Companion 120; APS Technologies, 800/874-1428; $599. PocketDrive 120MB; La Cle, 503/520-9000; $699.

INTERNAL FAX M0DEMS, Feb 93

PowerModem series; PSI, 408/559-8544; $195 to $495. PowerPort series; Global Village Communication, 415/390-8200; $229 to $499.

PRINTERS

COLOR PRINTERS, May 93

Dye-sublimation: ColorStream/DS; Mitsubishi International, 408/980-1100, $9950. Phaser IISO Color Printer; Tektronix, 503/682-7377; $9995.

Thermal-wax: ColorScript 210; OMS, 205/633-4300; $4995. Personal ColorPoint PSE; Seiko Instruments, 408/922-5800; $2995.

Low-end liquid-ink: HP DeskWriter 550C; Hewlett-Packard, 800/752-0900; $719.

Midrange liquid-ink: HP PaintJet XL300; Hewlett-Packard, 800/752-0900; $2795.

Solid-ink: Phaser III FX Color Printer; Tektronix, 503/685-3585; $9995.

PERSONAL PRINTERS, Sep 93

Ink-jet: StyleWriter II, Apple Computer, 408/996-1010; $399.


QuickDraw laser: LaserWriter Select 300; Apple Computer, 408/996-1010; $835.

WORKGROUP PRINTERS, Feb 94

High-speed: Hewlett-Packard 45i MX; Hewlett-Packard, 800/752-0900; $5499.

Best buy: Apple LaserWriter Pro 630; Apple Computer, 408/996-1010; $2529.

Hewlett-Packard LaserJet 4M; Hewlett-Packard, 800/752-0900; $3239.

SCANNERS

LOW-COST COLOR SCANNERS, Nov 93

$1300 to $1600: La Cle Silverscanner II; La Cle, 503/520-9000; $1599.

$1800 to $2100: Hewlett-Packard ScanJet 8; Hewlett-Packard, 800/752-0900; $1599.

Under $1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; $1299.

OCR, Nov 93

OmniPage Professional; Caere Corp., 408/395-7000; $995.

SYSTEMS/STORAGE

DOUBLE-SPEED CD-ROM DRIVES, Jul 93

Sheer speed: Pioneer DRM-60X; Pioneer, 408/988-1702; $1795.

Overall value: AppleCD 300, Apple Computer, 408/996-1010; $999.

Budget choice: NEC MultSpin 38; NEC Technologies, 708/860-9500; $465.

HIGH-SPEED HARD DRIVES, Aug 93


SCSI-2 adapter: QuickSCSI; PLI, 800/288-8754; $499.

MACINTOSH UPGRADES, Jun 93

SE accelerator (25MHz): Quick30; Novy Systems, 504/427-2358; $449 (without FPU).

SE/30 accelerator (30MHz or 33MHz): Universal PowerCache; DayStar Digital, 404/967-2077; 30MHz $999 (with FPU). 33MHz $499 (without FPU).

LC and LC II upgrades: Macintosh LC III Logic Board Upgrade; Apple Computer, 408/996-1010; $999.

Mac II accelerators: Radius Rocket 251, Radius Rocket 33; Radius, 408/434-1010; 251 $1199, 33 $2499.

Universal PowerCache series; DayStar Digital, 404/967-2077; $449 to $999.

Ifx SCSI accelerator: QuickSCSI; PLI, 800/288-8754; $499.

Quadra static-RAM cache cards: FastCache Quadra; DayStar Digital, 404/967-2077; $299 for Quadra 700 and 900, $448 for Quadra 800 and 950.

MIDRANGE HARD DRIVES, Mar 93

Low-capacity drive: La Cle Cirrus 240; La Cle, 503/520-9000; $769.

Notable technology: DiamondDrive 510; Mass MicroSystems, 408/522-1200; $2089.

Bargain: APS Fujitsu 520; APS Technologies, 800/874-1428; $1149.

All-around quality: hammer 525FMF; FWB, 415/474-8055; $2799.

OPTICAL DRIVES, Dec 93

3X-inch: Epson OMD 5010; ClubMac, 800/258-2622; $995. continues
Editors' Choice

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Teleware, 201/586-2300; $189.
Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

BUSINESS TOOLS

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $959.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

CD-ROM

TOP 10 CD-ROMS, Mar 94
Overall: Seven Days in August; Time Warner Interactive Group, 818/995-9999; $79.99.

COMMUNICATIONS/NETWORKS

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93
Faxme; Telefocus, 816/886-9800; $79.

NETWORK CONNECTIVITY, Sep 93
Netware for Macintosh: Novell, 801/429-7000; $495 for 5-user license to $2295 for 200-user license.

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

2-D CAD, Jan 93
Low-end: Blueprint; Graphisoft, 410/461-9488; $295.

3-D DESIGN, Aug 93
Price for performance: Ray Dream Designer 2.0; Ray Dream, 415/960-0765; $299.
All-in-one solution: Infran-D 2.5; Specular International, 413/253-3100; $895.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ClickArt Studio Series; T/Maker Company, 415/962-0195; $99.95 per volume.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/967-9990; $49.95.

FONT BUYERS' GUIDE, Mar 94

TEXT-INPUT/EDITING SOFTWARE, Jan 94
Book-length documents: Action; Macromedia, 415/252-2000; $495.
Multiuser system: Personal Librarian; Personal Library Software, 301/990-1155; $995.

PRESENTATION TOOLS

MULTIMEDIA AUTHORING, Mar 93
Entry-level: Passport Producer; Passport Designs, 415/726-0280; $495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; $189.95.
Book-length documents: FrameReader; Frame Technology, 800/843-7263; $84.95.

VITAL MEMORY SOFTWARE

VIRTUAL MEMORY SOFTWARE, June 94
Virtual memory Software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.

MEMORY BOOSTING SOFTWARE, Jan 94
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 hundreds of Macworld's authoritative product reviews. 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.

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. Apr 94

4D Server 1.0 (1.05), ACI US, 408/252-4444, $1495 to $3495. Database server uses the ingenious multitasking technology built into 4D to make it appear that each client has the full resources of the server. If you use 4D on a network, you need this product. Jun 93

Acrobat Exchange, Acrobat Distiller, Adobe Systems, 415/961-4400, $1595 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 or as convenient as you might expect. Oct 93

@Risk 1.1, Palisade Corp., 607/277-8000, $395. Statistical simulator for Microsoft Excel financial computations generates complex, statistically valid templates within Excel and is the first choice for analysts who work with probabilistic models every day. It assumes that the user is an Excel power user. Aug 93

BaseMap 1.0.1, GeoPoint, 415/957-1560, $149. For simple maps displaying simple data, this mapmaking 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

ClarisWorks 2.0, Claris Corp., 408/727-8227, $299. Integrated program provides more features, is easier to use and faster, and has better integration among modules than other available programs. Aug 93

Common Ground 1.0, No Hands Software, 415/802-5800, $189.95. Simple, robust document-interchange system is the clear choice for modest-document-distribution jobs. In tests, it worked easily with documents from many different applications. Oct 93

Cricket Graph III 1.5, Computer Associates International, 516/342-6000, $129. Basic and foolproof charting program produces cleaner charts than Excel with little effort, although its feature set is fairly modest. Apr 94

DeltaGraph Pro 3, DeltaPoint, 408/648-4000, $195. At its new lower price, this charting program is the best feature-for-feature value in Macintosh charting. There's even a new Chart Advisor function that suggests the appropriate type of charting for your data. Apr 94

EasyFlow 1.1, HavenTree Software, 519/544-6035, $229. The rough edges and distinctly un-Mac-like attributes of this flowcharting software reflect its DOS heritage, but on the whole it's easy to use. Sep 93

Helix Express 1.0 (2.0), Helix Technologies, 708/465-0242, $499. This relational database has an iconic programming language that sometimes baffles programmers, but provides an easy route into basic data-handling for nongrammers. Jul 93

Helix Tracker 1.0, Helix Technologies, 708/465-0242, $495. Well-designed workgroup-document manager has strong audit and annotation features: imposes just the right amount of administrative discipline. For large documents, however, Ethernet will look mightily attractive. Nov 93

ithink 2.2.1, High Performance Systems, 603/643-9636, $695. Although it requires a real training commitment for effective use, this product is an attractive dynamic business-modeling system. It's a good bet for identifying cloudy spots in the crystal ball. May 93

Lotus Notes 3.0, Lotus Development Corp., 617/577-8500, $495 per client. Well-organized, robust, and flexible business-data system demands a full-time administrator, preferably with considerable programming experience, for effective use. Sep 93

MacBarcode 2.2.4, ComputaLabel, 508/462-0993, $349 to $895. Simple-to-use desk accessory creates bar codes in EPS or Adobe Illustrator 1.1 format. DA cannot automatically create serial codes. Jun 93

MacProject Pro 1.0 (1.5), Claris Corp., 408/727-8227, $599. If you're working on a midsize project and like using PERT charts, this may be the project-management software for you. However, the multistep scheduling process and the limited integration between charts are frustrating if you prefer Gantt charts. May 93

Map II 1.5, ThinkSpace, 519/661-4006, $395. Well-structured program has most of the functions a simple geographical information system needs and is suitable for introductory instruction in GIS and for alert first-time users who just like maps. May 94

MarcoPolo 2.0, Mainstay, 805/484-9400, $395, inexpensive, easy-to-use product allows you or your workgroup to archive and retrieve documents, whether in electronic or paper form. Queries are easy to construct and searches are handled quickly. Sep 93

Market Manager 3.5, Breakthrough Productions, 916/265-0911, $395 to $1995. Sales automation software is designed to keep track of contacts, generate mailings, and make sure that leads don't fall through the cracks. It includes a remote module, but it has some odd user-interface features. Oct 93

Memomizer 3.0, Brains Software Engineering, 432-231-28573 (Austria), $160. Software records dictation, and you transcribe it in a word processor. You may prefer to stick with a handheld tape recorder, considering the product's RAM and storage appetite and its propensity to crash. Aug 93

Micro Planner Manager 1.1, Micro Planning International, 303/757-2216, $695. When you require cross-project resource sharing and leveling for a reasonable price, this project-management software has the edge. It has a nicely intuitive interface, though there's a steep learning curve for its advanced features. Nov 93

Microsoft FoxPro for Macintosh 2.5, Microsoft Corp., 206/882-8080, $495. Dazzling fast and easy to use relational database has a greatly improved interface and cross-platform compatibility. For projects of 4 to 20 users that handle large amounts of data (hundreds of thousands to millions of records) it offers excellent performance. Apr 94

Office Tracker 1.1, Millum Corp., 512/372-2255, $195 to $995. The efficient user interface of this software sign-out board, in both single-user and networkable versions, makes it easy to learn and use; but it has some minor flaws. Dee 93

Project Scheduler 5, Scitor Corp., 415/570-7700, $695. For midsize project-planning, this program's many hits outweigh its few misses. It goes beyond the requisite scheduling options, with inflation factors and unlimited projects in memory, and it conforms to accepted standards, so you get consistent, predictable results. Aug 93

SpreadBase 1.0.1, Objective Software, 415/306-7410, $695. Business data-analysis tool is a unique combination of database and spreadsheet functions. It's worth a close look for power users, despite meager documentation and a cranky macro language. May 93

Useful Voice Processor for Macintosh 1.1v7 (1.1v9), Useful Software Corp., 508/774-8233, $179.95. Dictation software lets you record and transcribe on a Mac. It has some useful features, but you must take uncommon care to avoid crashes. Dec 93
Advanced Math functionality, a competent calculating engine and superior charts; but Is missing outlining, real 3-D offered for Microsoft Excel. Jul 93

shortcomings. including some memory-management problems. Apr 94

fax software has an excellent address-book feature but also

TokenPeek 1.0 (2.0.3), AG Group, S10/937-6101, 579.99 to 5639.99.

Support removable drives or network volumes. Apr 94

example, printing when a printer is available and otherwise

ever. so check before buying. Dec 93

a worthwhile investment. Jan 94

deferring printing. It only supports some hardware,

and are drowning in a sea of devices and zones. this net-

Intercom system transmits System 7 SND resources,

DataViz, 203/268-0030, 5149. If your PC files are

work-management software will make your life simpler.

If being entertained while learning to type Interests you,

Mavis Beacon Teaches Typing:Z.O, Interactive Group, 818/95S-9999, $79.99. Grace-

full, well-integrated CD-ROM tutorial guides the curious

through brief but helpful explanations of basic computer

technologies. Jan 94

HyperStudio, Roger Wagner Publishing,

619/442-0522, $179.95. HyperStudio 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, Called 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

Mavis Beacon Teaches Typing 2.0, The Software Toolworks, 415/883-3000, $49.95. If being entertained while learning to type interests you, this typing tutor provides varied environments, interesting lessons, and good games. Jun 93

Millie’s Math House 1.0 (1.1), Edmark Corp., 206/556-8400, $49.95. Math-education software provides ways for preschoolers to experiment with numbers and counting. It’s engaging, but more advanced levels would keep children challenged longer. Jul 93
ENTERTAINMENT

BlackJack Trainer, ConIncCo, 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 won’t get in the way. Oct 93

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, 510/522-1164, $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 Mircoshot combat flight simulator. Dec 93

Hell Cab 1.0.1, Time Warner Interactive Group, 818/955-9999, $99.99. Take a diabolical New York cabbie with a penchant for time travel, toss in a few brainteasers, 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 the Empire State Building, add a few brainteasers, and you’ve got an interactive science-fiction epic on CD-ROM. The strength is the way it blends easy play with complicated strategy. Some bugs exist. Oct 93

FINANCE/ACCOUNTING

Andrew Tobias’ TaxCut 1993, MECA Software, 203/235-1441, $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

BestBooks 1.0, Teleware, 201/586-2200, $99, in a straightforward, unimbituating manner, this small-business accounting program integrates the standard bookkeeping functions of accounts receivable, accounts payable, and general ledger. Jul 93

ExpensePlus 1.0.1, State of the Art, 714/793-1222, $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 time-saver, you’ll need AppleScript expertise to modify the expense reports. Apr 94

MacTax 1993, ChipSoft, 602/295-3110, $69.95. Tax-preparation software provides a reasonably detailed manual and 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

MacTax 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

MacTax 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

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

GRAPHICS

addDepth 1.0.2, Ray Dream, 415/960-0768, $179. The purpose of this graphics program is to enhance the creation of 2-D images with 3-D effects. It’s versatile, accommodating, and affordable, but working on complex images gets tedious because of the automatic application of styles. Aug 93

Adobe Illustrator 5.0, Adobe Systems, 415/961-4000, $595. The Mac’s most dependable draw program has added enough new features to beguile the mind.
Star Ratings

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

Transconer 1.0 (1.1), TechPool, 216/291-1922, $395. Remarkable graphics-observation software can read PostScript files and convert them to a variety of formats. As you might expect of a program attempting to fill such a tall order, its conversions are not always flawless, but it can be a lifesaver nonetheless. Nov 93

upFront 2.0, Alias Research, 416/362-9181, $299. Capable modeler is something of an acquired taste. However, take the time to learn it and you'll find useful, if unconventional and demanding, tools that are well suited for architectural modeling. Jan 94

VirtuWalkthrough 1.1, Virtus Corp., 919/467-9700, $195. Interactive 3-D modeling software provides instantaneous access to rendered 3-D scenes, allowing you to travel through models at will. While it has some problems (such as occasionally just quitting), it's an excellent value. Jul 93

WarpWritings One, WarpWritings Two, Form and Function, 619/536-9999, $595 each. The images in these texture collections on CD-ROM are generally acceptable, although some are muddy and others are difficult to decipher at low resolutions. If you need images for repeating patterns, however, these repeat seamlessly and are a good value. Aug 93

MATH/SCIENCE

AlchemyIII, Tripos Associates, 314/647-1099, $595. Molecular-modeling software can model decapeptides and DNA fragments, in addition to the expected small molecules, with refreshing alacrity on a Mac IIci or better. Sep 93

AmazingUniverse 2.1 (2.1a), Hopkins Technology, 612/931-9976, $795. Space-image exploration package on CD-ROM offers an amazing variety of astronomical images with a very competent program (ProVision II) for modifying and inspecting those images. It assumes that users won't be fazed by such things as writing their own image-convolution matrices. Aug 93

CaduceusScience Review Macintosh Project 1.0, Scientia, 617/776-4277, $150 to $250. If you're taking the MCAT, you'd be nuts not to buy this interactive science review. With proper use, its 9MB of files are certain to improve your score. Apr 94

CircuitMaker 3.0, MicroCode Engineering, 801/226-4470, $1995. Much of the tedium of diagramming circuits and constructing prototypes is relieved by this digital circuit simulator that provides a powerful set of basic tools for a very reasonable price. Aug 93

CSCChemOffice 2.0, Cambridge Scientific Computing, 617/491-6862, $1595. Comprehensive chemistry software is the Mac equivalent of software that seven years ago would have cost $200,000 and required an equally costly minicomputer. It's a winner. Feb 94

DataDesk 4.0 (4.1), Data Description, 607/275-1000, $595. For finding patterns in data, this statistical-analysis program has no peer. Years of refinement have made it a uniquely valuable tool, despite its lack of some tests found in larger programs. May 93

FASTAT 2.0, STATYB, 708/864-5670, $199. Statistical business-analysis software makes sense as a day-to-day statistics tool. It provides the right tests for most requirements, and its graph types provide plenty of information, although they lack glamour. Jun 93

f(x) 6, Lascaux Graphics, 602/299-0661, $115. The main problem with this math software is four-dimensional visualization. It costs slightly more than a textbook, making it a great educational bargain. Sep 93

InStat 2.01, GraphPad Software, 619/457-3909, $595. For scientists with limited statistics backgrounds, the charty clarity of this lab-oriented statistics software's help screens will be invaluable, while the limited variables and minimal graphics will not be a problem. Nov 93

MacPhase 1.2, Otter Solutions, 315/768-3956, $159. Low-cost, scientific-data-visualization software with a large assortment of mathematical tools is an authentic bargain. A principal strength is a well-planned color-lookup-table editor that's delightfully easy to use.

MathCAD 3.1, MathSoft, 617/577-1017, $495. Numerical and symbolic computation software is easy to learn and use, and is much more powerful than earlier versions. It does not compete in scope with the largest mathematics programs, but for most science and engineering tasks, it's a fast way to get problems solved.

Mathematics 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. A quality-control tool kit for StatView users is limited in its response, but is generally well designed, well documented, and suitable for quality-control neophytes as well as professionals.

Spyglass Dicer 2.0, Spyglass, 217/355-6000, $695. Scientific 3-D visualization tool displays a two-dimensional slice through a three-dimensional object (which is represented in the computer by a data table). While Dicer purifies the limits of the Mac hardware, for its function this product is nearly the only game in town. Jul 93

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 4.0 (4.02), Abacus Concepts, 510/540-1949, $595. If your work uses statistics for decision support rather than abstract analysis, and you regularly have to present your results to nonstatisticians, this is the statistics package for you. Oct 93

SumTotal 1.0, Concurrent Engineering Tools, 602/464-8206, $99.95. Exceptional calculation 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-sink in menu operations. Oct 93

Theorist 1.5, Precise Corporation, 415/236-4252, $289.95. Symbolic-math program that you can figure out by yourself adds a useful table feature, more special functions of physics, and better graphics. It's still the only program to use real notation directly. May 93


Visualization of Natural Phenomena, Telos/SpinnerVerlag, 408/249-9314, $59.95. CD-ROM introduction to applying all aspects of computer engineering.
PRESENTATION TOOLS

<table>
<thead>
<tr>
<th>Software</th>
<th>ISBN/Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe Premiere 3.0, Adobe Systems</td>
<td>415/961-4400, $69.55</td>
</tr>
<tr>
<td>Avid VideoWorkshop 2.0, Avid Technology</td>
<td>508/640-6789, $49.95</td>
</tr>
<tr>
<td>CoSA After Effects 1.1, CoSA</td>
<td>401/831-2672, $129.95</td>
</tr>
<tr>
<td>Elastic Reality 1.0, ASDG, 3D/3D</td>
<td>508/273-6555, $349</td>
</tr>
<tr>
<td>Elasticity Works 1.1 (2.0), Interactive Solutions</td>
<td>415/377-0136, $395</td>
</tr>
<tr>
<td>MovieWorks 1.2 (2.0), Interactive Solutions</td>
<td>415/377-0136, $395</td>
</tr>
<tr>
<td>Passport Producer Pro 1.0, Passport Designs</td>
<td>415/726-0260, $995</td>
</tr>
<tr>
<td>React 1.0</td>
<td>408/725-2850, $199</td>
</tr>
<tr>
<td>Revolution, 415/553-8153, $995</td>
<td></td>
</tr>
<tr>
<td>Smalltalk/V for Macintosh 2.0</td>
<td>408/513-8000, $495</td>
</tr>
<tr>
<td>SoftPolish 1.1, Language Systems Corp.</td>
<td></td>
</tr>
<tr>
<td>SourceSafe 2.1, One Tree Software</td>
<td>919/821-2300, $295</td>
</tr>
<tr>
<td>Symantec C++ for Macintosh 6.0</td>
<td>408/253-9600, $499</td>
</tr>
<tr>
<td>VIP-C 1.0, Mainstay</td>
<td>805/484-9400, $495</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
<th>ISBN/Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe Premiere 3.0, Adobe Systems</td>
<td>415/961-4400, $69.55</td>
</tr>
<tr>
<td>Avid VideoWorkshop 2.0, Avid Technology</td>
<td>508/640-6789, $49.95</td>
</tr>
<tr>
<td>CoSA After Effects 1.1, CoSA</td>
<td>401/831-2672, $129.95</td>
</tr>
<tr>
<td>Elastic Reality 1.0, ASDG, 3D/3D</td>
<td>508/273-6555, $349</td>
</tr>
<tr>
<td>Elasticity Works 1.1 (2.0), Interactive Solutions</td>
<td>415/377-0136, $395</td>
</tr>
<tr>
<td>MovieWorks 1.2 (2.0), Interactive Solutions</td>
<td>415/377-0136, $395</td>
</tr>
<tr>
<td>Passport Producer Pro 1.0, Passport Designs</td>
<td>415/726-0260, $995</td>
</tr>
<tr>
<td>React 1.0</td>
<td>408/725-2850, $199</td>
</tr>
<tr>
<td>Revolution, 415/553-8153, $995</td>
<td></td>
</tr>
<tr>
<td>Smalltalk/V for Macintosh 2.0</td>
<td>408/513-8000, $495</td>
</tr>
<tr>
<td>SoftPolish 1.1, Language Systems Corp.</td>
<td></td>
</tr>
<tr>
<td>SourceSafe 2.1, One Tree Software</td>
<td>919/821-2300, $295</td>
</tr>
<tr>
<td>Symantec C++ for Macintosh 6.0</td>
<td>408/253-9600, $499</td>
</tr>
<tr>
<td>VIP-C 1.0, Mainstay</td>
<td>805/484-9400, $495</td>
</tr>
</tbody>
</table>

**MACWORLD June 1994**
programming code generator will let you code about ten times faster than you could using only one editor. Its real strength is in rapidly assembling smaller projects. May 94

UTILITIES

- **7th Heaven 2.5 (2.5.1), Logical Solutions,** 612/659-2495, $99.95. Our reviewer found the seven enhancements to System 7 fun and elegantly done, but not all of them were useful. Jul 93

- **Aliki Seek 2.1, Aliki Software Corp.,** 206/286-2600, $39.95. Competent file-finding utility scans by file name or content and lets you combine multiple search criteria. It cannot search in the background or find text in compressed files. Jul 93

- **AppleSearch 1.0, Apple Computer,** 408/996-1010, $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 catalog 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

- **Billy Steinberg's PBTools 1.0.1, Inline Software,** 203/435-4995, $99.55. If you want basic PowerBook management without added bells or complex menu bar displays, this collection of four utilities may be just your cup of tea. Jul 93

- **CD-ROM Toolkit 1.0.5, F/WB,** 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

- **Chameleon 2.0.3 (2.1), Logical Solutions,** 612/659-2495, $99.95. Seek desktop-pattern editor comes with an ample supply of rich, textured color images and a set of limited but functional editing tools. Sep 93

- **ClickChange 2.0, Dubl-Click Software,** 818/888-2068, $59.95. Interface-customizing package has nothing you need but is filled with everything you don't want. Feb 94

- **Connectix Desktop Utilities 1.0 (1.0.1), 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 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

- **CryptoMatic 1.0.1, Kent Marsh,** 713/522-5625, $99. Security software offers fast Finder-level encryption and decryption with effective file encryption.

Although its simplest encryption algorithm isn't quite hacker-proof, it's worth considering. Feb 94

- **DiskLock PB 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

- **The Disney Collection Screen Saver, Berkeley Systems,** 510/540-5535, $49.95. 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 1.0.3, 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. Nov 93

- **DriveTech 1.0, MicroMat Computer Systems,** 415/891-6227, $59.95. Without decent documentation or clearer error messages, this floppy-drive cleaning and diagnostic program is essentially a $50 floppy-drive cleaning kit. Since you can buy a cleaning kit without software for $10, that makes it a bad deal. Jan 94

- **DupLocator 1.0.3, Midnight Software,** 303/993-1013, $99. For new Macintosh users who don't have a general file utility, this software that locates duplicate files, as well as performing basic file commands such as moving and renaming files, may be useful. Jan 94

- **DynoPage 2.0, Portfolio Software,** 802/865-2700, $59.95. While this utility simplifies the printing of booklets and double-sided pages, it doesn't support PostScript graphics, is incompatible with some popular applications, and has a buggy drag-and-drop feature. Jul 93

- **eDisk 1.0 (1.2), Alysia Software Corp.,** 415/566-2263, $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

- **Freedom of Press Classic, ColorAge,** 508/667-8588, $149. Utility allows you to print PostScript graphics on almost any non-Postscript printer—easily and with impressive results. Mar 94

- **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 pretty paltry. Sep 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

- **KidDesk 1.0 (1.1), Edmark Corp.,** 206/656-8484, $39.95. If you have young children who love to experiment with your Mac, this desktop environment provides easily navigable play while protecting your files from the havoc that little fingers can wreak. Jun 93

- **Mac Pac 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 AutoDoubler, CopyDoubler, and a good file-management program, it's worth the price. Jan 94

- **MacTools 3.0, Central Point Software,** 503/690-8090, $149. Recovering trashed 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

- **MagiTyp 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 Microsoft Word. Sep 93

- **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

- **New Compass 1.0 (1.0.1), Now Software,** 503/274-2800, $99. Compression utility holds its own in a crowded market; it's easy to use, it's complete, and it compresses as well as or better than other options. Dec 93

- **Now Fun, New Software,** 503/274-2800, $69. Five control panels let you liven up your Mac by customizing everything from menu colors to system sounds. The included screen-saver modules and desktop patterns and pictures are fairly limited, though. Dec 93

- **Now Utilities 4.0.1 (4.0.1p), Now Software,** 503/274-2800, $129. Many thoughtful improvements have been added to this collection of utilities, which is now better integrated, more logically designed, and still an excellent deal for your dollar. The new scrapbook feature, however, is awkward and inconvenient. Aug 93

- **Open Sesame 1.02, Charles River Analytics,** 617/491-3474, $99. Utility automates Finder operations, such as opening and closing files, without resorting to macros or scripts. It has an elegant interface, but people with strict work habits are more likely to find its suggestions worthwhile than are those who don't follow a routine. May 94

- **OptiMem 1.4.1, Jump Development Group,** 412/681-6292, $129. Systemwide memory manager monitors RAM use and allocates RAM where it's needed. Works best with software that handles memory-money situations effectively. Mar 94

- **Peace of Mind 1.2.2 (1.3.3), DiagSoft,** 408/438-8247, $149. Hardware diagnostic tool performs exhaustive tests on major Mac hardware components; does an excellent job of diagnosing simple simulated hardware errors. The program has minor bugs and lacks a comparative test-history feature. Jun 93

- **Power To Go 2.0, Claris Corp.,** 408/727-8227, $99. PowerBook utility collection has a few unique slants—including a floating palette that can display battery-life estimates—that keep it above the also-rans. It does lack features of similar products. Dec 93

- **Public Utilities for the Macintosh 1.0, Symantec/Fifth Generation Systems,** 504/291-7221, $149. Utility sticks to the basics of disk diagnosis, disk repair, and file optimization. It does a good job, and sometimes unique, job, but disk optimization is slow. Jan 93

- **QuickKeys 3.0, CE Software,** 515/221-1801, $169. The simple, unintruding interface of this middle-management utility allows you to build a set of useful shortcuts quickly. Mar 94

- **RAM Doubler 1.0.1, Connectix Corp.,** 415/571-5100, $99. Inexpensive system extension doubles available RAM for many Macintosh users. There are a number of requirements, however, including System 7, 4MB of physical RAM, and a 68030 board. May 94
One of these is a color proof and one is output from our new printer. We forgot which is which.

We paid $70 and waited three days for one of these. The other popped out of our new Tektronix Phaser® 480 in minutes. Pull out your loupe and start guessing. And while you’re down there staring, note our output’s phenomenal color. PANTONE®-approved, it’s perfect for matching those tricky product colors, logos and skin tones. You might also notice the full 11” x 17” print area. Yes, Virginia, there are tabloid-sized full bleeds. And it shares easily: the Phaser 480 is a work group printer for Macs, PCs or workstations. Plus, it boasts a powerful RISC processor and true Adobe® PostScript® Level 2. Spread-sized bleeds? Reprint quality comps? Pre-film proofing right at your desk? Welcome to preproduction heaven.

So head down to your nearest Tektronix dealer to see for yourself. And by the way, our guess is that the one on the bottom is our print. Well, then again ...

For a free print sample or dealer location call 800/835-6100, Dept. 32C.

Phaser is trademark of Tektronix, Inc. All other marks are trademarks or registered trademarks of their respective companies.
Redux Deluxe 2.0. Inline Software, 203/435-4995, $79.95. Easy to learn and relatively simple to use, this backup program has some powerful features, such as scripting, but it doesn’t have a compression option. Jan 94

Retrospect 2.0, Dantz Development Corp., 510/253-3000, $249. Powerful backup and archiving software has an improved interface and scripting capabilities, and works well for all versions of System 7. Sep 92

Retrospect Turbo 2.0, Dantz Development Corp., 510/253-3000, $449. Utility allows fast, automatic backup of networked Macs to a central Mac with a backup device. It worked flawlessly in our reviewer’s tests. Sep 93

Safe and Sound, Central Point Software, 503/690-8090, $49.95. Limited but useful disk protection and — salvage utility has a clean, simple interface and is an efficient emergency recovery tool. Jun 93

SafeDeposit 2.1, Dayna Communications, 801/269-7200, $189. Automated backup program is easy to set up and use. Also, unattended backups must be restarted from scratch if disk space runs short and a new disk isn’t inserted. Sep 93

Safe or Sorry 1.0, Olderual Corp., 305/267-1112, $59. Unobtrusive control panel periodically saves all of your keystrokes, but requires System 7.1 and offers no clear-cut advantages when compared with other test recovery programs. Oct 93

SAM 3.8, Symantec Corp., 408/253-9600, $99. Efficient, thorough virus-protection software slows down system startup and application launching, but this program is a worthwhile investment for anyone who exchanges or downloads files. Mar 94

Scenscapes 1.0.1, Kiwi Software, 805/685-4031, $44.95. With more than 600 desktop patterns—and a suite of well-designed modules to transform those patterns—this fun and frivolous utility lifts desktop-pattern design to new heights of elegance. Nov 93

Square One 1.5.2, Binary Software, 310/582-8295, $74. Flexible, attractive icon-based file launcher provides immensely customizable palettes, including one that displays active applications. The application will consume 400K of your system memory. Aug 93

Stacker for the Macintosh 1.0.1, Stac, the Data Compression Company, 619/431-7474, $149. As long as you pay attention to the capacity of your hard drive, this driver-level compression product performs reasonably well, except for its slow hard drive read quotient. Oct 93

Star Wars Visual Clips, Sound Source Unlimited, 805/494-9996, $89.95. Control panel lets you play QuickTime movie clips from Star Wars at system events. If you have the money, the hard drive space, and the RAM, this is the kind of totally cool toy that will make you remember why you love your Mac. Sep 93

Tempo Plus 3.0.9, Affinity Microsystems, 303/442-4840, $179.95. Very capable macro-creating utility may be daunting for novices but offers plenty of power for advanced users. Mar 94

TimeTwo 2.0, Golden Triangle Computers, 619/587-0110, $149. This driver-level compression utility is transparent and robust. It caused no problems through a two-month course of testing, on a system with myriad utilities and system software tools. Mar 94

Toner Tuner 1.0.3, Working Software, 408/423-5696, $24.95. Inexpensive, incredibly useful extension adds a sliding bar to print dialog boxes allowing you to adjust the amount of toner applied to each print job. If you can’t save trees, you can at least save toner. Dec 93

ultraShield 1.252 (1.3), ustrE Software, 714/756-5140, $149. Sophisticated security product combines practically every feature you might need into an integrated package, including a lightning-fast version of the U.S. government data-encryption standard. Dec 93

Virex 5.0, Dataswitch Corp., 919/549-0711, $99.95. The extremely fast, trouble-free performance of this software makes the task of guarding against computer viruses almost painless. Its speed puts it ahead of the pack. May 94

Virtual 3.0.1, Connectix Corp., 415/571-5100, $59. If you need to eke out as much virtual memory speed as possible, this utility may be a useful tool. For System 6 users who want virtual memory, it’s the only game in town. Sep 93

Working Watermarker 1.02, Working Software, 408/423-5696, $49.95. Simple, useful system extension allows you to print or create watermarks, that’s “watermarks” in the background of virtually any document. Although it has imperfections, it’s earned a permanent spot in our reviewer’s System Folder. Jan 94

VERITCAL MARKET

Claire, The Personal Music Coach 1.0.1, Opcode Systems, 415/856-3333, $129.95. Musicanship program teaches pitch and interval recognition, sight singing, and intonation. Although the interface is nonstandard, it’s logical and easy to learn. May 94

Finales 3.0.1, Coda Music Technology, 800/843-2066, $749. Upgraded music notation software is now in infinitely more pleasant to use. Its comprehensive feature set makes it the standard against which all other music notation products must be judged. Dec 93

MacInteors, Microspot, 408/253-2000, $129. Correctly placing objects is unduly cumbersome in this interior-design software, but once you catch on to the program’s quirks, it’s useful. Feb 94

Musicshop 1.0, Opcode Systems, 415/856-3333, $149.95. MIDI sequencer is an excellent choice as a first sequencer. It’s powerful enough to satisfy the needs of most MIDI users. Oct 93

Roll Call 2.0 (2.5.6 or 3.0), by the Numbers, 603/927-4508, $495 to $595. 4th Dimension database application for church management helps track donations, attendance, church-group membership, and visitation. While not a complete church-management system, it’s an acceptable complement to a general accounting program. Aug 93

Sailing Master 1.1, Starboard Software, 313/662-4393, $64.99. Though the slow speed and jerky motion point to less-than-polished programming, this sailboat-racing simulation offers good tactical play and is fun—worth the price for sailing competitors. Nov 93

WRITING TOOLS

MacWrite Pro 1.5. Claris Corp., 408/727-8227, $249. The clean, uncluttered interface of this low-to-middle-level word processor is still one of its major assets. This upgrade adds support for QuickTime, PowerTalk, AppleScript, and more. May 94

MasterWord 5.1, Alki Software Corp., 206/286-2600, $99.95. The centerpiece of this package of add-on Microsoft Word commands is a set of customizable toolbars. Unfortunately, rough edges remain, including inaccuracies in the documentation and some features that don’t work as advertised. Aug 93

The Oxford English Dictionary, Oxford University Press, Electronic Publishing, 212/679-7300 ext. 7370, $585. CD-ROM dictionary contains 20 print volumes, including half a million words, but the flaws, omissions, unreliability and unforgivably poor design are undesirable. Apr 94

Random House Unabridged Dictionary, Random House Electronic Publishing, 212/572-2600, $179. The most comprehensive American-made dictionary on CD-ROM works within any program and is good at guessing misspelled words. Although some functions don’t work reliably, the quality and design of the software are better than those of other dictionaries on CD-ROM. May 94

Selling Coach Professional 4.0.1, Deneba Software, 305/396-5644, $195. If you’re considering investing in reference software, this spelling checker, dictionary, and thesaurus is relatively capable, if not completely accurate. Jun 94

Thunder 7 1.5.3, Baseline Publishing, 901/682-9676, $99.95. Stand-alone spelling checker and thesaurus interactively monitors your keystrokes and alerts you to potential errors as they are entered. It quickly and transparently prevents you from making embarrassing types. Nov 93

WordPerfect for Macintosh 3.0, WordPerfect Corp., 801/225-5000, $495. The innovative interface of this word processor uses context-sensitive button bars and expandable rulers to make imminently feasible accessible with a click of the mouse. It’s an accomplishment in ease of use. Mar 94

A Zillion Kajillion Rhymes 1.0, Eccentric Software, 206/628-2687, $49.95. Rhyming dictionary is quick, small, simple, and self-contained; but it only rhymes with the roots of search words (and ignores -ed, - s, and -ing endings). Nov 93

MISCELLANEOUS HARDWARE

AC5100, Altec 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 hiss noticeably. Dec 93

AC5150, Altec Lansing Consumer Products, 717/296-2818, $150. Subwoofer rounds out the sharp tones of the AC5100, but the bass response is neither punchy enough nor loud enough, and the unit is about the size and weight of a concrete block. Dec 93

Address Express, CoStar Corp., 203/661-9700, $49.95. Flaky performance and system crashes plagued this envelope-label printer in our tests, but the print quality was good. Oct 93

Apple Adjustable Keyboard, Apple Computer, 408/396-1010, $219. Keyboard is only a slight improvement on the flat slab keyboard. Technically, it corrects ultranumerary, but many sufferers of repetitive stress injuries want a keyboard that adjusts vertically. Jul 93

AppleCD 300, Apple Computer, 408/956-1010, $599. Double-speed CD-ROM drive spins its disk at twice the speed of earlier drives, providing faster access to large files. Jan 93

Apple Color OneScanner, Apple Computer, 408/996-1010, $1349. Tests of this color scanner demonstrate unpolished colors and sharp image continues
STATISTICA/Mac™ - A complete statistical data analysis system with hundreds of presentation-quality graphics integrated with all procedures:

- n-depth, comprehensive implementations of: Exploratory Techniques: Descriptive Statistics; Frequency tables: Large selection of nonparametric tests; Stochastic multiple regression methods with extended diagnostics; General nonlinear estimation (with predefined or user-specified models); Logit/Probit analysis; General implementation of ANOVA/MCM/ANOVA/MANCOVA designs of sequentially unlimited complexity; repeated, nested, incomplete, random, changing covariates, contrast analyses, post-hoc tests, custom designs; Discriminant function analysis of statistics; Canonical analysis; Time series modeling techniques for forecasting; Factor analysis with rotations; Cluster analysis (incl. hierarchical, k-means, and 2-way fitting); General survival/failure time analysis (incl. life tables, group comparisons, and regression models); Distribution fitting (a large selection of continuous and discrete distributions); Curve and surface fitting and smoothing (incl. spline, B-SPL, B-SPP, and others); and much more. A manual with comprehensive introductions to each method and step-by-step examples (Quick Start booklet explains all major conventions); balloon help.

