*S ARE INSANELY GREAT.

POWERCENTER 150 COMPLETE SYSTEM
$2495
150MHz 604 W/POWER 15" DISPLAY*

- 32 MB RAM (512 MB Max)
- 2 GB 5400 RPM Hard Drive
- 8x CD-ROM Drive
- 512K Level 2 Cache
- 2 MB VRAM 64-bit Accelerated On-board Video (4 MB Max)
- Mini-Tower Enclosure
- 3 PCI Expansion Slots
- Upgradeable CPU Daughter Card
- Extended Keyboard and Mouse
- Iomega 100 MB Zip Drive
- 33.6 Global Village Modem

GET A POWERCENTER™ MACWORLD MAGAZINE’S “BEST ALL-AROUND BUSINESS SYSTEM YOU CAN BUY”

“Best Mac OS System of the Year” and Macworld Magazine called the PowerTower Pro the “Best Mac OS Product of the Year.”

Power you can afford.

We’ve recently announced the biggest price cuts ever. Now our award-winning PowerBase line starts at just $1295. Our PowerCenters start at just $1695. And our PowerTower Pro line starts at just $295. Now you can get a great Mac OS system no matter what your budget is.

Get it any way you want it.

As always, every Power Computing system can be custom configured to meet your needs. Whether you need more RAM, a bigger drive, a RAID, a Jaz, a Zip or whatever else - we can put it all together and ship it right to your door. Plus, we have a large variety of QuickShip bundles that ship within 48 hours.


When you do your homework you’ll find that nobody even comes close to providing the price, performance or quality that you get when you buy from Power Computing.

PowerComputing
ORDER DIRECT 800-405-7693
CIRCLE 24 ON READER SERVICE CARD
In 1984, Apple changed the world.

The Macintosh, the computer for the rest of us, was digital emancipation for millions of the world’s coolest people (like you) who were smart enough to see and share the dream. For desktop publishing and design, editing video, multimedia production, working with sound, creating web content, or whatever else you’re into, the Mac still reigns supreme.

At Power Computing, we’re doing our share to fight back for the Mac by making Mac systems that are more powerful, more affordable and more accessible than any systems that have ever been available in the Mac market.

Power and performance.

When it comes to sheer speed nothing can beat our new PowerTower Pro 250 single processors or our 225MP and 250MP dual processors. They’re not just the fastest Macs on the planet — they crush anything that exists in the PC world. Plus, you get more than just speed — they’re the most expandable and most upgradeable systems you can buy. That’s probably why Macuser Magazine declared the PowerTower Pro to be the “BEST MAC OS SYSTEM OF THE YEAR”
Apple created the computer for “the rest of us.”

We created the computer “the rest of us” could afford.
POWERTOWER PRO SERIES: THE FASTEST AND MOST EXPANDABLE MACS EVER

POWERTOWER PRO 225
COMPLETE SYSTEM

$4695
225MHz 604e
W/17" DISPLAY*
64 MB RAM
- 2 GB 7200 RPM HD
- 8X CD-ROM Drive
- 1 MB Level 2 Cache
- HDS Twin Turbo w/8MB VRAM
- 6 PCI Expansion Slots
- Interleaved Memory
- 9 Drive Bays
- Upgradeable CPU Daughter Card
- 33.6 Global Village Modem
- MacMedia Director 5.0

POWERTOWER PRO 200
COMPLETE SYSTEM

$2695
200MHz 604e
16 MB RAM
- 2 GB 5400 RPM HD
- 8X CD-ROM Drive
- 1 MB Level 2 Cache
- 2 MB VRAM 64-bit Accelerated PCI Card
- 6 PCI Expansion Slots
- ATX Enclosure
- Interleaved Memory
- 9 Drive Bays
- Upgradeable CPU Daughter Card
- MacMedia Director 5.0

POWERCENTER 150: AWARD WINNING BUSINESS SYSTEMS

POWERCENTER 150
COMPLETE SYSTEM

$2495
150 MHz 604
W/15" DISPLAY**
32 MB RAM
- 2 GB 5400 RPM Hard Drive
- 8X CD-ROM Drive
- 512K Level 2 Cache
- 2 MB VRAM 64-bit Accelerated On-board Video (4 MB Max)
- Mini-Tower Enclosure
- 3 PCI Expansion Slots
- Upgradeable CPU Daughter Card
- Extended Keyboard and Mouse
- Iomega 100 MB Zip Drive
- 33.6 Global Village Modem

POWERCENTER 150
COMPLETE SYSTEM

$1695
150MHz 604
- 16 MB RAM (160 MB Max)
- 1 GB 5400 RPM Hard Drive
- 8X CD-ROM Drive
- 512K Level 2 Cache
- 2 MB VRAM 64-bit Accelerated On-board Video (4 MB Max)
- Low-Profile Enclosure
- 3 PCI Expansion Slots
- Upgradeable CPU Daughter Card
- Extended Keyboard and Mouse
- Low-Profile Enclosure
- 9 Drive Bays
- Upgradeable CPU Daughter Card
- Extended Keyboard and Mouse

POWERBASE: THE ULTIMATE EDUCATION/HOME/SMALL OFFICE SYSTEMS

POWERBASE 200
COMPLETE SYSTEM

$1495
200MHz 603e
- 16 MB RAM (160 MB Max)
- 1.2 GB EIDE Hard Drive
- 8X CD-ROM Drive
- 256K Level 2 Cache
- 3D Onboard Hardware Graphics Acceleration
- Upgradeable 2 MB DRAM On-board Video (4 MB Max)
- 3 PCI Expansion Slots
- Upgradeable CPU Daughter Card
- Extended Keyboard and Mouse w/PS2 support
- Low-Profile Enclosure

POWERBASE 180
COMPLETE SYSTEM

$1295
180MHz 603e
- 16 MB RAM (160 MB Max)
- 1.2 GB EIDE Hard Drive
- 8X CD-ROM Drive
- 256K Level 2 Cache
- 3D Onboard Hardware Graphics Acceleration
- Upgradeable 2 MB DRAM On-board Video (4 MB Max)
- 3 PCI Expansion Slots
- Upgradeable CPU Daughter Card
- Extended Keyboard and Mouse w/PS2 support
- Low-Profile Enclosure

GET ANY OF THESE SYSTEMS SHIPPED IN 48HRS OR LESS*

CONFIGURE YOUR DREAM SYSTEM THE WAY YOU WANT IT WITH ANY OF THESE GREAT OPTIONS:
- IOMEGA 100MB ZIP '145
- IOMEGA 1GB JAZ '995
- ULTRA SCSI/RAID SOLUTIONS STARTING AT '985
- GLOBAL VILLAGE 33.6 MODEM & INTERNET KIT '959

CUSTOM CONFIG SYSTEMS MAY TAKE LONGER.
SYSTEMS SHIP WITHIN 48 HRS OF CREDIT APPROVAL
CALL FOR AVAILABILITY OF 250MHz AND MP SYSTEMS

SERVICE & SUPPORT
- 30 day money back Guarantee
- Toll-free lifetime technical support
- 1, 2, or 3-year on-site service available, starting at $49.

CONFIGURE IT ANY WAY YOU WANT.
ORDER DIRECT 800-405-7693
MACWEEK 200, GOVERNMENT AND EDUCATION CUSTOMERS CALL 800-999-6975

http://www.powercc.com
2555 North IH 35, Round Rock, TX 78664-2085
Tel 512/388-6868 Fax 512/388-699
Internet: info@powercc.com
Microsoft Internet Explorer 3.0 for Macintosh. Does Netscape come with an uninstall program?

Let's look at the facts. Microsoft Internet Explorer 3.0 was **designed for the Mac** by our Mac developers to be faster and easier to use. It requires no upgrade since it runs on existing Macs like 680x0 and Power Macs, and it only needs a **4MB RAM partition**. (Netscape eats an 8MB partition.) Internet Explorer 3.0 supports **Stylesheets, ActiveX**, **Java** and native Mac technologies like **QuickTime, QuickTime VR** and **AppleScript**. It gives you lots of killer ways to customize your Web experience, as well as convenient access to e-mail and newsgroups. Microsoft Internet Explorer 3.0 is quicker and smarter and smaller and, incredibly enough, it's free. You can do a quick download from the Microsoft Web site, or call AT&T for a WorldNet connection and a free disk at 1-800-967-5363 ext. IE3. You may even want to keep Netscape for nostalgic reasons.

*Connect time charges may apply. ©1997 Microsoft Corporation. All rights reserved. Microsoft and Where do you want to go today? are registered trademarks and ActiveX and the Microsoft Internet Explorer logo are trademarks of Microsoft Corporation. Java is a trademark of Sun Microsystems, Inc. Other product and company names mentioned herein may be trademarks of their respective owners. Image courtesy of AURA/STScl and NASA.*
NEWS

Between the Lines Apple's new system-software chief raps with us about Rhapsody. / Future Tech Small is beautiful with new PowerPC chips. / First Looks Macromedia Director talks the Web's lingo, GoLive CyberStudio pushes the Web-page-creation envelope, and rumors abound about the first serious upgrade to QuarkXPress in six years. / New & Notable Kai's Pixel Soap, Net2Phone. / 24

COLUMNS

Letters Readers weigh in on NeXT, negative press, and MacUser lab results. / 13

Pamela Pffner Clones are worth repeating. / 19

Henry Bortman Clone-buying dos and don'ts. / 21

Andy Ihnatko Apple will survive. / 154

How to Reach Us / 8

Product Index / 112

Advertiser Index / 116

Marketplace / 127

REVIEWS

PowerTools Infiniti 3240 Power and PowerTools Infiniti 4200 Pro Competition escalates as newcomer PowerTools enters the Mac OS-system fray. We scope out the offerings. / 32

UMAX SuperMac S900DP/200 and UMAX SuperMac S900DP/250 RAID Two superfast systems make multiprocessing more affordable. / 34

Symantec Visual Cafe for Macintosh Create Java applications and applets via point, click, and drag. / 36

NetObjects Fusion Powerful Web-site-creation tool eases your HTML dependency. / 40

Fractal Design Poser 2.0 and Life Forms 2.0 Both applications let you create and manipulate human figures easily, but one has a leg up on the other. / 42

Nisus Writer 5.0 It's amazingly full-featured without being confusing — so why is the HTML support so clunky? / 44

WAV This $70 word processor with Internet connectivity is a good introduction to OpenDoc technology. / 47

La Cie FM Radio Module Turn your Macintosh into a radio, and turn off Howard Stern with a mouse click. / 47

Image Alchemy This graphics-file converter converts among some 65 formats, supports batch conversion, and lets you tweak images too. / 48

Audiotracer Create your own custom audio CDs. / 51

Live Picture XT Add Live Picture's impressive image handling to QuarkXPress. / 52

Chromatica Two Photoshop plug-ins for manipulating color. One sings; the other doesn't. / 52
COVER STORY

FUTURE MAC

APPLE, IBM, AND MOTOROLA have been working for three years to open the Mac hardware specification to make it easier to create Mac-compatible systems. The specification, called PowerPC Platform, or PPCP, promises to be the key to sub-$1,000 Mac OS systems, more-rapid innovation from Apple and clone makers, and even new machines running the Be operating system. We deliver the scoop on what will be real — and what won’t — when the first PPCP systems ship this summer. By Henry Bartman / 56

FEATURES

The Future of Storage

There will still be disk drives, but the cable that connects them to your Mac will be different and data transfer will be two to ten times as fast as with current storage systems. We bench-test all the contenders battling to replace SCSI as we know it and tell you what to expect, when to expect it, and what to do while you’re waiting. By Rik Myslewski and Kristina De Niki / 62

CD-ROM Drives

Is a 12x drive really three times as fast as a 4x drive? And when does it make sense to move up? We do the numbers. By Martin Wong / 54

DEPARTMENTS

DESKTOP MEDIA

Web Color Wizardry Create color images that look great on the Web or on any platform. / 71

Graphics How-To Turn a simple drawing into an eye-catching image in a few simple steps. / 74

Expert Tips What does Apple’s acquisition of NeXT mean for publishing professionals? / 76

NETWORKING

Software by LAN The right tool can take much of the drudgery out of ensuring that everyone on a network is running the latest software. / 79

Net.cetera What’s all this buzz about Java? / 85

HANDS ON

The Ergonomic Mac Resources to help you avoid eyestrain, headache, repetitive-stress injury, and tired tailbone. / 87

Help Folder Bob and Chris answer all your questions. / 91

PERSONAL MAC

Special Deliveries Mom-to-be software can explain what’s happening to you, even if it won’t make being an expectant mother as enjoyable as becoming one. / 150

The Game Room Riches, fame, and world domination: You can dream, can’t you? / 152

You want drawings that look like the ones you’ve always done by hand—or better. Exquisitely detailed. Perfect arrows. Crisp lines. Or maybe a squiggly sketch. You don’t want it to look like it was done on a computer.


You can draw anything with PowerCADD. And it’s easy.