- Extensive data management facilities: a super-fast spreadsheet of unlimited capacity with formulas (and Publish and Subscribe); merge/split files, "double entry" of values (numerals/text); ASCII data transformations, programmatic language; Import/Export data and graphs from/to Excel, Macs, CSS and other formats.

- Graphs integrated with all procedures (e.g., click on a correlation coefficient to produce the corresponding scatterplot and other graphs; click on a variable in the descriptive statistics table to produce a histogram and other graphs; click on an interaction effect in the ANOVA table to plot a table of interaction); Large selection of 2-dimensional graphs: Histograms (incl. multiple, clustered, bar charts, overlaid functions), Scatterplots (incl. multiple, weighted frequency, smoothed, function fitting), Multiple line and Range plots, Trend plots, Standard deviation plots, Data sequence diagrams, Contour plots, Box-and-whisker plots, Johnson plots, Bar graphs, Double pie charts, Scrollable dendrograms, Two-way testing plots, Curve fitting plots, Distribution comparison plots, Range plots, Reliability plots, Anamorphosis plots, Factor space plots, Consensus reader and residual diagrams, ANOVA interaction plots, Multivariate (multiple) matrix plots, Exploratory Data Analysis with histograms, and many other specialized plots.

- Large selection of 3-dimensional graphs: 3D surface plots (with data smoothing procedures, color by gray-scale shading, and projected contours), 3D scatterplots, 3D axis (place) plots, 3D exam plots with adjustable planes, 3D line/ribbon plots, 3D sequence block plots, 3D histograms, 3D surface-smoothed frequency plots, and 3D range plots ("flying boxes").

- All 3D plots displayed in true perspective, feature interactive real-time rotation facilities (incl. continuous rotation).

- Extensive graph customization options: all structural aspects of graphs (axes, scaling, patterns, colors, sizes, styles, regions, perspective, rotation, fitted functions, etc.); MacDraw-style tools with specialized "objects": hi-res graph and artwork embedding; page layout/preset; dynamic rulers; Publish and Subscribe graph links.

- All output displayed in Scrollsheets™ (dynamic, automatically scrollable tables: all numbers can be instantly converted into a variety of on-screen customizable, presentation-quality graphs).

- All Scrol/Sheets can be exported as data files and used for import, reexport.

- Flexible facilities to perform analyses on specific subsets of data. Extremely large analysis designs.

- Unlimited size of files.

- Extended precision. Unmatched speed (e.g., on a Mac IIfs, arbitrary rotation of a surface with 1,000 points takes 1 second; correlation matrix 50x50 with 100 cases—less than 5 seconds; transforming a 5,000 data point file—less than 2 seconds).

- Full support for System 7 ("Canopy") and "Publish and Subscribe." Apple events, balloon help, "drag and drop," 24-bit, Quadra cache, etc.

**Price: $695.**

Quick STATISTICA/Mac™ - A subset of STATISTICA/Mac, all basic statistical modules of STATISTICA/V: Basic and Descriptive Statistics, Frequency tables, Exploratory data analysis, Nonparametrics, Distribution Fitting, Stochastic multiple regression, ANOVA/MCM/ANOVA/MANCOVA. Manual with comprehensive introductions to each method and step-by-step examples (Quick Start booklet explains all major conventions).

- All data management facilities of STATISTICA/Mac.

- All graphics facilities of STATISTICA/Mac, including interactive rotation of all 3D graphs, extensive on-screen graph customization facilities.

**Price: $395.**

**DOS versions** are also available (can exchange data with Macintosh versions).

**STATISTICA** for **$755.** Quick STATISTICA for **$295.**

Domestic shi $10 per product; please specify type of computer with order; 14-day money-back guarantee.

**StatSoft™**

2325 E. 13th St. • Tulsa, OK 74104 • (918) 583-4149
Fax: (918) 583-4376

Star Ratings

details, perhaps due to color filters and lenses that Apple claims were designed and tuned for the scanner. Jul 93

- AppleDesign Powered Speakers, Apple Computer, 408/996-1010, $179. Tall and curvy powered speaker set looks and sounds good and can produce uncomfortably high volumes without noticeable distortion, but the bare-wire-and-terminal connections aren't user-friendly. Dec 93

- Apple Newton MessagePad, Apple Computer, 408/996-1010, $699. Although Apple released this personal digital assistant too early and marketing hype led to mistaken expectations, this is a very intelligent piece of work with an impressive variety of serious business uses. Dec 93

- Apple PowerCD, 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

- ArtZ 20B Tablet, Wacom Technology Corp., 206/750-8892, $499. Combining pressure-sensitive operation, manageable size, and a new pencil-thin stylus, this affordable digitizing tablet is perfect for artists looking for traditional-style control of their graphics programs. Aug 93

- Apple 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 hard for smaller children to press, and serious computer artists should still opt for a drawing tablet. Oct 93

- Coolscan LS-10e, Nikon Electronic Imaging, 516/547-4200, $2100. Compact desktop scanner for digitizing images from 35mm transparencies is slow, but delivers images good enough for newspapers and some catalogs. Dec 93

- Cypress PhonePro 1.2, Cypress Research Corp., 408/752-2700, $349 to $950. By improving its integration with FaxWorks and with PowerTalk and PowerShare, this powerful telephony software has greatly extended its business scope. May 94

- EMARC, Embarc Communications Services, 407/664-2000, $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 message service may prove useful, but the cost may be prohibitive to others. Sep 93

- Epson ES-800C, Epson America, 310/782-0770, $1499; Macintosh interface kit $399. Flexible 400-dpi scanner offers a range of options, including one- or three-pass scanning, plus a full-featured, easy-to-use software package. Aug 93

- G-Vox, Lynus, 215/925-0880, $399. Hardware-software guitar-instruction package lets your Mac "hear" the notes you play on your guitar. Although the hardware works well, the software has some basic problems and doesn't live up to the hardware. Apr 93

- 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

- LightningScan Portable, Thunderware, 510/254-6891, $459. Powerbook owners will find this hand scanner's modemin serial-port connection, lightweight interface, and total portability well worth the cost, although the scanner is incompatible with some desktop Macs. 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

- Mirror 800 Plus Color Scanner, Mirror Technologies, 612/633-4450, $1299. Add the NuBus JPEG board ($599) and easy-to-use 35mm transparency scanning module ($595) and get a nifty—if slow—desktop scanning package for a reasonable price. Jan 94

- PenDirect ADB, FTG Data Systems, 714/660-6693, $499. Simple, compact Duo dock wobbles to a mouse for routine tasks. Jan 94

- PowerPlate, Technoggin, 512/321-7777, $169.95 to $299.95. Line of long-lived, external power supplies with handy power-management utilities. Mar 94

- PowerLink Emitter, E-Machines, 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 solves occasional transfer problems. Nov 93

- PowerPlate, Technoggin, 512/321-7777, $169.95 to $299.95. Line of long-lived, external power supplies with handy power-management utilities. Mar 94

- ScanPack, VST Power Systems, 508/287-4600, $199.95. External battery pack for PowerBooks is compact, with a lightweight design. It comes with handy power-management utilities. Mar 94


- Wacom UD-1212R, Wacom Technology Corp., 206/750-8892, $479. Graphics tablet with pressure-sensitive stylus is easy to use and highly customizable, though it's incompatible with AppleTalk and AppleTalk Remote. May 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

- DataLink PB; Axcell Cellular Interface, Applied Engineering, 214/241-6060, $824. If you need a full-blown office on the beach, this PowerBook cellular modem-portable 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, $1299. If you need to expand your network at a reasonable price with minimal fuss, get this Ethernet transceiver. 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

- Perfect Port-A-Com, Perfect, 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 144PB, 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 solves occasional transfer problems. Nov 93

PRINTERS

- Apple Color Printer, Apple Computer, 408/996-1010, $2349. If you need large-format color output, but not precision color-matching, this well-built printer is a reasonable choice, although it doesn't support PostScript. Aug 93

- Apple Portable StyleWriter, Apple Computer, 408/996-1010, $499. Sleek, portable ink-jet printer weighs 4.5 pounds and is a pleasure to use. It uses standard StyleWriter cartridges. Jan 94

- Brother HJ-600, Brother International, 908/356-8880, $369. Compact, 360-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

- 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 page feed, it's also a great desktop printer, and with a 49-color print cartridge, it offers inexpensive 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 Pro 600 and 630, Apple Computer, 408/996-1010, $2099 to $2529. From their paper handling to their print quality, these laser printers are Apple's best. Unfortunately, they don't support PostScript. Jun 93

- LaserWriter Select 300, Apple Computer, 408/996-1010, $839. Inexpensive, low-capacity networkable, and an excellent value, in spite of a few weaknesses. Add a 4MB SIMM to take advantage of the printer's amazing PhotoGrade capabilities, which enable the printer to generate 91 shades of gray. Aug 93

- LaserWriter Select 310, Apple Computer, 408/996-1010, $1099. This big, slow printer is a true Adobe PostScript printer with both Mac and DOS ports, but it's not networkable or compatible with the Commodore

192 June 1994 MACWORLD
Sounds like it’s time to call CompuServe for hardware and software support.

As advanced as computers are these days, they still manage to bring out the primitive in us sometimes. Why not put your verbal skills to better use, with CompuServe?

We offer a whole world of support. Including hardware and software forums filled with people from all over who have faced the problems you’re dealing with now. No matter how basic — or complicated — your question, you can rely on your CompuServe friends to provide an answer.

We also have representatives of the most popular hardware manufacturers and software publishers online. They’ll address your problems quickly, and provide you with information that’s not available in any manual.

And then there are our vast reference resources. Whether you want more in-depth information, or just to keep up to date, you can take advantage of our extensive computer libraries as well as a comprehensive collection of articles from leading industry publications.

So lower your voice — and your blood pressure — because help is on the way. For more information or to order, see your computer dealer or call 1 800 848-8199. Outside the U.S. and Canada, call 1 614 529-1349.

CompuServe®
The information service you won’t outgrow.™
Star Ratings

PACKAGER

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. Small, light, quiet, inexpensive 105MB SyQuest drive is ingeniously packaged and ideal for both desktop and Notebook use. Sep 93

Infinity Optical 3.5, Peripheral Land, 510/657-2211, $1399. If you need the extra measure of permanence that magneto-optical storage provides—or a compact alternative to bulky cartridges—this drive, based on a Sony mechanism and using 3½-inch disks that store 120MB of data, deserves a look. Jun 93

LC III, Apple Computer, 408/996-1010, 4/80 $1349. Base system equipped with a 25MHz 68030 processor and 512K of VRAM. This is a machine that fits the bill and the pocketbook of most home users and small-business owners. Jul 93

MicroMac Plus Upgrade System, MicroMac, 714/362-1000, $439. This 68030 accelerator for the Mac Plus requires disassembling a Plus and using the Plus system board to assemble the MicroMac system. It speeds up the Plus dramatically, and supports an included extended full-page monochrome monitor. Jun 93

MultiDisk 150, Iomea, 801/778-1000, $699. Durable cartridges are one of the strongest reasons to choose this Bernoulli removable drive. Although it's slightly more expensive than a SyQuest drive, it's fast and reliable, and the disks are competitively priced. Jun 93

NuTec Duet, NuTek USA Corp., 408/973-8799, $299. Mac workable in both 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, Orange Micro, 714/779-2772, $1799. Nullus board has a DOS processor, letting you have your Mac and a PC, too. It's fairly well executed, though there are some minor problems. Oct 93

PLI 2.4 GB MiniArray, PLI, 510/657-2211, $4815. Slick and elegant RAID drive worked beautifully in tests, but it costs more than other options and the QuickSCSI board is sensitive to minor SCSI problems. Nov 93

PowerBook 140 F/25 Upgrade, Digital Eclipse Software, 510/547-6101, $399. By changing the oscillators and adding an FPU, Digital Eclipse changes a PowerBook 140 into a 170, 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 165c, Apple Computer, 408/996-1010, 4/80 $3399. The passive matrix screen of this color computer is full and has noticeable afterimages, but built-in expectations are reasonable, the speed of the processor provides a pleasant work environment. Jul 93

PowerBook 180c, Apple Computer, 408/996-1010, 4/80 $4169. The active matrix screen of this color 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 other benefits. The lack of a floppy drive can be inconvenient, though. Feb 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 040-based machine match those of a standard entry-level 486DX-based Windows PC. Mar 94

Quadra 800, Apple Computer, 408/996-1010, 8/230 $4679. Squat, yet curvy and attractive, this minitower system has fewer expansion opportunities than the Quadra 950, but just as much power. It's fast, slick, and moderately priced. Aug 93

Quadra 840AV, Apple Computer, 408/996-1010, 8/230 $4069. Technical tour de force uses a 40MHz 68040 microprocessor 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. Dec 93

SCSI MicroDock, Newer Technology, 316/685-4904, $175. Tiny Duo docking station is just under 4½ ounces and barely 5 inches long. It adds only an ADB port and a SCSI port—but both are useful. May 94

SledgeHammer2000/FW, F/WB, 415/474-8055, $3179. 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 $3179. 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, 408/967-2077, $1899. This accelerator card is equipped with the fastest 68030 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

VIDEO/DISPLAY

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 work. Dec 93

DyCam Model 3, DyCam, 814/998-8008, $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. Jan 94

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 this, frames package represents a step forward in QuickTime technology. Nov 93

Intellcolor Display/20, Radius, 408/434-1010, $3199. Although with its exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellcolor software, which lets you control the settings of your display, doesn't offer much added value. Apr 94

Movie/Movie, Sigma Designs, 510/770-0110, $349. This 7-inch Nullus 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. Dec 93

PaintBoard Turbo, RasterOps, 408/562-4200, $1499. Midrange video board supports 24-bit color monitors up to workouts 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. Oct 93

VideoToolKit 2.0, Abbate Video, 508/376-3712, $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
I need to manage graphics, documents, thousands of images. All my jobs are crisis jobs.

My work never stops. Fetch keeps it moving.

"Why didn't anybody think of this before?"
David Piña knows Aldus® Fetch® for Macintosh.
Because C. David Piña Design relies on it.

Winning numerous awards for such clients as Walt Disney® and the Academy Awards®, David and his staff have to deal with multiple projects, thousands of digital images, and dozens of design variations—files, documents, artwork, photos, logos, video clips, sounds, graphics, templates.

And Aldus Fetch is the seamless, quick-access bridge between all of them.

"We open it first thing in the morning, and it links all our applications with all our graphics and text elements for all our projects—so you don't have to re-create what you've already created.

Fetch puts everything right in front of you—visually. You can browse through galleries of "thumbnails"—more than 100,000 images in a single catalog. In any file format—EPS, PICT, TIFF™, JPEG, QuickTime, Kodak Photo CD, GIF, and many more. For any of your favorite applications—Aldus PageMaker®, Aldus Persuasion®, Aldus FreeHand®, Adobe Photoshop, QuarkXPress, you name it.

Fetch lets you catalog, browse, search, preview, retrieve, edit, and reuse materials quickly, efficiently, and cost-effectively. So you have instant access to all your work, whatever it is, wherever you've done it.

Whether you choose the standard-setting multiuser Workgroup Version that shares files across a network or the new Single-user Version that provides an affordable alternative for individual graphics professionals, Fetch puts everything within reach.

So reach for it. See your favorite Aldus reseller today. Or call us and we'll send you more information on how Fetch can keep your business moving.

Call toll-free (800) 685-3663.
Although TextBridge™ OCR software is easier to use, less expensive, and often more accurate, OmniPage™ still has its uses.

In a recent independent test on a wide variety of documents, TextBridge OCR provided more accurate recognition on average than OmniPage Professional.

Yet TextBridge is only 1/7th the price of OmniPage Professional—$99 vs. $695.

Available in both PC and Mac versions, TextBridge works with most popular word-processing applications, fax modems and scanners (including TWAIN support).

So try TextBridge. Of course, if you want to spend an extra $596, you can just coast along with OmniPage Professional.

To order TextBridge, call 1-800-248-6550 ext.3

Xerox Imaging Systems
A Xerox Company

Circle 100 on reader service card
Streetwise Shopper

SPECIAL HARDWARE AND SOFTWARE BUYING OPPORTUNITIES

Selected and edited by Charles Barrett

The following product listings include time-sensitive promotions being sponsored by Macintosh vendors and their resellers, as well as long-term price reductions and bundling arrangements. Each listing indicates 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.

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

Living Desktop 1.0 + EAC Online Connection Kit
Mantis Development is offering this $94.95 Pixel Pattern bundle (excluding $5 for credit-refunded processing fee) to all online service users. Living Desktop provides automated desk-top background customization in the Pixel Pattern graphic format; it comes with 150 patterns, plus the option to upgrade to version 2.0 for $19.95. The Electronic Arts Consortium Online Connection Kit (which includes EAC membership for one year) gives EAC members computerized access to Pixel Pattern artwork plus free and discounted software. For further details, call 800/230-6434. Offer expires 4/5/94.

ScanJet Ipp + WordScan 1.1
Hewlett-Packard is offering a free copy of Calera Recognition Systems’ $295 WordScan OCR software (Jun 92 ***) for version 1.0) to buyers of its $599 ScanJet Ipp 8-bit flatbed gray-scale scanner (1993 World-Class; Aug 92 ***) at a price of $19.95. The price of which has been lowered by more than 30 percent. For more information, call 800/272-6358.

TelevEyes/Pro + Action SE
Digital Vision is including a special version limited to six templates, edited-down documentation, and no clip media (of Macromedia’s $495 Action multimedia-integration program (Mar 93 “First-Time Authoring” Editors’ Choice; Feb 93 ***) for version 1.0) with its $799.95 computer-to-TV video scan-converter with genlock for output to flicker-free composite video or S-Video. Call 800/346-0090 to order, or for more information.

WriteNow 4.0 + Correct Grammar 3.0 + Calendar Creator 1.0 + KeyFonts
The Mac Zone is offering a software bundle (899045) consisting of WordStar International’s $119.95 WriteNow word processor (Jun 94 ***) and the Writing Tools Group’s $79.95 Correct Grammar, Spinaker Software’s $69.95 Calendar Creator, and Softkey’s $59.95 KeyFonts for Macintosh collection of 100 new typefaces. Available for $99.92 by calling 800/436-0606. Offer not to expire before 6/30/94.

COMPETITIVE UPGRADES

PowerPrint 2.5
GDf Software is offering this $149 printer-driver utility (Sep 93 “Maximize Your Printer” Editors’ Choice for initial release) for $75 to registered users of competitive products such as MacPrint and Chippler. PowerPrint lets more than 1000 PC-based printers become Mac-compatible. For more information, call 800/663-6222.

Reduxe Deluxe 2.5
InLine Software is offering this $79.95 backup software (Jan 94 ***) for version 2.0) for $40 to owners of competitive backup programs. This upgrade now includes Astound Systems’ $39.95 SpaceSaver, an expansion of StuffIt Deluxe (Aug 93 * * * * *) that provides background compression and automatic decompression. Call 800/453-7671 for more information.

DISCOUNTS/REBATES/SPECIAL OFFERS

Apple Workgroup Server + PowerPC Logic Board
Apple is offering a $500 mail-in rebate to customers who purchase either a Workgroup Server 60 or 80 before 4/30/94, plus a Workgroup Server PowerPC logic board upgrade before 10/31/94 once it becomes available this summer. A mail-in rebate form can be obtained from authorized resellers. Offer expires 11/15/94.

ArtPack
Olduvai is offering this “best-of” assortment, which has been selected from the ArtFont and ArtClips collections, free of charge (except for S&H). Valued at $59, it includes six display fonts and 25 professionally created images in EPS format. For more information, call 800/548-5151. Offer expires 6/30/94.

Compton’s Interactive Encyclopedia
Compton’s NewMedia has reduced the 1994 edition price of this CD-ROM encyclopedia, which includes video clips as well as photos and reference materials, from $395 to $149.95. For further information and to order, call 800/862-2206.

EtherWave AAUI Transceivers
Farallon Computing is offering Power Macintosh owners up to two $129 EtherWave AAUI transceivers for $89 cash. These transceivers provide 10BASEt Ethernet network connectivity and allow for daisy-chain configuration. Call 800/796-7761, ext. 1, for proof-of-purchase requirements. Offer expires 6/30/94.

IntelliColor Display/20 + PrecisionColor Display/20
Redgate Computing is offering the PrecisionColor Display/20, from $2299, the PrecisionColor Display/20v, from $2199 to $1999. Call 800/227-2795 for reseller information.

Macintosh Product Registry
Redgate Communications is offering this comprehensive registry in either print (released quarterly) or CD-ROM (released semiannually) format. The registry currently contains more than 6800 in-depth descriptions of Macintosh third-party products. An initial CD-ROM release is available for $59, with semiannual updates priced at $39 each. An annual subscription to the print version is $40; volumes can be purchased individually for $14.95 each. Call 800/333-8760 to order.

Microsoft Plus
Microsoft is offering extended services and product discounts to users of its products through this not-for-profit program. Services include express access to phone support service for Microsoft applications, a productivity-oriented Microsoft Plus bimonthly journal, and access to the Microsoft Plus Forum on CompuServe (with 30 days of no-charge connect time). Annual membership is $39. Registered Microsoft product owners can enroll by calling 800/999-5505.

MultiClip 2.1.7
Olduvai continues to offer this next-to-most-recent version of its $149 Clipboard/Scrapbook replacement utility direct (800/548-5151) for $9.95 (plus $6.10 shipping). Purchase includes a free MultiArt collection of clip art and sounds, plus a special MultiClip 3.0 upgrade price of $39.95. Offer expiration extended to 6/30/94.

Mutoh Plotters/Projection Panels
Mutoh America has reduced the prices of its XP-500 series of pen/plotters and ViewPoint color LCD projection panels. The XP-917 (D-size, sheet-fed) plotter drops from $8000 to $3495; the XP-510 (E-size, sheet-fed), from $6300 to $4995; and the XP-510R (E-size, roll-fed), from $7595 to $5695. The VP-100 panel goes from $5695 to $3995; the VP-200, from $8995 to $7595. The VP-300 LCD projectors drop from $13,495 to $9995. Call 708/952-8800 for more information.

NetWare 4
Novell has extended an offer whereby customers who purchase and register NetWare 4 by 12/31/94 automatically receive all updates and upgrades at no additional charge through 3/31/95. Enhancements are to include operating system updates, utilities for building NetWare Directory Services directory trees, and birdseye synchronization tools for more tightly integrating NetWare 4 with NetWare 3. Offer expires 12/31/94.

Newton Intelligent Messaging Lease
Apple Computer is offering a Newton MessagePad personal digital assistant (Dec 93 * * * * *) for Newton Message Pad, a Newton Messaging Card, and an Apple Wireless Messaging Service lease program through BellSouth’s MobileComm at $49.95 per month for local coverage (includes local paging service and up to 100 text messages) and $69.95 per month for nationwide coverage (up to 125 text messages). At the end of a 24-month lease, customers may purchase the MessagePad and Messaging Card for $89, or continue the lease with a $10 monthly discount. To order service, call 800/474-6374.

MACWORLD June 1994 197
No matter how well you've mastered technique, the wrong display can obscure the subtleties. That's why RasterOps makes display solutions for every style and budget.

Degas undoubtedly would've been impressed with the 20T Multiscan Color Display for picture-perfect accuracy, paired with the PaintBoard Professional™ and RasterOps DSPro, a Photoshop™ accelerator daughtercard. On the other hand, Mondrian might have found the RasterOps 20/20 Multimode Color Display and PaintBoard Lightning™ accelerated graphics cards a perfect fit for his straight lines and sparse color.

Both would be able to choose from the same 16.7 million color palette. And the competitive price means neither has to be a starving artist.

**Portrait of an industry leader**

The first company to deliver Macintosh® 24-bit color is a world leader in workstation-performance color. We're in our fourth generation of QuickDraw™ acceleration technology—achieving performance increases of up to 4400%.

Check the chart below, and you'll find a display solution that brings lifelike—and fast—color to your desktop.

The PaintBoard™ line offers single-slot photorealistic 24-bit big-canvas color, multiple resolutions and reliable acceleration for every graphic artist's needs.

There's an impressive display at a dealer near you. To find out where, call 1-800-SAY-COLOR.
**Advertiser Index**

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>Reader Service No.</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agfa/Scanner</td>
<td>158</td>
<td>800/655-4271</td>
</tr>
<tr>
<td>Agfa</td>
<td>159</td>
<td>800/655-2446</td>
</tr>
<tr>
<td>Atlas Corporation</td>
<td>82</td>
<td>800/874-1428</td>
</tr>
<tr>
<td>American Power Conversion</td>
<td>72</td>
<td>800/788-2208</td>
</tr>
<tr>
<td>Antivo Corporation</td>
<td>8</td>
<td>800/325-3341</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>20</td>
<td>—</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>47</td>
<td>—</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>49</td>
<td>—</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>51</td>
<td>—</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>61</td>
<td>—</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>107</td>
<td>800/874-3333</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>32-33</td>
<td>800/874-3333</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>70-73</td>
<td>—</td>
</tr>
<tr>
<td>Apple Computer</td>
<td>30</td>
<td>817-776-1110</td>
</tr>
<tr>
<td>Bottomline Distribution</td>
<td>63</td>
<td>512/412-4956</td>
</tr>
<tr>
<td>Canon Corporation</td>
<td>69</td>
<td>800/935-SCAN</td>
</tr>
<tr>
<td>Canon USA</td>
<td>110</td>
<td>800/04-CANON</td>
</tr>
<tr>
<td>CDROM Expo</td>
<td>—</td>
<td>617/361-8000</td>
</tr>
<tr>
<td>Central Point</td>
<td>93</td>
<td>800/277-3873</td>
</tr>
<tr>
<td>Charles River Analytics Inc.</td>
<td>64</td>
<td>800/411-0222</td>
</tr>
<tr>
<td>Citizen</td>
<td>185</td>
<td>800/4-PRINTERS</td>
</tr>
<tr>
<td>ClubMac</td>
<td>96</td>
<td>800/CLUBMAC</td>
</tr>
<tr>
<td>Communication Intelligence Corporation</td>
<td>—</td>
<td>800/888-9262</td>
</tr>
<tr>
<td>ComputServe</td>
<td>66</td>
<td>800/898-8199</td>
</tr>
<tr>
<td>Computer Discount Warehouses</td>
<td>2</td>
<td>800/841-CDW</td>
</tr>
<tr>
<td>Connect</td>
<td>189</td>
<td>800/850-5880</td>
</tr>
<tr>
<td>Contemporary Databases Group</td>
<td>188</td>
<td>800/873-9000</td>
</tr>
<tr>
<td>Corel Corporation</td>
<td>78</td>
<td>800/836-3279</td>
</tr>
<tr>
<td>CRA Systems Incorporated</td>
<td>200</td>
<td>800/755-9000</td>
</tr>
<tr>
<td>CTX International</td>
<td>38/39</td>
<td>502/595-6146</td>
</tr>
<tr>
<td>Dantz Development</td>
<td>26</td>
<td>—</td>
</tr>
<tr>
<td>Daxco</td>
<td>79</td>
<td>800/733-0080</td>
</tr>
<tr>
<td>Dayo Communications</td>
<td>161</td>
<td>800/443-2962</td>
</tr>
<tr>
<td>DGR Technologies</td>
<td>65</td>
<td>800/235-9748</td>
</tr>
<tr>
<td>Digital Axis</td>
<td>83</td>
<td>800/474-7555</td>
</tr>
<tr>
<td>Direct Connections</td>
<td>121</td>
<td>800/572-4305</td>
</tr>
<tr>
<td>Educor</td>
<td>157</td>
<td>800/843-9497</td>
</tr>
<tr>
<td>Engineered Software</td>
<td>12</td>
<td>910/299-4843</td>
</tr>
<tr>
<td>Epson</td>
<td>800/BUY-EPSON</td>
<td></td>
</tr>
<tr>
<td>Express Direct</td>
<td>81</td>
<td>800/765-0020</td>
</tr>
<tr>
<td>Focus Enhancements</td>
<td>201</td>
<td>800/538-4883</td>
</tr>
<tr>
<td>Fujitsu</td>
<td>—</td>
<td>800/831-4094</td>
</tr>
<tr>
<td>GDT Softworks</td>
<td>32/42</td>
<td>800/663-6222</td>
</tr>
<tr>
<td>Global Village</td>
<td>159</td>
<td>800/735-4821</td>
</tr>
<tr>
<td>Graphisoft</td>
<td>46</td>
<td>410/293-5114</td>
</tr>
<tr>
<td>HSC Software</td>
<td>5</td>
<td>310/398-8441</td>
</tr>
<tr>
<td>Insight Solutions</td>
<td>68</td>
<td>800/848-7677</td>
</tr>
<tr>
<td>Inspiration Software</td>
<td>—</td>
<td>800/877-4282</td>
</tr>
<tr>
<td>Intel Corporation</td>
<td>2-3</td>
<td>800/364-0919</td>
</tr>
<tr>
<td>Kensington Micro Hon Inc.</td>
<td>—</td>
<td>800/635-4242</td>
</tr>
<tr>
<td>La Cie</td>
<td>52</td>
<td>800/999-1242</td>
</tr>
<tr>
<td>LaserMaster Corporation</td>
<td>43</td>
<td>800/950-6886</td>
</tr>
<tr>
<td>LeSunset USA</td>
<td>255</td>
<td>800/243-TYPE</td>
</tr>
<tr>
<td>MacAcademy</td>
<td>—</td>
<td>800/527-1914</td>
</tr>
<tr>
<td>MacConnection</td>
<td>—</td>
<td>800/800-3333</td>
</tr>
<tr>
<td>MacMill</td>
<td>131</td>
<td>800/222-2808</td>
</tr>
<tr>
<td>MacNews</td>
<td>172</td>
<td>800/723-7474</td>
</tr>
<tr>
<td>MacProducts</td>
<td>175</td>
<td>800/622-8721</td>
</tr>
<tr>
<td>MacTable/ScanCo</td>
<td>—</td>
<td>800/722-6263</td>
</tr>
<tr>
<td>MacWarehouse</td>
<td>150</td>
<td>800/255-2657</td>
</tr>
<tr>
<td>Macworld Expo</td>
<td>—</td>
<td>617/361-8000</td>
</tr>
<tr>
<td>MegaHaus</td>
<td>245</td>
<td>800/786-1114</td>
</tr>
<tr>
<td>Microsoft</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Microlab</td>
<td>287</td>
<td>800/654-4180</td>
</tr>
<tr>
<td>Mini Technologies</td>
<td>228</td>
<td>800/643-4142</td>
</tr>
<tr>
<td>Mitsubishi Display Products</td>
<td>261</td>
<td>800/243-2515</td>
</tr>
<tr>
<td>Modus Technologies Inc.</td>
<td>109</td>
<td>800/800-4334</td>
</tr>
<tr>
<td>Momentum Inc.</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Motorola</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>NEC Technologies</td>
<td>25</td>
<td>800/NEC/INFO</td>
</tr>
<tr>
<td>NEC Technologies</td>
<td>16</td>
<td>800/NEC/INFO</td>
</tr>
<tr>
<td>New Software</td>
<td>—</td>
<td>800/237-2078</td>
</tr>
<tr>
<td>nView Corp</td>
<td>117</td>
<td>800/736-8439</td>
</tr>
<tr>
<td>Orange Micro Inc.</td>
<td>33</td>
<td>714/719-2772</td>
</tr>
<tr>
<td>Pinehead Micro Inc.</td>
<td>178</td>
<td>800/553-7070</td>
</tr>
<tr>
<td>Picker</td>
<td>13</td>
<td>800/888-9856</td>
</tr>
<tr>
<td>Power Cry Corporation</td>
<td>200</td>
<td>800/SPOWER2</td>
</tr>
<tr>
<td>PrecisionSoft, Inc.</td>
<td>269</td>
<td>515/225-3720</td>
</tr>
<tr>
<td>ProDirect</td>
<td>135</td>
<td>800/524-9552</td>
</tr>
<tr>
<td>Proxima Corporation</td>
<td>47</td>
<td>800/447-7694</td>
</tr>
</tbody>
</table>

For Instant faxed back information, call 1-800-234-0455

**InfoFAX**

For instant faxed back information, call 1-800-234-0455

Enter extension 502 for OMS Incorporated and extension 505 for Now Software
# Product Index

A quick and easy product index from Macworld. Simply use this index to find the page or advertiser 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></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business</strong></td>
<td>Apple Computer</td>
<td>20</td>
<td>196</td>
<td>Xerox Imaging Systems</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apple Computer</td>
<td>51</td>
<td>216-217</td>
<td>Alliance Peripheral Systems</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apple Computer</td>
<td>33-33</td>
<td>218-219</td>
<td>BottomLine Distribution</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>inspection Software</td>
<td>52</td>
<td>224-227</td>
<td>ClubMac</td>
<td>96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microsoft</td>
<td>14</td>
<td>23</td>
<td>Contemporary</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FutureSoft, Inc.</td>
<td>14</td>
<td>24</td>
<td>DQ Technologies</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Signature Software</td>
<td>175-176</td>
<td>235</td>
<td>Direct Connections</td>
<td>121</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wordperfect Corporation</td>
<td>102-103</td>
<td>15-19</td>
<td>LaCie</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>214</td>
<td>MacProducts</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>229</td>
<td>MegaHaus</td>
<td>265</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>232</td>
<td>Power City Corporation</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>233</td>
<td>ProDirect</td>
<td>135</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>211</td>
<td>SuperMicro</td>
<td>126</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>SyQuest</td>
<td>249</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Statistical</strong></td>
<td>Statsoft Incorporated</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>Central Point</td>
<td>93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Charles River Analytics Inc.</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connectix</td>
<td>189</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doni Development</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GDT Softworks</td>
<td>32/42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Insignia Solutions</td>
<td>68</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Now Software</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CAD/CAM</strong></td>
<td>12</td>
<td>Engineered Software</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>Graphsoft</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CD Rom</strong></td>
<td>61</td>
<td>Apple Computer</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Corel Corporation</td>
<td>78</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>272-273</td>
<td>Educorp</td>
<td>157</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>DataMic</td>
<td>53</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Data Management</strong></td>
<td>195</td>
<td>Aidas Corporation</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Educational</strong></td>
<td>268-270</td>
<td>Quality Computers</td>
<td>263</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fonts</strong></td>
<td>149</td>
<td>Letraset USA</td>
<td>255</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>175-176</td>
<td>Signature Software</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Graphics/DTP</strong></td>
<td>51</td>
<td>Apple Computer</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>Corel Corporation</td>
<td>78</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>155</td>
<td>HSC Software</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Pixar</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>141</td>
<td>Specular</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>Strata</td>
<td>114</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td>GDT Softworks</td>
<td>32/42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>52</td>
<td>Inspection Software</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Multimedia</strong></td>
<td>195</td>
<td>Aidas Corporation</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Pixar</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>SuperMac</td>
<td>88</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Networking</strong></td>
<td>14</td>
<td>PrimeSoft, Inc.</td>
<td>208</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OCR</strong></td>
<td>124-125N</td>
<td>China Corporation</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Presentation Software</strong></td>
<td>55</td>
<td>Xerox Imaging Systems</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Printers</strong></td>
<td>Canon USA</td>
<td>147</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Citizen</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lasermaster Corporation</td>
<td>123</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NEC Technologies</td>
<td>6-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>QMS Incorporated</td>
<td>158</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Video</strong></td>
<td>124-125S</td>
<td>Radius</td>
<td>146</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>Radius</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>RasterOps</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>76</td>
<td>MacAcademy</td>
<td>106</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Training</strong></td>
<td>193</td>
<td>Computserve</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Online</strong></td>
<td>267</td>
<td>CDROM Expo</td>
<td>156-159</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tradeshows/Conferences</strong></td>
<td>153</td>
<td>Macworld Boston Expo</td>
<td>153</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>12</td>
<td>Aigo</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Antero Corporation</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>MacTable/ScanCo</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td>14</td>
<td>MacTable/ScanCo</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mail Order</strong></td>
<td>216-217</td>
<td>Alliance Peripheral Systems</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>224-227</td>
<td>ClubMac</td>
<td>96</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>92-93</td>
<td>Computer Discount Warehouse</td>
<td>235</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>235</td>
<td>Direct Connections</td>
<td>121</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>212-213</td>
<td>Express Direct</td>
<td>88</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>79-81</td>
<td>MacConnection</td>
<td>158</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>203-210</td>
<td>MacMail</td>
<td>156</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>222-223</td>
<td>MacNews</td>
<td>172</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>214</td>
<td>MacProducts</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>230-231</td>
<td>MacWarehouse</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>223</td>
<td>MegaHaus</td>
<td>245</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>232</td>
<td>Power City Corporation</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>233</td>
<td>ProDirect</td>
<td>135</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>286-287</td>
<td>Quality Computers</td>
<td>263</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>221</td>
<td>RasterMac</td>
<td>262</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>215</td>
<td>Third Wave</td>
<td>186</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There's no cost or obligation. We even pay the postage! Simply fill in the questionnaire, then circle the numbers on the card below for the products that interest you. Numbers for advertised products can be found in the ad and in both the Product Index and Ad Index. Fold card and mail.

No staples please.

Please answer these questions so that we may better serve you.

A. Including yourself, approximately how many people are employed at your entire work-site? (Check one.)
   - 1000+
   - 999 - 100
   - 99 - 25
   - Under 25

B. Which of the following computers are installed at this entire work-site? (Check all that apply.)
   - Apple Workgroup Servers
   - Mac Quadra-series
   - Mac Centris-series
   - Mac II/Classic-series
   - Mac SE/30
   - Mac Plus

C. What is the total number of Macs installed at this entire work-site? (Check one.)
   - 1000+
   - 999 - 100
   - 99 - 50
   - 49 - 10
   - 9 - 1
   - None

D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/or services? (Check one.)
   - 1000+
   - 999 - 100
   - 99 - 50
   - 49 - 10
   - 9 - 1
   - None

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)
   - Determine/Initiate need for product/feature/price
   - Evaluate, recommend, or approve purchase
   - Authorize purchases

F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)
   - $1 million or more
   - $999,999 - $500,000
   - $499,999 - $100,000
   - $99,999 - $50,000
   - $49,999 - $10,000
   - Under $10,000

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)
   - Business software (Word processing, spreadsheet, database, etc.)
   - Graphics/Windows software
   - Monitors/displays
   - Printers/scanners
   - Networking/communications equipment
   - Multimedia/W videomedia products
   - Mobile computing products

H. What is your primary job function? (Check one.)
   - Computer Hardware/Network Management
   - MIS/IT/Network Management
   - Engineering
   - R&D/Scientific
   - Corporate/General Management
   - Accounting/Finance
   - Marketing/Sales/PR/Communications
   - Art/Design/Creative Services

Thank You!

Please print or type all information.

Title:
Co.:
Phone:
Fax:

Check box and fill in the appropriate information to subscribe to Macworld. You will be billed $24.00 for a 1-year (12 issue) subscription (U.S. only).

Expires August 5, 1994 51 June 1994
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
FREE FEDERAL EXPRESS
On your first order with MacMall* $3.00 shipping on future orders!

And No Credit Card Surcharges!

SUPER BUY!

THE HP DESKWRITER
300 DPI Inkjet Printer

- 35 Scalable Fonts
- Built-in print spooler
- Three-year limited warranty

Brand new! Limited Supply — Good while supplies last.

THE HP DESKWRITER 550C
Color Inkjet Printer

- 300 DPI color output
- Tri-color ink cartridge
- 35 scalable fonts
- Three-year limited warranty

Brand new! Limited Supply — Good while supplies last.

THE HP DESKWRITER C.. $389

THE HEWLETT PACKARD
DESKWRITER 520
INKJET PRINTER

HP’s most affordable high-quality printer

- Clear, sharp 600x300 dpi professional quality output
- HP’s exclusive Resolution Enhancement technology
- Grayscale printing for dramatic black graphics
- 35 TrueType scalable fonts
- AppleTalk and serial interfaces

HP SCANJET II SCANNERS

THE HP SCANJET IIlp
Greyscale Flatbed Scanner

300 DPI greyscale scanner
Bonus: Includes FREE Calera WordScan OCR Software

HP SCANJET IIcx
The high performance color/greyscale scanner that provides advanced features at a breakthrough price!

- Superior image quality with 1400 DPI enhanced resolution; 400 DPI optical resolution
- 24-Bit color allows you to recognize and scan over 16 million colors
- HP AccuPage 2.0 for better text recognition
- Optional transparency adapter available
- Optional 50-page document feeder available
- One-year HP Express Exchange Warranty for 24-hour replacement service

HP DeskWriter 310
The new HP DeskWriter 310 printer, no-compromise printing for Apple Macintosh PowerBook® users.

- Crisp 300 dpi black print
- Optional color kit for amazing color output
- Fast — up to 3 pages per minute
- Compact and lightweight
- 35 scalable fonts built-in
- Background printing
- Optional rechargeable battery

MacMall FAX Order Line: 310-222-5800
International Toll-Free Phone Lines
Australia 001-800-125-712 • Canada 800-548-2512
Denmark 0434-0297 • France 0590-1099
Italy 1678-74086 • Japan 0031-1-11-351
Norway 050-1209 • Netherlands 06-072-8613
Switzerland 046-05-3420 • U.K. 0800-89-1178

RAY DREAM DESIGNER 3.0
“By far the best modeling & rendering value around...” —MacWorld, August, 1993.
Try the leading 3D illustration package. It handles the details — lighting, shadows, transparency, reflections and perspective are automatic! Actually paint the most complex object in 3D!

$238

addDepth
PostScript goes 3D! Attention grabbing 3D depth and perspective for type and line art. Type or draw in addDepth, or import art from other drawing software for automatic 3D.

$119

JAG II
This award winning graphics utility is packed with new features. Resolution boosting eliminates the jagges in your images or animations. Supports PICT, TIFF, EPS, PhotoCD, more!

$85

VideoVision
Audio/video interface card and external connector panel captures signals from any source and converts them to QuickTime movies. Use any QuickTime editing application.

$3349

Multimedia Theater
90 DAYS same-as-cash FINANCING AVAILABLE!!
(a.a.c. Ask representative for details)

FWB Inc.

SCSI JackHammer

NuBus Card ............ $439 60722
PocketHammer 300/1MF Ext. 1GB .............. $1339 64093
PocketHammer 2100/7MF Ext. 2.1GB ........... $3099 64094
HammerDisk 1300/DFMF

1.3GB Optical ........ $3349 64095
HammerDAT 16G Ext.

4-8GB DAT ............ $1599 64096

Radius - Graphic Cards

PrecisionColor Pro 2XK ................... $1399 61709
BONUS NEC 3x6 CD-ROM from Radius

PrecisionColor Pro 2XK ................... $729 63706

PrecisionColor Pro 2XPK ................ $5399 62626

PrecisionColor Pro 2XK7 ................ $59 61695

Radius rebates/CD bonus valid thru 8/94

Radius - Multimedia

VideoVision with Premiere .......... $185 61287
VideoVision (Basic) ............. $1599 62146

RasterOps - Multimedia

MoviePak ...................... $518 62520
MoviePak w/Adobe Premier $5119 60694
MoviePak 2 ...................... $539 62517
24XLT ............ $5259 55053
24STV (7") ............. $678 63224

RasterOps - Graphic Cards

PaintBoard Turbo XL .......... $5399 62529
PaintBoard Professional - Starting at $1599 62317

SuperMac

VideoSpigot Nubus Pro ........ $1398 60177
Spigot & Sound Pro ........ $1115 60179
Thunderstorm Deluxe ........ $855 61370

FREE CD!

Get up to $200 worth of FREE software included on this disk. Plus interactive previews of over 100 software programs. To purchase any of the programs, simply call the Toll-Free Unlocking Center and you can own the programs instantly.

FREE WITH ANY ORDER! Request Part #H3090

SledgeHammer® Disk Arrays for the Macintosh

SledgeHammer® Arrays match a pair of high performance Fast or Fast & Wide SCSI drives:

• Designed for digital video, multimedia, publishing and prepress
• Sustained transfer rates up to 13.5MB/sec
• Includes RAID ToolKit Software & SCSI JackHammer® with NuBus, Wide, and II models
• Macintosh with PowerPC compatible today

SledgeHammer2000/2 MF Nubus $2829 64190
SledgeHammer4200/2 MF Nubus $5099 64071

Performance Storage Peripherals

Send mail orders to: MacMail Order Dept.,
2465 Mariposa St., Torrance, CA 90603-3144

MacMail FAX Order Line: 310-222-5800

ORDER TOLL FREE
800-222-2808

Call us for all your Apple Macintosh® Needs!
LOWEST PRICES? YEAH!

If you see a lower price advertised in this magazine, please call us and we'll do our very best to BEAT that advertised price.*

POWERBOOK CASES FROM

For a high quality, low cost case for your PowerBook consider the Targus NotePac with a padded computer section 14 x 11 x 2.5” and external 13 x 9 x 2” accessory pocket. Detachable shoulder strap and interior portfolio section. Model CND1.

Targus Leather Notebook Case
Full grain leather case is designed to carry a PowerBook and related accessories. Padded computer section is 15 x 11 x 2.5” plus an external 13 x 9 x 2” accessory pocket. Model CND1. $34.95

$94.95

Universal Note Case
Designed to carry PowerBook and personal printer in two separate compartments. 11 x 13 x 2.5”, plus an expanding section for your work papers. The ideal case for the mobile office! Model CUN1. $64.95

SUPERMAC

SuperMatch 20TXL
20” Display
• Trinitron Color Display
• 640 x 480 to 1152 x 870
• Built-in Tile and Swivel Base
$2189

SuperMatch 17T
17” Trinitron Display
• Single slot high-end accelerators for publishing and design
• Supports 12” to 21” displays (1152 x 870)
• On-board GWorld display memory
• Hardware panel and zoom
• SuperVideo display software
...the fastest we’ve seen” –MacWeek
$1039

Enter to win a FREE
Apple Macintosh Quadra® 605
4MB RAM
80MB Hard Drive
(80MB Hard Drive kit is included)
No purchase required simply send your complete name, address and daytime phone number to:
MACMALL CONTEST
Dept. AD, 2645 Maricopa St., Torrance, CA 90503-5144.
Entries must be received by May 31, 1994. Limit one entry per household. Employees and vendors of Creative Computers not eligible.

ORDER TOLL FREE
800-222-2808
Call us for all your Apple Macintosh® Needs!

SUPERMAC

SuperMatch Thunder/24
Color Graphics Card
• Single slot high-end accelerator for publishing and design
• Supports 12” to 21” displays (1152 x 870)
• On-board GWorld display memory
• Hardware panel and zoom
• SuperVideo display software
...the fastest we’ve seen” –MacWeek
$1685

GLOBAL VILLAGE COMMUNICATION

THE NEW POWERPORT SERIES offers unsurpassed fax/modem reliability and high speed. Communicate at 19,200 and even faster speeds using v.42bis compression. And with FAX speeds of 14,400 bps your communications are faster than ever before. Includes GlobalFax OCR software to convert received faxes into editable files. Also includes: ZTerm, GlobalFax and America Online software FREE!

PowerPort Mercury for PowerBooks .... $319 63062
TelePort Mercury for Desktop Macs .... $319 63061
PowerPort Gold for PowerBooks with 14.4 bps send and receive data/FAX .... $275 60467
TelePort Gold for desktop Macs with 14.4 bps send and receive data/FAX .... $275 60466
PowerPort Silver for PowerBooks with 9,600 bps send and receive data/FAX .... $245 60466
TelePort Bronze for Desktop Macs with 2,400 bps data and 9,600 bps FAX .... $95 61792

RASTEROPS

The most feature-rich mini docking/connectivity station for PowerBook Duo users!
• Up to 21” support, 8-bit
• Ethernet and Token Ring support
• 16-bit color for 14” displays
• Standard SCSI connector support

$519

Bundled with Farallon PowerPath FREE!

RasterOps 20/20 Color Display
• 3 .1mm super fine dot
• Supports 640 x 480 to 1152 x 870 (8 presets)
• Anti-static/glare coating
• Digital user controls
• 3-Year Limited Warranty

$1499

RANSTEROOPS PRODUCTS HAVE A 3-YEAR WARRANTY!

PaintBoard Lightning
New super fast 24-bit graphic display adapter for NuBus compatible Macintosh models gives you brilliant colors by the millions. Up to 250% faster than built-in video, Supports up to 1024 x 768 resolution which makes it ideal for imaging, color publishing and business uses. Works with RasterOps 20 20 monitor and many 17” and 20” displays.

$769

Offer Code: D462MG14 See ordering policies on last page.
We do it very fast!

With our sophisticated order entry, computerized warehouse and FedEx® shipping system we get your order on its way the same day, so you can enjoy your purchase tomorrow!

**CLEARANCE ITEMS BELOW COST!**

SHARP WIZARD OZ 9600II
S12K Organizer ...... $379 62553
SHARP WIZARD OZ 9600
120K Organizer ...... $309 62554
MICRONET 45MB REMOVABLE
SyQuest w/Cartridge $299 55926
MASS MICRO 45MB REMOVABLE
SyQuest w/Cartridge $279 55396
MacDepot 235MB Internal
Mold Drive $199 60505
PSI POWER MODEM IV
14.4bps Fax Modem . $199 61156
PLI Multi-session Double Speed CD-ROM DRIVE $349 60569
Maxa ALERT Software
Checks your system .... $49 61194
Very limited supply. All items NEW.

**ATTAIN**

InControl with Dynamic and CN .......... $98 63736

**CLARIS**

Works 2.0 w/Quicken $195 62273
FileMaker Pro 2.1 .... $265 62272
FileMaker Upgrade ...... $89 63622

**MICROSOFT**

Works 3.0 .......... $155 60664
FaxPro 2.5 .......... $98 63631
Excel 4.0 .......... $289 60298
Excel Upgrade ...... $125 60727
Word 5.1 .......... $289 60646
Word Upgrade ...... $125 60728

**RADIUS - MONITORS**

Precision Color Pivot .......... $859 60914
Two Page Display 20" .......... $849 62470

**WORD PERFECT**

WordPerfect 3.0 .......... $295 62659
WordPerf. Upgrade .... $55 63005
Competitive Upgrade ...... $89 63603

**Power Pro 601**

Maximum performance upgrade for Quadra 650, 760, 800, 900 and 950, and Centris 650.

Developed in cooperation with Apple, this card gives the graphics professional the maximum PowerPC upgrade. Faster than Apple’s upgrade card! Allows up to 128MB memory expansion, PLUS includes over $600 in FREE software including: ColorMatch and ColorMatch color management.

66MHz ... $1525 (212-7) $68
80MHz ... $2039 (212-7) $81

**Daystar DIGITAL**

Turbocharge your software up to 600% faster. Adapters required.

**TURBO 040 ACCELERATORS**

Turbo040 – 33 MHz Accelerator w/FPU and cache ............... $914 61022
Turbo040 – 40 MHz Accel. w/FPU and cache ............... $1084 83421
Turbo040i – 33 MHz (no FPU) ................... $744 61205
FastCache Turbo (1MB Cache for Turbo40) ............... $164 60926

**POWERCACHE**

(for almost all 202/030 Macs)

33MHz PowerCache (w/FPU) ............... $358 60642
33MHz PowerCache (no FPU) ............... $274 60643
50MHz PowerCache (w/FPU) ............... $338 60644
50MHz PowerCache (no FPU) ............... $414 60645

Adapter (for Turbo040/040i/PowerCache) ............... $98 60646

*Required for non-Mac III, II+, IIIx, Performa 680

**ArtZ**

6x8” Tablet
World’s first high-speed ADB compatible graphics tablet. The batteryless, cordless pressure-stylius has 120 levels of sensitivity. Programmable side switch for Undo, macros or other commands. 6x8” work area. Plugs into ADB port.

$289 (212-7)

**Macintosh Version** $265 (63474)

**NEW! Native PowerMac Version** $265

**Price Colored 17T**

New 17” color monitor with "on-the-fly" resolution switching from 640x480 to 1152x870. Digital controls for precise settings and super sharp, 25mm dot pitch give you quality you can see! Ask about the Radius warranty!

$1239

**Power Pro 2369**

Maximum performance upgrade for Quadra 650, 760, 800, 900 and 950, and Centris 650.

Developed in cooperation with Apple, this card gives the graphics professional the maximum PowerPC upgrade. Faster than Apple’s upgrade card! Allows up to 128MB memory expansion, PLUS includes over $600 in FREE software including: ColorMatch and ColorMatch color management.

66MHz ... $1525 (212-7) $68
80MHz ... $2039 (212-7) $81

**Precision Color Pivot**

New 17” color monitor with "on-the-fly" resolution switching from 640x480 to 1152x870. Digital controls for precise settings and super sharp, 25mm dot pitch give you quality you can see! Ask about the Radius warranty!

$1239

**Power Pro 2369**

Maximum performance upgrade for Quadra 650, 760, 800, 900 and 950, and Centris 650.

Developed in cooperation with Apple, this card gives the graphics professional the maximum PowerPC upgrade. Faster than Apple’s upgrade card! Allows up to 128MB memory expansion, PLUS includes over $600 in FREE software including: ColorMatch and ColorMatch color management.

66MHz ... $1525 (212-7) $68
80MHz ... $2039 (212-7) $81

**ORDER TOLL FREE**

**800-222-2808**

Call us for all your Apple Macintosh® Needs!

**MacMall 24x4-Pro Display Adapter**

6x8” Tablet
World’s first high-speed ADB compatible graphics tablet. The batteryless, cordless pressure-stylius has 120 levels of sensitivity. Programmable side switch for Undo, macros or other commands. 6x8” work area. Plugs into ADB port.

$289 (212-7)
**SONY**

**MULTISCAN® TRINITRON® COLOR GRAPHIC DISPLAY MONITORS**

**GDM-2036S 20” DISPLAY**
- Super fine pitch Trinitron tube with 0.30mm aperture grille
- Maximum resolution 1280x1024 non-interlaced
- Full MPRII compliance
- Sony Display Memory System includes 9 preset display modes and allows you to define 15 customized modes for precise adjustment of your visual display
- Tilt and swivel stand
- Cylindrical vertically flat black screen reduces ambient light reflections

**Price:** $179

**GDM-2038S 20” DISPLAY**
- A high performance 20-Inch Multiscan display perfect for CAD, imaging, graphic design and postpress applications.
- Three color temperature settings
- Trinitron tube with Super Fine dot pitch of 0.30mm
- Sony Display Memory System has 9 presets and allows up to 15 customized modes
- Maximum resolutions of 1600x1280 at 60Hz or 1280x1024 at 90Hz
- Full MPRII compliance

**Price:** $2049

**ORDER TOLL FREE**
**800-222-2808**

**Call us for all your Apple Macintosh® Needs!**

**MACRONIX, INC.**

**MaxFax™**

14.4 Internal Modem for Apple Macintosh PowerBook

Mobile computing just became faster and easier!
- 100% Apple PowerBook modem compatible
- 14,400 bps Group III send and receive fax
- 14,400 bps (V.42bis) full duplex data transfer
- Low power design uses 50% less battery power than most competing internal modems for PowerBook
- Compatible with: V.42/V.42bis, MNP-3, MNP-4 and V.42bis/MNP-5 data compression
- INCLUDES: Fax STFLC™ fax software with full send and receive fax capability. Fax from any application and automatically append a customized cover sheet. Also includes Microphone LT™ data software with scripting, easy to use graphical interface, and X, Y and Z-protocol's

**FIVE YEAR WARRANTY!**

**MaxFax 144/M PowerBook Internal Modem...**

**Price:** $189

**MaxLite™**

14.4 POCKET MODEM

Same great features of MaxFax 144/M in external case for "on the go" computing. Operates on internal 9V battery or from AC adapter! Smallest full-featured fax modem!

**Price:** $199

**Asante Ethernet Products**

Award-winning products and world-class support make Asante networking products winners all around. Free diagnostic software and technical support with most products. **THREE YEAR WARRANTY!**

**10THUB/12 (10BaseT hub w/ 12 ports, Thk & Thin ports) ...**
**Price:** $464

**10THUB/8 (10BaseT hub w/ 8 ports, Thin port) ...**
**Price:** $228

Mini ENISC (ThickSCSI Ether w/D & PB cable) ...
**Price:** $296

Mini ENISC10T (10T SCSI Ether w/D & PB cable) ...
**Price:** $236

MC4HIE64 (Mac & Performa 600, Thk, Thk & Thin) ...
**Price:** $138

MC4HIE64 (Mac & Performa 600, Thk, Thk & Thin) ...
**Price:** $138

MC3NB (Mac & Performa 600, Thk, Thk & Thin) ...
**Price:** $188

API1001 (AsantePort, Thk & 10BaseT or Thk) ...
**Price:** $328

FN09TA (FriendNet Media Aapter 19T) ...
**Price:** $59

FNTNA (FriendNet Media Aapter This) ...
**Price:** $59

AsanteLite (Mac & 10BaseT, Thin) ...
**Price:** $128

**See ordering policies on last page.**

MacMall Fax Order Line: 310-222-5800
FREE FEDERAL EXPRESS

On your first order with MacMall!**

$3.00 shipping on future orders!

And No Credit Card Surcharges!

SyQuest Cartridges

Lowest pricing on high quality removable cartridges for any compatible SyQuest drive mechanism.

44MB Syquest Cartridge ..... $58 1996
88MB Syquest Cartridge ..... $88 3304
105MB Syquest Cartridge ..... $58 61241

Call MacMall for Memory!

For the lowest prices on memory products for your desktop Macintosh or PowerBook, call us FIRST!

1x8 80ns ..... $44 1996
2x8 80ns ..... $75 1697
4x8 80ns ..... $155 1699

PowerBook Memory

140-170 2MB $35 0993
4MB $199 1996
6MB $269 1997
160-180 4MB $179 0999
6MB $279 0998
8MB $379 0997
10MB $439 0998
160/180c: 4MB $119 1199
6MB $299 1198
8MB $385 1199
10MB $479 1199

CENTRIS, LCIII, QUADRA/PowerMac

4MB 80ns ..... $149 0996
8MB 80ns ..... $309 1997
16MB 70ns ..... $678 1998

QUADRA/PowerMac 60ns

4MB 60ns ..... $169 0995
8MB 60ns ..... $329 1996
16MB 60ns non-compressed ..... $749 0997
32MB 60ns non-compressed ..... $1,449 0998

Duo Memory

4MB ..... $199 0998
6MB ..... $359 0999
12MB ..... $785 0997
20MB ..... $1,465 0998

Syquest 270MB External ..... $599 64241
Syquest 88C (RIW 44) External ..... $439 61944
Syquest 105MB External Drive ..... $399 61945

Quantum

Highest quality internal and external hard drives from MACMALL

All Hard Drives include "FWB" Hard Drive Software

(Because hard drive prices do fluctuate, please call for our current lowest price!) GO DRIVE SERIES, 2.5" for PowerBook

127MB 17ms Internal .... $234 63595
External ..... $314 63595
170MB 17ms Internal .... $258 63594
External ..... $338 63594
256MB 17ms Internal .... $338 64039
External ..... $418 64039

LPS SERIES, 3.5" Low Profile

270MB 11ms Internal ..... $258 61918
External ..... $328 61918
340MB 11ms Internal ..... $288 61937
External ..... $358 61937
540MB 10ms Internal ..... $468 61914
External ..... $538 61914
1088MB 11ms Internal ..... $829 55008
External ..... $899 55008

ELS SERIES, 3.5" Low Profile, Low Power

170MB 17ms Internal ..... $184 0996
External ..... $244 0996

PRO DRIVES

1225MB 10ms Internal ..... $969 61331
External ..... $1039 61331
1800MB 10ms Internal ..... $1079 5509
External ..... $1149 5509

Ocean Drive Series, 2.5" for PowerBook

127MB 17ms Internal ..... $234 63595
External ..... $314 63595
170MB 17ms Internal ..... $258 63594
External ..... $338 63594
256MB 17ms Internal ..... $338 64039
External ..... $418 64039

LPS SERIES, 3.5" Low Profile

270MB 11ms Internal ..... $258 61918
External ..... $328 61918
340MB 11ms Internal ..... $288 61937
External ..... $358 61937
540MB 10ms Internal ..... $468 61914
External ..... $538 61914
1088MB 11ms Internal ..... $829 55008
External ..... $899 55008

ELS SERIES, 3.5" Low Profile, Low Power

170MB 17ms Internal ..... $184 0996
External ..... $244 0996

PowerBook Memory

140-170 2MB $35 0993
4MB $199 1996
6MB $269 1997
160-180 4MB $179 0999
6MB $279 0998
8MB $379 0997
10MB $439 0998
160/180c: 4MB $119 1199
6MB $299 1198
8MB $385 1199
10MB $479 1199

OCEAN

VISTA 256
The ULTIMATE Removable Storage
The only 3.5" rewritable optical drive offering 256MB non-compressed capacity, as well as read/write 128MB cartridges. PC-WORLD "Best Buy" 9/93

$989 0998

FREE SHIPING and $100 offer applies to continental U.S. only. Orders over 10 lbs incur extra charges. Ask phone representative for full details of offer.

Call MacMall Toll Free 800-222-2808

ORDER TOLL FREE 800-222-2808

Call us for all your Apple Macintosh® Needs!
International Toll-Free Phone Lines
Australia 001-800-125-712 • Canada 800-548-2512
Denmark 0034-0297 • France 0598-1099
Italy 1678-74088 • Japan 0031-11-1351
Norway 050-1209 • Netherlands 00-23-8613
Switzerland 046-05-3420 • U.K. 0800-69-1178

ORDER TOLL FREE
800-222-2808
Call us for all your Apple Macintosh® Needs!

SONY®
High Performance, High Resolution Color Displays
With worldwide power certificates, and fully compliant with Swedish MPRll standards.

SONY CPD-1730
17" Color Display
• Trinitron® CRT
• Super fine .25mm dot pitch
• Up to 1024x768
• 72-Hz refresh
• Meets all EL/FVLF emission standards

SONY GDM-17SE1
17" Multiscan
• 30% flatter than other Sony monitors
• Up to 1600x1200
• Energy Star compliant.
• Super Fine .25mm pitch.
• Digital controls for advanced image attributes; color temperature.

ORDER TOLL FREE
800-222-2808
Call us for all your Apple Macintosh® Needs!

MacMall
YOUR MAC SUPERSTORE!

The Home Store
Broderbund
Mario Teaches Typing S29 62075
Prince of Persia II ....... $31 NEW!
Print Shop Deluxe ..... $49 62591
Electronic Arts
C. Yeger Air Combat ... $39 62072
PGA Tour Golf ......... $58 55939
Interplay
Bridge Deluxe w/Sharp ... $34 62545

Maxis
SimCity 2000 ......... $41.95 62818
MediaMate
3.5" FlexPack 5 ......... $7 63059
3.5" FlexPack 10 ....... $9 63058
Copy Clip ............... $7 63057
3.5" Disk Travel Color Pk. $9 63056
Multimedia StripeFile ... $9 63055
Fastrac Compact ....... $5 55496

Microsoft
Flight Simulator 4.0 .... $42 55421

Software Toolworks
Mavis Beacon Typing $29.95 60275
Chessmaster 3000 $29.95 60822

SUNOCO
Four-Year Extended Warranty from Geservice Protection Plus Available on All Hardware Products! Ask a Macmall Representative for Full Details!

MacMall
YOUR MAC SUPERSTORE!

UC1260
1200dpi
Color Scanner

This 24-bit, flatbed scanner gives you 600x1200dpi optical resolution and the ability to scan millions of colors.

• Scans newspapers up to 6.5" x 14".
• 2400dpi resolution through software.
• Includes FULL Adobe Photoshop 2.5.
• Optional document feeder and transparency option.

$1198

UC630LE
600dpi color scanner

• New bundled with Apple’s PHOTOFLASH software to simplify the scanning process.
• Raster “Four and a Half Mice” by Mackler magazine.
• Show with optional transparency adapter.
• Scan up to 1200dpi through software.

$698

UC840 800dpi

with full copy of Adobe PhotoShop 2.5.