“Now I can design my way.”
—Bob Payne, Architect

PowerCADD

Turn your genius loose. Put some fun back into your life. Order PowerCADD.

Call 910-299-4843 In Canada: 204-455-8111

ENGINEERED SOFTWARE

www.engsw.com Fax: 910-852-2067

6 MacUser / MAY 1997

CIRCLE 73 ON READER SERVICE CARD

DRAW circles around those other CADs

You want drawings that look like the ones you’ve always done by hand—or better. Exquisitely detailed. Perfect arrows. Crisp lines. Or maybe a squiggly sketch. You don’t want it to look like it was done on a computer.


You can draw anything with PowerCADD. And it’s easy.

“Now I can design my way.”
—Bob Payne, Architect

PowerCADD

Turn your genius loose. Put some fun back into your life. Order PowerCADD.

Call 910-299-4843 In Canada: 204-455-8111

ENGINEERED SOFTWARE

www.engsw.com Fax: 910-852-2067

6 MacUser / MAY 1997

CIRCLE 73 ON READER SERVICE CARD
Unbelievable Simplicity

Don’t be concerned about the resolution, size, horizontality and color correction and mode. Just import images in the Quark image box from a Photo CD disk or from a raw scan. Position them however you want using QuarkXPress’s tools. For each, send orders with the processing options to the IPM.

1. I import my pictures in my QuarkXPress document’s image boxes

TIF, EPS JPEG or Photo CD ImagePac: RGB, YCC, grayscale or CMYK. This image was scanned from a 35 mm original in RGB raw mode at 100% size on a PowerLook 2000 flatbed scanner at its optical resolution of 1000 dpi.

2. I position them using the XPress tools and I select processing options using the binuscan XTenison

The client XTenison writes the “order list” then sends it to the IPM for processing. It includes the values entered in the QuarkXPress “measurement bar” plus the processing and output options set in the XTenison’s user interface.

Phenomenal Productivity

A catalog with hundreds of images that may require several people’s worth of work can be processed and ready to output in just a few hours. Processing can take place overnight, even on a low-end desktop computer, with little RAM.

After processing, the new recalculated images are re-imported in the desired color mode with the right amount of pixels... automatically

3. CMYK 1.5 Mb

From a single RGB file, those CMYK, grayscale or CMYK-SW processed images will output at a blazing speed, due to their optimization.

Astonishing Quality

Each processing algorithm uses state-of-the-art technology. Even when the IPM is used only to resize images previously color corrected and separated, the screen preview is recalculated with colors and sharpeness that are truly impressive. No more surprises on the color proof!

binuscan Inc.
505 5th Avenue - New York, NY. 10017
Tel: (800) 881-2352 - Fax: (212) 681-0503

On the Internet:
http://www.binuscan.com
email: info@binuscan.com

THE SERVER APPLICATION

"binuscan IPM™" (Image Processing Machine) works in the background, using the processor only when it’s free. It recalculates a new image based on the original and a list of orders generated by a client application. This “order list” contains all the user’s output preferences, including (but not limited to) CMYK separation specs, automatic color correction instructions, and sharpening levels, as well as any other modifications made to the image (crop, flip, rotate, resize, etc.) by the client application. binuscan achieves an impressive high and consistent quality every time because the IPM bases its processing algorithms on an individual histogram analysis of every image.

THE CLIENT APPLICATION

Many client applications can be used to generate "order list" text files and save them into the IPM’s "TO DO" folder for processing. binuscan’s open architecture allows third party developers to write custom client applications. The binuscan ColorPro™ package includes the binuscan IPM™ plus client applications to acquire images from scanners or Photo CDs and binuscan JobManager™ (a Quark XTenison) which works as described to the left.

THE PERSONAL TOUCH

binuscan ColorCorrect is a utility included with the IPM which allows you to create ghost effects or “sepia effects” and harmonize the images on your page. This utility will perform color adjustments to processed images by writing PostScript functions to the image file. Modifications are then updated in your page layout in seconds, no matter how large the files are. Every modification can be reverted with the same ease and in the same manner.

a special version of binuscan is bundled with all UMAX high-end scanners and is freely available for every Pro Master Photo CD

binuscan
ColorPerfect

Client/Server Applications for complete digital image management

Mac OS & Windows 3.11, 95 & NT
How to Reach Us

THE EDITORS of MacUser want to hear from you. Send your questions, tips, kudos, comments, or complaints to MacUser, 50 Beale Street, 12th Floor, San Francisco, CA 94105; 415-547-8600. Send e-mail to letters@macuser.com (Internet). We are, unfortunately, unable to look up stories from past issues, recommend products, or diagnose your Macintosh problems by telephone. Contact Apple toll-free at 800-538-9696, ext. 500, for information on user groups in your area.

IF YOU SUBMIT A TIP to MacUser (and we hope you do), please be advised that you agree that Ziff-Davis Publishing Company and its affiliates and licensees can reproduce, publish, display, and distribute your tip worldwide in all print and electronic media and in all other forms, manner, and media now known or hereinafter devised.

Subscription Inquiries/Change of Address
FOR SUBSCRIPTION-SERVICE questions, address changes, or ordering information, please write to MacUser, P.O. Box 56986, Boulder, CO 80322-6986. New subscriptions and address changes can take six to eight weeks. For back issues (subject to availability), send $7 per issue, $8 outside the U.S., to Back Issues Dept., Ziff-Davis Publishing Company, P.O. Box 53131, Boulder, CO 80322-3131. We periodically make lists of our customers available to carefully screened mailers of quality goods and services. If you do not wish to receive such mailings, please let us know by writing to us at MacUser, P.O. Box 56986, Boulder, CO 80322-6986. MacUser (ISSN 0884-0997) is published monthly by Ziff-Davis Publishing Company, One Park Avenue, New York, NY 10016. Editorial Offices: 50 Beale Street, 12th Floor, San Francisco, CA 94105. Telephone: 415-547-8600. U.S. subscription rates are $27 for 12 issues, $45 for 24 issues, and $62 for 36 issues. Additional postage for orders outside the U.S.: Add US$16 per year for surface mail. Single-copy prices are $3.99 (Canada, $4.99). Canadian GST registration #14049 6720 RT. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 278521.

POSTMASTER: Send address changes to MacUser, P.O. Box 56986, Boulder, CO 80322-6986. Periodicals Mail postage paid at New York, NY 10016, and at other mailing offices.

ZD Net/Mac: MacUser Online
ZD NET/MAC is a commercial online service that provides selected articles, reviews, and electronic supplements to MacUser. In addition, you will find thousands of reviewed shareware files and have a chance to interact with editors. To order a free starter kit to access ZD Net/Mac, hosted on CompuServe, call 800-848-8199. On CompuServe, simply type GO ZMC:MACUSER. Or check out MacUser's home on the World Wide Web, at http://www.macuser.com/.

Complaints About Advertisers
MACUSER EDITORS are not responsible for the contents of the advertisements in the magazine. However, if you bought a product advertised in MacUser, are dissatisfied, and can’t resolve the problem, write to Ad Department, MacUser, 50 Beale Street, 12th Floor, San Francisco, CA 94105.

Permissions and Reprints
MATERIAL IN THIS PUBLICATION may not be reproduced in any form without permission. Written requests for permission should be addressed to Chantal Tucker, Ziff-Davis Publishing Company, One Park Avenue, New York, NY 10016, or faxed to 212-503-5475.

MacUser's Online CPU
Be sure to check out MacUser’s Online CPU Report Cards for information on all currently-shipping Mac OS systems. Created by the experts at MacUser Labs, these capsule reviews will help you shop for a new system, or let you compare your own Mac’s performance with other Mac OS systems. MacUser Labs gives you the numbers you can trust.

JULY AD CLOSE:
TUESDAY, APRIL 22, 1997

Tips for QuarkXPress
If you use QuarkXPress as your desktop publishing application, then the July issue of MacUser is just for you! Noted QuarkXPress expert Brad Walrod, author of QuarkXPress Unleashed, gives the top 10 time-saving tips for QuarkXPress from basic keyboard shortcuts to more advanced productivity tips. Read MacUser’s Desktop Media section and you’re guaranteed to learn a new trick or two.

Charging your Charts
Tired of the same ‘ol pie chart in your presentations? Want to add pizzazz to bar graphs in your company’s Annual Report? If you’ve answered yes to these questions, then be sure to read these capsule reviews will help you shop for a new system, or let you compare your own Mac’s performance with other Mac OS systems. MacUser Labs gives you the numbers you can trust.

http://www.zdnet.com/macuser/cpu/
Be sure to check out MacUser’s Online CPU Report Cards for information on all currently-shipping Mac OS systems. Created by the experts at MacUser Labs, these capsule reviews will help you shop for a new system, or let you compare your own Mac’s performance with other Mac OS systems. MacUser Labs gives you the numbers you can trust.

JULY AD CLOSE:
TUESDAY, APRIL 22, 1997
Finally! A Real Design Tool for the Web

Visual Layout and Design Control
Unlike novice Web authoring tools, GoLive CyberStudio lets you visually layout Web pages using a grid and frames. Simply drag-and-drop files directly from the Finder onto your Web page. You precisely control the placement of objects—just as you would with page layout software.

HTML Native File Format
Different from other site-creation tools, GoLive CyberStudio always works in an HTML native file format. So at any stage of production you can get at your HTML source code or share files with people using any other HTML authoring tool.

Project and Site Management
Graphically design a site’s structure, adjust the site’s hierarchy, add pages, delete pages, as well as verify, change and update links and anchors.

Layout, Textual and Site-Oriented Modes
Design a page visually in a graphical layout mode, write HTML source code, create frames, edit JavaScripts, even structure an entire site. You are never restricted to someone else’s idea of the smartest way to build a Web site.

Without a doubt, the Macintosh is the designer’s computer. But till now, you’ve been waiting for Macintosh software that truly supports the design of a professional quality Web site. Well, stop waiting and start working!

GoLive CyberStudio is the first real solution for HTML layout, design and Web site management. It gives Macintosh users unprecedented creative control and flexibility when designing a Web site.

GoLive CyberStudio
The best way to design a Web site.

http://www.golive.com

© 1997 GoLive Systems, Inc. All brand and product names are trademarks of their respective companies.
Simplify the equation.
Multimedia design power without programming? No problem.

QuarkImmedia™ is proof that multimedia doesn't have to be rocket science.

Take the unparalleled design control and versatility of QuarkXPress™. Add sound, video, animation, and interactivity. Plus Internet functionality, cross-platform compatibility, and multiple media delivery options. Throw in powerful scripting capabilities and subtract the hassle of programming, tagging, or coding. Top it off with a host of high-end multimedia authoring features — minus the high-end learning curve. There you have it: QuarkImmedia. Professional design software for multimedia and Internet publishing.

Spend more time figuring out how to make your ideas work, and less time figuring out how to make your software work.

1 The royalty-free QuarkImmedia Viewer works in concert with Netscape Navigator and Microsoft Internet Explorer. 2 View on Mac, Power Mac, or Windows. 3 Reach your audience via CD-ROM, disk, intranet, the Web, and print. 4 Generate complex interactions with menu-driven scripting. 5 Editable anti-aliased type, transitions, streaming audio, intelligent caching, custom cursors, multistage buttons...

QuarkImmedia, For the interactive imagination.

For a free demo package, give us a call or visit our Web site.
http://www.quark.com/immedia.htm 1-800-788-7835 Ext. 3017
Project Scheduling Made Easy.

FastTrack Schedule™ 4.0

You can't stay on schedule if you don't have one!

FastTrack Schedule 4.0 lets you create and update presentation-quality schedules quickly and easily. Whether you need a quick scheduler or a full tracking system, FastTrack Schedule 4.0 offers the combination of flexibility, ease of use and power all in one program!

Take a quick look at some of the features found in FastTrack Schedule 4.0. Simple scheduling and impressive power are as easy as... 1,2,3.

1. Flexibility
   - Timescales from Hours to Fiscal Years
   - Link Options + Find & Replace
   - Paste in Graphics & Add Textblocks
   - Custom Bar and Milestone Styles
   - Page Breaks + Shift items in Work Units
   - Capture Schedule Defaults + Hide Graph
   - Layout Options for Multi-columnar Reports
   - Durations in Work Hours & Work Days

2. Ease of Use
   - On Line Help Systems + Tool Tips
   - Balloon Help + Action Columns
   - Control Palette + Auto Scrolling
   - Bar Tracking Window + Select All
   - Interactive Page Preview Layer
   - Cursor Tracking Window + Quick Corner
   - Templates + Floating Toolbox
   - Autofit Schedule + Auto Resize Row Height

3. Power
   - Scheduled, Revised & Actual Dates
   - Custom Work Calendar
   - Filters & Sorts + Task Dependencies
   - Outline tasks to show sublevels
   - Import & Export Data as ASCII text
   - Network Versions - File Locking, Passwording
   - Available for Macintosh, Power Macintosh, Windows 3.1, NT 3.51, NT 4.0 and 95

Call to order, for more information or download a free demo today!
(800) 450-1983
http://www.aecsoft.com

CIRCLE 15 ON READER SERVICE CARD
I Have Met the Enemy

THE MAC HAS NEVER BEEN in more danger than it is now, and that danger comes not from Microsoft, Intel, or any other competitor. It comes from the Mac media. Editors and journalists should be extolling the opportunity the NeXT acquisition brings. Instead, they whine about the lack of details, complain that Apple will never pull it off, or say that they're unsure of its benefits. No wonder newspapers such as the Wall Street Journal are already pronouncing Apple DOA. Maybe Apple won't achieve its ambitious timetable, but I for one hope it does and will not assume that it can't.