$898

ClarisWorks 2.1

In addition to its award-winning word processing, spreadsheet, charting, database, graphics, and communication capabilities, ClarisWorks 2.1 now offers dazzling new capabilities. You can have the powerful function of a complete outline, presentation slide show with QuickTime movies, and color painting. Plus many improved features have been added to all existing applications: text wrap; show/hide invisibles; custom text styles; charts with symbols, color scales and 3D; pop-up database information; 256 colors; advanced drawing tools and much, much more! ClarisWorks 2.0 continues to provide all its powerful capabilities in one seamless, integrated application — still for less than the price of a dedicated word processor — and still requiring only 1MB of memory to run!

Native PowerPC Version $195

MacMall FAX Order Line: 310-222-5800

Other Code: D6526MD14 See ordering policies on last page.
MacMall has it all!

If you’re looking for a Macintosh peripheral or accessory and don’t see it then give us a CALL! We do our best to carry just about everything!

ORDER TOLL FREE
800-222-2808
Call us for all your Apple Macintosh® Needs!

SUPER CD-ROM BUY!!
NEC® Mechanism
Caddyless, all-in-one design

FREE "CD-ACCESS"
Includes FREE FWB CD-ROM Bundle

INCREDBLE PRICE!

$99

FREE "CD-ACCESS"
Includes FREE FWB CD-ROM Bundle

• Single speed: NEC mechanism
• Brand New with One Year Warranty

ANTEC TRIPLE SPEED
CD-4Xpress CD-ROM

• NEC’s Triple Speed 195ms, 450kbs/sec CD-ROM Drive
• QuickTime compatible; plays audio CDs, too!
• Includes SCSI cable
• Multi-session, Photo CD compatible

FREE “Compton’s Encyclopedia for Macintosh”!!

$99

$579

SUPER CD-ROM BUY!!
NEC® Mechanism
Caddyless, all-in-one design

FREE "CD-ACCESS"
Includes FREE FWB CD-ROM Bundle

INCREDBLE PRICE!

$99

FREE "CD-ACCESS"
Includes FREE FWB CD-ROM Bundle

• Double spin speed
• Photo CD (Multisession) Compatible
• High-speed access: 320 msec
• High-speed data transfer rate of 300KB/sec.
• Includes SCSI system cable, external terminator extra

Breakthrough Price!

$289

Save up to $500 on CD-ROMS...

Purchased any CD-ROM drive from MacMall and you can purchase any of these CD-ROM BUNDLES below shown for as little as $99!

ENCYCLOPEDIA BUNDLE INCLUDES THESE GREAT TITLES:

• Ellens Multimedia Encyclopedia CD
• Animals CD
• US Atlas CD
• World Atlas CD

NEW

Encyclopedia Bundle

$98

REFERENCE BUNDLE INCLUDES THESE GREAT CD TITLES:

• Guinness Book of World Records CD
• Mayo Clinic CD
• Color 1st CD
• Capital Hill CD

Entertainment Bundle

$88

FREE CATALOG SUBSCRIPTION

Fill out this coupon (or make photo-copy) and mail to:
Creative Computers – MacMall, 2645 Mariposa St., Torrance, CA 90503, Attn: Advertising

Name ___________________________ Address ___________________________
City ____________________________ State ______ Zip __________

FREE CATALOG SUBSCRIPTION

Offer Code: D432MG14

Get up to $200 worth of FREE software

included on this disk. Plus interactive previews of over 100 software programs. To purchase any of the programs, simply call the Toll Free Linking Center and you can own the programs instantly.

FREE WITH ANY ORDER!
Request Part #63090

MacMall Order Hotline
800-222-2808
Express Customer Service
800-560-6800
Technical Support
800-760-0300

When in Southern California, please visit any of our Creative Computers SUPERSTORES! Southern California’s #1 Apple Macintosh® Reseller!

Creative Computers

Los Angeles
Santa Monica
1515 Wilshire Blvd.
City of Santa Monica
(310) 394-7779

Los Angeles
South Bay
4850 Redondo Beach Blvd.
City of Lawndale
(310) 542-2292

Orange County
Lake Forest
33718 El Toro Rd., Ste. F-1
Lake Forest / El Toro
(714) 859-3300

San Diego
Kearny Mesa
8841 Government Mesa Blvd.
Kearny Mesa Area
(619) 467-4700

Circle 131 on reader service card
HARD DRIVES

FUJITSU

<table>
<thead>
<tr>
<th>CAPACITY</th>
<th>DESCRIPTION</th>
<th>INTERNAL</th>
<th>EXTERNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>520MB</td>
<td>3.5&quot; HH 9ms</td>
<td>$485</td>
<td>$545</td>
</tr>
<tr>
<td>1200MB</td>
<td>3.5&quot; HH 9ms</td>
<td>$665</td>
<td>$745</td>
</tr>
<tr>
<td>2400MB</td>
<td>5.25&quot; FH 11.5ms</td>
<td>$1385</td>
<td>$1485</td>
</tr>
</tbody>
</table>

Fujitsu Drives carry a 3 year warranty.

Quantum

<table>
<thead>
<tr>
<th>CAPACITY</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8GB</td>
<td>Only $1075</td>
<td></td>
</tr>
</tbody>
</table>

Quantum Drives carry a 5 year warranty.

SCANNERS

MICROTEK

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ScanMaker II UCJ630</td>
<td>24-bit Color, 600x300 dots</td>
<td>$659</td>
</tr>
<tr>
<td>ScanMaker II UCJ400</td>
<td>48-bit Color, 600x300 dots</td>
<td>$980</td>
</tr>
</tbody>
</table>

UMAX

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ScanAV X500</td>
<td>Transparency</td>
<td>$599</td>
</tr>
<tr>
<td>ScanAV X600</td>
<td>Color Transparency</td>
<td>$999</td>
</tr>
</tbody>
</table>

SYSTEMS

Cassette Cartridge

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syquest 270</td>
<td>250MB Cassettes</td>
<td>$439</td>
</tr>
<tr>
<td>Syquest 105</td>
<td>450MB Cassettes</td>
<td>$279</td>
</tr>
<tr>
<td>Syquest SSC</td>
<td>5GB Cassettes</td>
<td>$239</td>
</tr>
<tr>
<td>Syquest 44</td>
<td>10GB Cassettes</td>
<td>$399</td>
</tr>
</tbody>
</table>

TAPE DRIVES

Tape

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CAPACITY</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sony DAT</td>
<td>250MB</td>
<td>$499</td>
</tr>
<tr>
<td>Maxell 8mm</td>
<td>24-bit Color</td>
<td>$199</td>
</tr>
<tr>
<td>Maxell 8mm</td>
<td>24-bit Color</td>
<td>$299</td>
</tr>
</tbody>
</table>

MULTIFUNCTIONAL

Multifunctional

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syquest 8EC &amp; 650 Optical Drive</td>
<td>$2389</td>
<td></td>
</tr>
<tr>
<td>Syquest 8EC &amp; Photo CD-ROM &amp; 220MB Hard Drive</td>
<td>$1290</td>
<td></td>
</tr>
</tbody>
</table>

PRE-PRESS SUPER SYSTEM

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadra 840AV/40M/BX-CD-ROM</td>
<td></td>
</tr>
<tr>
<td>Quadra 840AV/40M/BX-CD-ROM</td>
<td></td>
</tr>
<tr>
<td>500MB Hard Drive</td>
<td></td>
</tr>
<tr>
<td>Extended Keyboards</td>
<td></td>
</tr>
<tr>
<td>SuperMac 20&quot; Hi Res Color Monitor, 24-bit</td>
<td></td>
</tr>
<tr>
<td>Accel-Writer 8100, 960 dpi, 1x17</td>
<td></td>
</tr>
<tr>
<td>Laser Printer</td>
<td></td>
</tr>
<tr>
<td>Scan AV 6400 dpi Photoshop LE</td>
<td></td>
</tr>
</tbody>
</table>

CALL US TODAY!

0% DOWN SUPER LEASING

Call our new leasing department for all your leasing needs. You will enjoy the freedom to lease the equipment you want to meet your individual needs. We can lease you a complete system or a h hive printer you can choose a 3, 2, 1, or 4 year term. All terms include a 100% tax deductible lease.

BUNDLE SPECIAL

SuperMicro 8EC & 650 Optical Drive + Photo CD-ROM + 220MB Hard Drive $775

A SuperMicro multifunctional drive is a custom-made combination of hard drive, optical drive, CD-ROM drive, tape drive, or Syquest drive all mounted together in the same enclosure. You decide which components you need, and SuperMicro will build for you.

There are many advantages to multifunctional drives over individual components:

| Single unit requires less space |
| No tangle of power cords |
| Guaranteed compatibility |
| Costs less than separate components |

PRESENTATION COMBO

Syquest & Duel Speed Photo CD-ROM drive $775

Includes external drive, 2550 SCSI Cable, Mac SW, and Terminator. Retail price: $1295

No one has a more complete family of 5.25" and 3.5" rewritable optical drives than SuperMicro.
We're not like the other
We go the extra

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.

New Low Prices

Apple Quadra 840 AV with CD-Rom Drive 8MB RAM, 230MB HD, includes Ethernet & FPU.

$3799

SuperMac Thunder 646 (a, 'the fastest 24-bit card' with the GSP & the award winning 3D-Tile, 3D Tintin Display (b)

SuperMac. 

For color publishing & pre-press, nobody delivers more power and performance than SuperMac. SuperMac's 24-bit graphic accelerators constantly sweep MacWorld magazine's top 3 ratings for the fastest cards on the market. SuperMac's large screen displays are tailored to the demands of the graphics professional.

SuperMac

Power Macintosh

PowerPC

Talk to an expert.

Get real RAID performance on any NuBus Mac with the power combination of FWB's E2.0 GT Sledgehammer 1020 FPU, NuBus and FWB's E50 machammer accelerator card.

For color publishing & pre-press, nobody delivers more power and performance than SuperMac. SuperMac's 24-bit graphic accelerators constantly sweep MacWorld magazine's top 3 ratings for the fastest cards on the market. SuperMac's large screen displays are tailored to the demands of the graphics professional.

Power Macintosh

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
FOCUS Enhancements' Lapis 17 is without a doubt the best value available today. Offering an unmatched combination of performance and price, this 17" Trinitron gives you sharp, brilliant color in 4 resolutions. Add the accelerated 24-bit color card, and you've got all the features and speed at half the price of all the comparable systems. Now you can have the performance you demand at a price you can afford.

From affordable 24-bit color at under $900, to top-of-the-line, 1200 dpi performance, Umax offers a scanner for every need and budget. With Adobe Photoshop for image editing and manipulation and an optional transparency adapter for scanning slides and transparencies, Umax scanners bring professional power to the desktop!

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 mean 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!
The Magic RAID System is a Nubris SCSI 2 card based array system. RAID levels 0 and 1 (and/or levels 0,1,4, and 5 with access times down to 4ms and transfer rates up to 10 MB/sec at RAID level 0 can be configured from software. The system is compatible with SCSI 1 and 2, SCSI Manager 4.3. RAID drives are all metal construction complete with all cables and software. Magic 1.0 GB RAID $1,899
Magic 2.0 GB RAID $2,699

5X faster than the APS Pro DAT

The Magic 2GB compression tape drive will backup your data at amazing speeds over 68MB/Minute. It is the only tape drive fast enough to keep up with a RAID drive. You can do a full 1GB backup in only 15 minutes. Retrospect 2.0 included.

Magic Memory

Memory upgrades available for all PowerBooks. Call for best pricing.

PowerBook RAM
Newton 1MB / 2MB
1MB / 2MB SIMMs
From $25
From $14

Magic Optical

2 Year Warranty
Magic 256 MB Optical** $989
Magic 128/256 MB Cart $515.65
Precision 128 Carts / 10 Pack$329
CDR 61:74 Min $20124

Magic SyQuest

Magic 45 SYQuest** $499
Magic 88 CYQuest** $498
Magic SyQuest 105 / 200 / 340 Cyl $211.00
Imag0 140 Transportable** $579
SyQuest 450-105 Cartridge $799
150 Transportable Cartridge $599

* One Year Warranty
** Two Year Warranty
*** Five Year Warranty

Magic Hard Drives

Magic 240 Ext. for $299
Custom configurations available. Call for current pricing and warranty information.

Manufacturer Store Available In Mega.
Maxtor ....... $54 540 1200 1240
Micropolis ... $120 1200 2400 3200
Quantum F1S ... $127 120
Quantum GS ... $127 120 140 256
Quantum LPS ... $127 240 340 512
Quantum PRO ... $127 128 1800
Empire ...... $10 1090
Scagie ... $120 2500 3400 90
Baracuda ... $120 2500
SyQuest ... $8 89 165 270
Fujitsu ... $120 1200 2400

Magic Network

Magic Net Adapter $114
Manufactured under license from Famlian.

Magic Modems

All FaxModems come with full feature Fax STT, Microphone, America Online, and Compressive Startup Kit.

Magic FaxModems

Magic V.32 V.21 Class $289.00
28,800bps modem, 14400bps send & receive, fax, V.42bis/V.32bis hardware & MNP-1-10 protocols. 2 year warranty, 30 day money back guarantee.

Magic 14400 Data Fax Modem $139.00
57,600 bps data, 14400bps S/R fax, V.42bis/V.32bis, MNP-1-5 protocols. Beats the Suckers. Hands Down in Performance

High Speed Modem Cable $15
Hardware Handshaking.

Magic PowerBook Modems

14400 bps Data/Fax Modem $199
57,600 bps data, 14400 bps Fax, V.32bis, V.42bis, MNP 1-5.
24956 Data/Fax Modem $79
2400bps modem, 9600bps send & 4800bps receive fax, V.42, MNP 1-5.

MacProducts USA

800 622 8721

International Sales 512-476-5295 Fax 512-499-0888


MacProducts USA can transform your Powerbook 140 or 145 into a 170, your 160 into a 180, or your DVO 210 into 230.

140 Upgraded to 170
25min (6800) (8888)
28min (6900) (8888)
$129

145 Upgraded to 170
25min (6800) (8888)
$129

160 Upgraded to 180
33min (6800) (8888)
$299

210 Upgraded to 230
33min (6800) (8888)
$299

24 hour turn around backed with a 1 year warranty.

MacProducts USA can transform your Powerbook 140 or 145 into a 170, your 160 into a 180, or your DVO 210 into 230.

140 Upgraded to 170
25min (6800) (8888)
28min (6900) (8888)
$129

145 Upgraded to 170
25min (6800) (8888)
$129

160 Upgraded to 180
33min (6800) (8888)
$299

210 Upgraded to 230
33min (6800) (8888)
$299

24 hour turn around backed with a 1 year warranty.
Still Faster Than Fujitsu for $719
Magic 128 Optical With a 2 Year Warranty

- Faster than the Fujitsu 128
- Twice the warranty 2 years
- Better Software than APS or FNB
- Authorized Repair Center

The 128 mechanism tolerates the larger drive access functions, allowing drive access functions to be sped up significantly.

MacWorld December 93, as being 15% faster overall than the Fujitsu 128. The Magic 128 Optical has a max transfer rate of 33 MB/Sec using a split head laser design.

Magic 128 Optical ** $719
Magic 256 Optical ** $899

Magic CD Pro 410i Toshiba $349
Magic CD Pro 340i Toshiba $499
Magic CD Pro 6 Quadralink $1,399

CDs
- CD-ROM Multimedia Encyclopedia $49
- W/purchase of CD Drive
- 6CD Bundle $49
- Call for CD-ROM Catalogue

Free NEC 3xe with purchase of Lemanese GT or 24x Pro
Wacom ArtZ and 12 x 12 6x8 $279
Apple PowerBook 180c/1600 $818.00

Dilimo 50Mhz
- 413.00
- Dilimo 50Mhz
- With FPU $818.00

Cartridges
- 44MB $55.00
- 88MB $55.00
- 105MB $64.00

Radius TPD 20GS Display $799.
Precision Color Pro 24x $1,245.
Precision Color Pro 24x $439.
PhotoBooster $769.
VideoVision Studio $3,299.
Rasterscan 20 Trintron $2,199.
Rasterscan 2020c $1,999.
MoviePack w/Premier 3.0 $1,149.
Precision Color Display 17" $1,124.
Paintboard Turbo/Pro $1,095/1,299.
Apple 14 $319.
Apple Audiovision Monitor $599.
Lemans GT $1,899.
Sony 14/1730 $589/1,049.
Nec 3/4/5/6 $6 Call

Umax 630 LE
- $700.00
- Umax 1260 $1,149.00

Quark Express 3.2 $539.00

QulcKeys 3.0 $103.00
Suitcase 2.1 $235.00
Filemaker Pro 2.1 $235.00
Fractal Painter $249.
Fractal x2 $79.00
Freehand 4.0 $369.
Macromind Director 4.0 Call
MiniCards 4.0 $499.
MS Excel 4.0 $279.
MS Word 5.0 $279.
Quickies 3.0 $103.
Suitcase 2.1 $49.
System 7.1 Pro $99.

Radius Rocketshare $299.

Quantum 1.2GB $999.
PLI 40R/88 Syquest $329/469.
PLI80/1270 Syquest $429/629.
PLIDAT 4GB $1,399.

SCANNERS
- Microtek IIXE $1,080.
- Microtek IISP $279.
- Microtek 35T $1,349.
- Umax 630LE $675.
- HP ScanJet IICX $929.
- Tamarak 1200 $1,564.
- Nikon CoolScan $1,920.

SOFTWARE
Adobe Illustrator 5.0 $369.
Adobe Photoshop 2.5.1 $499.
Aldus Pagemaker 5.0 $499.
Canvas 3.5 $269.
Filemaker Pro 2.1 $235.
Fractal Painter $249.
Fractal x2 $79.
Freehand 4.0 $369.
MacroMind Director 4.0 Call
MiniCards 4.0 $499.
MS Excel 4.0 $279.
MS Word 5.0 $279.
Quickies 3.0 $103.
Suitcase 2.1 $49.
System 7.1 Pro $99.

MacProducts USA


Third Wave
800 622 8721

Circle 186 on reader service card

MacWorld June 1994

M64MW
All Drives Are Not Equal.

"in the fiercely competitive world of the humble desktop hard drive, nobody sweats the details more than APS. Elegant design, quality components, and rock-solid construction distinguish the compact APS SR 2000 Case."
—Editors of MacUser

### APS HARD DRIVES

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Internal</th>
<th>SR2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS Q170</td>
<td>163MB</td>
<td>Quantum 7140</td>
<td>163MB</td>
</tr>
<tr>
<td>APS MX240</td>
<td>234MB</td>
<td>Maxtor 7200</td>
<td>234MB</td>
</tr>
<tr>
<td>APS Q270</td>
<td>257MB</td>
<td>Quantum 7C27</td>
<td>257MB</td>
</tr>
<tr>
<td>APS MX290</td>
<td>276MB</td>
<td>Maxtor 7290</td>
<td>276MB</td>
</tr>
<tr>
<td>APS MX345</td>
<td>324MB</td>
<td>Maxtor 7345</td>
<td>324MB</td>
</tr>
<tr>
<td>APS 340</td>
<td>327MB</td>
<td>Maxtor 7345</td>
<td>327MB</td>
</tr>
<tr>
<td>APS Q540</td>
<td>516MB</td>
<td>Quantum 7450</td>
<td>516MB</td>
</tr>
<tr>
<td>APS MS1.2AV</td>
<td>915MB</td>
<td>Maxtor 2165A</td>
<td>915MB</td>
</tr>
<tr>
<td>APS MS1.2</td>
<td>1001MB</td>
<td>Maxtor 2165A</td>
<td>1001MB</td>
</tr>
<tr>
<td>APS MS4110</td>
<td>1002MB</td>
<td>Maxtor 2110</td>
<td>1002MB</td>
</tr>
<tr>
<td>APS Q 1080</td>
<td>1029MB</td>
<td>Quantum 1080</td>
<td>1029MB</td>
</tr>
</tbody>
</table>

### APS MX 290

The APS MX 290 provides great performance with transfer rates of 1.8MB per second, access speeds of 24 ms and seek times as low as 13.1 ms. This 270MB drive is a terrific upgrade for any Mac.

Just $99

### SSC1 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 DXTerm technology in the form of an external SCSI performance monitoring instrument.

SR 2000 StacKIT™ Just $24

- End Cable Bondage Forever!
- Minimize Scsi Chain Length
- Heavy Metal Shielding
- Protects Scsi Signal
- StacKIT Includes Four Concave Stacking Feet
- StacKIT Includes Exclusive APS SCSI C "Connector"

### APS TECHNOLOGIES

Great Products. Priceless Support!

(800) 874-1428
Hey, That's My DAT!

Only APS DATs bring you all the benefits of our SR 2000 enclosure with DATerm, Digital Active Termination

**APS DAT**
The amazing APS DAT offers great performance and reliability. Get up to 2.6GB on a 90-minute tape with backup speeds as high as 10MB per minute.

**APS HyperDAT Speed**
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 10GB on a single tape! Best of all, your regular DDS and DDS compression tapes can be read in the APS HyperDAT, too!

**CD ROM**
- **Model**: T4101
- **SR 2000**: $299
- **APS T 3401**: $49

APS stocks hundreds of CD titles: call our Inforbase today for a document directory at (800) 374-8802.

**APS INTERNATIONAL Global Storage Resource**
APS Intl. Sales Line: (816) 920-4109
On parle français au (816) 920-4138
Sc hablar español en (816) 920-4136
Si parla Italiano via (816) 920-4137
Wir sprechen Deutsch (816) 920-4138

**MAGNETO OPTICAL**
- **Model**: APS 128MB MO
- **Internal** SR 2000: $79
- **APS T 155 MB Tape Backup**: $479

**POWERBOOK STUFF**
- **APS SCSI DDC w/PowerMerge**: $39
- **APS SCSI BOY**: $19
- **APS PowerBalls**: $9.99 ea

Hey, That's My DAT! 

[Advertisement for APS DATs and other products]
Free NEC 3Xe CD-ROM
when you buy a 24X Pro or LeMans GT from Bottom Line

PrecisionColor Pro 24XK for $725/PrecisionColor Pro 24X for $825 with rebate

SONY Monitors

75E CPD 1730 $1199 1025

SUPRA FAX MODEM

V.32bis MacPac $215 V.32bis PB $219

GLOBAL VILLAGE

Gold Mercury $277 319

SYQUEST CARTRIDGES

44mb Cart. 88mb Cart. 105/270mb Cart. $59/55 $89/80 $55/57
**DGR Technologies**

**DGR Multi MAX and LC MAX**

Upgrade your LC, LCII, LCIII and Performa with the LC MAX. Increase the single expansion slot to four, add another hard drive and supplement your LC with an additional 40 watt power supply. Conflicting cards can be easily switched on or off as needed. Enter the world of Multi-Media with the Multi MAX! Equipped with a multi-session, double spin CD-ROM, and amplified stereo speakers, you can access the vast library of CD-ROMs available or listen to your favorite music.

Multi MAX $799.00
LC MAX $299.00

**DGR Power RAID Storage System**

High speed RAID technology at a real world price. The DGR Power RAID Storage System is a RAID level 0 and 0, 5, 6 array system. Access time is 4ms with transfer rates up to 10 MB/Sec.Busy at RAID levels 0 and 1 using a 10 GB array on a 680AV. The system is compatible with SCSI 1 and 2. SC 4 Manager 4.3 (Async), and will work with all Power PC and Mac AV platforms. RAID enclosures are all metal construction complete with all cables and software. The Power RAID Storage System provides its own SCSI chain via a NATUS 232 card, allowing you to add more RAID enclosures as you need them.

**DGR Optical Drives**

DGR Technologies is committed to the excellence that has made us the industry leader. Each drive is shipped in an all-steel case with a universal 40 watt power supply, double-shielded SCSI cable, external terminator and a free cartridge. (Also for PC's!)

128 MB $799.00
256 MB $899.00
1.3 GB $2499.00

**JetInc. Ink Jet Refills**

JetInc is the most economical way to refill your inkjet printers. It provides over 50% savings, and incorporates recycled materials to help reduce landfill waste.

2Pk Black/Color $19.99
500C 6Pk $74.99
550C / 560C / 310 8P $55.95

**ColorBLASTER LC**

Blasting 16-bit color graphics on monitors up to 14" using the VRAM slot of the LC, LC II and the Performa 400,405,430. Bundled with Color! $169.00

**Colleague Business Software**

Colleague Business Software has functions such as appointment calendar, client/prospect file invoicing, job tracking, checkbooks, general ledger, sales/expense, and accounts receivable reports. MacWorld Editor's Choice award and 4 1/2 mice in MacUser. $599.00

**800-235-9748**

Monday-Friday 8am to 7pm CST DGR Technologies accepts MC, Visa, Discover, Pre-Paid & COD orders. 1219 West Sudder, Suite 209, Austin, Texas 78705 Tel: 512/472-6955 Fax 512/472-6955 Apple ink DGR Circle 65 on reader service card.
Below Dealer Cost!  
RADIUS SPECIALS

Below Dealer Cost Clearance! All Radius products are brand new with full manufacturers one year warranty! All quantities are extremely limited and will be sold on a first come first serve basis. Dealer cost prices are shown below for comparison.

RADIUS COLOR DISPLAY/21
- 1152 x 870 resolution 
- True WYSIWYG mode
- Compatible with Centris or Quadra built in video (16 bit on Quadra 950)

POWERVIEW $199
- Allows most PowerBooks and the Classic IIb to support color, grayscale, monochrome displays and projectors.
- International Version 3.3

COLOR PIVOT LE
- With purchase of CARD. We have cards for SE/30, LC, IIsi, Nubus, Quadras.

$399

SONY 20 INCH TRINITRON
- Grayscale
- Compatible with the Radius Precision Color Calibrator

SUPRMac SUPRVIEW
- Similar to PowerView but also does TV!

ROCKETS/ACCELERATORS

RADIUS ROCKET 68040 FROM $599
- 68040 processor
- Supports up to 128 MB of standard RAM in 8 SIMM slots
- QuickDraw acceleration w/Radius boards

- Grayscale
- Built-In video compatible

- Additional features listed below.

VMWARE $499
- Converts Macs into a full color display
- 35% larger Image area
- Flat tension mask screen
- Pivot Vision 1s 2Ms

VIVIDVISION
- Highly integrated 7" card design.
- May 92 Edition
- Additional features listed below.

CALL FOR ALL RADIUS VIDEO BOARDS!
Circle 20 on the reader service card
Our Break-Through Technology Caught the Competition by Surprise...Wait 'Til They See Our New Prices!

$599

NEW RELISYS

• 2400 dpi Resolution
• Free Photoshop LE

$1499

RELI2412

• 2400 dpi Resolution*
• Free Transparency Unit
• Free Full Photoshop
• Free OmniPage OCR

* Increased hardware resolution now delivers true 1200x300 dpi scanning and interpolation up to 2400 dpi!

Now you can have all the features without the high cost.

Before now, buying a quality scanner meant spending a fortune. Relisys' new Cold Scan Technology changes everything. Finally, a family of full-featured scanners at prices you can afford!

Dust-Free, Cold Scan Technology. Ordinary hot-lamp scanners rely on a fan to circulate cool air - and dust - throughout the scanning process. But new cold scan technology allows Relisys to fully encapsulate the process. So you get unprecedented, dust-free accuracy.

Exceptional Value. What's more, our new technology is not only superior to the competition's - it's more affordable!

Plus, Relisys gives you free software with all of our scanners; like Caere OmniPage Direct, so you can scan text directly into your word processing program and Adobe Photoshop for image editing and manipulation.

Call today for details on the complete line, or to order direct.

Order Direct:

1-800-756-5777

Customer Service Hotline: 800-677-3888

These offers expire May 31, 1994. Prices subject to change without notice. A 2% surcharge applies to American Express purchases. All returned orders may be subject to a minimum 15% restocking fee plus return shipping. Call for manufacturers' RMA before returning. Software, unless defective, cannot be returned after it has been opened.

Circle 262 on reader service card
<table>
<thead>
<tr>
<th>Category</th>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays &amp; Cards</td>
<td>RasterOps 20T 20&quot; Multimode Color Trinitron Display, 4 resolutions up to 1152x870.</td>
<td>$2099</td>
</tr>
<tr>
<td></td>
<td>Radius Precision Color Pivot Built in video, full page resolution, portrait and landscape.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Radius Call</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agfa StudioScan 600x300 dpi, interpolates to 2400 dpi, with Free Photoshop LE, FotoTune LE &amp; FotoSnap</td>
<td>$999</td>
</tr>
<tr>
<td></td>
<td>Ave Color Scanner 600 dpi color scanner, interpolates up to 2400 dpi, with Free Adobe Photoshop LE</td>
<td>$599</td>
</tr>
<tr>
<td>Scanners</td>
<td>UMAX 1200dpi, 24 bit color, with free full Photoshop</td>
<td>$11.99</td>
</tr>
<tr>
<td></td>
<td>UMAX UC 2600 88Mhz/66Mhz Universal Turbo 040, includes FPU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REI 2421LE 1200x300dpi hardware dpi, interpolates to 2400 dpi with Photoshop LE and Free OmniPage OCR.</td>
<td>$929</td>
</tr>
<tr>
<td></td>
<td>REI 2421T 1200x300dpi hardware dpi, interpolates to 2400 dpi with free full Photoshop, Free OmniPage OCR and Free Transparency Option.</td>
<td>$1199</td>
</tr>
<tr>
<td></td>
<td>RELI 9600dpi 1200x600dpi hardware dpi, interpolates to 9600 dpi, with full Photoshop and Free Transparency Option.</td>
<td>$2299</td>
</tr>
<tr>
<td></td>
<td>Lapis 17&quot; 1&quot; Multi-resolution, Color Trinitron.</td>
<td>$1049</td>
</tr>
<tr>
<td></td>
<td>15&quot; Full Page Gray Scale Display</td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>Two Page Gray Scale Display</td>
<td>619</td>
</tr>
<tr>
<td></td>
<td>LTV LG/LT Portable</td>
<td>255/249</td>
</tr>
<tr>
<td></td>
<td>Gray Scale &amp; Color Video Cards for all Macs Call for Pricing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Philips 15&quot; Color Display with built-in Speakers</td>
<td>$529</td>
</tr>
<tr>
<td></td>
<td>SuperMac 20/12X4, 21/17X4, Spectrum Power + 1152 (7&quot;) Thunder 24 w/Free DSP</td>
<td>2299/2199</td>
</tr>
<tr>
<td></td>
<td>Phillips 15&quot; Color Display with built-in Speakers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ether Lan Print</td>
<td>$259</td>
</tr>
<tr>
<td></td>
<td>PocketJet 1GB Int. HD</td>
<td>1299</td>
</tr>
<tr>
<td></td>
<td>PocketJet 3GB Int/Ext</td>
<td>2199/2399</td>
</tr>
<tr>
<td></td>
<td>SledgeHammer 4.08GB, 400 FMF Wide Disk Array</td>
<td>629</td>
</tr>
<tr>
<td></td>
<td>Hammer PE 130MB Mag. Optical</td>
<td>999</td>
</tr>
<tr>
<td></td>
<td>Jackhammer SCSI Accelerator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modem Legend 14.4, Super Fax</td>
<td>179</td>
</tr>
<tr>
<td></td>
<td>V.52bis High Speed Send/Receive Fax</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modem - Lifetime Warranty</td>
<td></td>
</tr>
<tr>
<td>Networking</td>
<td>FOCUS Ether Lan Print</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethernet Print</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Now connect 2 printers to your Ethernet network, introductory price</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ether Lan Print Plus (6 printers)</td>
<td>349</td>
</tr>
<tr>
<td></td>
<td>Ethernet Net Phone Connectors</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Transceivers Thin or Thick</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Ether Lan Hub 8/7 TurboStar 16</td>
<td>229/2399</td>
</tr>
<tr>
<td></td>
<td>Ether Lan Cards/Card 10 Paks</td>
<td>Call/Call</td>
</tr>
<tr>
<td></td>
<td>Multimedia Super System</td>
<td>$499</td>
</tr>
<tr>
<td></td>
<td>Featuring High Performance, Double Speed, Multisession CD-ROM Complete with Powerful Stereo Speakers, Headphones, Microphone and 5 popular CD titles.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ask About Other Special 7-pak Bundles Only $199</td>
<td></td>
</tr>
</tbody>
</table>
At MacNews, we give you more than a price quote and a delivery date... we give you answers!

You get guaranteed top quality, because we evaluate products from all the leading manufacturers, then we carry only the best.

We know our products inside and out. We'll help you choose exactly the right products for your needs and budget.

We've sharpened our pencils so you get more than the best products—you get the best value too.

With customer service and technical support departments that stand behind our products, help is always just a toll-free call away.

MacNews Hours: M-TH 8am-7pm; Fri til 6pm (CT) Sat 10am-2pm
1-800-723-7744
24hr Fax 312-871-4556 • International Orders Welcomed
Customer Service Hotline: 1-800-677-3888
A ClubMac Quantum Drive is the best "plug-and-play" storage solution for your Macintosh computer. All Quantum drives are backed by ClubMac's 30 Day Money Back Guarantee and Two Year Warranty. (For drives include ONE Year Warranty).

| Drive Series | Capacity | Model | Express | Internal | External | Format | Capacity | Model | Express | Internal | External | Format | Capacity | Model | Express | Internal | Internal | External | Express | Internal | Internal | External | Express | Internal | External | Express | Internal | External | Express | Internal | Internal | External | Express | Internal | Internal | External | Express | Internal | Internal | External | Express | Internal | Internal | External | Express | Internal | Internal | External | Express | Internal | Internal | External |
|--------------|----------|-------|---------|----------|----------|--------|---------|-------|---------|----------|----------|--------|---------|-------|---------|----------|----------|----------|---------|----------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|
| GO DRIVE SERIES | 2.5" POWERBOOK DRIVES | 170mb | 17ms | $259 | $379 | 170mb | 17ms | $185 | $245 | 256mb | 17ms | $339 | $459 | 270mb | 11ms | $239 | $299 | 340mb | 11ms | $289 | $349 | 440mb | 11ms | $469 | $529 | 540mb | 9.5ms | $549 | $609 | 1080mb | 9.5ms | $799 | $859 | 1800mb | 10ms | $1079 | $1139 |
| QUANTUM DRIVES | 3.5" LOW PROFILE, LOW POWER | 170mb | 17ms | $185 | $245 |
| | | 256mb | 17ms | $339 | $459 |
| | | 270mb | 11ms | $239 | $299 |
| | | 340mb | 11ms | $289 | $349 |
| | | 440mb | 11ms | $469 | $529 |
| | | 540mb | 9.5ms | $549 | $609 |
| | | 1080mb | 9.5ms | $799 | $859 |
| | | 1800mb | 10ms | $1079 | $1139 |

ClubMac Removables

- ClubMac 44mb 5.25" (5055) $249 $289
- ClubMac 88c 5.25" (65010) $379 $419
- ClubMac 200mb 5.25" (59200) $559 $599
- ClubMac 105Mb 3.5" (52103) $339 $379
- ClubMac 270mb 3.5" (52370) $619 $659

CARTRIDGES

- 44mb (50490/105mb (50310) $59
- 88mb (50800) $89
- 200mb (502000) $99
- 270mb (50327) $99

ClubMac DAT

- DDS & DDS-DC DRIVES
  - 2 to 4 GigaBytes at per minute per Megabyte
  - 20 sec average data access time (800m tape)
  - 1mb/min backup rate, 10MB/sec transfer rate
  - MTBF at 80,000 hours
  - 30/60 Day Warranty
  - Includes Retrospect V2.0 Backup Software and ONE 9mm Tape Cartridge

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Express</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0GIG</td>
<td>ClubMac DAT DDS DC 60mb, 90m</td>
<td>$799</td>
<td>$859</td>
<td></td>
</tr>
<tr>
<td>2.4GIG</td>
<td>ClubMac DAT DDS-DDS 60mb, 90m</td>
<td>$1079</td>
<td>$1139</td>
<td></td>
</tr>
<tr>
<td>4.8GIG</td>
<td>ClubMac DAT DDS-DDS 60mb, 90m</td>
<td>$1699</td>
<td>$1759</td>
<td></td>
</tr>
</tbody>
</table>

ClubMac DAT/2

- DDS-2 DRIVE
  - 20 sec average data access time (800m tape)
  - 2mb/min backup rate, 3MB/sec transfer rate
  - MTBF at 80,000 hours
  - ONE Year Warranty
  - Includes Retrospect Remote 2.0 Drive and ONE 12mm Tape Cartridge

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Express</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0GIG</td>
<td>ClubMac DAT DDS-2 60mb, 90m</td>
<td>$799</td>
<td>$859</td>
<td></td>
</tr>
<tr>
<td>2.4GIG</td>
<td>ClubMac DAT DDS-DC 60mb, 90m</td>
<td>$1079</td>
<td>$1139</td>
<td></td>
</tr>
</tbody>
</table>

Verbatim DAT Tapes

- 4mm (80m)...
  - $12 / $110 3.5" 128mb...
  - $29 / $250 5.25" 1.2GIG...

Optical Media

- 4mm (80m)...
  - $15 / $125 5.25" 1.2GIG...
  - $35 / $300 5.25"...

ClubMac Optical Drives

- ClubMac 3.5" 128mb Optical
  - "Low price and all-around value characterize this 128mb rewritable drive."

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Express</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5&quot; 128mb Fujitsu Optical</td>
<td>$899</td>
<td>$959</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5&quot; 128mb Epson Optical</td>
<td>$1669</td>
<td>$1729</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5&quot; 128mb Sharp Optical</td>
<td>$2699</td>
<td>$2759</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hewlett-Packard 5.25" 650mb Optical External

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Express</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.25&quot; 650mb Optical - 3.5&quot; 1.2GIG Optical External</td>
<td>$839</td>
<td>$889</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Seagate

- Seagate drives offer the highest performance and capacity at a price point that is affordable for any Macintosh user.
- Capacities range from 1 GigaByte to 2.4 GigaByte.

For more information, contact the manufacturer or visit their website.
MultiSpin 3Xp

MultiSpin CD-ROM Readers

**MultiSpin 3Xe**

The 3Xe is our highest performing triple speed external reader. It transfers data at 450 KB/sec, has an incredible 195ms access time and a 256 KB continuous-flow cache. Another MultiSpin 3Xe ErgoDesign feature is that it can be used in either a horizontal or vertical orientation.

**MultiSpin 3Xi**

For users that want to discover the world of multimedia the 3Xp Personal CD-ROM reader is perfect for use in the office, home or on the road. It combines 3X transfer rate performance, 250ms access time and a 256 KB continuous-flow cache in a compact design, making it an incredible value.

**MultiSpin 4X Pro**

w/o bundle...$589
w/bundle...$689

MultiSpin 3Xi (CDR-500) (Internal, 195ms access time)...
MultiSpin 3Xp (CDR-400) (Portable, 250ms access time)...
MultiSpin 4X Pro (CDR-900) (External, 180ms access time)...

NEC MultiSpin CD-ROM Readers include Macintosh interface kit and a Two Year Warranty. NEC MultiSpin CD-ROM Readers are MPC Level 2, QuickTime and Kodak Multivision Photo CD compliant.

**Network Products**

**Ethernet Adapter Products**

3 in 1 Card (Nubus, PDS, SE, LC)...
Thick/Thin Card (Mac II, LC)...
Thick/10BaseT Card (Mac II, LC)...
microSCSI PowerBook...
Apple AUI Ethernet Adapters (Quadra, Centris, Laser, W53)...
Single Port 10BaseT or Thin...
Dual Port 10BaseT and Thin...
Multiple AUI products...

**Ethernet Hubs**

StarBase T 9 Port (B-RJ-45, 1 BNC)...
HubLite 5 Port 10BaseT Hub...

**Networking**

**5 Year Warranty**

**FIVE YEAR WARRANTY**

**Sonic Systems, Inc.**

**FAX 1-800-258-2622**

**ClubMac**

**1-800-258-2622**

**MacWorld, June 1994, p. 735**

**ClubMac**

**1-800-258-2622**

**MacWorld, June 1994, p. 735**

**ClubMac**

**1-800-258-2622**

**MacWorld, June 1994, p. 735**
**EPSON & MICROTEK**

**Epson ES-800C Pro-Mac**

- ES-800C Pro-Mac ........................................... $1249
- Action Scanning-Mac ...................................... $799

**Microtek ScanMaker IIsp**

- ScanMaker II with Photoshop 2.5 LE .................. $799
- ScanMaker II with Photoshop 2.5 LE ............... $665
- ScanMaker IIx with Photoshop 2.5 ................. $1049
- ScanMaker IIg with Quark Design 1.0 ........ $489

**AGFA StudioScan**

- StudioScan from AGFA. So much scanner for so little money...

**SONY 17” TRINITRON**

Sony 17SE1 Trinitron monitor

- This new 17-inch Trinitron display features a unique Application Specific Integrated Circuit (ASIC), supports resolutions up to 1600 x 1200 at 60Hz, has a 0.25mm Aperture Grille Pitch and is Energy Star compliant.

**SUPERMAC**

- Free DSP for a limited time!

**24-BIT GRAPHIC ACCELERATORS**

- Thunder/24 v.2.0 (61130) ........................................ $1699
- Spectrum Power v.1152 (63430) ......................... $1169
- Spectrum/24 Series V (63830) .......................... $839

**LARGE SCREEN DISPLAYS**

- SuperMatch 21TXL Trinitron (ST02100) ............. $2199
- SuperMatch 20TXL Trinitron (ST02100-XL) ....... $1949
- SuperMatch 20 Plus Color (ST00975) ................. $1649
- SuperMatch 17TXL Trinitron (ST00735) .............. $1049
- Platinum II Two-Page GS (ST01000) .................. $999

**MULTIMEDIA SOLUTIONS**

- Digital Film (DV530) ........................................... $3199
- Spigot II Tape (DV530) ..................................... $849
- Video Spigot NuBus (DV1030) .......................... $369
- Video Spigot LC (DV1050) ................................. $249

**RASHEROPs CORPORATION**

- PaintBoard Lightning
  - The PaintBoard Lightning is a highly accelerated 24-bit NuBus graphics adapter. It delivers exceptional photo-realistic true color up to resolutions as high as 1024 x 768 making it ideal for imaging, color publishing and business productivity.
  - MONITORS
    - 17” MultiScan Trinitron (GDN-1700) .............. $1185
    - 17” MultiScan Trinitron (EP5-1700) ........ $1079
  - GRAPHIC CARDS
    - PaintBoard Lightning (2685) ........................ $779
    - Horizon 24 (2687) ........................................ $2259
    - PaintBoard Turbo XL (2695) ......................... $1129
    - PaintBoard Professional (2716) ................... $1799
    - PaintBoard BLI (2641) ................................. $319
  - MULTIMEDIA
    - MoviePak Presenter (2699) ........................... $1399
    - MoviePak2 (2698) ......................................... $1549
    - MoviePak2 Pro Suite (2602) ....................... $3289
    - 24XLT (2548) ................................................ $2529
    - 24XV (2536) .................................................. $719
    - Video Expander II (2622) .............................. $499

**E-MACHINES**

- The RasterOps DuoMate 16sc combines a SCSI interface with support for a variety of bit depths up to 16-bit per pixel (depending on the monitor and resolution). The SCSI interface may be used to connect an external hard disk or other devices such as a SCSI Ethernet adapter. SCSI disk mode is supported to ease file transfers.
MONITORS

- PrecisionColor/21 ........................................ $2149
- IntelliColor Display/20 (0341) ........................ $1929
- PrecisionColor Display/20V (0427) ............... $1679
- PrecisionColor Display/17 (0440) .................. $1249
- PrecisionColor Pivot (0354) .......................... $649
- Pivot Display (0356) ................................. $565
- Full Page Display (FPD) (0424) ....................... $489
- TPD/20gs/21gs ............................................. $799/$1005

GRAPHIC CARDS

- LeMansGT ..................................................... $1949
- PrecisionColor Pro 24X (0429) ........................ $1349
- PrecisionColor Pro 24XK (0422) ................. $735
- PrecisionColor Pro 24XP (0431) .................. $435
- PrecisionColor 24X (0422) ........................ $844

MULTIMEDIA

- VideoVision Studio (0418) ............................. $3389
- VideoVision Studio Upgrade (0419) ............. $1529
- VideoVision (Basic) (0416) ......................... $1499

NEC MULTISYNC 6FGp

- 15" MultiSync 3V (JC-153SYMA) ..................... $469
- 15" MultiSync 4FGp (JC-1531VMA-3) ............. $629
- 17" MultiSync 5FGp (JC-1731VMA-3) ............. $989
- 17" MultiSync 5FGp (JC-1741UMA-3) .......... $1099
- 21" MultiSync 6FGp (JC-2141UMA-3) ......... $1999

NEC Multisync carry a THREE Year Warranty.

SILENTWRITER 640

The NEC's SilentWriter Model 640 is a personal laser printer designed especially for the Macintosh. This compact, easy to operate printer delivers an unbeatable combination of professional level performance and print quality at a price most any Mac owner can afford.

- Silentwriter 640 (440/440, 300 dpi, PS Level 2, 2 fonts) $719
- Silentwriter 640 (440/440, 600 dpi, PS Level 2) .... $1379

Silentwriter 640 carries a TWO Year Warranty.

HP LASERJET 4ML

- 4ML with 200 dpi, 3 fonts, 25 scalable fonts, Adobe Postscript level 2 .......... $1029
- 4MP with 1200 dpi, 3 fonts, 25 scalable fonts, Adobe Postscript level 2 .... $1395

CALL FOR FREE CATALOG

- No Surcharge!

CALL 1-800-258-2622

MACWORLD June 1994 227
Now is the best time to accelerate your Macintosh with the Speedster 040. Starting at just $399, you can upgrade to '040 power and get blazing, 100% compatible performance from the Mac you already own.

Speedster 040 runs all your software up to 6X faster! Plus, its universal, low-cost design uses custom chips, saving you up to 50% over the competition. At Mobius, we stand behind you with a 3-year warranty, 30-day money-back guarantee, and unlimited technical support rated "Excellent" by MacWorld Magazine. Call today to order and receive your free Macintosh Performance Handbook.

Compare and Save!

<table>
<thead>
<tr>
<th></th>
<th>Speedster 040</th>
<th>Daystar Turbo 040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speedster 25i</td>
<td>$399</td>
<td>$799</td>
</tr>
<tr>
<td>Speedster 33i w/cache</td>
<td>$599</td>
<td>$999</td>
</tr>
<tr>
<td>Speedster 33i w/FPU &amp; cache</td>
<td>$799</td>
<td>$1,199</td>
</tr>
<tr>
<td>Speedster 40f w/FPU &amp; cache</td>
<td>$1,099</td>
<td>$1,399</td>
</tr>
<tr>
<td>128K Cache Option</td>
<td>FREE!</td>
<td>$199</td>
</tr>
</tbody>
</table>

Why settle for scrolling around on a tiny 13" monitor when you can view your entire document on an award-winning Mobius Display. You'll have over three times more desktop! Just plug it directly into your Macintosh and view up to 256 gray-levels* on the bright, razor-sharp screen. Now available for over 50 Macs, Mobius Displays are rated at over 80,000 hours MTBF—the most reliable in the industry. And starting at just $399, the best value you'll find anywhere. So choose the display that MacWorld named "Editor's Choice." Call us today to place your order, and get the Choice Display for all your work.

Mobius Monochrome Displays

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobius Two Page Display GS</td>
<td>$699</td>
</tr>
<tr>
<td>Mobius One Page Display GS</td>
<td>$399</td>
</tr>
<tr>
<td>Mobius Mono Video Card</td>
<td>$99</td>
</tr>
</tbody>
</table>

"For Macs w/supporting built-in video card may be req. call for info. †When purchased with display. How to Order: We accept Visa, MasterCard, AmEx and Discover. Corporate and Education P.O.s. Cache is free with Speedster 33i, 33f, and 40f models only. Competitive pricing as of 5/16/94. All trademarks are property of their respective holders. Mobius, 3835 Doyle Street, Emeryville, CA 94608, (510) 654-0556.
Our 8th year selling quality drives at incredible prices.  
30 Day money back guarantee.  
Fast, friendly, and smart service.  
Lifetime technical support.  
24 Hour turnaround, 1 year replacement policy.  
Thank you for your business!

Syquest  

INCREASING SALE!  
Complete External Subsystem includes:  
• Syquest drive in an external enclosure.  
• 2 year warranty on drive & case.  
• 1 Cartridge (1 year warranty)  
• 2 SCSI cables (23 to 50 & 50 to 50)  
• External plug in SCSI terminator.  
• 2 SCSI cables (25 to 50)  
• Anubis (by Charisma) formatting software  
• 1 Cartridge (1 year warranty)  

Includes formatting software and cables.

CD ROM DRIVE SALE!  
External CD ROM includes: 
External drive with external RCA jacks. SuperSeek drive with music play, terminator, and cable.  

CD ROM DRIVES  

SALE!  
Includes software with music play, $25 Photo CD processing coupon, and cables. Multi Drive CD Towers in stock!  

TAPE DRIVES  

OPTICAL DRIVES  

MICROPOLIS NEW PRODUCT!  

Hard Drives specifically designed for enhanced data transfer performance in applications such as multimedia, desktop publishing, and video editing.  
Capacity Model Internal External  
1000MB MC2110AV $99 $999  
700MB MC2171AV $1129 $1399  
3000MB MC1936AV $2199 $2299  

Prices and specifications subject to change. All media and/or are registered trademarks of their respective companies. Return must be in new condition, and may be subject to restocking fee. Shipping is not refundable.

Circle 245 on the reader service card  
MACWORLD June 1994 229
MacWAREHOUSE
SPECTACULAR SUPER SAVERS!

ASD Security Trio
Take FileGuard, TrashGuard & FileDuo
Together and save! Publisher: ASD Software
$149.95

Adobe Illustrator 5.0
With FREE Streamline!
Illustrator 5.0 offers more flexibility, more powerful tools, and a friendlier user environment. Create dazzling gradients, unlimited layers with style transparency, unlimited levels of undo and redo, work in the Previous mode and more...
$89

Macintosh MessagePad 110
The incredible butterknife you've been waiting for is here! Apple's Newton MessagePad is a message communications assistant that helps you stay in touch with the world, organize your life, and keep track of your ideas. Because it is designed to know how you work, it actually acts as your assistant.
$599

Newton G-Vox Bundle
Get your guitar and computer on speak-ernet! Your Newton will be able to: Play songs, identify notes & chords, tune, and more.
$389

Aldus Persuasion 3.0
Powerful online network backup software for centralizing backups and archiving. Great with multiple sources, destinations, and file selection criteria.
$325.95

Image Editor Pro 2.0
Image Editor Pro 2.0. Complete communications for the Mac. Internet mail and news, MacTCP, multiple concurrent conversations, intellige...
$149.95

Yearn 2 Learn
With FREE Soopy doll
Join Soopy and the entire PEANUTS gang in the second Yearn 2 Learn title. Designed to make learning fun, kids can choose from different activities including: Interactive Comics, math games, word games, memory games, and more...
$39.95

MiniCAD 5
The multi-award winning price/performance leader for Mac CAD contains an auto-2D, 3D, a database/spreadsheet/word processor, a library of over 1,200 mechanical, want and furniture symbols. Includes FREE mechanical library symbols. CAD/CAM conversion kit and more. Your practical precision CAD solution...
$49

Images with Impact CD-ROM
Add impact to your publishing and design projects with high-resolution, versatile illustrations on over 1,700 sheets. Unlabeled. Includes Paint, Faces, Accents & Borders.
$279.95

Apple Personal Diagnostics
The most complete and easy-to-use diagnostic software for your Mac. Keep your Mac trouble-free by checking and reporting on the well-being of your Mac's hard disk, disk drives, display, and more. Save money on software. Diagnostics can't stand your computer up, but they can help you before problems arise.
$99.95

MacHandwriter
The power of pen computing is available to all users at all levels of expertise. Print, write, or draw on your Mac as if these were paper-and-pen allowing you to see your work on screen. Full-screen composition, encryption, and verification.
$299.95

Windowatch
Watch/Watch 3.1 tracks window usage and stand-alone or networked Mac. It's designed for Publishers or any business that tracks a window's performance. It keeps track of every minute usage, prints, and other data. System is reliable and user friendly. System is invaluable to small businesses...
$89

14" Color Display
View up to 355 colors. Selected from over 16 million colors. 14" screen, 490 x 490 resolution with super fine 0.20 mm dot pitch. provisions for expansion with Macintosh. Available in deep black and white.
$299

DesignCAD 2D/3D
DesignCAD is a professional computer-aided design program that includes full-featured 2D drafting and 3D modeling in one package. 2D DesignCAD is dedicated to architecture, engineering, animation, desktop publishing, and multimedia. It's designed for small businesses...
$155

1-800-255-6227
Overnight Delivery-Only-$3.00

Publisher: Small Business
COM 0043

Publisher: American Graphical
COM 9921

Publisher: Graphisoft
COM 0101

Publisher: Graphisoft
COM 0101

Publisher: Graphisoft
COM 0101

Publisher: Graphisoft
COM 0101

Publisher: Graphisoft
COM 0101
Power User Double Speed CD-ROM Drive

Order your Power User CD-ROM Drive now for only $199 and, for only $99 more, we'll include your choice of any one of these popular chart topping CDs:

- The Bodyguard soundtrack with Whitney Houston
- Billy Joel's River of Dreams
- Sting's Ten Summoner's Tales
- Music Box by Mariah Carey

HURRY, quantities are limited!

Get the entire 21-volume Grolier Encyclopedia on ONE CD-ROM!

Plus... for only $99!

Buy now and get 2 bonus CD-ROMs FREE!

Power User Double Speed CD-ROM Drive
Ask for item# BND 0316 .................. 109.
PLUS, for only $99, choose one of the following music CDs (limit 1 per customer):

- Item# APL 0002 Whitney Houston-The Bodyguard
- Item# APL 0005 Billy Joel-River of Dreams
- Item# APL 0004 Sting/Ten Summoner's Tales
- Item# APL 0005 Mariah Carey-Music Box

The Grolier Multimedia Encyclopedia PLUS! The Animals! FREE and Atlas Pack FREE! Ask for item# BND 0007 .................. 69.95

Total Suggested Retail: $515.95

*When you order the Power User CD-ROM Drive at the same time.

THE MAC SUPERSTORE

BUSINESS & PRESENTATION

A LASTING IMPRESSION

Flexible Insignia (Full line available)............ ea. 59

ALBD

BUS0108 Brochure Pro .......................... 49

DAD0704 FileMaker Pro 2.1 ........................ 299

GLOBAL VILLAGE (FULL LINE AVAILABLE)

PowerPorts ........................................ Cal.

HAYE

MO10013 ACCURA 144v/for 144 ............ 229.95

MO10012 ACCURA tried 9x4x9 ............ 229.95

INSIGNIA (FULL LINE AVAILABLE) ............. 89.95

UTI0052 Accuscan 3.0 .......................... 89.95

POWERED

INT00012 14.4 Stnd. Receiver Fax Modem 189.95

SHIYA

NET0098 LiquidaxiL .......................... 599

ZOOM TELEPHONICS

BMB0090 VPS 4.3 Users MacPack ............... 169.95

EDUCATIONAL & ENTERTAINMENT

BROOKLAND

GR10020 Kid Pen 1.2 .......................... 35

NOICENTRIC SOFTWARE

EC5061 MacWrite Turbo Math Facts 3.0 ......... 35

PERSONAL TRAINING SYS (FULL LINE AVAILABLE)

ECH2 4.0, Word 5.1, Filemaker Pro 2.0 69.95

THE SOFTWARE TOOLS

BND0108 Miracle Plane Bundl .......... 299

GRAPHICS & DESIGN

ADORE SYSTEIM (FULL LINE AVAILABLE)

GR10367 Illustrator 8.0 w/ FREE Streamline ...... 399

GR10418 Photoshop 5.0 .......................... 399

ALEUS

GR10465 FireHand 9.0 .......................... 299.95

BND0219 SuperPaint SUPER BUNDL ............ 99

DYPA066 PageMaker 5.0 .......................... 579

DYPA022 PageMaker 5.0 Upgrades ............. 149

APPLE COMPUTER, INC.

GR10047 QuickTime Starter Kit ................. 109.

CLARK

GR10053 MacDraw Pro 1.5 ..................... 269.95

ELECTRONICS FOR IMAGING (EFI)

GR10432 Cachet .................................. 799.

GUILE

OTP0110 FreeBSD 3.3 .......................... 589

SOFTWARE ENGINEER

P01049 Keyboards .......................... 49

INPUT & OUTPUT

CATRE

IMP0269 OmniScan .......................... 399

KENSINGTON

LPG021 Turbo Mouse (SE or II) 4.0 ............. 109

MICROTEK (FULL LINE AVAILABLE) ............. 699

INP0056 Miracle Scanner II ................. 699

MOUSE SYSTEMS

INP0246 SuperScan Plus 3-Car Display ......... 1799

PLAYBACK PRODUCTS

BATTERY TECHNOLOGY INC.

AG10200 Gallery for Powerbook .................. 59.95

KENSINGTON

INP0221 Notebook Keypad .................. 79

ALL-IN-ONE CENTER

MW0694 PowerPad .......................... 99.95

UPGRADES & DRIVES

DATYSN DIGITAL

DR10049 Universal PowerCable 33 Mhz ...... 299.95

DR10050 20 Mhz Turbo B/o Accelerator ...... 299.95

PERIPHERAL LAND, INC.

STA1015 Infinity 50IV .................................. 599

POWERED

CM5011 4 Line SIMM 80's 124

CM5012 4 Line SIMM 168's 124

CM5015 448 MB By Customer Request 249.95

BMD0166 4GB SGB Removable ................. 279.95

UTILITIES & PROGRAMMING

ALADDIN SYSTEMS

UTI0024 Summit Deluxe 3.0 ........................... 69

APPLE COMPUTER, INC.

B011404 System 7.1. Personal Uplift Kit ...... 59.95

SY00910 At Ease 2.0 .................. 45.95

CARD

UTI0263 OmniPage Street .................. 59.95

MICROMAT COMPUTER SYSTEMS

UT0506 MacG4 2.3 .......................... 89

SYMANTEC CORPORATION

UTI0131 MacUtility for the Mac 2.0 ......... 99.95

UTI0334 Syntactic Antivirus 3.5 (SAM) ....... 65.95

FREE CATALOG SUBSCRIPTION

MW0694

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).

Call 24 hours a day, 7 days a week.

Inquiries: 908-367-0440 FAX Your Order to: 908-505-9279

CompuServe Code: GMW

NEW! Express Customer Service Number: 1-800-925-6227

I'm Kerry, call me at: 1-800-255-6227 (1-800-ALL-MACS)
### Quantum, Best Byte for MACs!

<table>
<thead>
<tr>
<th>ELS Series</th>
<th>GO Drive Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>Capacity</td>
</tr>
<tr>
<td>127 MB</td>
<td>17 MB</td>
</tr>
<tr>
<td>170 MB</td>
<td>17 MB</td>
</tr>
<tr>
<td>540 MB</td>
<td>10 MB</td>
</tr>
<tr>
<td>270 MB</td>
<td>19 MB</td>
</tr>
<tr>
<td>340 MB</td>
<td>20 MB</td>
</tr>
</tbody>
</table>

**Capacity**: Includes a 1 year warranty. GO drives include a 1 year warranty. Includes 2 year warranty.

### Fujitsu, Extremely Fast!

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Int.</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>240 MB</td>
<td>M2637</td>
<td>355</td>
<td>465</td>
</tr>
<tr>
<td>330 MB</td>
<td>M2622</td>
<td>345</td>
<td>405</td>
</tr>
<tr>
<td>520 MB</td>
<td>M2624/F</td>
<td>565</td>
<td>625</td>
</tr>
</tbody>
</table>

**Capacity**: Includes a 2 year warranty. Includes 2 year warranty.

### Micropolis, Music & Multi Media Apps, Novell Certified

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 GB</td>
<td>M4110</td>
<td>Low Profile 3.5&quot;</td>
</tr>
<tr>
<td>1.2 GB</td>
<td>M2210</td>
<td>8 MS, 5400 RPM FAST SCSII</td>
</tr>
<tr>
<td>1.2 GB</td>
<td>M2217</td>
<td>10 MS, 5400 RPM FAST SCSII</td>
</tr>
<tr>
<td>2.4 GB</td>
<td>M1926</td>
<td>11 MS, 5 yr. War. Fast SCSII</td>
</tr>
<tr>
<td>3.6 GB</td>
<td>M1936</td>
<td>11 MS, 5 yr. War. Fast SCSII</td>
</tr>
</tbody>
</table>

**Capacity**: Includes a 2 year warranty. Includes 2 year warranty.

### Disk Arrays

<table>
<thead>
<tr>
<th>Model/Capacity</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDI 2 GB Array</td>
<td>$3880</td>
</tr>
<tr>
<td>PDI 3.2 GB Array</td>
<td>$4480</td>
</tr>
<tr>
<td>PDI 4.2 GB Array</td>
<td>$5540</td>
</tr>
</tbody>
</table>

**Capacity**: Includes a 5 year factory warranty and are backed by a 30 day money back guarantee. Includes 2 year warranty.

### Hewlett Packard

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Int.</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 GB</td>
<td>C2424</td>
<td>3.5&quot;</td>
<td>155</td>
</tr>
<tr>
<td>2.4 GB</td>
<td>C2490</td>
<td>3.5&quot;</td>
<td>205</td>
</tr>
<tr>
<td>2.35 GB</td>
<td>C3010</td>
<td>5.25&quot;</td>
<td>2075</td>
</tr>
<tr>
<td>Optical Drives</td>
<td></td>
<td>23.5ms</td>
<td>2599</td>
</tr>
</tbody>
</table>

**Capacity**: Includes a 5 year factory warranty and are backed by a 30 day money back guarantee. Includes 2 year warranty.

### QMS Printers

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS 4 40PPM 300DPI</td>
<td>$1399</td>
</tr>
<tr>
<td>PS 860 8PPM 600 DPI, 11x17</td>
<td>$3825</td>
</tr>
<tr>
<td>PS 1725 17PPM, 600 DPI, New Price!</td>
<td>$4399</td>
</tr>
</tbody>
</table>

**Price**: Includes a 5 year factory warranty and are backed by a 30 day money back guarantee. Includes 2 year warranty.

### Seagate

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 GB</td>
<td>ST3200N</td>
<td>3.5&quot; Low Profile 10ms</td>
</tr>
<tr>
<td>1.2 GB</td>
<td>ST1200N</td>
<td>3.5&quot; 10ms</td>
</tr>
<tr>
<td>1.9 GB</td>
<td>ST11950N</td>
<td>3.5&quot; 36ms</td>
</tr>
<tr>
<td>2.4 GB</td>
<td>ST12550N</td>
<td>3.5&quot; 9ms</td>
</tr>
<tr>
<td>3.4 GB</td>
<td>ST43400N</td>
<td>5.25&quot; 11ms</td>
</tr>
<tr>
<td>9 GB</td>
<td>ST41080N</td>
<td>2.25&quot; 11ms</td>
</tr>
</tbody>
</table>

**Capacity**: Includes a 5 year factory warranty and are backed by a 30 day money back guarantee. Includes 2 year warranty.

### Tape Backup Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Int.</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 GB</td>
<td>HP35740A</td>
<td>4mm</td>
<td>$1025</td>
</tr>
<tr>
<td>3-5 GB</td>
<td>HP35480A</td>
<td>4mm</td>
<td>$1109</td>
</tr>
<tr>
<td>4-10 GB</td>
<td>HP1531A</td>
<td>4mm</td>
<td>$1565</td>
</tr>
<tr>
<td>20-50 GB</td>
<td>HP1533A &amp; Auto Tape Loader</td>
<td>4mm</td>
<td>$3495</td>
</tr>
<tr>
<td>2-5 GB</td>
<td>Exabyte E205</td>
<td>8mm</td>
<td>$1399</td>
</tr>
<tr>
<td>5-10 GB</td>
<td>Exabyte E205</td>
<td>8mm</td>
<td>$2549</td>
</tr>
<tr>
<td>20-50 GB</td>
<td>Exabyte 1D &amp; Auto Tape Loader</td>
<td>8mm</td>
<td>CALL</td>
</tr>
</tbody>
</table>

**Capacity**: Includes a 5 year factory warranty and are backed by a 30 day money back guarantee. Includes 2 year warranty.

### External Cabinets

<table>
<thead>
<tr>
<th>Cabinet</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZERO FOOTPRINT</td>
<td>$75</td>
</tr>
<tr>
<td>MICRO CAB</td>
<td>$89</td>
</tr>
<tr>
<td>FULL HEIGHT</td>
<td>$129</td>
</tr>
<tr>
<td>MULTIPLE BAY CABINETS</td>
<td>$80-129</td>
</tr>
</tbody>
</table>

**Price**: Includes a 5 year factory warranty and are backed by a 30 day money back guarantee. Includes 2 year warranty.

### Contact Information

**Phone**: 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 required trademarks of their respective companies. Freight not included.**
The Only Guide You Need to Master the Mac Universe!

**MACWORLD COMPLETE MAC HANDBOOK PLUS CD, 2ND EDITION**

Covers System 7 Pro, Adobe Acrobat, & Apple's New AV Models

**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.

ISBN: 1-56884-033-0
Price: $39.95 USA/$52.95 Canada
800 pages

Order Risk-Free: 1-800-762-2974
For fastest service, fax your order to (415) 358-1260. Phone 8am to 5pm, PT, or complete and mail the order form. Also available wherever computer books are sold.

Yes! Please send me: I Wish to Pay by:

IDG Books Worldwide, Inc.
155 Bovet Road, Suite 310
San Mateo, CA 94402
(800) 762-2974, (415) 312-0600
Fax (415) 358-1260

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: $39.95 USA/$52.95 Canada
792 pages

Order Risk-Free: 1-800-762-2974
For fastest service, fax your order to (415) 358-1260. Phone 8am to 5pm, PT, or complete and mail the order form. Also available wherever computer books are sold.

Yes! Please send me: I Wish to Pay by:

IDG Books Worldwide, Inc.
155 Bovet Road, Suite 310
San Mateo, CA 94402
(800) 762-2974, (415) 312-0600
Fax (415) 358-1260
## Hard Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Size</th>
<th>Access</th>
<th>Warranty</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>545MB</td>
<td>3.5&quot;</td>
<td>SAMS</td>
<td>Eagle 2</td>
<td>$985</td>
</tr>
<tr>
<td>1.2GIG</td>
<td>3.5&quot;</td>
<td>9MS</td>
<td>Hawk 1</td>
<td>$899</td>
</tr>
<tr>
<td>122MB</td>
<td>3.5&quot;</td>
<td>SAMS</td>
<td>Eagle 2</td>
<td>$895</td>
</tr>
<tr>
<td>2.0GIG</td>
<td>3.5&quot;</td>
<td>BARRS</td>
<td>Eagle 2</td>
<td>$989</td>
</tr>
<tr>
<td>2.5GIG</td>
<td>3.5&quot;</td>
<td>BARRS</td>
<td>Eagle 2</td>
<td>$989</td>
</tr>
<tr>
<td>2.5GIG</td>
<td>3.5&quot;</td>
<td>WIDE</td>
<td>Eagle 2</td>
<td>$989</td>
</tr>
<tr>
<td>3.4GIG</td>
<td>3.5&quot;</td>
<td>10MS</td>
<td>Eagle 2</td>
<td>$989</td>
</tr>
<tr>
<td>9.0GIG</td>
<td>5.25&quot;</td>
<td>11MS</td>
<td>Eagle 2</td>
<td>$989</td>
</tr>
</tbody>
</table>

### Conner

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Size</th>
<th>Access</th>
<th>Warranty</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>945MB</td>
<td>3.5&quot;</td>
<td>12MS</td>
<td>Eagle 2</td>
<td>$985</td>
</tr>
<tr>
<td>1.0GIG</td>
<td>3.5&quot;</td>
<td>9MS</td>
<td>Eagle 2</td>
<td>$899</td>
</tr>
</tbody>
</table>

### Hitachi

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Size</th>
<th>Access</th>
<th>Warranty</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7GIG</td>
<td>5.25&quot;</td>
<td>12.8 MS</td>
<td>Eagle 2</td>
<td>$1945</td>
</tr>
</tbody>
</table>

Anubis Formatting Software included with all hard drives.