Bryan Chaffin
bryan@wwwwebservers.com

WHY DOES MACUSER THINK it's cool to talk about how much Apple sucks? I'm tired of reading about how bored and annoyed your authors are with Apple. The Mac on my desk is a beast of a computer and a pleasure to use. Considering the alternative of Windows 95, I'm still convinced I made the right choice. Why not support this position?

Melissa Mecca
mecca@macconnect.com

I just because we question Apple's actions doesn't mean we don't want Apple and the Mac to succeed. (Believe me, we've also been accused of being too positive when reporting about Apple!). The decisions being made right now are critical to the Mac's long-term success, and our policy is to provide balanced coverage. / PP

Forbidden Fruit

HENRY BORTMAN'S "PowerBook Monopoly" (March '97, page 21) brought back memories of the cage-rattling fury we raised in our call for desktop clones just a few years back. Sure, Apple begrudgingly capitulated, but what Apple called "clone makers" weren't seasoned clone makers at all. Instead, clone licenses were handed off to little startups that could barely make a dent in Apple's bottom line. Open licensing was (and still is) a white lie. Apple hardware protectionism prevails and continues to adversely affect the platform's strength. Serves 'em right.

Craig Koller
via the Internet

The Power to Be Depressed

IT'S A DEPRESSING TIME to be a Mac owner, and for me one of the most depressing moments came when I read your analysis of Mac OS systems ("Which Mac?" March '97, page 84), in which you recommended that prospective buyers not buy an Apple machine. It is, of course, your job to present the facts and figures correctly, and obviously clone makers are offering better value in some ways.

What was upsetting was that your article offered no justification — beyond the consideration of mere facts and figures — for those who still might want to buy an Apple-made computer. There are substantial reasons for doing so, you know, such as hardware design and reputation for quality and the need to support a firm that seems in serious jeopardy.

By not supporting the decision to buy Apple products, you are undermining the basic existence of the platform you profess to love. Nobody will be interested in buying a Mac clone if there is no Apple Computer.

James T. Pendergrast
New York, NY

Over-Powering

IS MACUSER BIASED in favor of Power Computing? A prime example of this is how your initial coverage of the PowerTower Pro 225 failed to emphasize that it was a prototype or

WRITE TO LETTERS

c/o MacUser
50 Beale Street, 12th Floor
San Francisco, CA 94105
letters@macuser.com

All letters become the property of MacUser, and we reserve the right to edit any letters we print. Include a return address and a daytime phone number. If you write to us via e-mail, please specify whether you want your electronic address printed.
limited-availability model. This would be OK if other brands received similar treatment, but I can find no mention of a UMAX SuperMac S900/225S in the March issue, and this is a shipping model your mail-order advertisers seem aware of. There’s no mention of UMAX’s 240-MHz or 200-MHz dual-processor models at all. Surely these products are equally newsworthy and no less available than the PowerTower Pro was at the time of its coverage.

Equally glaring is the lack of copy about Power’s quality-control problems and the company’s inability to deliver products on time. Since customer support and reliability are supposedly factors in your mouse ratings, these omissions cast doubt on the overall veracity of those ratings.

R. R. Cook-Robinson
LiveMixer@aol.com

/ Hmmn. Is that a UMAX machine on the cover? When it comes to covering the hottest products, it’s darn hard to review ones we don’t have. Power’s knack for getting machines into the hands of reviewers the minute they are finished (which, unfortunately, is sometimes before there are enough in inventory to meet demand) has made it possible for us to cover Power products quickly. Other vendors, such as UMAX, have had a harder time getting new products out for evaluation. The good news is that that’s starting to change. And although it is our job to recommend products for our readers, it is our policy to give all vendors fair and equal consideration and to let the lab tests and first-hand experience of experts decide which computer is the best. / AG

I THINK THE RESULTS you arrived at in “Which Mac?” (March ’97, page 84) fail in many respects to account for the actual state of the Mac market.

Apple machines can be found for prices lower than the estimated street prices you used in your article. I’ve seen a Performa 6400/180 for $1,199, a Power Mac 8500/180 for $2,799, and other Apple models for prices that were 20 to 30 percent lower than those you listed. On the other hand, I’ve never seen a Power Computing or UMAX machine on sale for anything less than 90 to 95 percent of your estimated street prices.

Furthermore, you make absolutely no mention of the actual purchasing experience. If you head over to http://www.powerwatch.com, you’ll hear many tales of bait-and-switch tactics, overselling, inexplicably long waits, hard-drive failures, and other woes involved in a Power Computing purchase. Power’s ads have dealt with some of these problems more openly than MacUser has.

James A. Whitney
via the Internet

/ When we put our “Which Mac” story to bed, the prices used in the evaluations were current as supplied by the vendors. But between the time we finished the story and readers received it, Apple made major price cuts, especially on Performa models that weren’t selling. It’s because of the fluidity of pricing that even the features of Macs and Mac clones that we maintain the CPU Report Card database on our Web site (http://www.zdnet.com/macuser/cpu), the best place to go for up-to-the-minute reviews and test data on the latest Macs. / AG

Don’t Close OpenStep

YOUR OVERVIEW of the Apple-NeXT deal offered some valuable insight into Apple’s future plans (“Apple’s NextStep,” March ’97, page 24; “More Than a New OS,” March ’97, page 26), but you missed several key points.

First, NeXTstep/OpenStep already supports QuickTime via Nextime. Granted, it doesn’t yet support VR or the conferencing function, but a foundation exists. QuickDraw 3D is not yet supported, but NeXT offers something even better — Pixar’s RenderMan. Combining QuickDraw 3D for low-end work and Render-Man for high-end tasks could make the Mac one of the most compelling 3-D platforms on the planet.

As for QuickDraw GX, considering that some of Apple’s own applications don’t support it, I think one can safely assume that Apple will opt for NeXTstep’s far more elegant Display PostScript solution.

OpenStep is more than just a simple development environment. The user version of OpenStep allows anyone running Windows NT, Windows 95, Solaris, or NeXTstep (on a 486, Pentium, PA-RISC, SPARC, or PowerPC machine) to run applications developed with OpenStep developer tools. Your OS article suggested that OpenStep has a Windows 95 “look and feel.” Wrong. If you compile an OpenStep application for Windows 95, it will look like a Windows 95 app. Compile it for Solaris, and it will look like a Solaris app.

You failed to mention that any application developed with OpenStep tools needs only to be recompiled to run on other hardware platforms and operating systems. With OpenStep, Apple has a chance to become an essential, if not ubiquitous, force in the computer industry. If it fails to exploit this advantage — or worse, gets greedy and ties NeXT technology to the Mac and PowerPC exclusively — we might as well not bother waiting for Mac OS 8. NeXT abandoned the idea of proprietary technology several years ago when it became clear that proprietary meant obsolete. Apple has been too slow to realize this. The company needs to open all of its technology up; make OpenStep the favored development environment on Macs as well as PCs; and, finally, make the next Mac OS available on a variety of hardware platforms.

Robert A. Wyatt
rob@bedazzled.com

Let the Seller’s Wares Be

I’M NOT HAPPY with how you dismissed Paul Cheng’s concerns (“Clones Aren’t Clones,” March ’97, page 14). If, in fact, you’re testing some machines with Speed Doubler and some without, your benchmark comparisons are worthless to me also. They’re especially meaningless because I use a lot of software that’s incompatible with Speed Doubler. Why not disable the gimmicks and let us see what the hardware can really do?

Lee Blaske
Excelsior, MN

We test systems as shipped to make sure the results we see in our labs are the same you’d see when testing your new system with your own copy of MacBench. MacBench 4.0 is quite sensitive to how systems are configured. In fact, the results you get from MacBench can help you tweak the last little bit of performance out of a particular system. We encourage you to get a copy of MacBench from our Online CPU Report Cards Web page (http://www.zdnet.com/macuser/cpu) and run your own set of numbers for the particular configuration you desire. / JP

Microsoft Semiotics

DO YOU THINK Microsoft would be increasing its developer support if it thought the Macintosh were going to die? That bunch of penny-pinchers? Never.

Casey O’Donnell
casey2@colorad.net

Corrections

Roman is worth seven Scrabble points (The Game Room, March ’97, page 196).


The correct contact information for Deltec (The Geek Beat, December ’96, page 27) is 800-335-8321 or 619-291-4211; http://www.deltecpower.com/.

The correct price for Cubase 3.0 VST (see review, March ’97, page 50) is $399.
If our amazingly fast and accurate scan doesn't impress you, maybe you should consider a re-shoot.

INTRODUCING THE EPSON® EXPRESSION® 636 COLOR SCANNER

Everything the camera sees, it sees. And we mean everything. Because Epson TrueScan® technology with 36-bit scanning gives you the power to accurately recognize 68.7 billion colors and 4,096 levels of gray—more than you'll ever need. 600 dpi optical resolution (4,800 dpi max) lets you capture the most minute detail with incredible clarity—like the soft edge of a raging storm cloud. And you'll get your perfect image in a lot less time than from other high-end graphics scanners. For a lot less money.

But the Expression 636 isn't only about great images. Text Enhancement Technology and Auto Area Segmentation let you accurately scan both text and graphic images from the same page—even from colored backgrounds. SCSI and bidirectional parallel ports allow easy, simultaneous hook-up to both Mac and PC systems. And our TWAIN driver is full of features like PhotoQuick®, which lets you turn negatives into high-quality positives. So you'll have images that will blow you away. And if by chance they don't, what you need is a better photograph. For more info, call 1-800-GO-EPSON. Ask for operator 3020.

Our professional Mac bundle comes with full versions of Live Picture®, Claris HomePage™, e. Paper®, Kai's Power Tools®, SCSI cable, and a transparency unit. Because a scan this intense is bound to inspire. YOU'VE GOT TO SEE IT IN COLOR:

Professional PC bundle also available with full version Adobe Photoshop™, Adobe Type Manager™ 3.6, NoteSoft™, Presto! PageManager™ LE, Claris HomePage, Kai's Power Tools, SCSI interface and cable, and a transparency unit. Other scanner configurations available. EPSON is a registered trademark of Seiko Epson Corp. Expression and TrueScan are trademarks of Epson America, Inc. All other trademarks are the property of their respective owners.

© 1997 Epson America, Inc. www.epson.com

CIRCLE 123 ON READER SERVICE CARD
At Apple, we started with one simple goal: to make it easier to do the things you want to do. Over the years, the Macintosh® operating system has helped millions of people do just that, by providing a simple, intuitive approach that makes all aspects of computing easier. But even more impressive than what a Macintosh can help you do today is what it will help you do tomorrow.

It does more than ever.

So what does the future of the Mac OS look like? For a glimpse, check out our newly released Mac OS 7.6. It's faster than ever before—so you can start your Mac, launch applications, save files and print up to 40% faster.

Connecting to the Internet is easier too. With the latest version of the Apple® Internet Connection Kit (it includes Netscape Navigator™ 3.0 and other Internet tools), you're one step away from accessing the Net. Or, if you prefer, you can use AOL or our own Apple Cyberdog™—they're included with Mac OS 7.6 along with TCP/IP and PPP.

Mac OS also has the latest version of Apple QuickTime®, the industry standard for multimedia creation and delivery. And it makes upgrading easier: with one CD-ROM and a streamlined installation process.

Intrigued? Then you'll love what comes next. Because we're hard at work on the next version of the Mac OS, code-named Tempo. Right from the start you'll notice a new look, with beveled buttons, icon drop shadows and other 3-D enhancements to the desktop. Tempo will dramatically improve system responsiveness by incorporating multitasking, multi-threaded functionality and native PowerPC® capabilities directly in the OS. So you can run multiple applications more smoothly, and launch new applications while files are copying in the background. Tempo extends our Internet capabilities with easy...
Apple's complementary operating systems—Mac OS and Rhapsody—allow you to choose the system that best meets your needs. They also allow you to decide when it's time to make the transition.

setup, personal web sharing and built-in Java. And it will help you be more organized, by reducing on-screen clutter with spring-loaded folders and pop-up windows for frequently used items.

Of course, Tempo also paves the way for further updates to the Mac OS. Because there's much more to come.

It will be the NeXT thing.