## Optical Drives

### Fujitsu

- 435 MB 3.5" internal: $357
- 375 MB 9MS: $315
- 625 MB 8MS: $575

### Seagate

- Hawk 1 545MB 3.5" 685 $685
- Barracuda 1 128MB 3.5" 755 $755
- Elite 3 3.5" 899 $899

### Conner

- ST31200N 545MB 3.5" 685 $685
- ST12400N 122MB 3.5" 755 $755
- ST12400N 2.0GIG 3.5" 1555 $1555

## Operations

- Includes one cartridge:
  - 128MB Ricoh: $839
  - 128MB Fujitsu: $765
  - 650MB Ricoh Hyperspace: $1799

## CD Roms

- Toshiba 4401: $320
- Toshiba 3401: $439
- Sony CDU-561: $385

### Hitachi

- 128MB Optical: $765
- 128MB Optical: $839

## Tape Backup Systems

### Fujitsu

- 255MB Sanaky CP-150: $495
- 1.3-2GIG Archive: $899
- 1.3-6GIG Archive Turbo: $1099

### Seagate

- Exabyte 5605: $2179
- Sony 4000: $1099
- Sony 5000 DDS-2: $1189

## Media

- 900MB Tape: $10
- 120MB: $555
- 112MB: $175
- 72MB: $75
- 72MB Optical: $650

### Raid Systems

- 1.0 GIG RAID: $1399
- 2.0 GIG RAID: $2199
- 3.0 GIG RAID: $3999

### Umax Scanners

- UMAX 630 OCR: $649
- UMAX 840: $899
- UMAX 1200: $1289
- UMAX 1220: $1499

### Kodak ColorErase PS

- Color DyeSub Printer/PS level 2: $5099

### High Performance Drives

- Seagate Hawk 1.08GB/9ms access: $849
- Seagate Hawk 2.4GB/9ms access: $1499
- 2GB DAT Tape Backup: $699

### New Wacom Tablet!

- UDI218BM 12x18 tilt w/ calligraphy pen: $739

### PowerBook SCSI switch

- Switchable from SCSI to Deck Mode, sturdy metal shielded connectors, LED activity indicator: $36

### 17" Trinitron

- $799

### Digital Axis International

- 30-Day Satisfaction Guarantee!
- One Year Free On-Site Service!

### Kodak ColorErase PS

- Color DyeSub Printer/PS level 2: $5099

### High Performance Drives

- Seagate Hawk 1.08GB/9ms access: $849
- Seagate Hawk 2.4GB/9ms access: $1499
- 2GB DAT Tape Backup: $699

### NEW Wacom Tablet!

- UDI218BM 12x18 tilt w/ calligraphy pen: $739

### PowerBook SCSI switch

- Switchable from SCSI to Deck Mode, sturdy metal shielded connectors, LED activity indicator: $36

### Digital Axis International

- 30-Day Satisfaction Guarantee!
- One Year Free On-Site Service!

### Kodak ColorErase PS

- Color DyeSub Printer/PS level 2: $5099

### High Performance Drives

- Seagate Hawk 1.08GB/9ms access: $849
- Seagate Hawk 2.4GB/9ms access: $1499
- 2GB DAT Tape Backup: $699

### NEW Wacom Tablet!

- UDI218BM 12x18 tilt w/ calligraphy pen: $739

### PowerBook SCSI switch

- Switchable from SCSI to Deck Mode, sturdy metal shielded connectors, LED activity indicator: $36

### Digital Axis International

- 30-Day Satisfaction Guarantee!
- One Year Free On-Site Service!
<table>
<thead>
<tr>
<th>Category</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCESSORIES</td>
<td>257</td>
</tr>
<tr>
<td>Cases</td>
<td></td>
</tr>
<tr>
<td>Covers</td>
<td></td>
</tr>
<tr>
<td>Diskettes</td>
<td></td>
</tr>
<tr>
<td>Furniture</td>
<td></td>
</tr>
<tr>
<td>Security Systems</td>
<td></td>
</tr>
<tr>
<td>Serial Switches</td>
<td></td>
</tr>
<tr>
<td>Trackballs</td>
<td></td>
</tr>
<tr>
<td>PowerBook</td>
<td></td>
</tr>
<tr>
<td>BUSINESS TOOLS</td>
<td>236-238</td>
</tr>
<tr>
<td>Bar Code</td>
<td></td>
</tr>
<tr>
<td>Credit Authorization</td>
<td></td>
</tr>
<tr>
<td>Point of Sale</td>
<td></td>
</tr>
<tr>
<td>Property Management</td>
<td></td>
</tr>
<tr>
<td>Foreign Language Translation</td>
<td></td>
</tr>
<tr>
<td>EDUCATIONAL &amp; RECREATIONAL</td>
<td>258-259</td>
</tr>
<tr>
<td>Astrology</td>
<td></td>
</tr>
<tr>
<td>Astronomy</td>
<td></td>
</tr>
<tr>
<td>Discount Software</td>
<td></td>
</tr>
<tr>
<td>Flashcards</td>
<td></td>
</tr>
<tr>
<td>Games</td>
<td></td>
</tr>
<tr>
<td>Genealogy</td>
<td></td>
</tr>
<tr>
<td>Grading</td>
<td></td>
</tr>
<tr>
<td>Lottery</td>
<td></td>
</tr>
<tr>
<td>Music</td>
<td></td>
</tr>
<tr>
<td>On-Line Services</td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td></td>
</tr>
<tr>
<td>GRAPHICS</td>
<td>261-262</td>
</tr>
<tr>
<td>3D</td>
<td></td>
</tr>
<tr>
<td>CAD/CAM</td>
<td></td>
</tr>
<tr>
<td>Clip Art</td>
<td></td>
</tr>
<tr>
<td>Fonts</td>
<td></td>
</tr>
<tr>
<td>Graphics Translators</td>
<td></td>
</tr>
<tr>
<td>MOBILE COMPUTING &amp; PDA's</td>
<td>256-257</td>
</tr>
<tr>
<td>Battery Charger</td>
<td></td>
</tr>
<tr>
<td>PowerBook Accessories</td>
<td></td>
</tr>
<tr>
<td>Security Supplies</td>
<td></td>
</tr>
<tr>
<td>MULTIMEDIA &amp; CD-ROM</td>
<td>260-261</td>
</tr>
<tr>
<td>Presentation</td>
<td></td>
</tr>
<tr>
<td>NETWORKING &amp; COMMUNICATIONS</td>
<td>259</td>
</tr>
<tr>
<td>BBS</td>
<td></td>
</tr>
<tr>
<td>Printer Interface</td>
<td></td>
</tr>
<tr>
<td>PROGRAMMING &amp; UTILITIES</td>
<td>264</td>
</tr>
<tr>
<td>Languages</td>
<td></td>
</tr>
<tr>
<td>SERVICES &amp; SUPPLIES</td>
<td>263-264</td>
</tr>
<tr>
<td>CAD/CAM</td>
<td></td>
</tr>
<tr>
<td>Computer Insurance</td>
<td></td>
</tr>
<tr>
<td>Computer Repair</td>
<td></td>
</tr>
<tr>
<td>Consulting</td>
<td></td>
</tr>
<tr>
<td>Data Recovery</td>
<td></td>
</tr>
<tr>
<td>On-Line Services</td>
<td></td>
</tr>
</tbody>
</table>

**Bar Code Headquarters**

**Bar Code Readers**

- for all Macintosh ADB or Serial
- Attaches thru ADB as 2nd Keyboard in seconds.
- Wand, Magstripe, CIP, Laser, Slot Badge
- All European Keyboards Supported
- New Top Rated by Independent Reviews
- Complete Reader with Cordless RF Wand - $695
- Complete Reader with CCD Scanner - $624
- Complete Reader with Corded Steel Wand - $329

**Portable Readers**

- for all Macintosh ADB or Serial
- 64K or 256K RAM. Keyboard or serial upload.
- Download Tables
- Wand, CCD or Laser Input
- 4 x 20 LCD, 35 Keys
- 2 Built-in Inventory Programs
- Optional Voice prompts and error msgs. You record!
- Double duty as non-portable
- Very easy to program & interface with applications
- Complete 64K Unit with Wand & Voice - $799

**Ordering is Easy!**

- 30 Day Money Back Guarantee
- Qualified POs Accepted
- 2 Year Warranty on Readers
- Same Day Shipping
- Free UPS Blue in US

**Phone:** 800-345-4220

or call 408-458-9938 • FAX 408-458-9964

In Europe call our Irish Office at 00 353 1 6614 566

**WORTHINGTON DATA SOLUTIONS**
Label Printing Software Tamed!

Introducing the most sophisticated, easy-to-use, bar code label printing utility ever. Label Press includes hundreds of Avery templates and industry standards such as Kmart, JCPenney, UPS, FedEx and many more. For any Mac compatible printer. For industrial label printing Label Press Thermal Works with all Intermec, Fargo Datamax, and Zebra printers.

SYNEX (800) 447-9639

BRING HOME AN AWARD WINNER.

With POWER TRANSLATOR® PROFESSIONAL from Globalink® you can translate words, sentences, even entire documents into Spanish, French or German to/from English. All at the push of a button.

Specialized Subject Dictionaries are available for technical and professional uses. You can even create your own!

Give your Mac the power to talk global. Get POWER TRANSLATOR PROFESSIONAL, your ticket to worldwide communication.

Globalink, Inc.

9302 Lee Highway, Fairfax, VA 22031-1308
Tel.: 1-703-273-5600 • Fax: 1-703-273-3866
U.S. and Canada

CIRCLE 460 ON READER SERVICE CARD

The Experts Choice for Barcoding!

Barcode Generation

MacBARCODA

With a color option that works

All the vital features for safe, high-quality barcode production. All the popular barcode types. Compatible with all major page-makeup and graphics software. The highest precision barcoding package available for the Mac.

Barcode Readers

Bar code data collection for the Mac or PC. Works with any software package. All major bar codes supported.

Wand Reader $ 255
Laser Reader $ 495

Label Printing

on Sheets


Label Printing

on Reels

The easiest solution for printing short-run multi-variation labels on reels with powerful text, graphics, and barcode facilities. Compatible with the range of Zebra reel-fed thermal printers.

Call Toll Free

800-289-0993

Computalabel

28 Green Street, Newbury MA 01951 Fax 508-462-9198

CIRCLE 544 ON READER SERVICE CARD
BUSINESS TOOLS
SYSTEMS & PERIPHERALS

The Recognized Macintosh Bar Code Experts

**UniScan-300**

- ADB Bar Code/Mag Stripe Reader
- Includes wand, communications software, cable, battery & AC adapter.
- 256K storage (128K RAM & 128K Flash PROM) upgradeable to 1 meg.
- Data collection program included - Inexpensive program generator

**PDCS-300**

- Portable System (1 year warranty)
- 30-Day Money Back Guarantee on All Products
- Established 1978 - Newton Scanners and Software Available Now!
- Discounts for Resellers, Schools, Non-Profit & Government Agencies

2495 Old Middlefield Way, Mt. View CA 94043
(415) 988-0141 Fax (415) 988-0289
(800) 526-5920 AppleLink: BARCODE

CIRCLE 441 ON READER SERVICE CARD

Cash On Your Screen!

Credit Card Authorization & Electronic Deposit

**MacAuthorize**

- Automatically authorizes and deposits all credit card sales - individually or in batches
- Save time and money, eliminate credit terminals
- Certified on all major bank networks
- Hands all credit cards plus check guarantee
- Supports AppleEvents & Import/Export
- Supports card readers & receipt printers
- Instant totals, discount rates, printed reports, etc.
- Database and file searching
- Many more features

POS Credit Developers since 1981

800-4-TELLAN • 408/274-1110 • Tellan Software, Inc.

CIRCLE 460 ON READER SERVICE CARD

Scanning bar codes is even easier!

**PRINTBAR™**

- COMPATIBLE WITH VIRTUALLY ANY MACINTOSH APPLICATION
- CHOOSE FROM: • UPC/EAN/ISBN • Code 39 • Interleaved 2 of 5 • POSTNET/FIM
- 90-DAY MONEY BACK GUARANTEE

Mac Authorize

800-232-7625

CIRCLE 465 ON READER SERVICE CARD

MacWorld Shopper

BUSINESS TOOLS

Job Tracking
Manufacturing
Forecasting

New Hybrid Solutions • Relational Database
AppleScript Ready • Easy-to-Use Interface

Call Now for Demo
800-782-5682

KEEP YOUR DUCKS IN A ROW

WITH

POST/ OE 4 MAC™

- CREDIT CARD PROCESSING
- ORDER ENTRY • ACCOUNTING
- POINT OF SALE • BARCODE
- TELEMARKETING • INVENTORY
- DEMO VERSION AVAILABLE

EES Companies, Inc.
(800) 508 - 4444

MacLandlord $399

Upradated 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
313/626-6247

PostScript Laser Printer for Macs and PCs!

- Only $595 for this great deal on PostScript printers! Call for our free catalog!
- Fast 32-bit A/D 29000 KSC processor
- Micropage TrueType PostScript interpreter with 35 TrueType fonts
- Compatible with both Adobe Type 1 and TrueType fonts
- PC and Macintosh compatible - it connects to both simultaneously
- Appledr. cups, Canonical Parallel and RS232 Serial Interfaces
- Compact reliable 4ppm, 300dpi Canon B engine
- Includes EP 8000 laser printer cartridge same as used by HP and Apple
- 1 Year Warranty, 30 Day Money Back Guarantee, free technical support

CIRCLE 463 ON READER SERVICE CARD

June 1994  MACWORLD
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

A Not-For-Profit Corporation
## MAC PROFESSIONAL

We only sell brand new products with full one year part & labor warranty. Dealers, Consultants and Int'l orders welcome.

19801 Ventura Blvd, Woodland Hills, CA 91364 Prices are C.O.D. and Subject to change. In business since 1988.

### Power Mac

<table>
<thead>
<tr>
<th>Model</th>
<th>RAM</th>
<th>HD</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>6100 8/160</td>
<td>840 AV 8/30-CRD</td>
<td>2977</td>
<td></td>
</tr>
<tr>
<td>6100 8/250-CD</td>
<td>840 AV 15/500</td>
<td>2977</td>
<td></td>
</tr>
<tr>
<td>6100 AV 8/250-CD</td>
<td>840 AV 32/1Gb</td>
<td>3077</td>
<td></td>
</tr>
<tr>
<td>7100 8/250</td>
<td>840 AV 64/1.7Gb</td>
<td>4177</td>
<td></td>
</tr>
<tr>
<td>7100 AV 8/500-CD</td>
<td>840 AV 8/12/14 MB RAM</td>
<td>5477</td>
<td></td>
</tr>
<tr>
<td>7100 16/500</td>
<td>8/230</td>
<td>1977</td>
<td></td>
</tr>
<tr>
<td>7100 24/1GB</td>
<td>24/5000</td>
<td>2777</td>
<td></td>
</tr>
<tr>
<td>8100 8/250</td>
<td>40/1Gb</td>
<td>3577</td>
<td></td>
</tr>
<tr>
<td>8100 16/500</td>
<td>72/1.7Gb</td>
<td>4977</td>
<td></td>
</tr>
<tr>
<td>8100 AV 8/250-CD</td>
<td>840 AV 16/240/340 MB HD</td>
<td>3647</td>
<td></td>
</tr>
</tbody>
</table>

### Quadra

<table>
<thead>
<tr>
<th>Model</th>
<th>RAM</th>
<th>HD</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Mac Quadra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6100 8/160</td>
<td>840 AV 8/30-CRD</td>
<td>2977</td>
<td></td>
</tr>
<tr>
<td>6100 8/250-CD</td>
<td>840 AV 15/500</td>
<td>2977</td>
<td></td>
</tr>
<tr>
<td>6100 AV 8/250-CD</td>
<td>840 AV 32/1Gb</td>
<td>3077</td>
<td></td>
</tr>
<tr>
<td>7100 8/250</td>
<td>840 AV 64/1.7Gb</td>
<td>4177</td>
<td></td>
</tr>
<tr>
<td>7100 AV 8/500-CD</td>
<td>840 AV 8/12/14 MB RAM</td>
<td>5477</td>
<td></td>
</tr>
<tr>
<td>7100 16/500</td>
<td>8/230</td>
<td>1977</td>
<td></td>
</tr>
<tr>
<td>7100 24/1GB</td>
<td>24/5000</td>
<td>2777</td>
<td></td>
</tr>
<tr>
<td>8100 8/250</td>
<td>40/1Gb</td>
<td>3577</td>
<td></td>
</tr>
<tr>
<td>8100 16/500</td>
<td>72/1.7Gb</td>
<td>4977</td>
<td></td>
</tr>
<tr>
<td>8100 AV 8/250-CD</td>
<td>840 AV 16/240/340 MB HD</td>
<td>3647</td>
<td></td>
</tr>
</tbody>
</table>

### PowerBooks

<table>
<thead>
<tr>
<th>Model</th>
<th>RAM</th>
<th>HD</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>New PowerBooks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have Arrived</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>165 / 180 / 180 Color</td>
<td>4 / 8 / 12 / 14 MB RAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80 / 160 / 240 / 340 MB HD</td>
<td>Any Configuration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. Village Mercury</td>
<td>G. Village Gold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CALL</td>
<td>CALL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Express Modern</td>
<td>Express</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CALL</td>
<td>CALL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Printers

<table>
<thead>
<tr>
<th>Model</th>
<th>RAM</th>
<th>HD</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser Select 310</td>
<td></td>
<td></td>
<td>467</td>
</tr>
<tr>
<td>Laser Select 320</td>
<td></td>
<td></td>
<td>497</td>
</tr>
<tr>
<td>Laser Select 350</td>
<td></td>
<td></td>
<td>4377</td>
</tr>
<tr>
<td>Laser Pro 630</td>
<td></td>
<td></td>
<td>1477</td>
</tr>
<tr>
<td>Laser Pro 610</td>
<td></td>
<td></td>
<td>2047</td>
</tr>
<tr>
<td>HP 4SI</td>
<td></td>
<td></td>
<td>1987</td>
</tr>
<tr>
<td>HP 4MP</td>
<td></td>
<td></td>
<td>1987</td>
</tr>
<tr>
<td>HP 1200</td>
<td></td>
<td></td>
<td>1987</td>
</tr>
<tr>
<td>HP 500C</td>
<td></td>
<td></td>
<td>1987</td>
</tr>
<tr>
<td>HP 350C</td>
<td></td>
<td></td>
<td>1987</td>
</tr>
<tr>
<td>HP 310</td>
<td></td>
<td></td>
<td>1987</td>
</tr>
</tbody>
</table>

### Monitors

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td></td>
</tr>
<tr>
<td>Sony</td>
<td></td>
</tr>
<tr>
<td>NEC</td>
<td></td>
</tr>
<tr>
<td>Supermac</td>
<td></td>
</tr>
</tbody>
</table>

### Scanners

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Film DV 2050</td>
<td>3377</td>
</tr>
<tr>
<td>Thunder II</td>
<td>2377</td>
</tr>
<tr>
<td>Video Vision Studio</td>
<td>3277</td>
</tr>
<tr>
<td>Pinnacle Recordable CD</td>
<td>3677</td>
</tr>
</tbody>
</table>

### DUO

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMAX 630</td>
<td>747</td>
</tr>
<tr>
<td>UMAX 840</td>
<td>997</td>
</tr>
<tr>
<td>UC 1260</td>
<td>1497</td>
</tr>
<tr>
<td>HP 1200-M</td>
<td>957</td>
</tr>
<tr>
<td>270C</td>
<td>957</td>
</tr>
<tr>
<td>Dock w/230 HD</td>
<td>697</td>
</tr>
<tr>
<td>1037</td>
<td>1977</td>
</tr>
</tbody>
</table>

### Peripherals

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Hard Drive Case</td>
<td>697</td>
</tr>
</tbody>
</table>

### Audio Video

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Video</td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td></td>
</tr>
</tbody>
</table>

### Latest

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Word</td>
<td>$149.99</td>
</tr>
<tr>
<td>Microsoft Word Upgrade</td>
<td>$70.99</td>
</tr>
<tr>
<td>SuperPaint</td>
<td>$29.99</td>
</tr>
<tr>
<td>Math Now</td>
<td>$10.99</td>
</tr>
<tr>
<td>Math Write</td>
<td>$49.99</td>
</tr>
<tr>
<td>Call For Additional Close-out Software!</td>
<td></td>
</tr>
</tbody>
</table>

### SPECIALS

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Hard Drive Case</td>
<td>$69.99</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac II</td>
<td>1/0</td>
</tr>
<tr>
<td>Mac LC II</td>
<td>4/0</td>
</tr>
<tr>
<td>Mac IIfx</td>
<td>5/0</td>
</tr>
<tr>
<td>Mac LCII</td>
<td>4/0</td>
</tr>
<tr>
<td>Mac LCIII</td>
<td>5/0</td>
</tr>
<tr>
<td>Mac Quadra</td>
<td>700</td>
</tr>
<tr>
<td>PBook 170</td>
<td>4/0</td>
</tr>
</tbody>
</table>

### Used

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Specials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used Mac</td>
<td>$99.99</td>
</tr>
<tr>
<td>New Apple 14&quot; Color Plus</td>
<td>$99.99</td>
</tr>
</tbody>
</table>

### Used Specials

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used Mac IIfx</td>
<td>3/40</td>
</tr>
<tr>
<td>New Apple 14&quot; Color Plus</td>
<td>3/40</td>
</tr>
</tbody>
</table>

### System Special

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/0</td>
<td></td>
</tr>
</tbody>
</table>

### Specials

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle 495 on Reader Service Card</td>
<td></td>
</tr>
</tbody>
</table>

### We Specialize in custom made configurations

---

**Phone (818) 719-9200**

We Guarantee best pricing

**Fax (818) 719-9115**

---

**Macworld SHOPPER**

---

**Systems & Peripherals**

---

**FREE SOFTWARE • OVER $200.00**

(Manufacturer's SRP, Limited Time Offer, While Supplies Last • Upgrade to Over $500.00 SRP of software for only $25.00)

---

**NEW**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac LC 2/40 System</td>
<td>$799.99</td>
</tr>
<tr>
<td>Standard II Keyboard</td>
<td></td>
</tr>
<tr>
<td>14&quot; Color Plus Monitor</td>
<td></td>
</tr>
<tr>
<td>New Centris 610 4/80 w/EN</td>
<td>$999.00</td>
</tr>
<tr>
<td>New LC 2/40</td>
<td>$999.00</td>
</tr>
<tr>
<td>New IICl 5/80 w/cache</td>
<td>$999.00</td>
</tr>
<tr>
<td>New Quadra 800</td>
<td>$999.00</td>
</tr>
<tr>
<td>New Pari LW NT</td>
<td>$999.00</td>
</tr>
<tr>
<td>New Laserwriter Select 300</td>
<td>$999.00</td>
</tr>
<tr>
<td>New Conner 543MB 3.5&quot; Int HD</td>
<td>$999.00</td>
</tr>
<tr>
<td>New Conner 543MB Ext HD</td>
<td>$999.00</td>
</tr>
<tr>
<td>New LC Ethernet Cards</td>
<td>$999.00</td>
</tr>
</tbody>
</table>

**1-800-729-7031**

---

**Used**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac II</td>
<td>1/0</td>
</tr>
<tr>
<td>Mac LCx</td>
<td>1/0</td>
</tr>
<tr>
<td>Mac IIsi</td>
<td>3/40</td>
</tr>
<tr>
<td>Mac IIsi</td>
<td>5/0</td>
</tr>
<tr>
<td>Mac IIsi</td>
<td>5/80</td>
</tr>
<tr>
<td>Mac LCII</td>
<td>4/0</td>
</tr>
<tr>
<td>Mac IIfx</td>
<td>5/0</td>
</tr>
<tr>
<td>Mac IIx</td>
<td>5/0</td>
</tr>
<tr>
<td>Quadra 700</td>
<td>4/0</td>
</tr>
<tr>
<td>PBook 170</td>
<td>4/0</td>
</tr>
</tbody>
</table>

---

**System Special**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used Mac IIfx 3/40</td>
<td></td>
</tr>
<tr>
<td>New Apple 14&quot; Color Plus</td>
<td></td>
</tr>
<tr>
<td>Used Apple Std. II Keyboard</td>
<td></td>
</tr>
</tbody>
</table>

---

**1-800-729-7031**

**WE WANT TO BUY YOUR NEW/USED MAC EQUIPMENT**

---

Prices represent a Cash Discount - off Full Price.

---

**242 June 1994 MACWORLD**
<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Mac Upgrade Card</td>
<td>$659</td>
</tr>
<tr>
<td>PowerPC 6100/60 Logic Bd</td>
<td>$1085</td>
</tr>
<tr>
<td>PowerPC 6100/80 Logic Bd</td>
<td>$1498</td>
</tr>
<tr>
<td>PowerPC 8100/80 Logic Bd</td>
<td>$3998</td>
</tr>
<tr>
<td>Apple 7 1/2 Color Plus</td>
<td>$309</td>
</tr>
<tr>
<td>Apple 14 1/2 Color</td>
<td>$449</td>
</tr>
<tr>
<td>Apple 14 3/4 Color</td>
<td>$699</td>
</tr>
<tr>
<td>Apple Multiple scan 20'</td>
<td>$1292</td>
</tr>
<tr>
<td>Sony 17SE Color Monitor</td>
<td>$1498</td>
</tr>
<tr>
<td>SuperMac 17 T Color</td>
<td>$799</td>
</tr>
<tr>
<td>SuperMac 20&quot; Plus Monitor</td>
<td>$1498</td>
</tr>
<tr>
<td>SuperMac 20-1XL</td>
<td>$2349</td>
</tr>
<tr>
<td>Spectrum 24 PDQ+</td>
<td>$998</td>
</tr>
<tr>
<td>Spectrum 24 seriesSV1</td>
<td>$799</td>
</tr>
<tr>
<td>Spectrum Power</td>
<td>$1292</td>
</tr>
</tbody>
</table>

**PowerBooks**

- PowerBooks 340 HD: $599
- Quantum 250 MB HD 3.5": $259

**Peripherals**

- Global Village PP Gold: $279
- Global Village pp Mercury: $359
- Geoport Adaptor: $19
- Memory for all mac's
- PowerBook Battery: $69
- V-max 840: $994
- omega mac trans 90: $229

**DEAL OF CENTURY**

- MicroNet 88 MB
- Syquest HD removable
- Includes 88 MB Cart, Utility SW, & Cable

**ADVENTIVE MAC SYSTEMS**

- Tel: (910) 314-7737
- Fax: (910) 314-7512

**SYSTEMS & PERIPHERALS**

- PowerBooks 340 HD: $599
- Quantum 250 MB HD 3.5": $259

**ADVANCED MAC SYSTEMS**

- Tel: (910) 314-7737
- Fax: (910) 314-7512

**ACQUISITION**

- Mon-Fri 9:00 To 6:00 Since 1988
- 1941 Freeman #B
- Signal Hills, CA 90804
- Fax (310) 498-0032

**CIRCLE 443 ON READER SERVICE CARD**

**ACUITY**

- ALL PRICES INCLUDE SALES TAX
- ORDER TOLL FREE 800-334-KIWI

**WANTED:** Macs

- We’ll pay you cash for used Mac equipment! Call now for FREE quote.
- We also sell refurbished Macs w/1-yr warranty & 10-day money-back guarantee. All models.

**RENTEX**

- (800) 545-2313
- CIRCLE 521 ON READER SERVICE CARD

**MAC BYTE**

- Buy • Sell • Trade Macintosh Computers
- Preowned Macs with Warranty
- Cash For Your Mac or Peripheral
- Low & High End Custom Setups

**MAC WORLD**

- June 1994

**MAC.NET**

- THE NEW TRENDSETTER
### Power PC's

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Memory</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>8100</td>
<td>8/0</td>
<td>3750</td>
<td></td>
</tr>
<tr>
<td>8100</td>
<td>16/500</td>
<td>4495</td>
<td></td>
</tr>
<tr>
<td>8100</td>
<td>40/1.8</td>
<td>6899</td>
<td></td>
</tr>
<tr>
<td>8100</td>
<td>128/2.4</td>
<td>10450</td>
<td></td>
</tr>
<tr>
<td>8100</td>
<td>256/3.4</td>
<td>16850</td>
<td></td>
</tr>
<tr>
<td>8100AV</td>
<td>8/0</td>
<td>4330</td>
<td></td>
</tr>
<tr>
<td>8100AV</td>
<td>40/1.8</td>
<td>6595</td>
<td></td>
</tr>
<tr>
<td>8100AV</td>
<td>128/2.8</td>
<td>10650</td>
<td></td>
</tr>
<tr>
<td>8100AV</td>
<td>256/34</td>
<td>17250</td>
<td></td>
</tr>
<tr>
<td>8100AV</td>
<td>16/1.7</td>
<td>5450</td>
<td></td>
</tr>
<tr>
<td>7100</td>
<td>8/0</td>
<td>2595</td>
<td></td>
</tr>
<tr>
<td>7100</td>
<td>24/500</td>
<td>3695</td>
<td></td>
</tr>
<tr>
<td>7100</td>
<td>72/108</td>
<td>8395</td>
<td></td>
</tr>
<tr>
<td>7100</td>
<td>136/2.4</td>
<td>11895</td>
<td></td>
</tr>
<tr>
<td>7100AV</td>
<td>16/500CD</td>
<td>4650</td>
<td></td>
</tr>
<tr>
<td>7100AV</td>
<td>48/1.7</td>
<td>6295</td>
<td></td>
</tr>
<tr>
<td>7100AV</td>
<td>72/2.5</td>
<td>6895</td>
<td></td>
</tr>
<tr>
<td>7100AV</td>
<td>16/250</td>
<td>3227</td>
<td></td>
</tr>
<tr>
<td>6100</td>
<td>8/0</td>
<td>1651</td>
<td></td>
</tr>
<tr>
<td>6100</td>
<td>8/250CD</td>
<td>2295</td>
<td></td>
</tr>
<tr>
<td>6100</td>
<td>16/500</td>
<td>2683</td>
<td></td>
</tr>
<tr>
<td>6100</td>
<td>32/1.2</td>
<td>3295</td>
<td></td>
</tr>
<tr>
<td>6100AV</td>
<td>8/250CD</td>
<td>2495</td>
<td></td>
</tr>
<tr>
<td>6100AV</td>
<td>16/500</td>
<td>2895</td>
<td></td>
</tr>
<tr>
<td>6100AV</td>
<td>16/250</td>
<td>2450</td>
<td></td>
</tr>
</tbody>
</table>

### Quadra's

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Memory</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>840AV</td>
<td>0/0</td>
<td>2450</td>
<td></td>
</tr>
<tr>
<td>840AV</td>
<td>16/500</td>
<td>3450</td>
<td></td>
</tr>
<tr>
<td>840AV</td>
<td>64/2.0</td>
<td>3895</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>8/500</td>
<td>2495</td>
<td></td>
</tr>
<tr>
<td>950</td>
<td>8/400</td>
<td>3195</td>
<td></td>
</tr>
<tr>
<td>950</td>
<td>64/1.2</td>
<td>6150</td>
<td></td>
</tr>
<tr>
<td>605</td>
<td>8/230</td>
<td>1275</td>
<td></td>
</tr>
<tr>
<td>610</td>
<td>16/230</td>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>650</td>
<td>16/500</td>
<td>2795</td>
<td></td>
</tr>
</tbody>
</table>

### Power Books

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>8/80</td>
<td>2195</td>
</tr>
<tr>
<td>180</td>
<td>14/340</td>
<td>3195</td>
</tr>
<tr>
<td>180C</td>
<td>14/340</td>
<td>3395</td>
</tr>
<tr>
<td>250</td>
<td>12/240</td>
<td>2195</td>
</tr>
<tr>
<td>270C</td>
<td>12/240M</td>
<td>3150</td>
</tr>
<tr>
<td>BlackBirds</td>
<td>CALL</td>
<td></td>
</tr>
</tbody>
</table>

### Apple Monitor

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>14&quot; HiRes</td>
<td>425</td>
</tr>
<tr>
<td>14&quot; AV/20&quot;</td>
<td>399/2039</td>
</tr>
</tbody>
</table>

### Demo Mac's

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>840</td>
<td>8/230</td>
<td>2395</td>
</tr>
<tr>
<td>800</td>
<td>8/230</td>
<td>1850</td>
</tr>
<tr>
<td>950</td>
<td>8/400</td>
<td>2495</td>
</tr>
<tr>
<td>G4</td>
<td>5/80</td>
<td>695</td>
</tr>
<tr>
<td>Classic</td>
<td>1/80</td>
<td>395</td>
</tr>
<tr>
<td>160</td>
<td>4/80</td>
<td>995</td>
</tr>
<tr>
<td>MacPlus</td>
<td>2.5/80</td>
<td>225</td>
</tr>
</tbody>
</table>

### Dodge

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>540MB-H.D.</td>
<td>995</td>
</tr>
</tbody>
</table>

### Kodak

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ColorErase</td>
<td>695</td>
</tr>
<tr>
<td>ColorErase</td>
<td>1495</td>
</tr>
</tbody>
</table>

### UMAX

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC630</td>
<td>995</td>
</tr>
<tr>
<td>UC840</td>
<td>995</td>
</tr>
<tr>
<td>UC1260</td>
<td>1295</td>
</tr>
<tr>
<td>UC1200SE</td>
<td>2495</td>
</tr>
<tr>
<td>Transparency</td>
<td>495</td>
</tr>
</tbody>
</table>

### New Items

- Quicktake: 695
- ColorPro: 595
- Newton 110: 649
- Seiko Desibi CALL
- Apple Color Printer: 595

### Printers

- HP810: 595
- Seiko Desibi CALL
- Apple Color Printer: 595

### AGFA

- StudioScan: 1050
- Studio Scan Transp.: 345
- Arcus Plus: 3295
- Arcus Transp.: 795

### Specials

- Sony 19" 20" Trinitron: 1650
- Nikon CoolScan: 1750
- Canon 610: 480: 975
- Duo 250: 4/230: 1695
- Duo Dock: 230HD: 595
- Apple Color: 150
- Toshiba 800MB: 350

### GCC

- SelectPress 600: 3695
- SelectPress 1200: 5595
- ColorTone: 5959

### Exchange any OLDMAC to Power PC

### Call for Apple 3rd party products: international orders, Visa, MC & AmEx Welcome • Next Day Shipping for U.S.A. & International

Prices are subject to change with notice • All prices shown are C.O.D. Prices

---

**Call for Reader Service Card**

Tel: (310) 470-7099 • Fax: (310) 470-8099
**Power Mac 8100**
- AV 16/600CD... $489
- 8/250CD... $689
- Soft Windows 16/300... $469

**Apple Monitors**
- 14" Conv Plug... $299
- 14" In Use RGB... $439

**Power Mac 7100**
- AV 2/300CD... $2895
- AV 6/81/G3... $3995
- Soft Windows 16/250... $969

**Jet Ink**
- 2CP styl Writer Pro... $59
- HP DJ 5600... $99

**Power Mac 6100**
- AV 2/300CD... $2395
- 8/250CD... $2895
- Soft Windows 16/250... $2295

**Scanners**
- Scanner/IXE... $995
- Color One Scanner/IXE... $169

**Monitors**
- PC... $99

**New Macs**
- LC II 1MB... $1595
- LC II 2MB... $2195
- LC II 4MB... $2695

**New Apple Products**
- Extended KB... $155
- Go Port... $135

**App/Eng**
- Networks Labs' Allergies CPU Boosters...
- NEW! Labs' Allergies G3 Boosters...

**MacAttack**
- (800) 299-MACS  (800) 299-6227
- 409.690.5353 (Fax)

---

**CIRCLE 533 ON READER SERVICE CARD**
Inventory Reduction!!

Duo Dock (no floppy) $199.
SE 1/20 ........................................ 249.
LCII 2/40 ....................................... 399.
Ilisi 3/40 (new) .................................. 449.
PowerBook 100 2/20 .......................... 499.
PowerBook 140 2/20 ............................ 599.
Mac II 0/0 ........................................ 279.
Personal L'writer LS ............................. 349.
Apple 14" Trinitron ............................... 299.

Quantities are very limited and items will be sold on a first come first sold basis. CPUs are without keyboard.

17" Multi-Res Color Monitor by Lite-On
High quality monitor displays 640x480, 832x624 and 1024x768, 26 dot pitch. Includes tilt-swivel base and interconnect cable.
Blow-Out Price!!
$549.
8-bit Nubus video board for Lite-On.........$199.

Monitors

Apple 12" mono ................................ $149.
Apple Basic Color .................................. 129.
Apple 12" color .................................. 169.
Performer Plus (NEW) .......................... 299.
Apple Portrait .................................. 399.
Seiko CM1445 (NEW) .......................... 449.
Apple 16" color (NEW) .......................... 899.

(Prices with purchase of CPU)

Printers

Imagewriter I .................................. $169.
Imagewriter Ic .................................. 229.
Imagewriter II .................................. 299.
Imagewriter LG .................................. 449.
Personal L'writer LS ............................ 349.
Personal L'writer NT .......................... 649.
Laserwriter II engine (NEW) ................. 699.
Laserwriter lint .................................. 799.
Laserwriter lintx ................................. 999.

$549-

New!

LC 2/40. Includes Apple Basic color, keyboard, & mouse.

World's Most Affordable Color Mac!

Parts

Logic Boards
Floppy Drives
Hard Drives
Power Supplies
Imagewriter Parts
Laserwriter Parts
Cases
Portable Parts
PowerBook Parts

Upgrades

Mac 512K to Plus ................................ $99.
Mac SE FDHD ROM & Drive .................. 329.
Mac lilo to lilo ................................. 499.
Mac SE to SE-30 logic board ................. 999.
Mac II to IIx .................................. 1299.
Mac II FDHD (ROM only) ...................... 249.
Iilo to Quadra 650 ........................... 1399.

Personal L'writer NTR logic upgrade!!........$299.

Macintosh SE logic board ...

Misc. Specials!

CD-SC w/Wayzanta "Fun House" ...... $149.
LC Power Supply & case ....................... 179.
20-Meg External Hard Drive .............. 89.
SE-Applebid .................................. 129.
1.44 FDHD floppy mech ....................... 159.
ADB Extended Keyboard (3rd Party) .... 79.
40-Meg Tape Backup .......................... 129.
LaserWriter Plus ROM upgrade ............ 99.
PowerBook 140/170 Battery ................. 49.
12" Monochrome monitor .................... 169.
LG Logic bd .................................. 99.
Mac II Plus Power Supply & Case ........ 149.
ADB Mouse .................................. 49.
40-Meg Internal for Mac Portable ........ 149.
68Kk External Floppy ......................... 110.
5.25 External PC Drive ......................... 25.
1!.x/1.1x/1.1x Power Supply ................. 149.
Portable Battery Recharger ................. 49.
2.5-10-Meg PowerBook Drive mech ....... 39.
1200 Baud Personal Modem w/cable .... 29.
40-Meg 5.25 (Internal Mac II/lx/Ix/Ix) .. 49.
Nubus Black & White Video bd .......... 49.
LC Ethernet Board .......................... 49.
CRT & Yoke Assy. (Plus & SE) ............ 29.
Ilie Case .................................. 39.
Mac Plus Keyboard ........................... 59.
20-Meg Internal Hard Dr. .................... 49.
Portable 2400 Baud Internal Modem .... 59.
20-Meg External Hard Drive ............... 139.
Case & Power Supply-Mac II/lx/Ix/Ix .... 199.
Classic SE Power Supply ................. 179.
Personal NT Logic Bd ......................... 173.
Mac Portable Numeric Keypad ............. 29.
8-Bit Video BD (nubus) ..................... 149.
Personal SC Logic Board ................. 29.
SuperMac 5/16v (p'book video IOface) .... 199.
ilx case & power supply ................. 189.
Classic Logic bd ............................ 129.
CRT & Yoke Assy ............................ 49.
Mouse (Mac Plus) .............................. 59.
ilx 1-Meg SIMMS ............................. 29.
ilx Case .................................. 129.
Plus Power Supply ........................... 119.
StyleWriter AC adapter ..................... 49.

$999.

We Buy Macs! Call 318-424-9791


Shreve Systems
1200 Marshall St Shreveport La 71101
FAX 318-424-9771 Tech. 318-424-9787
800-227-3971

CIRCLE 405 ON READER SERVICE CARD
Macintosh has changed the world too! ... Again! ... Call 1 800 275-9924 today.  
for all your Mac & PowerPC needs! 
Our prices will ROCK your world!

MACINTOSH & PC's HARDWARE, SOFTWARE, TRAINING, SERVICE & SUPPORT & LEASING  
C.R.I. SYSTEMS  
331 DANTE CT.  
HOLBROOK NY 11741  
IN NY CALL 1-800-772-3720  
FAX 727-0823

WE BEAT ANY PRICE!  
CPU's: POWER PC & POWER PC Upgrades  
Quadras & Powerbooks All models available  
DISPLAYS: Apple, SuperMac, NEC, RasterOps, Radius, Sony and others.  
SCANNERS: Microtek, Umax, HP, Sharp & More.  
PRINTERS: Apple, HP, NewGen, GCC.  
MODEMS: Global Village  
DEALERS AND INTERNATIONAL SALES WELCOME!  
800·822·5557  
(818)880·6116  
FAX (818)880·6103  
22941 Ventura Blvd., Suite H91  
Woodland Hills, CA 91364

WE SERVE THE COMPUTER INDUSTRY, ALL DOWN THE LINE!
SALE!! CLOSE OUT PRICES!!

Apple Performa display: 14" VGA, .39 dot pitch, 640 x 480, tilt and swivel base, brand new, 1 year Apple warranty. Only $149.95...10 PCS+: $129.

Apple Workgroup Server 95: PDS card upgrade kit. New, bulk pack, warranty. Upgrade Quadra 900, 950 to Apple Workgroup Server, 512K S89.95...128K $699.95.

PC/PC Computer Liquidators
1650 Mansfield St.
Santa Cruz, CA 95062
Call: 408-464-2667
Fax: 408-464-2800

F O N 3 1 0 - 4 4 1 - 9 1 8 1  □ F A X 3 1 0 - 4 7 9 - 0 1 2 4
10835 SANTA MONICA BLVD., SUITE 102, LOS ANGELES, CA 90025
CIRCLE 439 ON READER SERVICE CARD

TRADE & UPGRADE

TRADE IN YOUR OLD MAC FOR A NEW MAC!

IF YOU PRICES

DEC 5MB/10MB 10MB 20MB 30MB 50MB 100MB 200MB 300MB 500MB 1GB

$175 $350 $500 $675 $850 $1300 $1750 $2500 $3500 $6000

Upgrade Power Macs to PowerBook 400/440 to PowerBook 440/460 Special Upgrade Power Supply LC, LCII, LClI m flop.py Drive Performa 440 33 mb $385 IN STOCK Centris 610 $895

PARTS!!! Special Upgrade Power Supply LC, LCII, LClI to Floppy Drive Performa 460 33 mb $385 IN STOCK Centris 610 $895

We sell: NEW MACS, PRE-OWNED MACS AND PARTS!!

PLUS MEMORY, SCANNERS, PRINTER, MONOQ & MORE

Increase Your Visibility

Macworld Shopper section offers a great format to bring your ad to life.
**MAC Xtra! Delivering The Knockout Punch On High Prices!**

### Memory Upgrades

<table>
<thead>
<tr>
<th>Specification</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x8x80</td>
<td>$40</td>
</tr>
<tr>
<td>2x8x80</td>
<td>$75</td>
</tr>
<tr>
<td>4x8x80</td>
<td>$148</td>
</tr>
<tr>
<td>4x8x80 II/Ix</td>
<td>$155</td>
</tr>
<tr>
<td>16x8x70 (Low Profile)</td>
<td>$619</td>
</tr>
<tr>
<td>1x8x80fx</td>
<td>$42</td>
</tr>
<tr>
<td>4x8x80fx</td>
<td>$150</td>
</tr>
<tr>
<td>16x8x90fx</td>
<td>$621</td>
</tr>
<tr>
<td>4MB 72 pin (70NS/60NS)</td>
<td>$139/$147</td>
</tr>
<tr>
<td>8MB 72 pin (70NS/60NS)</td>
<td>$296/$299</td>
</tr>
<tr>
<td>16MB 72 pin (70NS/60NS)</td>
<td>$615/$625</td>
</tr>
<tr>
<td>32MB 72 pin (60NS)</td>
<td>$1,305</td>
</tr>
<tr>
<td>Newton-2MB</td>
<td>$289</td>
</tr>
</tbody>
</table>

### Powerbook Memory

<table>
<thead>
<tr>
<th>Specification</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB 100-6MB</td>
<td>$265</td>
</tr>
<tr>
<td>PB 140/170-4MB/6MB</td>
<td>$165/$259</td>
</tr>
<tr>
<td>PB 160/180-4MB/6MB</td>
<td>$165/$255</td>
</tr>
<tr>
<td>PB 160/180-8MB/10MB</td>
<td>$325/$415</td>
</tr>
<tr>
<td>PB 165C/180C-4MB/6MB</td>
<td>$165/$269</td>
</tr>
<tr>
<td>PB 165C-8MB/10MB</td>
<td>$335/$439</td>
</tr>
<tr>
<td>PBDUO 210-230-4MB/6MB</td>
<td>$165/$215</td>
</tr>
<tr>
<td>PBDUO 210-230-8MB/10MB</td>
<td>$299/$349</td>
</tr>
<tr>
<td>PBDUO 210-230-12MB/20MB</td>
<td>$672/$969</td>
</tr>
<tr>
<td>PBDUO 210-230-28MB</td>
<td>$1,685</td>
</tr>
</tbody>
</table>

### Accelerators

**DAYSTAR Universal Powercache**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>030 33/33 w/FPU</td>
<td>$289/$379</td>
</tr>
<tr>
<td>050 50/50 w/FPU</td>
<td>$439/$565</td>
</tr>
<tr>
<td>Turbo 040 25/33</td>
<td>$779/$949</td>
</tr>
<tr>
<td>Turbo 040 40</td>
<td>$1,129</td>
</tr>
<tr>
<td>128K Cache for Turbo 040 Accelerators</td>
<td>$172</td>
</tr>
</tbody>
</table>

**APPLIED ENGINEERING**

**Optical Cartridges**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>128 MB (Samsung)</td>
<td>$34</td>
</tr>
<tr>
<td>650 MB (Samsung)</td>
<td>$85</td>
</tr>
<tr>
<td>1.2GB/512K (Verbatim)</td>
<td>$112</td>
</tr>
<tr>
<td>1.3GB/1024K (Verbatim)</td>
<td>$112</td>
</tr>
</tbody>
</table>

### Accelerators

**Rumi 1.2 Ext/Rumi 1.2 Int**

<table>
<thead>
<tr>
<th>Int</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 Ext/Rumi 1.2 Int</td>
<td>$1,109/$1,089</td>
</tr>
<tr>
<td>1.2 Ext/Rumi 1.70 Int</td>
<td>$299/$219</td>
</tr>
<tr>
<td>85 Ext/Rumi 85 Int</td>
<td>$279/$209</td>
</tr>
<tr>
<td>240 Ext/Rumi 240 Int</td>
<td>$349/$279</td>
</tr>
<tr>
<td>525 Ext/Rumi 525 Int</td>
<td>$699/$609</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>$299</td>
</tr>
<tr>
<td>Optical 128 MB w5/5 cartridges</td>
<td>$995</td>
</tr>
<tr>
<td>44MB SyQuest w5/5 cartridges</td>
<td>$299</td>
</tr>
<tr>
<td>88MB SyQuest w5/5 cartridges</td>
<td>$449</td>
</tr>
<tr>
<td>105MB/C SyQuest w5/5 cartridges</td>
<td>$445</td>
</tr>
<tr>
<td>2GB DAT Drive</td>
<td>$1069</td>
</tr>
<tr>
<td>8GB DAT Drive</td>
<td>$1219</td>
</tr>
</tbody>
</table>

**Brochure**

- We accept MasterCard, VISA & Discover
- Prices subject to change
- Returns subject to approval and restocking fee

**Contact Information**

**MAC Xtra**

1075 Bellevue Way N.E. Suite 114,
Bellevue, WA 98004

Phone: (206) 455-0786
Fax: (206) 455-3448

**CALL:** 1-800-553-4230
### Introducing Memory

**PowerBook Memory As Low As $169**

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerBook 140/150/160</td>
<td>$169 / $259</td>
</tr>
<tr>
<td>PowerBook 170/180/190</td>
<td>$169 / $259 / $329 / $419</td>
</tr>
<tr>
<td>Duo 12/14/20/24/28</td>
<td>$575 / $649 / $785 / $1692</td>
</tr>
</tbody>
</table>

### Accessories

- Battery Charger - Battery 140-180 Bundle: $125
- Long Life Battery 140-180: $259
- Automobile Adapter 100-180 / DUO: $259
- Axon Switch-3 Serial Port: $95
- Keytronic Keyboard: $259
- Battery Charger: $140 / $180 Bundle: $12525

**Ask about our Lifetime Warranty on all our memory products. Prices and availability are subject to change.**

### Scanners/Printers

- HP Printer Memory 4MB / 8MB: $1179 / $5359
- MicroMac SIMM Changer: $98
- DUO 12/14/20/28: $5575 / $11692
- DUO 4/6/8: $1169 / $1219 / $1305 / $1355
- PB1 65C·180C·4/6/8/10: $1169 / $1272 / $1332 / $1442
- PB1 40·170-4/6: $5169 / $259

### DUO 12/14/20/28

- DUO 12/14/20/28: $5575 / $11692
- DUO 4/6/8: $1169 / $1219 / $1305 / $1355

### PB1 65C·180C·4/6/8/10

- PB1 65C·180C·4/6/8/10: $1169 / $1272 / $1332 / $1442

### Battery Charger

- Battery Charger: $140 / $180 Bundle: $12525

### Videotex

- Supra 2400 Modem S/R Fax 5600 w/ C: $1139
- Supra 2400 Modem ONLY: $159
- Supra v.32bis S/R Fax 14.4 w/ Voice: $239

### Duo Dock

- Duo Dock FPU: $165

### RAM

- RAM 4MB: $269
- RAM 8MB Int: $299
- RAM 16MB Int: $399
- RAM 32MB Int: $599
- RAM 64MB Int: $699
- RAM 128MB Int: $1199
- RAM 256MB Int: $1799

**Includes FREE Cartridge from SyQuest!**

### SyQuest Drives

- SyQuest 4MB Int: $59
- SyQuest 8MB Int: $94
- SyQuest 10MB Int: $129

### SyQuest Drives

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round 4MB SyQuest</td>
<td>$269</td>
</tr>
<tr>
<td>Round 8MB SyQuest</td>
<td>$445</td>
</tr>
<tr>
<td>Round 16MB SyQuest</td>
<td>$1297 / $1299</td>
</tr>
<tr>
<td>Round 32MB Int / Ext</td>
<td>$1897 / $1999</td>
</tr>
<tr>
<td>Round 64MB Int / Ext</td>
<td>$2397 / $2499</td>
</tr>
<tr>
<td>SyQuest 4MB Int / Ext</td>
<td>$399 / $499</td>
</tr>
<tr>
<td>SyQuest 8MB Int / Ext</td>
<td>$799 / $899</td>
</tr>
<tr>
<td>SyQuest 16MB Int / Ext</td>
<td>$1799 / $1899</td>
</tr>
<tr>
<td>SyQuest 32MB Int / Ext</td>
<td>$2799 / $2899</td>
</tr>
<tr>
<td>SyQuest 64MB Int / Ext</td>
<td>$3799 / $3899</td>
</tr>
<tr>
<td>SyQuest 128MB Int / Ext</td>
<td>$5799 / $5899</td>
</tr>
<tr>
<td>SyQuest 256MB Int / Ext</td>
<td>$7799 / $7899</td>
</tr>
</tbody>
</table>

### Sonics As Low As $89

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonic Ether 101/Thin-II/1C</td>
<td>$799</td>
</tr>
<tr>
<td>Sonic Ether 200 Modem/1C</td>
<td>$999</td>
</tr>
<tr>
<td>Sonic Ether 2100 PowerBook</td>
<td>$1299</td>
</tr>
<tr>
<td>Sonic Ether 2500 PowerBook</td>
<td>$1499</td>
</tr>
<tr>
<td>Sonic Ether 3000 PowerBook</td>
<td>$1699</td>
</tr>
<tr>
<td>Sonic Ether 3500 PowerBook</td>
<td>$1999</td>
</tr>
<tr>
<td>Sonic Ether 4000 PowerBook</td>
<td>$2199</td>
</tr>
<tr>
<td>Sonic Ether 4500 PowerBook</td>
<td>$2399</td>
</tr>
<tr>
<td>Sonic Ether 5000 PowerBook</td>
<td>$2599</td>
</tr>
<tr>
<td>Sonic Ether 5500 PowerBook</td>
<td>$2799</td>
</tr>
<tr>
<td>Sonic Ether 6000 PowerBook</td>
<td>$2999</td>
</tr>
<tr>
<td>Sonic Ether 6500 PowerBook</td>
<td>$3199</td>
</tr>
<tr>
<td>Sonic Ether 7000 PowerBook</td>
<td>$3399</td>
</tr>
<tr>
<td>Sonic Ether 7500 PowerBook</td>
<td>$3599</td>
</tr>
<tr>
<td>Sonic Ether 8000 PowerBook</td>
<td>$3799</td>
</tr>
<tr>
<td>Sonic Ether 8500 PowerBook</td>
<td>$3999</td>
</tr>
<tr>
<td>Sonic Ether 9000 PowerBook</td>
<td>$4199</td>
</tr>
<tr>
<td>Sonic Ether 9500 PowerBook</td>
<td>$4399</td>
</tr>
<tr>
<td>Sonic Ether 10000 PowerBook</td>
<td>$4599</td>
</tr>
<tr>
<td>Sonic Ether 10100 PowerBook</td>
<td>$4799</td>
</tr>
<tr>
<td>Sonic Ether 10200 PowerBook</td>
<td>$4999</td>
</tr>
<tr>
<td>Sonic Ether 10300 PowerBook</td>
<td>$5199</td>
</tr>
<tr>
<td>Sonic Ether 10400 PowerBook</td>
<td>$5399</td>
</tr>
<tr>
<td>Sonic Ether 10500 PowerBook</td>
<td>$5599</td>
</tr>
<tr>
<td>Sonic Ether 10600 PowerBook</td>
<td>$5799</td>
</tr>
<tr>
<td>Sonic Ether 10700 PowerBook</td>
<td>$5999</td>
</tr>
<tr>
<td>Sonic Ether 10800 PowerBook</td>
<td>$6199</td>
</tr>
<tr>
<td>Sonic Ether 10900 PowerBook</td>
<td>$6399</td>
</tr>
<tr>
<td>Sonic Ether 11000 PowerBook</td>
<td>$6599</td>
</tr>
<tr>
<td>Sonic Ether 11100 PowerBook</td>
<td>$6799</td>
</tr>
<tr>
<td>Sonic Ether 11200 PowerBook</td>
<td>$6999</td>
</tr>
<tr>
<td>Sonic Ether 11300 PowerBook</td>
<td>$7199</td>
</tr>
<tr>
<td>Sonic Ether 11400 PowerBook</td>
<td>$7399</td>
</tr>
<tr>
<td>Sonic Ether 11500 PowerBook</td>
<td>$7599</td>
</tr>
<tr>
<td>Sonic Ether 11600 PowerBook</td>
<td>$7799</td>
</tr>
<tr>
<td>Sonic Ether 11700 PowerBook</td>
<td>$7999</td>
</tr>
<tr>
<td>Sonic Ether 11800 PowerBook</td>
<td>$8199</td>
</tr>
<tr>
<td>Sonic Ether 11900 PowerBook</td>
<td>$8399</td>
</tr>
<tr>
<td>Sonic Ether 12000 PowerBook</td>
<td>$8599</td>
</tr>
<tr>
<td>Sonic Ether 12100 PowerBook</td>
<td>$8799</td>
</tr>
<tr>
<td>Sonic Ether 12200 PowerBook</td>
<td>$8999</td>
</tr>
<tr>
<td>Sonic Ether 12300 PowerBook</td>
<td>$9199</td>
</tr>
<tr>
<td>Sonic Ether 12400 PowerBook</td>
<td>$9399</td>
</tr>
<tr>
<td>Sonic Ether 12500 PowerBook</td>
<td>$9599</td>
</tr>
<tr>
<td>Sonic Ether 12600 PowerBook</td>
<td>$9799</td>
</tr>
<tr>
<td>Sonic Ether 12700 PowerBook</td>
<td>$9999</td>
</tr>
<tr>
<td>Sonic Ether 12800 PowerBook</td>
<td>$10199</td>
</tr>
<tr>
<td>Sonic Ether 12900 PowerBook</td>
<td>$10399</td>
</tr>
<tr>
<td>Sonic Ether 13000 PowerBook</td>
<td>$10599</td>
</tr>
<tr>
<td>Sonic Ether 13100 PowerBook</td>
<td>$10799</td>
</tr>
<tr>
<td>Sonic Ether 13200 PowerBook</td>
<td>$10999</td>
</tr>
<tr>
<td>Sonic Ether 13300 PowerBook</td>
<td>$11199</td>
</tr>
<tr>
<td>Sonic Ether 13400 PowerBook</td>
<td>$11399</td>
</tr>
<tr>
<td>Sonic Ether 13500 PowerBook</td>
<td>$11599</td>
</tr>
<tr>
<td>Sonic Ether 13600 PowerBook</td>
<td>$11799</td>
</tr>
<tr>
<td>Sonic Ether 13700 PowerBook</td>
<td>$11999</td>
</tr>
<tr>
<td>Sonic Ether 13800 PowerBook</td>
<td>$12199</td>
</tr>
<tr>
<td>Sonic Ether 13900 PowerBook</td>
<td>$12399</td>
</tr>
<tr>
<td>Sonic Ether 14000 PowerBook</td>
<td>$12599</td>
</tr>
<tr>
<td>Sonic Ether 14100 PowerBook</td>
<td>$12799</td>
</tr>
<tr>
<td>Sonic Ether 14200 PowerBook</td>
<td>$12999</td>
</tr>
<tr>
<td>Sonic Ether 14300 PowerBook</td>
<td>$13199</td>
</tr>
<tr>
<td>Sonic Ether 14400 PowerBook</td>
<td>$13399</td>
</tr>
<tr>
<td>Sonic Ether 14500 PowerBook</td>
<td>$13599</td>
</tr>
<tr>
<td>Sonic Ether 14600 PowerBook</td>
<td>$13799</td>
</tr>
<tr>
<td>Sonic Ether 14700 PowerBook</td>
<td>$13999</td>
</tr>
<tr>
<td>Sonic Ether 14800 PowerBook</td>
<td>$14199</td>
</tr>
<tr>
<td>Sonic Ether 14900 PowerBook</td>
<td>$14399</td>
</tr>
<tr>
<td>Sonic Ether 15000 PowerBook</td>
<td>$14599</td>
</tr>
<tr>
<td>Sonic Ether 15100 PowerBook</td>
<td>$14799</td>
</tr>
<tr>
<td>Sonic Ether 15200 PowerBook</td>
<td>$14999</td>
</tr>
<tr>
<td>Sonic Ether 15300 PowerBook</td>
<td>$15199</td>
</tr>
<tr>
<td>Sonic Ether 15400 PowerBook</td>
<td>$15399</td>
</tr>
<tr>
<td>Sonic Ether 15500 PowerBook</td>
<td>$15599</td>
</tr>
<tr>
<td>Sonic Ether 15600 PowerBook</td>
<td>$15799</td>
</tr>
<tr>
<td>Sonic Ether 15700 PowerBook</td>
<td>$15999</td>
</tr>
<tr>
<td>Sonic Ether 15800 PowerBook</td>
<td>$16199</td>
</tr>
<tr>
<td>Sonic Ether 15900 PowerBook</td>
<td>$16399</td>
</tr>
<tr>
<td>Sonic Ether 16000 PowerBook</td>
<td>$16599</td>
</tr>
</tbody>
</table>

### Modems

- Global Village Teleport / Powerport (Bronze) 24/96/48: $907
- Global Village Teleport / Powerport (Gold) 14,200: $14,200
- Global Village Teleport / Powerport (Silver) 9,600: $9,600
- U.S. Robotics Sportster 14.4/56K Fax: $1,279

### FAX

- FAX 206-454-7302

### Educational/Government

- 1-800-848-1424

### Fortune 1000 Companies

- 1-800-848-1418
Standard SIMMs
1 Megabyte: 40.00
2 Megabytes: 75.00
4 Megabytes: 145.00
8 Megabytes: 329.00
16 Megabytes: 599.00

Video RAM
4 Bit to 8 Bit Upgrade (Mac II/III cards): 24.00
256K Queued 700/900, Performa 46/46V RAM: 21.00
256K Queued, LC 520 VRAM: 25.00
256K Centris, LCII, Performa VRAM: 25.00
512K VRAM for LC, LCII, Ili, Ivi, DuoDock, and Performa: 39.00

6882 FPU Boards
25 MHz for Macintosh LC: 55.00
20 MHz w/2 slots for Mac I/II: 119.00
25 MHz for Mac Classic II: 55.00

Cache Cards, Etc.
128K Cache Card for LCIII and Performa 450: 159.00
w/25 MHz FPU: 239.00
Ili 64K Cache Card: 159.00
Ili 64K Cache Card: 125.00
Ili 2-slot Card and 6882: 119.00

Math Coprocessors
68882 16 MHz FPU: 39.00
68882 20 MHz FPU: 45.00
68882 25 MHz FPU: 49.00
68882 33 MHz FPU: 59.00
68882 50 MHz FPU: 99.00
68882 16 MHz FPU: 45.00

Miscellaneous
LaserWriter Pro 810 4 MB upgrade: 275.00
LaserWriter Pro 810 8 MB upgrade: 549.00
I.I. Microlaser 1 MB: 39.00
Mac Classic 1 MB Board: 75.00
68851 16MHz PMMU: 89.00
if requested, MODE 32 software included, w/PMU: 39.00
Mac Portable 3 MB Card: 369.00
Mac Portable 4 MB Card: 399.00
Mac Portable 5 MB Card: 449.00

PowerBook Memory
<table>
<thead>
<tr>
<th></th>
<th>100</th>
<th>140/170</th>
<th>160/180</th>
<th>165c/180c</th>
<th>Duos</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MB</td>
<td>95.00</td>
<td>95.00</td>
<td>95.00</td>
<td>95.00</td>
<td>95.00</td>
</tr>
<tr>
<td>4 MB</td>
<td>175.00</td>
<td>159.00</td>
<td>165.00</td>
<td>165.00</td>
<td>195.00</td>
</tr>
<tr>
<td>6 MB</td>
<td>259.00</td>
<td>225.00</td>
<td>239.00</td>
<td>239.00</td>
<td>225.00</td>
</tr>
<tr>
<td>8 MB</td>
<td>-----</td>
<td>310.00</td>
<td>315.00</td>
<td>319.00</td>
<td></td>
</tr>
<tr>
<td>10 MB</td>
<td>-----</td>
<td>385.00</td>
<td>405.00</td>
<td>405.00</td>
<td></td>
</tr>
<tr>
<td>14 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>725.00</td>
</tr>
<tr>
<td>20/28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>995.00</td>
</tr>
</tbody>
</table>
UPGRADES & MEMORY

Jungle Warfare Prices!

Power PC

Power Macintosh

PowerPC Memory Kit

0 512 $159
0 256 $129
0 128 $129
PowerPC Video Expansion Kit

32 pin SIMMs

38 42 45 73 137
72 pin SIMMs

72/160/128/64 Dims

POWERBOOK MEMORY

DESCRIPTION

QUANTUM 2yr. War.
ELS 170mb 3.5" $299/279
100mb 3.5" $279/259
54mb 3.5" $179/159
1225mb 3.5" $559/539

QUANTUM 20 Drive

INT/EXT $399

S30mb 3.5" $509/479
2.5mb 3.5" $299/279

EXTERNAL DRIVE HOUSING

Complete w/ SCSI cable and power cable

FULL HEIGHT $89
Half Height Mini $49

SUPERMAC Displays

Super Match 21 Two-Page $2469
SuperMatch 20 TXL Multimode $2615
SuperMatch 20 Color Plus $1790
SuperMatch 17 Multimode $999
SuperMatch 17 TXL Trinitron $1098
Platinum 21 Two-Page Display (79611)

GRAPHIC CARDS

Quicktime Movie Making

VideoSpigot NuBus* / LC $379/259
Spigot & Sound NuBus* CALL
VideoSpigot Pro NuBus* / IIsi** CALL
Spigot & Sound Pro NuBus** CALL

Freemium Adobe Premiere 2.0 LE
Freemium Adobe Premiere 2.0 Full Version

SUPERMAC Displays

Quicktime Movie Making

VideoSpigot NuBus* / LC $379/259
Spigot & Sound NuBus* CALL
VideoSpigot Pro NuBus* / IIsi** CALL
Spigot & Sound Pro NuBus** CALL

FREE Adobe Premiere 2.0 LE
FREE Adobe Premiere 2.0 Full Version

RAS TEROPS

Displays

20/20 Multimode Color $1589
Sweet 16 Color $999

SUPERMAC Displays

Quicktime Movie Making

VideoSpigot NuBus* / LC $379/259
Spigot & Sound NuBus* CALL
VideoSpigot Pro NuBus* / IIsi** CALL
Spigot & Sound Pro NuBus** CALL

FREE Adobe Premiere 2.0 LE
FREE Adobe Premiere 2.0 Full Version

ASY ANTE PRODUCTS

Macs SE (80000 PDS)
MC35E Thk/Thin/10BaseT, 33K $209
MC4EFT Thk/10BaseT, 33K $139
SCSI Products
EN/SC107 10BaseT, Includes SCSI Cable $249
EN/SCPB-105 Cable w/HPD-D & DB-25 for PB $55

FriendlyNet Adapters

10Base T Hubs

10Hub/12 10Base T Hubs w/12 101, Thk/Thin Port $489
AH1701 12 or 5 Hub w/ SWPNP/H/W Module $909

Ethernet Talk to LocalTalk

AP 1002 Hastech, Thk/Thin $329
AP 101 Amcron Thk/Thin $329

Mac Il Family & Performa 600 (nuBus)
MC3NBS Thk/Thin/10BaseT, 64K $209
MC4N64 Thk/Thin, 64K $159

Mac IIsi & SE/30 (68030 PDS)
MC 3113 Thk/Thin, 64K, 64K FPU Socket $209
MC 30E64 Thk/Thin, 64K, FPU Socket $159
LC/LCI/Performance 400 (68030, 680D0 PDS)
MC+LCI Thk/Thin/10Base T, FPU Socket $209

5 Year Warranty

7921 Professional Circle
Huntington Beach, CA 92648

LifeTime Warranty. Prices subject to change without prior notice. International and back.

748-848-5958

MAC WORLD
June 1994
255
With SimmStack™ you can:

- Use your 30-pin SIMMs in your 72-pin Mac
- Convert one 72-pin SIMM slot into two slots

**SAVE Money on Memory!!!**

**Easy To Install**
Simply plug old SIMMs into SimmStack™ and plug into 72-pin slot of your Mac. 100% Compatible.

**SAVINGS**
Beat the high cost of memory by utilizing existing memory in your new system. Enables you to recycle your old memory.

SimmStack™ is available for most 72-pin Macs including PowerPC Macs

**Guarantee:** We Stand Behind Our Products! All products carry a 30 day money back guarantee.

---

**MEMORY**

CALL US LAST FOR LOWEST PRICES ON ALL MAC MEMORY.
1MB - 32 MB, FOR ALL POWER BOOKS, DUOS & PRINTERS, PPU CARDS, FPU CHIPS, PMU CHIPS & VRAM

LIFE TIME WARRANTY
M.C., VISA & DISCOVER
P.O.'S WELCOMED

1-800-662-SIMM (7466)
SERVING THE INDUSTRY SINCE 1983

DATA MEMORY SYSTEMS
508-683-2325 FAX 508-975-5232
15 UNION ST. LAWRENCE, MA 01840

---

**SOURCE INTERNATIONAL**

Silicon Valley's FIRST CHOICE for Computer Memory

(415) 323-6059 Fax (415) 326-3552

---

**Dynamic Engineering**

PowerBook & Duo Accelerators
MacPortable Memory, HDD, Batteries
Mac & PC Systems & Accessories
PowerBook 100 Batteries SGS
PLI 88/105 Syquest HP Printers & FAX
From PAL to PowerPC Simms...We have Memory
435 Park Dr., Ben Lomond, Ca. 95005 (P)(408)-336-8891 (F)(408)-336-3840

---

**HOT SHUFFLER PRODUCT CATEGORIES**

FIND THE PRODUCTS THEY NEED FAST.
Sentinel PowerBook™ Security

Dual Security Features:
• Prevents theft by securing your PowerBook computer to desks, tables, chairs, etc.
• Secures your disk drive, preventing tampering and unauthorized data access
• Simple system for quick and easy installation.
• Portable: goes with you wherever you take your PowerBook.

Secure peace-of-mind at the office, at home, the airport, and anywhere else you and your PowerBook travel.

For more information call 800-451-2792...