When we began defining a new software architecture that would take us into the future, we had two clear objectives: to enhance our traditional strengths, and to create an operating system that would leapfrog the competition, setting standards into the next century.

Enter NeXT: By acquiring NeXT Software and adopting their kernel-based architecture, Apple can offer advanced system services such as true multitasking, protected memory and symmetrical multiprocessing. We have also strengthened our position in client-server and Internet/Intranet markets. And NeXT's object-oriented development environment and powerful tools such as WebObjects and Enterprise Objects Framework give us clear advantages in the creation of new solutions.

Merging NeXT and the Mac OS will create a next-generation OS that will give our competitors something new to catch up to. It will be an OS that helps developers create breakthrough applications by allowing greater experimentation and efficient reuse of code. It will include the best of our graphics technologies, such as ColorSync and QuickDraw GX. And we plan to adopt the Adobe PostScript imaging model for Rhapsody and transfer the best of our existing graphic technologies, including ColorSync and QuickDraw GX.

CIRCLE 103 ON READER SERVICE CARD
Faster-acting relief.

Now, PaperPort vx comes with an SCSI adapter so it's even faster at relieving organizational headaches.

### PAPERPORT vx MEANS YOU'LL NEVER AGAIN HAVE TO WASTE TIME RETYPING

It can scan thousands of words in minutes—from virtually any type of document. Reports, Memos, Letters. Then PaperPort vx's integrated Xerox TextBridge™ OCR software converts these words to digital format so they can be edited or copied.

**NEW. PAPERPORT vx CONQUERS THE COMMON FORM**

Forms. If they're the bane of your existence, buy Visioneer's FormTyper™ software. Like magic, it brings up forms on your computer and fills in all the fields you need to fill out. All you have to do is tab from field to field, and type. (FormTyper is sold separately and is available directly from Visioneer at http://www.visioneer.com).

### PAPERPORT vx PUTS POWER BEHIND YOUR E-MAIL

Find a good tidbit about a competitor in the Sunday paper? Scan it into PaperPort and send it off to your colleagues using e-mail, so they can use the data to close the big deal on Monday morning.

### PAPERPORT vx FITS EASILY INTO YOUR MAC SYSTEM

It's sleek and small. It rests right between your keyboard and monitor.

### PAPERPORT vx AND SCSI ADAPTER: A NATURAL CONNECTION

Connect your PaperPort vx to your SCSI port with the included SCSI adapter for Macintosh. Dealing with paper has never been faster or easier.

### PAPERPORT vx GETS RID OF CLUTTER

Then there are all of those newspaper articles, financial statements, meeting notes, and Dear Binky columns you just can't bear to part with. You can use PaperPort to scan paper as long as 30 inches, and photos in up to 256 shades of gray. So you can save them forever, and get rid of the originals—with no remorse.

### PAPERPORT vx PUTS POWER BEHIND YOUR E-MAIL

Find a good tidbit about a competitor in the Sunday paper? Scan it into PaperPort and send it off to your colleagues using e-mail, so they can use the data to close the big deal on Monday morning.

### PAPERPORT vx IN THREE EASY STEPS

1. Feed in a document. In as quick as 6 seconds, it's scanned.
2. Drag and drop it onto most of your favorite applications.
3. Edit, copy, print, e-mail, fax, file, or organize the material as necessary.

### PAPERPORT vx MAKES SMART ARCHIVES

Imagine never having to rummage to find an important slip of paper. PaperPort lets you create archives of critical documents—receipts, invoices, your car registration, even those love notes from the 7th grade.

### PAPERPORT vx KEEPS TRACK OF YOUR CONTACTS

Tired of forgetting people's names and numbers? Just scan business cards into PaperPort, and create a file of your business contacts—all on your Macintosh computer.

### PAPERPORT vx MEANS YOU'LL NEVER GET RID OF CLUTTER AGAIN

Have to waste time retyping PaperPort again? Then there are all of those newspaper articles, financial statements, meeting notes, and Dear Binky columns you just can't bear to part with. You can use PaperPort to scan paper as long as 30 inches, and photos in up to 256 shades of gray. So you can save them forever, and get rid of the originals—with no remorse.

### PAPERPORT vx CONQUERS THE COMMON FORM

Forms. If they're the bane of your existence, buy Visioneer's FormTyper™ software. Like magic, it brings up forms on your computer and fills in all the fields you need to fill out. All you have to do is tab from field to field, and type. (FormTyper is sold separately and is available directly from Visioneer at http://www.visioneer.com).

### PAPERPORT vx PUTS POWER BEHIND YOUR E-MAIL

Find a good tidbit about a competitor in the Sunday paper? Scan it into PaperPort and send it off to your colleagues using e-mail, so they can use the data to close the big deal on Monday morning.

### PAPERPORT vx FITS EASILY INTO YOUR MAC SYSTEM

It's sleek and small. It rests right between your keyboard and monitor.

### PAPERPORT vx AND SCSI ADAPTER: A NATURAL CONNECTION

Connect your PaperPort vx to your SCSI port with the included SCSI adapter for Macintosh. Dealing with paper has never been faster or easier.

### PAPERPORT vx GETS RID OF CLUTTER

Then there are all of those newspaper articles, financial statements, meeting notes, and Dear Binky columns you just can't bear to part with. You can use PaperPort to scan paper as long as 30 inches, and photos in up to 256 shades of gray. So you can save them forever, and get rid of the originals—with no remorse.

### PAPERPORT vx PUTS POWER BEHIND YOUR E-MAIL

Find a good tidbit about a competitor in the Sunday paper? Scan it into PaperPort and send it off to your colleagues using e-mail, so they can use the data to close the big deal on Monday morning.

### PAPERPORT vx IN THREE EASY STEPS

1. Feed in a document. In as quick as 6 seconds, it's scanned.
2. Drag and drop it onto most of your favorite applications.
3. Edit, copy, print, e-mail, fax, file, or organize the material as necessary.

### PAPERPORT vx MAKES SMART ARCHIVES

Imagine never having to rummage to find an important slip of paper. PaperPort lets you create archives of critical documents—receipts, invoices, your car registration, even those love notes from the 7th grade.

### PAPERPORT vx KEEPS TRACK OF YOUR CONTACTS

Tired of forgetting people's names and numbers? Just scan business cards into PaperPort, and create a file of your business contacts—all on your Macintosh computer.

### PAPERPORT vx MEANS YOU'LL NEVER GET RID OF CLUTTER AGAIN

Have to waste time retyping PaperPort again? Then there are all of those newspaper articles, financial statements, meeting notes, and Dear Binky columns you just can't bear to part with. You can use PaperPort to scan paper as long as 30 inches, and photos in up to 256 shades of gray. So you can save them forever, and get rid of the originals—with no remorse.

### PAPERPORT vx CONQUERS THE COMMON FORM

Forms. If they're the bane of your existence, buy Visioneer's FormTyper™ software. Like magic, it brings up forms on your computer and fills in all the fields you need to fill out. All you have to do is tab from field to field, and type. (FormTyper is sold separately and is available directly from Visioneer at http://www.visioneer.com).

### PAPERPORT vx PUTS POWER BEHIND YOUR E-MAIL

Find a good tidbit about a competitor in the Sunday paper? Scan it into PaperPort and send it off to your colleagues using e-mail, so they can use the data to close the big deal on Monday morning.

### PAPERPORT vx FITS EASILY INTO YOUR MAC SYSTEM

It's sleek and small. It rests right between your keyboard and monitor.

### PAPERPORT vx AND SCSI ADAPTER: A NATURAL CONNECTION

Connect your PaperPort vx to your SCSI port with the included SCSI adapter for Macintosh. Dealing with paper has never been faster or easier.

### PAPERPORT vx GETS RID OF CLUTTER

Then there are all of those newspaper articles, financial statements, meeting notes, and Dear Binky columns you just can't bear to part with. You can use PaperPort to scan paper as long as 30 inches, and photos in up to 256 shades of gray. So you can save them forever, and get rid of the originals—with no remorse.

### PAPERPORT vx PUTS POWER BEHIND YOUR E-MAIL

Find a good tidbit about a competitor in the Sunday paper? Scan it into PaperPort and send it off to your colleagues using e-mail, so they can use the data to close the big deal on Monday morning.

### PAPERPORT vx IN THREE EASY STEPS

1. Feed in a document. In as quick as 6 seconds, it's scanned.
2. Drag and drop it onto most of your favorite applications.
3. Edit, copy, print, e-mail, fax, file, or organize the material as necessary.

### PAPERPORT vx MAKES SMART ARCHIVES

Imagine never having to rummage to find an important slip of paper. PaperPort lets you create archives of critical documents—receipts, invoices, your car registration, even those love notes from the 7th grade.

### PAPERPORT vx KEEPS TRACK OF YOUR CONTACTS

Tired of forgetting people's names and numbers? Just scan business cards into PaperPort, and create a file of your business contacts—all on your Macintosh computer.

### PAPERPORT vx MEANS YOU'LL NEVER GET RID OF CLUTTER AGAIN

Have to waste time retyping PaperPort again? Then there are all of those newspaper articles, financial statements, meeting notes, and Dear Binky columns you just can't bear to part with. You can use PaperPort to scan paper as long as 30 inches, and photos in up to 256 shades of gray. So you can save them forever, and get rid of the originals—with no remorse.

### PAPERPORT vx CONQUERS THE COMMON FORM

Forms. If they're the bane of your existence, buy Visioneer's FormTyper™ software. Like magic, it brings up forms on your computer and fills in all the fields you need to fill out. All you have to do is tab from field to field, and type. (FormTyper is sold separately and is available directly from Visioneer at http://www.visioneer.com).

### PAPERPORT vx PUTS POWER BEHIND YOUR E-MAIL

Find a good tidbit about a competitor in the Sunday paper? Scan it into PaperPort and send it off to your colleagues using e-mail, so they can use the data to close the big deal on Monday morning.

### PAPERPORT vx FITS EASILY INTO YOUR MAC SYSTEM

It's sleek and small. It rests right between your keyboard and monitor.

### PAPERPORT vx AND SCSI ADAPTER: A NATURAL CONNECTION

Connect your PaperPort vx to your SCSI port with the included SCSI adapter for Macintosh. Dealing with paper has never been faster or easier.

### PAPERPORT vx GETS RID OF CLUTTER

Then there are all of those newspaper articles, financial statements, meeting notes, and Dear Binky columns you just can't bear to part with. You can use PaperPort to scan paper as long as 30 inches, and photos in up to 256 shades of gray. So you can save them forever, and get rid of the originals—with no remorse.

### PAPERPORT vx PUTS POWER BEHIND YOUR E-MAIL

Find a good tidbit about a competitor in the Sunday paper? Scan it into PaperPort and send it off to your colleagues using e-mail, so they can use the data to close the big deal on Monday morning.

### PAPERPORT vx IN THREE EASY STEPS

1. Feed in a document. In as quick as 6 seconds, it's scanned.
2. Drag and drop it onto most of your favorite applications.
3. Edit, copy, print, e-mail, fax, file, or organize the material as necessary.

### PAPERPORT vx MAKES SMART ARCHIVES

Imagine never having to rummage to find an important slip of paper. PaperPort lets you create archives of critical documents—receipts, invoices, your car registration, even those love notes from the 7th grade.

### PAPERPORT vx KEEPS TRACK OF YOUR CONTACTS

Tired of forgetting people's names and numbers? Just scan business cards into PaperPort, and create a file of your business contacts—all on your Macintosh computer.

### PAPERPORT vx MEANS YOU'LL NEVER GET RID OF CLUTTER AGAIN

Have to waste time retyping PaperPort again? Then there are all of those newspaper articles, financial statements, meeting notes, and Dear Binky columns you just can't bear to part with. You can use PaperPort to scan paper as long as 30 inches, and photos in up to 256 shades of gray. So you can save them forever, and get rid of the originals—with no remorse.
Everybody Must Get Cloned

"OH NO," some of you said when you saw this month's cover. There they go again, promoting CLONES. Doesn't MacUser care about Apple anymore? What's the big deal about machines made by some third-party company, anyway?

How did I know some of you would say this? Because many of you have already said it in the letters you send in. For example, seems some of you took exception to our comprehensive buyers guide "Which Mac?" (March '97, page 84) in which Apple's Macs fared poorly. We even went so far as to point it out in a sidebar to the story, entitled "The Verdict: Apple Falls Behind." Judging by the strangled noises emanating from the MacUser mailbox, you'd think we'd just made casseroles out of the Easter Bunny.

C'mon, people, get over it. Clones are here to stay, and thank goodness. Clones (isn't there a better word?) are starting to contribute significant sales to the overall Mac market. They shore up market share while providing consumers with more choices. How can that be a bad thing?

Case in point: Much has been made in the mainstream media about the Mac's declining market share. Reports by such chip counters as Dataquest and International Data Corp. put the Mac's slice of the American PC pie at a little over 6.5 percent in 1996, down from 11 percent in 1995. Apple shipped 30 percent fewer Macs to U.S. customers in 1996 than in 1995.