New! From

PADLOCK SECURITY
Provided by Master Lock

Stop PowerBook™ theft with the Kablit™ Sentinel

PowerBook Products:
- SlimPack for PowerBook (MC-1805) $149.95
- PowerGage Battery (MC-180) $89.95
- High Capacity Battery (MC-170) $69.95
- PowerCharger Plus (MC-SC100) $149.95
- PowerCharger (MC-CHR) $129.95
- Automobile Power Adapter (MC-AP100) $99.95

PowerBook Accessories:
- X-Pack Extended Battery and case $119.95
- For Newton MessagePad (NT-K01)

PowerBook Duo Accessory:
- Starter Kit (MC-170 + MC-CHR) $149.95
- Power-Kit (MC-180 + MC-SC100) $199.95

SlimPack for Duo (MG-2005) $299.95
- RapidCharger for Duo (MC-SC200) $149.95
- Automobile Power Adapter for Duo $69.95 (MC-AP200)

Batteries

Chargers

Accessories

PowerBook Products:
- Batteries
- Chargers
- Accessories

ComputerWorld’s “5th Wave” Cartoon Mouse Pad

The Best Way To Reduce Annoying Noises
Fits Neatly Under Your Computer

Unwanted noises are absorbed and damaging vibrations are dampened by Super Mat’s new high-tech material to create a more stress-free working environment. Plus Super Mat:
- Protects-CD-ROM & Hard Disks
- Protects your desk from marks and scratches
- Works great under printers

Serve $5.00 Reg. $2.95. Now only $19.95
Add $4.75 Shipping-Handling, Cal. res. add 8.25% tax
60 day money-back guarantee

CALL 1-800-88-INOVAC 24 hr

Super Mat

Macworld Shopper

MOBILE COMPUTING & PDAS

ACCESSORIES

Batteries

Chargers

Accessories

PowerBook Products:
- Batteries
- Chargers
- Accessories

ComputerWorld brings humor to a mouse pad featuring a cartoon from “The 5th Wave” series by Rich Tennant. Not available in stores, this colorful foam-backed pad will keep your mouse clean and protect your desktop. Best of all, it’s only $4.99* Send your name, address and check or money order to COMPUTERWORLD, P.O. Box 9171, Framingham, MA 01701, Attn: Product Fulfillment. For credit card orders, call 1-800-343-6474.

*In U.S., for each unit ordered, add $1.25 for postage and handling; orders outside U.S. add $2.50 each. Residents of MA, CA, GA, NJ, and DC add applicable sales tax. Canada residents add G.S.T.
Explore the Internet - FREE!

DELPHI, a leading international online service, now offers full access to the Internet. You can explore this incredible electronic network with no risk. You get 5 hours of evening/weekend access to try it out for free!

Use electronic mail to exchange messages with over 20 million people throughout the world. Download programs and files using FTP, connect in real-time to other networks using Telnet, and participate in Usenet Newsgroups, the world's largest bulletin board with over 4500 topics. If you're not familiar with these terms, don't worry; DELPHI has expert online assistants and a large collection of help files, books, and other resources to help you get started.

After the free trial you can choose from two low-cost membership plans. With rates as low as $1 per hour, no other online service offers so much for so little.

5-Hour Free Trial!
Dial by modem, 1-800-DLPHI-HELP. Press Return once or twice. At Username, enter JONDELPHI. At Password, enter MCCWAV. (Circled name can change to a dial-in.com instead)

Questions? Call 1-800-DLPHI-HELP. (Circled name can change to a dial-in.com instead)

CIRCLE 583 ON READER SERVICE CARD
Power Tools for the Power Presenter

Project full color images directly from your computer and eliminate the expense and hassle of slides and transparencies. Make more effective and powerful presentations. Call us now for the best in portable LCD panels and all-in-one projectors!

SALES • LEASES • RENTALS

- All major brands-- one stop shopping
- Compatible with Mac/PC/Powerbook, QuickTime
- Knowledgeable staff
- Visa, MC, AMEX, Purchase Orders, GSA pricing
- Overnight shipping available
- Satisfaction guaranteed or your money back

Call Today 1800 726 3599
FREE CATALOG

101 The Embarcadero Ste 100-A, San Francisco, CA 94105 Hours: 6:30 to 5:30 PST; 9:30 to 8:30 EST VOICE: 415 772 5800, FAX: 415 968 3817

CIRCLE 579 ON READER SERVICE CARD
QuickTime Transfers
Home VHS, VHS-C, 8-MM, Hi-8 or 3/4" video to Quicklime movie files. Transfer Quicklime and Multimedia Presentations (QM Director, etc.) to FULL SCREEN video onto above video formats. DIGIVision reads and records to CD-ROM, Syquest 44/88MB or Floppies, at 15fps to 30fps, 160x120 full screen, mono and stereo audio.
$10/1min., $28/5 min., $45/10min., $80/20 min.
DIGIVISION
800-880-6444
310-475-9226 Fax

LOGO DESIGN SOFTWARE
Create logos like this in minutes; sell them for $75 - $500.
Logo SuperPower is a large graphics logo database. You use one or more "design elements," and modify them to create your very own logo in minutes. There are over 2,600 logo design elements in the full package. Or choose the basic package of 650 elements. For the Mac: Requires FreeHand or Illustrator.
Logo SuperPower - basic $399
Logo SuperPower - full $599
Get 30% off with Pro/Infor. Call...
(800) 640-5646

CIRCLE 100 ON READER SERVICE CARD

A Design Breakthrough...
...intuitive 3D modeling
PowerPC Native or 68K
• easy, fast, intuitive 3D CAD
• 3D direct manipulation
• sketch in live 3D perspective
• object-based shadows
• fit, flip, snap to objects
• paste into openings
• sun studies, walkthroughs
• import/export DXF, PICT, etc.
Call Artistic: 503-345-7421
or fax: 503-346-9566
In Canada: 204-453-8111
CIRCLE 408 ON READER SERVICE CARD

Mac Multimedia
Loviel 2X CD ROM Drive $349
Loviel 3X CD ROM Drive $549
Upgrade Your Bundle w/Speakers & 4 Title Choices
From Our Extensive CD Library for Just $100, Including
Compositions etc., Jeppo Rave, Mayo Clinic, The Beatles, Nautels, Jazz, Toons, Dinosauars...
Complete Multimedia Systems
We Stock Desktop Video and Authoring Systems — Plug & Play right out of the box!
High End Video, 3D, & Graphic Software—Senta Pro, CoSA, Director, Premiere...

CIRCLE 504 ON READER SERVICE CARD

MAP ART
"Best Collection" Map Category
GloArt's greatest hits
MacWorld, January 1994
"Fine Artwork" MacWorld 1992
FULLY EDITABLE WITH ILLUSTRATOR, FREEHAND & OTHER PROGRAMS!
CARTESIA
2 S. Main St., Berks 737
Lamberton, NE 68050
24 hr. Fax: 402-697-8244

CIRCLE 407 ON READER SERVICE CARD
CIRCLE 415 ON READER SERVICE CARD
CIRCLE 534 ON READER SERVICE CARD
Sometimes it's best to sweat the details and with a graphic translator like CADMOVER... it's all details!!

We couldn't call a release this big a 3.5. Kandu went into hypervdrive and didn't stop until CADMOVER 4.0 was ready to ship. We missed both our deadline and our release number, but took the time to create something really worthwhile for our customers.

The new CADMOVER is faster, plus:
- All New Editing Dialogs
- Task Specific Output Controls
- A Scripted Batch Processor
- Ångströms to Astronomical Units Translation Accuracy
- New EPSF Readers For AutoCad v. 12, Gplot, & Pro Engineer (Vector)
- Five New Integrated Formats, ClarisCad, Wavefront (.OBJ) Presenter Professional, Envisage 3D, and MiniCad+ 4.0 Text.
- See You At MacWorld Washington – Booth 910

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!
Macintosh Computer Repair

Component level repair in less than 48 hours.
We stock hard to find & custom parts.
Same day parts shipping & most repairs.
Telephone tech support on repair kits.
School and corporate P.O. accepted.
Dealers/Servicers only.

1040 Tyinn #7/Eugene, OR 97402/(503) 344-5335/FAX (503) 344-5020
CIRCLE 482 ON READER SERVICE CARD

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.

800.743.0594
CIRCLE 454 ON READER SERVICE CARD

Don't Panic
"The Data Recovery ExpertsTM"

› Best Success Rate
› Fast Turnaround
› No Recovery—No Fee

Absolute Data Recovery!
2440 Whiskey Rd. • Colorado Springs, CO 80915

303-651-5500
CIRCLE 455 ON READER SERVICE CARD

SlideImagery

Slides & Overheads
Kodak Portfliio Services
Dye-Sub Output
Large Color Posters
Canon Fiery Lasers
Slide Duplication
4x5 Neg/Pos/B&W
Data Transfer to CD-ROM

48 Hour, $3.00 a slide

(800) 232-5411
CIRCLE 456 ON READER SERVICE CARD
**SERVICES & SUPPLIES**

**PROGRAMMING & UTILITIES**

---

**Data Recovery Service**

CPR & RS has been recognized in national magazines for its data recovery techniques. With the use of our custom software and hardware, data has been recovered from Mac’s, PC’s, Power Books and Laptops, on all drives and all types of failures with 98% success. No minimum or eval. fees. Let the company that trains the Pro’s Recover your Data.


C.P.R. & Recovery Services, Inc.

11440 Okeechobee Rd. #201

Royal Palm Beach, FL 33411

800n65-9292 407n95-7266

---

**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: 1-800-642-5865

*SAP Refurbished Macs, Fast overnight shipping available. We use genuine Apple™ parts.

---

**SAFEWARE**

**Insures Your Computer**

The Computerowner’s Policy insures you against theft, fire, accidental damage, lightning even power surge! Replace or repair for $49 a year. Available in the U.S. & Ontario.

1-800-800-1492

SAFEWARE, The Insurance Agency Inc.

2929 N. High St., PO Box 0211

Columbus, OH 43202

---

**Notebook Thefts Skyrocket! Why Take the Risk?**

NOW “Insurance to Go”

The Risks

The Insurance

Premiums start at

Power Surge - Lightning $60 a Year

Earthquake - Accident

1-800-722-0385

The Computer Insurance Agency, Inc.

6190 NW McAlpine Rd. NE • Puyallup, WA 98371

---

**Digital Imaging**

**Slides**

4x5 chrome/negs

$16

Dye sub print/overhead

$18

Hi Res Scanning

$10

Quantity Duplication on Slides and Overheads

Show & Tell

39 W 38th St. NY NY 10018

212 840 2912 • 212 840 7953 (fax)

---

**FORTRAN 77 • System 7**

LS FORTRAN is an ANSI/ISO standard FORTRAN 77 compiler for the Macintosh. Supports extensions from VAX and Cray FORTRAN, built-in debugging, background execution, software or hardware floating point, optimized code generation, and 2D or 3D graphics support. The complete solution to your FORTRAN programming needs.

Language Systems Corp.

P.O. Box 140

Sterling, VA 20164

703/476-0161 703/689-9593 Fax 703/252-6470

See us at Macworld D.C. EXPO Booth #741

---

**FAX**

**MACTRAN PLUS Ver.4.5**


DCM Data Products

1200 Quall St, #280

Newport Beach, CA 92660

714-724-8001/201

714-724-8003 FAX

---

**The Economical Inkjet Printer Refill from DGR**

- Color
- Black
- Cyan
- Magenta
- Red
- Green

JetInk is the only economical and reliable cartridge refill solution for inkjet printers.

$15.99

---

**We can scan your 35MM slides & negs onto Photo CD**

24 Hr Turnaround as low as $0.60 an image

1-800 WRITE CD

800-974-8323

---

**FORTAN**

FORTRAN PLUS Vers.4.5


DCM Data Products

1200 Quall St, #280

Newport Beach, CA 92660

714-724-8001/201

714-724-8003 FAX

---

**Process Color Printing on Demand**

Print your files in brilliant four color process for less than the cost of color laser copies.

- Direct from your Postscript files
- Imaged at high resolution
- 24-hour service available
- Brochures, posters, fliers Call today for pricing on your design

We offer complete Digital Imaging, Scanning, Prepress Services, Printing & Finishing.

---

**FORTRAN 77 • System 7**

LS FORTRAN is an ANSI/ISO standard FORTRAN 77 compiler for the Macintosh. Supports extensions from VAX and Cray FORTRAN, built-in debugging, background execution, software or hardware floating point, optimized code generation, and 2D or 3D graphics support. The complete solution to your FORTRAN programming needs.

Language Systems Corp.

P.O. Box 140

Sterling, VA 20164

703/476-0161 703/689-9593 Fax 703/252-6470

See us at Macworld D.C. EXPO Booth #741
If you think you just get some floor space, think again.

MACWORLD EXPOSITION

Gain access to a world marketplace.

In 1994, tens of thousands of Macintosh professionals will gather for MACWORLD Exposition where they will make decisions about what products and services they'll buy now and in the coming year. Based on what they see and learn at MACWORLD Expo, they'll decide how to expand their system to expand their world.

MACWORLD Expo/Boston – August 2-5, 1994
MACWORLD Expo/Canada – October 18-20, 1994
MACWORLD Expo/San Francisco – January 4-7, 1995

Reserve your booth space today for MACWORLD Exposition and see how some floor space can turn the world into your marketplace.

Please send me more information on MACWORLD Expo.
I am interested in exhibiting in:
☐ Boston ☐ Canada ☐ San Francisco

Name
Title
Company
Address
City/State/Zip
Phone Fax

Mail to: Mitch Hall Associates
260 Milton Street, Dedham, MA 02026
Or Fax to: 617-361-3389 Phone: 617-361-8000
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

Educational Development Foundation
A Not-For-Profit Corporation
This magazine’s got your name, your rank and your number.

The better we know you, the better our chances of writing articles you’ll find relevant and useful. The same holds true for our advertisers.

Knowing who you are (your name, job title, company and industry) enables them to more easily develop messages with your informational requirements.

Circulation information helps advertisers determine who you are, what to say and where to say it. And since advertisers support our publication and allow us to keep bringing you high quality editorial, we think they deserve the most reliable and current circulation facts and figures available.

BPA International helps us provide it. An independent, not-for-profit organization, BPA International audits our circulation list once a year to verify that it’s accurate and up to date.

The BPA International audit makes sure our advertisers get the readers they pay for. And when advertisers get the readers they pay for, chances are they get the results they pay for, too.


270 Madison Avenue, New York, NY 10016, 212-779-3200.
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!

"I have purchased over 15 different clip art collections, and yours is truly the best!"
—Scott Goldstein

FREE EDUCATIONAL CATALOG

Find out why Enhance is America's favorite journal & catalog of educational technology. Four times per year, over 250,000 teachers look to Enhance for grant writing tips, technical advice, product reviews, and success stories from across the country. Enhance is free! Call today, or clip and mail this order form.

ORDER NOW AND GET BONUS CD WITH EVERY ORDER

The Q-ROM
Software Demos • Educational Games
Entertainment Games • Fonts
QuickTime Movies • Clip Art • Much more!

Find out what makes Quality Computers the leader in Educational Technology across America!
CD-ROMS

BORDERBUND
Arthur's Teacher Trouble 34.95
Carmen World Deluxe 49.95
Just Grandpa & Me 34.95
Myst 47.95
New Kid on the Block 34.95
Tortoise and the Hare 34.95

SCIENCE BOOKS - CLASSROOM VERSIONS

Genius's Retreat 24.95
Cinderella 24.95
Muscle Puddles 24.95
Scary Poems for Potted Plants 24.95
Tale of Benjamin Bunny 24.95
Tale of Peter Rabbit 24.95
Thomas' Snowstorm 24.95

SOFTWARE TOOLWORKS

Capitol Hill 29.95
Oceans Below 29.95
San Diego Zoo: The Animal 39.95
Space Shuttle 39.95
U.S. Atlas v 3.0 39.95
World Atlas 3 Multimedia 39.95

TIMEWORKS

Publish It Easy 3.0 49.95

WAZZATA

World Factbook 24.95
CD-Fun House 24.95

SOFTWARE

BORDERBUND
Balance of the Planet 39.95
Carmen America's Past 29.95
Carmen Time 29.95
Carmen World 24.95
Kid Pix 34.95
Kid Pix Companion 24.95
Print Shop Deluxe 47.95
Spread/Cover of the Sea 28.95
The Backyard 29.95
The Playroom 34.95
The Treehouse 34.95

CLARIS

CLARISWorks Competitive Upgrade 99.95

DAVIDSON

Kid Works 2 34.95
Math Blaster Mystery 29.95
The Counter 34.95
Zoo Keeper 34.95

EDMARK

Bailey's Book House 28.95
KidDesk 34.95
Mike's Math House 28.95
Thinkin' Things 32.95

INTUIT

Quicken 44.95

LAWRENCE PRODUCTIONS

Discovering America 34.95
Nigel's World 27.95
The Lost Tribe 29.95

LEARNING COMPANY

Bilingual Writing Center 169.95
Math Rabbit 1 34.95
Math Rabbit 2 34.95
Reader Rabbit 1 34.95
Reader Rabbit 2 34.95
Reader Rabbit's Ready for Letters 34.95
Super Solvers Midnight Rescue 34.95
Super Solvers Outofcontrol 34.95
Super Solvers Spellbound 34.95
The Writing Center 49.95
Treasure Math Storm 34.95

MAXIS

SimCity 2000 39.95
SimEarth 32.95
SimFarm 34.95
SimLife 29.95

MECC

Amazon Trail 34.95
DivePark Tycoon 34.95
My own Stories 39.95
Quest for the Hidden 34.95
Oregon Trail 29.95
Super Munchers/Number Munchers Bundle 39.95
USA Geography 29.95

MICROSOFT

Creative Writer Academic 39.95
Fine Artist Academic 39.95
Microsoft Word Academic 44.95
Microsoft Works Academic 44.95

QUALITY COMPUTERS

SmartStart 49.95
SmartStart Pro Version 79.95
SmartPrice 49.95

RICHARD WAGNER

HyperStudio 2.0 109.95

SYNTHESIS

Norton Utilities 2.0 Academic 74.95
SAM 3.5 Academic 44.95

TIMEWORKS

Publish It Easy 3.0 49.95

WEEKLY READER

Sticklebear's Early Learning Activities 34.95
Sticklebear Math Town 34.95
Sticklebear's Reading Room 34.95

HARDWARE

APPLIED ENGINEERING

Trans.Wave 4300 379.95
Trans.Wave 2325 Mac.Classic 189.95
Trans.Wave LC/50MHz 389.95
Trans.Wave SE 1330 199.95

DIGITAL VISION

Computer Eyes (B&W) 199.95
Computer Eyes (Color) 299.95
Computer Eyes RT 399.95

E-MACHINES

Simply TV 399.95

HEWLETT-PACKARD

ScanJet IIc 999.95
ScanJet IIIp 729.95

LAPIS TECHNOLOGIES

Lapis GC01 Deck 179.95
LV L.V. 280.95
LV Portable 349.95

LOGITECH

Polaris Pscs 549.95
ScanMax Model 32 w/CatchWord Pro 249.95

QUALITY COMPUTERS

Q Drive 68 MB 199.95
Q Drive 170 MB 349.95
Q Drive 270 MB 495.95
Q Drive 340 MB (Comer) 495.95

SUPRA

Supra/Max 144LC 169.95

SOFTWARE-LIBRARIES

CLARISWORKS 2.1

Upgrade from any "Works" program to ClarisWorks, the highly rated integrated Macintosh program. ClarisWorks features: Word Processing, Dictionary & Thesaurus, Multiple Column Layout, Text/Graphics Rotation, WYSIWYG Display, Import & Export, Spreadsheet, Database, Mail Merge, Communications and much more!

$99.95

SPECIAL

SCANMAN MODEL 32 W/CATCHWORD PRO

$249.95

THE BACKYARD

$29.95

SUPRA FAX MODEM

$169.95

SAN DIEGO ZOO: THE ANIMALS

$39.95

PUBLISH IT! EASY 3.0

$49.95

SUPER MUNCHERS/NUMBER MUNCHERS BUNDLE

$29.95

WHO WE ARE. Quality Computers has been a leader in the educational technology market for 10 years. When we started, everyone used Apple II's. Today, schools are using more Macs and PCs. But no matter what kind of computers schools use, we will be there to provide their needs. Call for your free catalog and issue of our educational newsletter.
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, a 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

HEAR APPLE'S PLAINTALK TECHNOLOGY FOR YOURSELF!

CALL 1-800-MAC-YACK!
1-800-622-9225

LISTEN ALONG WITH OUR SMARTVOICE DEMONSTRATION:

"If computers could talk, imagine the things they'd say! Welcome to the SmartVoice demonstration! The most powerful speech utility for your Macintosh. SmartVoice works within your word processor, so you can have your letters read back to you to check for clarity. SmartVoice brings the Power of Speech to your Macintosh! Now you can see and hear the text on your screen..."

Dear Mr. Jones,

This letter is in regards to...

SmartVoice ...................... 49.95

Crank It Up with Labtec Speakers ..................... 24.95
Labtec Shielded Mini-Speakers for full-range voice reproduction.
Batteries or adapter required.

Talking Software ........................................ 39.95 ea
Early Learning made fun through the power of speech synthesis! Three colorful packages available: Math, Phonics, and Music.
All require Speech Manager and MacinTalk 2 or MacinTalkPro 2 (included with Quadra 800 models, or available separately) with the SmartVoice package.

*MacinTalk 2 requires Mac Plus or better with System 6.0 or later and uses about 192K RAM. MacinTalkPro 2 requires Mac LC or better running System 7.0 or later and uses between 686K and 2.5MB depending on the voice selected. High-quality voices require the use of MacinTalkPro 2.

** "Apple," "MacinTalk," and "PlainTalk" are trademarks of Apple Computer, Inc.

FREE CD-ROM W/EVERY ORDER!

MENTION CODE MV-164 WHEN ORDERING

SCHOOL P.O.S BY PHONE, FAX OR MAIL.

Circle 263 on reader service card

Quality Computers ™

1-800-777-3642
32200 Nine Mile Rd. • St. Clair Shores, MI 48080 • 819-774-7200 • Fax 819-774-2998
The 1994 CD-ROM Expo: Profiting From Digital Publishing
October 5-7, 1994 • World Trade Center • Boston, MA

With The Endless Opportunities That CD-ROM Provides...

CORPORATIONS ARE SLASHING COSTS AND multiplying their profits with CD-ROM for advertising and sales presentations (from catalogs to kiosks), records management, technical product support, documentation, and training.

GOVERNMENT IS DRASTICALLY REDUCING the cost of printing, storage and distribution of databases via CD-ROM.

EDUCATORS — IN SCHOOLS, LIBRARIES, AND museums — are turning their analog assets into digital dollars.

THE PRINT-PUBLISHING INDUSTRY — including books, magazines, and newspapers — is expanding to profitable new horizons with CD-ROM’s ability to capture and disseminate information at a fraction of historical print costs.

ENTERTAINMENT INDUSTRIES ARE PROFITING from an expanded ability to reach untapped audiences in the consumer market, thanks to CD-ROM technology.

The CD-ROM Expo Conference will feature first-hand success (and horror!) stories from all these communities, including valuable lessons learned in the production and marketing/distribution of CDs.

If You Would Like to Publish a CD...
Don’t begin before you’ve learned how to enjoy the benefits while avoiding the pitfalls!

If You Are Publishing a CD...
Are you sure you’re taking fullest advantage of the CD-ROM tools and techniques that can help you accomplish more in less time, with fewer complications, smaller margin for error, and greater opportunity for profit?

At the CD-ROM Expo Conference, You Can Learn About...
Successfully publishing and marketing a CD
• Maximizing multimedia in CD-ROM production • Coping with multiple platforms and formats • Copyright and licensing issues • Authoring and development tools • Emerging new production techniques • Interactive application design • Networking multimedia applications • Text retrieval and development • Content asset management and exploitation • Strategies for defining markets • Industry trends and developments, including portable and wireless communications • Pricing/promotion/advertising in new markets • Financing CD-ROM titles • New distribution channels • Creating/converting data to digital form • Transitioning from print and on-line to CD-ROM • Legislative initiatives • Where to find digital talent • In-house CD-ROM production and distribution vs. outside services • Using standard digital formats for different kinds of data... and more.

If You’re Interested in CD-ROM Titles For Home, School, or Business Use . . .
The exhibit floor at CD-ROM Expo will dazzle you with a fabulous array of titles, bringing a universe of information, entertainment, and education to your desktop!

Yes, I’d like more information about the 8th annual CD-ROM Expo October 5-7, 1994, I’m interested in: □ exhibiting □ attending

NAME_________________________TITLE_________________________
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
Join the CD-ROM Revolution!

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!

*FREE Express
Shipp
in![

All drives are ready to run
and are Kodak multisession compatible. Driver software
and cable included. Specify #991
MAC to SCSI or #852 SCSI to
SCSI cable (except NEC).

CD Tech-410A $359
#5100—AT-320ms/DTR-320k/sec

CD Tech-T3401 $479
#1824—AT-280ms/DTR-327k/sec

Plextor DM5028 $429
#5028—AT-245ms/DTR-335k/sec

NEC 3x $597 (external)

Buy a CD-ROM drive from us, and add a bundle up
to 90 days after purchase!
1300 EDUCORP Shareware* $149.00
This 2-CD set is filled with 100's of new & updated programs.
Over 1 gigabyte of the best public domain and Shareware software. There's something for everyone! You'll find tons of useful programs in the categories of education, business, productivity, utilities, games, fonts and clip art. Plus, you get a browser, tutorials, a printed catalog and technical support. System 7 optimized.
$50 off with a CD-ROM drive purchase from EDUCORP.
Published by EDUCORP

1564 Wayzata World Factbook $24.95
1994 Edition. Journey around the globe. You'll find detailed high quality photos, in-depth information from the State Department, CIA, or travel advisories. Published by Wayzata.

1385 Right Images* $159.95
STARS * PLANETS * ASTROonauts * NEBULAS * SHUTTLES * "The best and most comprehensive commercial collection..." Published Magazine
People naturally react to these artistic images. Unlimited reproduction rights on over 100 photographs. Published by Tsunami Press

1603 Anatomist... $249.00
Explore the details of human anatomy with this convenient reference. Included are anatomical terms, over 500 illustrations, notes describing and elaborating on the illustrations, and more than 2400 spoken terms. Medical and life science students will make extensive use of the text that accompanies the diagrams. Personal notes can be added to supplement the existing information.
Published by Folkstone

84 Atlas Fun Pack $59.95

50137 Marshbook* $17.95
"1993 Award of Excellence" New Media. 3D graphics and animation take you on a walk through the proposed Mars Habitat. The interface informs you of the various functions planned for the base. Published by Gazelle Technologies.

50225 CD AllCache* $53.95
High performance CD-ROM drive acceleration software. Make your CD-ROM drive unacceptably fast with CD AllCache. Optimizes drive performance—searches, seeks and opening of files and folders. Manually adjust cache sizes or click on the button, and the data cache settings will be optimized automatically. Enjoy AllCache's Audio DA and listen to your favorite music while you work. Corporate and site licenses available.
Published by CharisMac Engineering

50346 Midnight Stranger $59.95
"This is a landmark product that should be in the Smithsonian Institution," SFJU. The first interactive How-to to employ Virtual Video, a new language in education. You'll interact with 9 unique characters as you learn about the character's mission into the deciding of the control panel and only become involved in events that might turn violent. The visual, 3-D, animation of the planet, the 3-D graphics, the character are amazing. Published by Gazelle Technologies.

L1171 1 Photo. to Remember $14.95
Pedro Meyer shares his parents last 12 years together with photos, narrative, and music. XeroxMillion Top 10. Published by Youvog

All 3 just $79.95
You don't have to buy a CD-ROM drive to get this great price.

1450 Instant Buttons & Controls $149.95
For Macromedia Director users! Over 500 buttons and controls for multimedia. Save time and money, just copy and paste. Designed by a team of veteran multimedia producers. For kinks, presentations, training programs and more. Sold worldwide to NASA, Northrop, Apple, Seiko, Amgen and others.
Published by statmedia

The Multimedia Pioneer
EDUCORP 1-800-843-9497
Kodak Photo CD is a trademark and used under license.
Give me a Macintosh, a laser printer, and a fax modem, and I’m ready to conquer the world. I don’t need an office, support staff, and management. Like many Macintosh owners, I’m a home-office warrior. My commute is 30 seconds—45 seconds if I stop to get a cup of coffee in the kitchen. I set my own hours, and I don’t attend staff meetings where people who don’t care about anything have to listen to people who don’t know anything.

I don’t have to beg an MIS department to buy me a Macintosh; I can buy any Macintosh my wife lets me buy. Macintosh has made this all possible, and sometimes it seems like nirvana. But to be completely truthful, a lot of our starry-eyed visions about having a Macintosh home office are more myth than reality. Here’s why.

Plug and Pray
Myth: Macintosh does not require technical support. You go to your local computer store, select a Macintosh from the distinctly and clearly positioned product line with the help of a knowledgeable salesperson, take it home, open the box, plug, and play.

Reality: Plug and pray describes real life. I crash at least five times a day. Now StartUp is the utility I use most often, because I spend so much time tracking down INIT conflicts. Luckily I have a friend who spends half his day scanning bulletin boards for updates and patches for the software we use, and he provides me with technical support.

Alone at the Top
Myth: Working at home with your Macintosh means you’re isolated so you can concentrate on being more creative and productive. You aren’t interrupted by coworkers, and you are not at the beck and call of a manager. You can sit at your Macintosh, completely focused, in Macintosh bliss.

Reality: You can’t concentrate on being more creative and productive. When your Macintosh won’t print, there isn’t a Macintosh dump to find the LocalTalk connector that came undone. Simple tasks such as printing a label, stuffing an envelope, and licking stamps are now your problems.

Furthermore, Macintosh’s alleged ease of use temptst you to make everything cooler. When you work for a big, dumb company, you crash off a memo in Times and Helvetica, and everyone is impressed by your laser output.

When you work at home, you decide to integrate graphics and QuickTime movies in your document because “it should work.” It doesn’t.

And let’s face it, Macintosh users are gregarious types—who wants to be isolated? If you’ve got E-mail, you don’t have to be. I send my columns and books out electronically to a cadre of beta sites who are my harshest critics. I float column ideas on bulletin boards and troll for sources. I’m not isolated—in fact, because I check my four E-mail services 50 times each day, I’m inundated.

PC Jr.
Myth: Since you’re at home, you don’t need day care for your children. Although this myth has little to do with using a Macintosh, it is a big part of working at home. Theoretically, working at home is the best of all worlds: bonding with your children, working in bliss, and saving the money you would have spent on day care.

Reality: You need day care more than ever, because Junior has only two states—crying and being adorable. Each of these states is more attention-consuming than a screen saver. Both states are unforeseeable. Both states are unavoidable. You wouldn’t think of taking your child to an office without day care, so why would you do this at home?

If you think you can get away without day care, you probably think that a PowerBook battery lasts two hours. That PowerPC is compatible with your old software. That Bill Gates needs an IRA. That Guy Kawasaki thinks about anything but royalties.

The Big Bucks
Myth: You make more money working at home. The advertisements tell you that a Macintosh home office is inexpensive: a computer, a laser printer, and some software—max, $2500.

Reality: You discover you need more RAM. And an optional tray to print envelopes. And a fax modem. And a dedicated fax line. And a PowerBook. Soon you’ve spent $5000.

Sure, as a Macintosh home-office warrior you can charge two or three times what a company pays an employee. However, when the dust settles, most people who work at home make the same as they would at a company, because they go nuts buying the latest Macintosh, laser printer, fax modem, cellular phone, beeper, stereo, and CD’s—in the name of “enhanced productivity.”

On the Other Hand
These myths aside, I am not trying to discourage you from working at home; I’m providing a realistic perspective. But your worst day as a Macintosh home-office warrior will be better than your best day at a company you don’t like.

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 BitJugglers, Global Village Communication, Bookmaker Corporation, and others. He can be reached at Kawasak@radionet.net.
Don't lie to me.
how much is it going to cost me; and, will it look good on my desk? The answers are: Yes; around the same that it will cost you for a 2X; and you'd better believe it.

Our new MultiSpin CD-ROM readers are not only fast but interactive and intuitive to your needs, with control and display features on the front panel that tell you exactly what's going on (or not going on) at all times. They also have stand-alone audio controls so you can play music CDs without a computer. And there's a complete line of NEC interfaces, which include easy-to-use installation software. So you won't spend half your life trying to hook your reader up.

They're compatible with Macs and PCs, as well as Kodak Multisession Photo CDs. And they come with the longest commitment in the industry—a 2-year limited warranty.

For more information on our new MultiSpin 3X CD-ROM readers, call 1-800-NEC-INFO now. Or, for immediate details via fax, call NEC FastFacts at 1-800-366-0476, request document #23768.

We'll answer any questions you may still have about CD-ROM. And (this is the best part) you'll actually get to have an honest conversation for a change.
You want the truth? Here it is. NEC's new MultiSpin 3X CD-ROM readers are the best-performing readers on the market.

Notice, there is no asterisk to qualify that statement. No special connections are required to make our readers run at triple speed. And, you don't have to have an NEC computer or monitor. (Although it would be nice if you did.)

We were the first to introduce double speed. And now we improved our data transfer rate to 450 Kbytes/sec. and made a triple-speed reader. (Because that's what you wanted.) We also cut our access time to less than 200 milliseconds, added a 256-Kbyte continuous-flow cache, a SCSI 2 interface, and a full 16-bit SCSI card.

OK, so now we've done what every true computer ad must do. We've filled your head with a long list of numbers and specs. But, what does it all mean?

Well, it means you can get your information three times faster than you can with standard readers, see smoother animation and video.

And then there are the really important questions. Like is our CD-ROM reader easy to use;
The first trackball in awards is first in something even more important.

MacUser gave it the coveted Five Mice. The readers of Macworld voted it "Best Input Device" five times. It has won more awards than any Macintosh input device in history.

What makes Turbo Mouse the number one choice in input devices?

Move the ball. Click the buttons. Feel the difference.

Turbo Mouse is more comfortable than an ordinary mouse. Its superior trackball design means less hand and arm movement; you move only the ball, not the entire device.

And it's more comfortable than an ordinary trackball. A unique combination of hardware and software make the difference.

Turbo Mouse has a large comfortable ball that rests on high-quality stainless steel bearings. The movement is ultrasmooth. Precise.

The buttons are also more comfortable. They are oversized, well-positioned and easy to click. Your fingers don't have to stretch as much. There is less fatigue after a day's work.

Program the buttons. Jump to HotSpots. Save unnecessary movements.

The other part of the comfort story is our unique, programmable software. It allows you to automate the functions you use most often.

Kensington Satisfaction Guarantee

Turbo Mouse 4.0 comes with on-screen help, two ADB ports for chaining and is fully System 7 compatible. Our unique Satisfaction Guarantee includes a 5-year warranty, toll-free technical support, and a no-risk 60-day trial.

For information, call 800-535-4242. Outside the US, 415-572-2700. For information by fax, call and enter 82 and request document #325.

Turbo Mouse® 4.0

KENSINGTON®