Sounds pretty bleak, until you factor in the shipments of Mac OS-compatibles. In the fourth quarter of 1996 alone, more than 130,000 Mac clones were sold, bringing the total number of Mac OS systems sold in that period to 1.053 million. Clones now account for 9 percent of all Macs sold, almost double the percentage of the year before. In the United States alone, clones now make up 13.6 percent of Mac OS systems sold — and that's in just two years of Mac OS licensing.

A few more stats: Motorola sold 40,000 StarMax systems in just eight weeks. UMAX claimed shipments of just under 100,000 Macs in its first six months. And Power Computing sold more machines in its first year than Compaq did in its first. Admittedly, that's a flattering comparison, and one that Power must work hard to sustain.

And 1997 should be even more interesting. UMAX is hitting its stride and putting pressure on Power with competitively priced new machines and multiprocessor systems. Motorola is showing that it's in this for the long haul, with a surprisingly strong showing in its first months in the Macintosh business. Storage stalwart and cataloger APS has begun shipping its M-Power clones (see our review in last month's issue) to customers who want customized machines at low prices. Newcomer PowerTools seeks to undercut everybody with rock-bottom prices. A sub-$1,000 Mac, anyone?

And wouldn't be surprised if you'll be able to buy a Mac OS-compatible laptop this year. Won't that be sweet?

Like a Rolling Clone

Many of you wrote to complain about experiences with delayed shipments, shoddy manufacturing, and poor technical support, most notably from Power Computing. You wondered if you could trust clone manufacturers to deliver the solid engineering and superior design you've come to expect from a Mac.

The answer is yes and no. Power's early problems definitely made buyers skittish about forking over hard-earned cash for a clone. The company says that it has put new quality-assurance procedures in place and has reduced its shipping turnaround on some models to 48 hours. It's too early to tell if these efforts are making a difference. But Power Computing isn't the only company to experience difficulties. We've also had machines from other vendors arrive weeks late, with dead motherboards and cracked cases — including some from Apple.

I'm not making excuses, but it's easier for me to understand how companies new to systems manufacturing can make such mistakes than how Apple can. While appearing on a call-in radio show the other day, I was peppered with jokes about the PowerBook 5300. Like the poodle in the microwave, the flaming laptops have entered urban lore. And then there were problems with Apple's newest desktop Macs — the Power Mac 7300, 8600, and 9600 — which caused a brief delay in their shipment.

That's the bad news. The good news? If you need a new Mac now, you can buy a Mac clone. At last, we are no longer being held hostage by the ebb and flow of Apple quality assurance and product supply.

And if you're shopping for a new Mac, turn to Henry Bortman's column this month for what to watch out for when buying a Mac clone. And you can always find the most up-to-date performance ratings of all currently shipping Mac OS systems in our CPU Report Cards (http://www.macuser.com/cpu).

Next month: I'm on vacation next issue, and I'm not taking my computer with me (not that the phone lines are reliable enough in Ulaanbaatar, Mongolia, to let me dial in anyway). MacUser Editor Andy Gore will be writing this column in my absence. See you in the July issue.
DayStar

800 MHz
Industrial Strength
Four Processor
Systems
For Imaging,
3D, and
Video Experts

Genesis MP

DayStar Digital, Inc.
5556 Atlanta Hwy., Flowery Branch, GA 30542, 770-967-2077, Fax: 770-967-3018, Email: info@daystar.com
Caveat Emptor

HENRY BORTMAN

CLONES ARE GREAT until you have to buy one. It's easy to be dazzled by vendor claims that their offerings are the fastest, latest, and greatest. But a little time spent scratching the surface of those claims can save you a lot of headaches — and money — later on.

Demand Supply. Before you get your heart set on the latest speed demon, make sure it's shipping. Really shipping. Just because a vendor is advertising a particular model doesn't mean it has any stock on hand. Apple, with its chronic underprediction of customer demand, has set ample precedent on this front. But Power Computing is working overtime to take the product-shortage crown from Apple.

Case in point: the PowerBase 240. The PowerBase was a finished, ready-to-ship product back in the summer of 1996, when MacUser tested it. Power began advertising it in October. But nobody I know managed to buy one till after the New Year.

Power had a host of reasons — or excuses. First came "240-MHz processors are in short supply." Then, "These systems are being manufactured overseas, and it takes a long time for them to get here." And finally, "We got a couple of large orders that snatched up the whole supply."

Whatever. It all came down to this: PowerBase 240s were nowhere to be found. We know. We tried to order some. If you did, too, you probably got the same response we did: "We do have PowerBase 200 systems in stock."

Ask About Upgrades. Although computer makers would be perfectly happy to sell you a new system every year or two, you may prefer coaxing a bit more mileage out of a computer you already own, unless you're independently wealthy.

Upgradability is the key to system longevity. Does the model you're considering have a processor-upgrade socket? Motorola's systems don't. (Neither, incidentally, do Apple's Performas.) Is the Level 2 cache upgradable? Is another question to ask clone vendors.

UMAX, for example, made the unwise decision to solder a 512K cache to the logic board of its high-end S900 system. Although some vendors argue that there's no value in having a larger-than-512K L2 cache, our tests have shown otherwise.

Ask about the bus speed of your potential system too. The slower a computer's system bus, the lower the maximum speed on processor upgrades, at least with the current crop of PowerPC chips. A computer with a 40-MHz bus, for example, can't support processors faster than 240 MHz. And even if it could, its relatively slow bus would act as a bottleneck to overall system performance.

And there's the question of multiprocessing. If you think you might want to upgrade to an MP system in the future, make sure it's going to be possible. Many Mac models don't support this capability. And some vendors take a proprietary approach to MP: UMAX includes two proprietary processor slots in its S900 systems. This makes it less expensive than with single-slot systems to upgrade to two processors, but it also locks you into buying only a UMAX upgrade card.

Check the Specs. When you compare MacBench 4.0 scores for two systems, dig beneath the surface. Make sure you understand all the factors that contribute to one system's getting a better score than another. MacUser tests systems exactly as they ship to customers. Some people complain that this approach is unfair. They think we should "level the playing field," by putting an L2 cache of the same size into every system we test, for example. We disagree. Vendors have reasons for configuring their systems the way they do. They put in a larger cache, to continue with the L2 example, to improve performance — and they charge you for it. Vendors that cut corners by putting a smaller, or no, L2 into their systems put a premium on price over performance. Most customers use a system exactly the way it comes out of the box — and that's precisely how we test them.

But that's why it's important for you to know why a particular system got the score it did on a particular test. Take MacBench's disk tests, for example. The main reason one system does better than another on these tests is because different drives have dramatically different performance characteristics.

Can you, as a user, tweak your system to improve on what the vendor offers you? Sure. The easiest way to do this — not to mention that it doesn't cost anything — is to boost the size of your disk cache, which you set in the Memory control panel. Of course, this eats up some of the physical RAM that would otherwise be available to run applications.

Reed the Fine Print. In particular, check the warranty. If something breaks, are you entitled to on-site repair or do you have to ship your machine to the vendor to get it fixed? If shipping is required, who pays for it? What's the guaranteed turnaround time on repairs? Will the company cross-ship you a working system while it's fixing your broken one?

Motorola's warranty is particularly entitlement. The company trumpets its unique five-year warranty, but if you examine it closely, you'll notice that in the fourth and fifth years, Moto can either "repair or replace the system . . . or . . . refund to the customer the then fair market value of the system unit." Now you tell me: What's the fair market value of an over-three-year-old system?
Who better to make your Mac than Apple, Our Mac User "Best Buy" five-year limited warranty is four years longer than our competitors.'
With Mac® clones popping up everywhere, wouldn't it be great to know there's one made by someone you already trust? We thought so too. Which is why we've introduced the StarMax™ Mac OS-based line of computers. From 180 MHz to 240 MHz, 1.2 GB to 2.5 GB hard drives and starting at $1,249.' And with Motorola Six Sigma quality behind them, every StarMax comes with a five-year limited system warranty—and nobody can clone that. Plus StarMax outperformed similarly configured Mac OS computer systems by as much as 45% in recent tests. It's no wonder more StarMax computers were sold in our first 100 days than any other Mac compatible in history. So get your own StarMax Mac OS computer by calling us or visiting our website. And put yourself ahead of the crowd.

1-800-759-1107 ext.MWU - www.mot.com/starmax

©1997 Motorola, Inc. All rights reserved. Motorola and ® are registered trademarks and StarMax is a trade-mark of Motorola, Inc. PowerPC and the PowerPC logo are registered trademarks of and are used under license from International Business Machines Corporation. Mac and Mac OS are registered trademarks of Apple Computer, Inc. MacBench is a registered trademark of Ziff-Davis Publishing Co. All other brand and product names are the trademarks or registered trademarks of their respective holders. "Manufacturer's suggested retail price.”

Motorola Computer Group

What you never thought possible."
Mac OS to Run on Intel Chips

Apple's new software chief outlines revolutionary plans for the next Mac OS.

A TOUGH YEAR awaits Avie Tevanian, former vice president of engineering at NeXT Software. Recently anointed as Apple's senior vice president, system software engineering, Tevanian has what is quite possibly the most challenging job in the computer industry: creating the next Mac OS. I sat down with him to get his take on Rhapsody (Apple's code name for its upcoming operating system) and on the rumors that future PCs may come equipped with a "Mac Inside" sticker.

AG. What is Rhapsody going to offer developers to induce them to port their applications to Yellow Box and not just rely on Blue Box?
AT. First of all, from a technical perspective, the Yellow Box frameworks are very powerful, making it extremely easy to build very nice applications very quickly. For example, if you're a small development shop and you want to do something to change the world, you're going to be able to bring your new application to market for far less cost and much quicker with Rhapsody technologies.

We will complete the Rhapsody rollout in the middle of next year. This will be the Unified Release, which is the complete Yellow Box (NeXTStep API), the complete Blue Box — everything fully functional, fully supported. At that point, anyone ought to be able to use Rhapsody without any restrictions.

For Next-Generation PowerPC Chips, Less Is More

DOWNSIZING CONTINUES to be all the rage in corporate America. Employees are stuffed into smaller work spaces, get less power, and are expected to increase their productivity by following the infuriating dictum "Work smarter, not harder." Apparently the engineers of the PowerPC Alliance have also decided that downsizing is a great idea — for the design of the first representatives of the next generation of PowerPC microprocessors.

This summer, Mac OS systems will appear that will be powered by two new PowerPC chips any corporate HR director would love. These as-yet-unnamed chips (or parts, in microprocessor parlance) take up very little space, require very little power, and do only the work that's absolutely necessary to efficiently run the Mac OS and its applications.

The tiny size and low power requirements of these two new parts are remarkable — especially when the chips are compared with those of the behemoths coming out of the factories (or fabs, in chipspeak) of the Alliance's competition, Intel. Each new part crams 6.35 million transistors onto a 67-square-millimeter slice of silicon. Compare that with the 200 or so square millimeters required to fit the 5.5 million transistors on a Pentium Pro, and you can guess why the Alliance is predicting that its new parts may be significantly less expensive than Intel's current flagship chip.

And they'll run on far less power too. A 200-MHz Pentium Pro typically sucks wattage in the mid-30s; the new Alliance parts require only 5 watts when humming along at 250 MHz. What's more, they come equipped with progressive power-saving modes — affectionately called Doze, Nap, and Sleep — that increase their mobile-computing value.

Small size, low cost, and frugal power requirements are all well and good, but only if a part can hold its own in the performance wars. According to Alliance documents, the new parts should do very well, thank you. Quote: "With a 1MB L2 cache operating at half the processor clock frequency and a system bus operating at 50MHz in a 5x mode, the processor performance is estimated at 10 SPECint95." Don't sweat the details; just compare that score of 10 on the industry-standard SPECint95 benchmark test with that of a top-of-the-line 200-MHz Pentium Pro: a hair over 8.5.

But high benchmark scores are only part of the story. Remember "smarter, not harder?" As maddening as that advice may seem, Alliance engineers
can focus on what your idea is and your added value instead of how to make menus work.

In addition, we'll be making the APIs and the tools available cross-platform. So as you're developing for Rhapsody, you're not limited just to Apple's customer base. You can now also go after NT-based systems or even sell the software for PCs running Rhapsody.

AG. You said Rhapsody would support PCs. Could you explain?

AT. The term Rhapsody is identified with the whole architecture, including the user interface, Yellow Box, Blue Box, and the core OS. In terms of platform support, the easiest case is the PowerPC. It's all there. When you move to Intel, there will be the ability to run Rhapsody on a generic Intel PC. Go buy from Compaq, Dell — whatever PC vendor you want to buy from — and you can run the entire Rhapsody software stack with the exception of Blue Box.

AG. So, the only thing you won't be able to do is run legacy Mac apps?

AT. That's right, no Blue Box applications. There's yet a third option — you can take the Yellow Box APIs and run those on top of NT. Then you don't necessarily have the whole operating environment, but you have the ability to run Rhapsody applications on top of NT on PCs.

AG. Do you have a feeling for how long it will take to get the PC versions of Rhapsody done?

AT. We have not publicly talked about commitments for when we're going to deliver these options, but I believe it's safe to assume there are no major lags behind any of the releases we already have planned for the PowerPC.

[For a transcript of the entire interview with Avia Tevanian, go to http://www.macuser.com/online/tevanian.html. — Ed.]

have taken it to heart, crafting their new parts to work hand in glove with the Mac OS. Without getting into such dweebian technical niceties as on­chip L2-cache tag RAM and dynamic branch prediction, let's just quote the projected results: 40-to-45-percent real-world improvement over the 603e and 80-to-90-percent improvement over the 603e. What's impressive about these claims is that they're based on MHz-to-MHz comparisons, even though the new parts are expected to first appear at 250 MHz and then increase to 400 MHz by the end of their life cycle.

Of the two new parts, one can be immediately dropped into existing motherboards. The other, which has extra pins to accommodate a performance-enhancing 1-to-1-clock-rate attachment to its L2 cache, will appear in systems a bit after the first, after Mac OS system designers have had time to accommodate it. If the Alliance's speed estimates are true, we should see some screaming low-cost Mac OS systems in the near future. /BIK/MYSLEWSKI

**FIRST LOOKS**

**Director 6:**

Macromedia offers powerful new Web animation tools.

IT'S NO SURPRISE that Macromedia has taken pains to address many of the more problematic issues of content delivery on the Web in Director 6, the soon-to-be-released upgrade of its pioneering multimedia-authoring application. The Web is where the action is — and every day that action includes more multimedia and animation.

We took a close look at a beta version of Director 6 and discovered many Web authoring enhancements, all welcome and few easily available in competing products. For example, Macromedia Shockwave files can now stream over Net connections — they can begin playing before they're entirely downloaded.

Director can establish an unprecedented level of communication between Shockwave and other advanced Internet technologies, including JavaScript, ActiveX, and Live Connect. Also, Shockwave movies can be placed in HTML documents by use of the standard Java Applet tag, allowing them to play on browsers that lack the Shockwave plug-in.

Shockwave movies can now be tested — and debugged — directly on the authoring machine; you no longer have to upload the files to a server. In another important addition for serious media developers, new Lingo commands have been implemented to facilitate the creation of hybrid CD-ROM/Web applications, allowing CD-ROM interfaces built in Director (and playing from a local CD-ROM) to link to live data from the Web. What's more, Xtras (Director extensions that extend its functionality) can now be embedded directly in Shockwave files, making it easier to distribute enhanced Shockwave applications.

Longtime Director users will appreciate that the maximum number of "castmembers" (individual animated elements) on-screen at any one time has been increased to 120 (compared to 48 in Director 5). Several long-overdue enhancements have been added to the Score window (the main timeline display for animated elements). Among them are zooming and scaling the Score display and displaying multiple simultaneous Score views. Many smaller, positive changes have also been made to the way individual frames in the Score are edited.

The new Behavior Inspector palette makes it easy to quickly write basic Lingo commands. Acting as a type of "wizard," the Behavior Inspector also allows a particular chunk of Lingo to be treated as an encapsulated "pseudo-object." The behavior can be dragged and dropped onto other castmembers, which then automatically inherit the Lingo and its associated behavior. Although this addition is not a full-featured object model, it's still an improvement over the Lingo implementation in previous versions of Director, which required repetitive — and laborious — code writing.

External media editors can automatically be invoked from within Director: Instead of using the Director Paint module (which looks more dated with each release), you can designate a program such as Photoshop to be your default image editor — simply double-click on the image, and Director 6 will automatically open the selected image, using the default editor. Separate external editors can be designated for text, audio, and graphics.

All in all, the many improvements and additions are likely to please seasoned Director fans and new users alike. We look forward to the release version of the program to see how well these significant improvements actually perform in real-world applications and how well Director 6 works with the other elements bundled with it in Director 6 Multimedia Studio: SoundEdit 16 v2.2, Sonic Foundry Sound Forge XE, Extreme 3D 2, and Macromedia xRes 3. /DAVID BIEDNY

**PROS:** Significant enhancements for Web authoring. Transparent Java and ActiveX support. Improved Score interface.

**CONS:** Still has steep learning curve. New object-handling features not fully satisfactory.

**INFO:** Director 6 Multimedia Studio, $399; Studio upgrade, $499; Director-only upgrade, $399. Macromedia: 800-945-9354 or 415-252-2000; http://www.macromedia.com/.

![The new look of the Score timeline window makes it easier to do comprehensive editing of animated elements in complex compositions.](image-url)
NEW & NOTABLE

Ki’s Pixel Soap. The unique interface of this image-editing tool, the first in MetaTools’ new MetaWorld series, has 3-D tools that float above a virtual desktop and control 48-bit color calculations and 16-bit alpha channels. Other features include selective color correction, real-time zooming and panning, and continuous undo. $49. MetaTools: 805-566-6200; http://www.metatools.com/.

Asante Mini PCI Network/Modem. This mini plug-in PCI card for the new PowerBook 3400 gives you 10BASE-T Ethernet access and a 33.6-kbps fax modem. $495. Asante: 800-662-9686 or 408-435-8401; http://www.asante.com/.

Spreadsheet 2000 2.0. This upgrade to Let’s Keep It Simple Spreadsheet 1.0 is more visually oriented, letting users create formulas in customizable color input and output grids with the aid of colored indicators that warn against incorrect formulas. $110; upgrade, $39.95. Casady & Greene: 800-359-4920 or 408-484-9228; http://www.casadyg.com/.

Microtech Road Runner 1000, 1380. These 2.5-inch SCSI hard drives are compatible with Apple’s 100-, 200-, and 500-series PowerBooks. Road Runner 1000, $899; Road Runner 1380, $999. Microtech: 800-222-9488 or 203-468-6223; http://www.microtechint.com/.

Net2Phone. Make cheaper phone calls through your Mac — not to another computer, but to an actual telephone. Using a virtual debit card, dial through the Net2Phone interface and get cell-phone-like transmission quality. Software, free download; debit cards are available from various vendors. $1, 195; upgrade, $375. ESRJ: 800-447-9778 or 909-793-2853; http://www.esri.com/.

CyberStudio window, you can place text and graphic objects on the grid and move them anywhere you like (except on top of one another — that’s something HTML doesn’t let you do). CyberStudio automatically generates the HTML code required to create your design.

While you’re designing your pages, you can switch into two other page views with the click of a tab: In Outline mode, you can see your document in terms of the HTML tags you use — a view that can speed the debugging of pages containing errant code. In Source mode, CyberStudio displays your page with raw HTML codes color-coded to make them easier to understand. Any changes made in either of these two modes will also affect the WYSIWYG version of your document.

GoLive CyberStudio supports all commonly used text-style tags, including text colors and fonts. Its support for the Font Face tag is the best we’ve seen, allowing authors to create Font Sets — a series of related fonts that let you specify which font should be substituted if a particular font isn’t present on a reader’s system.

The program also supports tables (although for most layout uses, users will probably want to use CyberStudio’s page grid) and multiple interactive buttons, inking tools for creating text and picture frames, and text along a path. It also reports that QuarkXPress 4.0 hasn’t been upgraded significantly in six years. Six. Years. With QuarkXPress 4.0’s features and ship date still unconfirmed at press time and Adobe PageMaker 6.5 now rolling off the assembly line, rumors abound about the coming QuarkXPress upgrade.

MacUser’s sister publication, MacWEEK, reports that QuarkXPress 4.0 will support greater design flexibility by including a set of Adobe Illustrator-like drawing tools for creating text and picture frames and text along a path. It also reports that the new version will boast HiFi Color process printing, allow users to mix percentages of spot colors within the program, and support EPS and TIFF clipping paths. Quark won’t confirm these reports, but when asked, Ed Owens, Quark’s manager of evangelism, referred users to the MacWEEK article (http://www.macweek.com/mw_1103/mw_quark.html).

Officially, Quark has announced that QuarkXPress 4.0 will ease the plight of long-document creators, by offering enhanced indexing and table-
forms on a single page. GoLive says that since CyberStudio's database of HTML tags is a "module" separate from the rest of the application, the program can be made to support forthcoming HTML features without forcing users to download a whole new application.

CyberStudio supports frame sets — an HTML feature that lets you place multiple HTML files in one window — but doesn't let you edit pages within their frame set, unlike PageMill. We hope GoLive will consider adding this feature to the final version, given that creating frame sets is difficult if you can't edit the pages in place.

CyberStudio's support for multimedia is without peer. You can add Java applets or browser-plug-in files to a page and then run them within the editing window. CyberStudio also understands variables supported by many common plug-ins, making it easier to control the appearance of plug-in objects on your pages.

In addition to offering authoring features, CyberStudio helps Webmasters keep track of their sites. CyberStudio's project window lets you view all of your Web site's documents and links. If you move a file to a new location, using the Finder, CyberStudio can quickly update the links to that file. Like Fusion, CyberStudio allows you to arrange your pages in an organizational hierarchy and can also automatically generate an MCF (Meta-Content Format) document for use with Apple's HotSauce Web-navigation plug-in. But unlike Fusion, CyberStudio doesn't automatically generate navigational items on your pages — Fusion's got CyberStudio beat in this respect.

GoLive Pro, GoLive's first Web authoring product, offered an attractive and easy-to-use interface but didn't make the grade in terms of features. CyberStudio's interface is just as attractive, featuring floating palettes containing groups of template icons you drag and drop into your editing window. The feature set is impressive indeed.

Given the fast-moving state of the Web publishing market, we have no doubt that other products will quickly move to match CyberStudio's feature set. But for now, GoLive has a leg up on all its competitors — CyberStudio should appeal to all serious Web authors who want a powerful graphical page editor. / JASON SNELL

IN BRIEF

Macromedia to Do DTV

Multimedia King Macromedia is diving into the digital-video market, with Final Cut, its new heavyweight digital-video-editing software. Final Cut's drag-and-drop editing environment is built around a central "player," with each window functioning as a plug-in. Features include an extensive set of effects and filters and the RealTime option for use with dual-stream digital-video boards. Pricing isn't set, but Macromedia says that the cross-platform product will run in the $1,000-to-$3,000 range when it ships in mid-1997. Macromedia: 800-326-2128 or 415-252-2000; http://www.macromedia.com/.

A Vote of OS Confidence

Q. WHAT DO YOU THINK of Apple's decision to go with NeXTstep as the basis for the next Mac OS?

Five thousand people responded to our recent Web-based poll, and a huge majority of them — 71 percent — approve of Apple's decision to base its next OS on NeXTstep. But maybe most poll respondents were simply happy to have a choice of two upcoming Mac operating systems — Apple's next OS and the BeOS. (To register your opinion in MacUser's online polls, go to http://www.macuser.com/poll.html.) / JASON SNELL

Motorola to License BeOS

Life Goes On for Never-Say-Die Be. After losing out to NeXT in the Mac OS battle, Be licensed its powerful BeOS to Power Computing. Now the Motorola Computer Group has announced its intent to bundle the BeOS with the Mac OS, on its StarMax Mac clones. Also, Be and Motorola have formed a technology alliance and will study the feasibility of using the BeOS on Motorola's high-end PowerStack systems. Although the hoped-for flood of BeOS applications is a disappointing trickle, the BeOS is a viable PowerPC OS alternative — a well-positioned one if Apple's Rhapsody effort should stumble. / RIK MYSLEWSKI
# NEW & NOTABLE

**Astound WebMotion.** Create streaming, Java-based multimedia Web content — including 2-D animation and sound — that doesn't require a plug-in to view. $69.95. Astound: 888-427-8686 or 415-845-6200; http://www.astound.com/.

**Total PowerSMP.** Boost your Mac's speed with one of this family of application-accelerator cards, each equipped with one, two, or four PowerPCs (a 128K L2 cache; and two SIMM slots. Available processors are a 132-MHz 604 and a 165-MHz, 198-MHz, and 231-MHz 604e. $1,400 to $5,400. Total Impact: 805-987-8704; http://www.totalimpact.com/.

**Tektronix Phaser 450.** New color-calibration and -correction options and reformulated dye-sub media enhance this color printer's latest incarnation. Print up to 9.3 x 12.7-inch, full-page bleeds for prepress proofing. $6,995; upgrade from Phaser 440, $695. Tektronix: 800-835-6100 or 503-682-7377; http://www.tek.com/.

**Microtech MicroDAT 24000.** This DAT drive, which has a data-transfer rate of 1.2 megabytes per second, stores 24 GB at 2:1 compression or 12 GB in native mode on a 125-meter DAT tape. $1,999. Microtech International: 800-220-9489 or 203-468-6223; http://www.microtechint.com/.

**Conflict Catcher 4.** This utility's reworked interface now displays file icons and load times, and the program includes such new features as plug-in management and automatic conflict testing after startup crashes. $69.95; upgrade, $39.95. Casady & Greene: 800-339-4920 or 608-484-9228; http://www.casadyg.com/.

**FARGO Signature CD Color Printer.** Print water-resistant, CMYK text and graphics directly on printable-surface CD-R media. Thermal inkjet printer prints at two resolutions (300 x 300 or 600 x 300 dpi) on one disc at a time. $1,295; CMY cartridge, $52.95; black cartridge, $39.95. FARGO Electronics: 800-205-5852 or 612-946-8415; http://www.fargo.com/.

**Design Your Own Home 3D WalkAround.** Create 2-D layouts and 3-D walkthroughs (at up to 15 frames per second) with this CAD software, using its libraries of objects, textures, and floor plans. $100. Abracadata: 800-451-4871 or 541-342-3036; http://www.abracadata.com/.

**MAPublisher 2.** Import GIS (Geographic Information System) map files into Adobe Illustrator for editing, layout, and PostScript conversion. $495; upgrade, $99. Avenza Software: 800-884-2555 or 905-639-3330; http://www.avenza.com/; /BROOKE C. WHEELER

---

# FIRST LOOKS

**Extensis VectorTools**

Frustrated by Flash overfunction? It's a common lament for many users of drawing-program plug-ins, since only a few meet users' basic needs and offer significant time savings for Adobe Illustrator and Macromedia FreeHand.

Extensis DrawTools 1.0 has proven itself to be one of the only real productivity boosters. Our first look at a beta version of its renamed upgrade, Extensis VectorTools 2.0, due out this spring, proves that the legacy continues.

VectorTools doesn't have the single-feature punch of other drawing plug-ins, but it's blossomed into a strong collection of useful, everyday tools for Illustrator and FreeHand. The package contains VectorTools versions for both drawing programs, with Illustrator users getting the slightly better deal.

VectorTools 2.0's host of handy features has one standout, the simple but convenient VectorLibrary. Embed often used artwork, photos, and text in the library palette for quick drag-and-drop access — like using a library in QuarkXPress.

The new VectorMagic Wand...

---

**Microtech 3D Xplosion:**

Inexpensive 3-D-game speed booster.

It's not clear whether the Power Mac will succeed as a 3-D-gaming platform, but it's unlikely to do so unless powerful — and cheap — 3-D hardware becomes standard equipment. With all the big-name 3-D-chip vendors eagerly porting their existing firmware and drivers to the Mac, plus the promise of new chips on the way, this looks to become a reality.

One such chip powers the soon-to-be-released Microtech 3D Xplosion card. In fact, the 3D Xplosion is nothing more than a single PIX 3D Graphics Processor, from S-MOS Systems, mounted on a card; PCI cards don't get any simpler than this.

Unlike ATT's popular 3-D-graphics accelerator, the Xclaim 3D, which uses its own RAM to store texture maps locally, the 3D Xplosion uses existing system memory instead. This approach lowers the card's cost — and speed. Since moving textures across the PCI bus is somewhat inefficient, any card using this approach will be outperformed by more-expensive cards equipped with dedicated texture RAM. In addition, the 3D Xplosion works in conjunction with existing graphics-card or built-in display circuitry — another bottleneck a combo 3-D/display card doesn't have.

Still, it's a bargain: The 3D Xplosion will sell for about $100 less than the least expensive of ATT's 3-D-graphics offerings — and, according to an S-MOS spokesperson, cards utilizing the PIX chip will soon be available at a street price of below $100.

We tested an early version of the 3D Xplosion with not-yet-even-beta-release drivers and saw noticeable, although not staggering, improvements in 3-D-game performance. Performance should...
2.0: Solid, useful plug-in package.

adds a needed feature to Illustrator and improves on a FreeHand standard. Illustrator users who envy FreeHand's Find & Replace Graphics (which searches for and replaces an object attribute — a stroke width of 6 points, for example) will appreciate how VectorMagicWand takes this idea one step further. You can set the magic wand's specifications to find a range of attributes — for example, every stroke with a width between 5 and 7 points.

But as FreeHand and Illustrator are two different packages, so are their VectorTools versions. What may sell VectorTools to Illustrator users is a tool FreeHand users already have — object style sheets. VectorStyles lets you save attributes set in the Paint Style dialog box (such as stroke color) as a style. To apply the style, you select an object and double-click on the style name. VectorStyles doesn't pack the scripting-like power of Alien Skin's Stylist, but it's easier to use.

VectorTools' FreeHand version has two exclusive tools, VectorType and VectorCaps. VectorType gives FreeHand users character-level control over text, and VectorCaps allows them to change word case with a single click. Yet neither tool will prove as essential to FreeHand users as the powerful VectorStyles will be to Illustrator users.

Rounding out the VectorTools package are searchable tips and preset frame options and custom-tool-bar creation for Illustrator users. The handy VectorNavigator palette shows a miniature of your image with a red box indicating the zoom-in area so you don't lose your place.

VectorTools 2.0's simple, convenient tools make it a great plug-in package for both Illustrator and FreeHand, with Illustrator users having a few extra incentives to buy. / SCHOLLE SAWYER

The Geek Beat

ISDN. Users of Sagem ISDN terminal adapters can leave the driving to software, thanks to a new version of Sagem's free PPP application that automatically allocates ISDN bandwidth based on the kind of work you're doing. When you're viewing a Web page, for example, the software might use only one of the two available ISDN B channels. Start downloading a large file, and the software automatically fires up the second B channel, doubling the available bandwidth. 408-448-8690; http://www.satysa.com/.

NETWORKING. Compatible Systems' WAN routers now support secure tunneling of AppleTalk and IPX via STEP (Secure Tunnel Establishment Protocol). With a Compatible Systems router in place at the corporate office, remote users can dial a local Internet service provider and connect to the corporate LAN via TCP/IP and tunneled AppleTalk or IPX. 800-356-0283 or 303-444-9532; http://www.compatible.com/.

SONIC SYSTEMS. Sonic Systems has added IPX support and the moniker PRO to its QuickStream remote-access server. $999; upgrade, $499. 408-736-1900; http://www.sonicsys.com/.

CROSS-PLATFORM. Orange Micro is shipping a 200-MHz Pentium card for PCI Macs (starting at $2,000); a 2-7-inch, Performa-oriented 100-MHz Pentium card ($799); and a version of Windows NT 4.0 ($278) for all the company's Pentium-based Macintosh coprocessor cards. 714-779-2772; http://www.orange micro.com/.

INTERNET. WebSentinel, from Purity Software, is a Web-server plug-in and security application that extends the standard security realms and that features a Users & Groups-style interface. $99. 512-328-2288; http://www.purity.com/.

Pacific Coast Software's SiteGuard also gives Webmasters added realm security and maintains a database of users and groups that can be accessed remotely. 5295-619-675-1106; http://www.pacific-coast.com/.

DEVELOPMENT. Metrowerks has acquired The Latitude Group, maker of porting tools and libraries. Metrowerks intends to use Latitude's software to port CodecWarrior to Sun Microsystems' Solaris platform. Metrowerks: 800-377-5416 or 512-873-4700; http://www.metrowerks.com/.

DOCUMENTATION. For Next's OpenStep development environment is now available at http://www.next.com/Pubs/Documents/Download/.

/ SHELLY BRISBIN

Because its S-MOS PIX 3-D-graphics-accelerator chip has its own built-in PCI Interface, the Microtech 3D Xplosion is the least crowded PCI card we've ever seen.
Epson Stylus Color 800: Stunning 1,440-dpi print quality.

**PROS:** Extremely high-quality color and monochrome output.

**CONS:** LocalTalk and Ethernet cards are expensive options.


All image processing takes place on your Mac, which connects to the Stylus Color 800 either through its serial port or through an optional LocalTalk ($149) or Ethernet ($499) card — and, no, that astronomical Ethernet-card price is not a misprint. A PostScript Level 2 software RIP will be available soon.

Although printing speed is highly dependent on your Mac's horsepower, Epson claims rates of "up to" 8 pages per minute for printing in monochrome and "up to" 7 pages per minute for printing in CMYK color. Our prerelease printer, however, never achieved these lofty goals. It's faster than its Stylus Color predecessors (and its new 1,440-x-720-dpi sibling, the $299 Stylus Color 600), but the Stylus Color 800's highest-quality output takes time — lots of it. /RICK MYSLEWSKI

**THE OFF BEAT**

Desktop Picture Window

WATCH CLOUDS FLOAT over Mount Whitney or see the sun set behind Yosemite Valley simply by installing Sundial ($29.95 list), from John Neil & Associates. Sundial is a time-lapse QuickTime movie that fills up your entire Mac desktop and updates about every five minutes — it does tie up your Mac while it updates, due to the current Mac OS' lack of preemptive multitasking. Over the course of the day, you can see the sun rise and set in any of ten 640-x-480, 832-x-624, or 1,024-x-768-pixel scenes. Once the Mac/NeXT hybrid OS is released, Sundial should be as unobtrusive as it is spectacular. $29.95. John Neil & Associates: 800-663-2943 or 415-905-3000; http://www.jna.com. /NANCY PETERSON
AppleShare IP 5.0: Versatile package serves to satisfy.

TCP/IP IS EVERYWHERE these days — except, oddly, in the Mac’s venerable file-and print-server software, AppleShare. But AppleShare IP 5.0, due in the first half of 1997, will finally fix that and provide other new features as well.

We took a close look at the beta version, available at http://appleshareip.apple.com/. The complete package is bursting with new applications and improvements, but we’ll wait to test a bug-free final version before we decide whether or not AppleShare IP 5.0 is robust enough to woo back Mac-server administrators who have been lured into the Wintel world by NetWare or Windows NT.

AppleShare IP 5.0 includes software for five types of servers: file-sharing, FTP, Web, e-mail, and print; you enable only the applications you need. The Web- and FTP-server software requires TCP/IP; the print-server software is AppleTalk-only, and the file-sharing-and e-mail-server software use AppleTalk or TCP/IP. All share a central Users & Groups file and are managed with linked administration tools. AppleShare IP 5.0 requires both System 7.5.5 or later and OpenDoc — a combination that accounts for its 32-MB RAM requirement.

TCP/IP AT LAST

The most revolutionary component of the new suite is AppleShare TCP/IP file sharing. To connect to a server via TCP/IP, each user needs AppleShare Workstation 3.7 (included in the server-software package). The Workstation client software displays servers in the Chooser as before, but it also has a field for the server’s IP address.

You can mount server volumes via AppleTalk or TCP/IP without needing to specify on the server which protocol users will use — just set up users and shared volumes as you would on an AppleTalk-only server. The procedure’s simplicity belies the significant value of TCP/IP-based file sharing: IP file transfers are frequently faster than AppleTalk transfers.

The e-mail-server software, Apple’s first since the ill-fated PowerShare, supports APOP authentication and is MIME-compliant. Based on the POP standard, it lets anyone with a POP-compatible client (Mac or PC) retrieve mail.

The Web- and FTP-server software, like most other Macintosh-based types, supports standard

From the AppleShare IP Server Manager, you can launch all five server functions and assign access privileges for server folders or volumes, just as you do with file sharing.

CGI (Common Gateway Interface) applications protect Web directories in the same way as you do AppleShare folders, with passwords. FTP purportedly works in the same way but was disabled in the early February beta version we tested — as was the print-server software.

Server administration and drive/folder sharing follow the same familiar AppleShare process, with user and group management for all servers. User accounts can be imported from older versions of AppleShare. If you delete a user, the software now asks whether you want to transfer the access privileges to another user or to add a new one.

TOO SOON TO TELL

AppleShare IP 5.0 delivers features Mac network administrators have been wanting and confirms Apple’s reputation as a developer of complex yet user-friendly software. Although the slow, unstable beta version we tested may sound a cautionary note for eager network managers, we must wait until AppleShare IP 5.0 officially ships to find out if Apple engineers can successfully exterminate all the bugs...

PROS: Full-featured server software with intuitive user interface. TCP/IP-based file transfer.

CONS: No remote-administration tools.


MACINTOSH PRICE INDEX

THE UNITED COMPUTER EXCHANGE index reflects average sales prices of new and used Macs as of February 3, 1997. Prices (other than those for compact models, Performas, and LCs) do not include a monitor or a keyboard. The United Computer Exchange is a national cleaninghouse of used microcomputer equipment.

MAC MODEL | NEW | USED
---|---|---
Classic II (4/40) | $215 | 
LC III (4/80) | $175 | 
Performs 5215CD (8/4GB) | $1,600 | 
Performs 6220CD (16/1GB) | $685 | 
Ri (5/60) | $175 | 
Rl (4/80) | $200 | 
ile. (4/100) | $250 | 
Quadra 605 (8/160) | $400 | 
Quadra 630 C (4/250) | $475 | 
Quadra 650 (8/230) | $525 | 
Quadra 800 (8/230) | $800 | 
Quadra 840 refuses (8/230/CD) | $950 | 
Quadra 950 (8/230) | $875 | 
Power Mac 6100/66 (8/350/CD) | $650 | 
Power Mac 7100/80 (8/700/CD) | $875 | 
Power Mac 7200/90 (8/900/CD) | $975 | 
Power Mac 7500/100 (16/1GB/CD) | $1,275 | 
Power Mac 8100/100 (16/1GB/CD) | $1,250 | 
Power Mac 8500/120 (16/2GB/CD) | $1,825 | 
Power Mac 9500/132 (16/2GB) | $2,175 | 
PowerBook 165 (4/60) | $700 | 
PowerBook 165 (4/120) | $675 | 
PowerBook 1900/66 (8/500) | $1,000 | 
PowerBook 520 (4/160) | $950 | 
PowerBook 540c (4/320) | $1,255 | 
PowerBook 5500 (100/8/500) | $1,500 | 
Duo 250 (4/200) | $550 | 
Duo 280/66 (4/320) | $875 | 
Duo 280/100/80 (8/750) | $1,499 | 
$1,175 | 
Power Computing Power 100 (16/GB/CD) | $825 | 
Power Computing PowerWave 640/150 (8/GB/CD) | $1,650 | 
= discontinued model

For more pricing information on these and other models, call 800-755-3033 or 770-955-0569 or visit http://www.uce.com/. And find it online in ZD Net, in Library 1 (Special Reports) of the MacUser Forum (GO ZMC-MACUSER).

MACUSER UTILITY OF THE MONTH

Monkey See & Do

NO, IT’S NOT FRENCH for “my key chain.” MonKeysChain is an exclusive MacUser utility that brings back one of the most convenient features of PowerTalk: the key Chain. Simply add the user name and password of any network server or even any protected URL or FTP site to MonKeysChain’s list, and it remembers and decrypts them for you, storing server or generic URL or FTP icons on a floating palette. All you will ever need to enter after that is MonKeysChain’s password.

Written by Darryl Payne, MonKeysChain is available free, beginning March 30, exclusively from MacUser’s Software Central on the Web (http://www.zdnet.com/macuser/software) and CompuServe (GO ZMC-MACUSER.). /PHIL Dyer

MAY 1997 / MacUser 31
REVIEWS

PowerTools Infiniti 3240 Power

PowerTools Infiniti 4200 Pro

New clone vendor fuels price/performance wars.

**UNHERALDED STARTUPS** and big-name brands are both essential to a healthy computer-clone industry, so the arrival of relative unknown PowerTools Systems in the Mac-clone arena marks another step in the development of the Mac OS-compatible hardware market. The company, established just over a year ago to market clock-chip accelerators, has now added a full line of Mac OS systems, which it calls the Infiniti series. These systems don't deliver features or performance you can't already get from other vendors, but they have low prices and offer exceptional flexibility.

The Lineup

The Infiniti line ranges from a bare-bones box that costs only $999 to a decked-out video-production system listing for $4,499. The systems are all based on Tanzania logic boards, built by Motorola — the same board used in Motorola's own StarMax systems, APS Technologies'M·Power line, and Apple's new Power Mac 4400.

Like other current Tanzania systems, the Infiniti models have PowerPC 603e or 604e processors soldered onto the board. Three EDO (extended data out) DIMM sockets can hold up to 160 MB of RAM total; there's also a slot for a Level 2 cache and another that can hold 2 or 4 MB of video RAM.

On the back, you'll find most of the usual Mac ports, with a few important exceptions: Ethernet is not built in, and instead of Apple's DB15 monitor port, you get a PC-standard SuperVGA connector. That makes it easy to plug in multisync monitors from Windows-oriented vendors, but it means you'll need an adapter to use a monitor designed for the Mac. (And that's only with multisync monitors — most older, fixed-frequency Mac monitors won't work at all.) On the plus side, you get PS/2 keyboard and mouse ports, which let you connect PC input devices, and you get a single ADB connector.

As for size and shape, PowerTools' only option is a tower case with a 200-watt power supply, five PCI slots, and bays for up to four 3.5-inch drives and three 5.25-inch drives.

PowerTools launched the Infiniti line with a series of stripped-down models targeted at dealers, VARs, corporate buyers, and power users — anyone, in short, interested in configuring systems with components of their choosing. Consisting of nothing but the logic board, floppy drive, power supply, and enclosure, such systems are known as 0/0 configurations, but for accuracy's sake, there ought to be more zeroes: They come not only without memory and hard drive but also with no CD-ROM drive, Level 2 cache, video RAM, keyboard, mouse, or Mac OS.

Currently, PowerTools offers four configurations: The three 603e-based boxes — the Infiniti 3180, 3200, and 3240, with 180-, 200-, and 240-MHz processors, respectively — go for $999, $1,099, and $1,299, respectively. The Infiniti 4200, with a 200-MHz 604e, is $1,499. Do the arithmetic carefully — the prices look appealingly low, but unless you already have the missing pieces on hand, you might come out ahead buying a more fully configured package.

That doesn't necessarily mean going to another vendor, though: PowerTools also offers several predefined package deals, which include an 8x CD-ROM drive, extended keyboard, mouse, Mac OS 7.6, and other features. The Smart bundle, for example, consists of an Infiniti 3180 with 16 MB of RAM, a 2.5-GB EIDE hard drive, 2 MB of VRAM, and a 256K L2 cache, for $1,599; the Elite bundle combines the Infiniti 4200 board with the same hard drive plus 32 MB of RAM, a 4-MB video...
card, a 512K cache, a 33.6-kbps fax modem, and speakers, for $2,998.

The latest additions to the line are two desktop video-production systems. The Infiniti 3240 dVp, priced at $2,499, includes a 200-MHz 603e processor, 32 MB of RAM, a 3.2-GB IDE hard drive, an 8x CD-ROM drive, a 512K L2 cache, 4 MB of SGRAM (synchronous graphics RAM — a fast form of video memory), a microMotion DC-20 digital-video card, and limited editions of Adobe Photoshop and Premiere. The Infiniti 4200 dVp combines all the same features with a 200-MHz 604e processor and a StreamLogic JackHammer Fast Wide SCSI card driving a striped pair of 2.1-GB Fast Wide Seagate Barracuda drives — in addition to the 3.2-GB EIDE drive — for $4,499. And if you don’t like any of the bundle deals PowerTools offers, you can design your own custom configuration.

One apparent drawback to the Infiniti line — in common with all Tanzania systems — is the lack of a CPU-upgrade path. PowerTools has neatly sidestepped the problem, however, by promising to offer complete logic-board upgrades with faster processors. The company said that it expects these boards to cost no more than CPU daughterboards for other Mac OS systems, and so far it appears to be living up to its claim: It’s already shipping Tanzania upgrade boards priced from $499 to $899, depending on processor speed.

Put to the Test

Using MacBench 4.0, we tested the speed of two PowerTools models, the Infiniti 3240 Power and the Infiniti 4200 Pro, and we were pleasantly surprised by what we found. The 3240 outperformed two other 240-MHz 603e systems — Power Computing’s PowerBase 240 and UMAX Computer’s SuperMac C600/240 — on all tests except the Floating Point test, where for some reason the Infiniti system fell far short. On MacBench’s Processor test, the Infiniti 3240 Power placed almost 25 percent ahead of the other two systems.

That matchup wasn’t exactly fair, however, because the 3240 (configured as in PowerTools’ $2,499 Power bundle) had a 512K L2 cache — twice as much as the competing systems — and Mac OS 7.6, which significantly improves scores in MacBench 4.0’s Processor test. With the Infiniti 4200 (configured as in the Pro bundle), also $2,499, we had a more even playing field: The 200-MHz 604e systems we compared — Motorola’s StarMax 4000/200 MT and APS’ M+Power 604e200 — at least had L2 caches of the same size (512K).

Again, the PowerTools system handily bested its rivals. Its 14-percent edge in the Processor test may be attributable to Mac OS 7.6, but there was no ambiguity about its huge lead in the Disk and Publishing Disk tests: The IBM DeskStar drive PowerTools puts in the Infiniti 4200 Pro simply blows away the Quantum drives APS and Motorola use.

Costing Them Out

We compared PowerTools’ prices to those of APS in particular, since the two companies offer similar hardware via the same distribution model. In many cases, PowerTools’ systems were appreciably, although not dramatically, cheaper than APS; in other cases, APS offered fully configured systems priced a bit below PowerTools’ packages with the same processor, but the PowerTools bundles included considerably more. Both PowerTools and APS provide one-year standard warranties requiring that defective equipment be returned to the factory for repair; both offer extended-warranty plans at extra cost.

The Bottom Line

Certainly, an element of risk is involved in buying from a small company with no real track record. Although the systems we tested appeared well made, the products haven’t yet been through sustained real-life testing. On the whole, though, we liked what we saw. If you’re looking for good prices, good speed, and plenty of configuration options, the Infiniti series is well worth consideration. / Henry Norr


HEFTING THE POWERTOOLS

We subjected two PowerTools Infiniti systems to our industry-standard MacBench 4.0 test suite to see how they fared against competing systems, and the results were encouraging. Thanks in part to Mac OS 7.6, which ships with the Infiniti systems (and which boosts MacBench Processor scores), the PowerTools systems compared favorably to the other systems. The tested systems were the Infiniti 4200 Pro bundle (200-MHz PowerPC 604e, 24 MB of RAM, 512K L2 cache, 3.5-GB hard drive, 8x CD-ROM drive, and 2 MB of VRAM) and the Infiniti 3240 Power bundle (240-MHz PowerPC 603e, 32 MB of RAM, 512K L2 cache, 3.2-GB hard drive, 8x CD-ROM drive, and 1 MB of VRAM). MacBench 4.0 scores are relative to those of an Apple Power Mac 6100/60 with a 30-MHz memory bus, a 250-MB hard drive, 2 MB of built-in graphics RAM, and no L2 cache. MacUser’s Online CPU Report Cards contain complete and up-to-the-minute information on these and all other currently shipping Mac OS systems; they can be found on the MacUser Web Edition’s New Mac Ratings page, at http://www.zdnet.com/macuser/cpu.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>418</td>
<td>101</td>
<td>366</td>
<td>288</td>
<td>324</td>
<td>375</td>
<td>328</td>
<td></td>
</tr>
</tbody>
</table>

*Tests performed with virtual memory off.
REVIEWS / MAC OS SYSTEMS

Dual-Processor Systems

UMAX SuperMac S900DP/200

UMAX SuperMac S900DP/250 RAID

Two fast new systems make multiprocessing more affordable.

You're losing money every second you sit idle. Two fast new systems make multiprocessing more affordable.

UMAX SuperMac S900DP/200 and S900DP/250 RAID are based on the UMAX SuperMac S900 systems we recently reviewed (see “Mac OS Systems,” January '97, page 33). The S900DP/200, in fact, is almost identical to the S900DP/200; they both have 32 MB of RAM, an IBM UltraStar Ultra SCSI drives, and an 8x CD-ROM drive. (The S900DP/200 has a 2-GB hard drive; the S900DP/200's drive holds 2.1 GB.) On the negative side, they also share the S900 systems' soldered-on 512K L2 cache and clumsy drive-covering plastic door. The big difference between them is that the S900DP/200 has an additional 200-MHz 604e microprocessor on a card installed in UMAX's unique secondary-processor slot.

With a street price of around $4,500, the S900DP/200 is the most cost-effective system we've seen for those joining the multiprocessing world. Even more interesting than the S900DP/200, however, is its beefier sibling, the S900DP/250 RAID. The specifications of this high-powered offering are truly impressive: 64 MB of RAM; an IMS TwinTurbo 128M graphics card with 8 MB of VRAM; a RAID array with two 1.1-GB IBM UltraStar Ultra SCSI drives; an 8x CD-ROM drive; an Iomega Zip drive; and UMAX's E100 PCI card, which provides Ultra SCSI as well as 100BASE-T Ethernet ports.

The crowning glories of the S900DP/250 RAID, however, are its two 250-MHz 604e microprocessors — the fastest chips in any Mac OS system we've tested to date. The S900DP/250 RAID is so chock-full of goodies that it's a fully configured content-creating workhorse right out of the box — no, make that a racehorse.

Our testing with MP-enabled Photoshop 4.0 and ElectricImage Animation System 2.7 showed it to hold its own against — and, in some cases, surpass — the four-processor DayStar Genesis MP 720+ running Photoshop 3.0.5 with Adobe's MP-enabling plug-in and a beta version of ElectricImage Animation System, which we tested for our recent MP-system roundup (see “Muscle Macs: A Shop 3.0.5 with Adobe’s MP-enabling plug-in and UMAX’s ElOO PCI card, which provides Ultra SCSI as well as 100BASE-T Ethernet ports.

The Bottom Line

It used to be that if you were an image-processing professional, you could afford only one of the two best ways to create a high-speed system: a ton of RAM or a multiprocessor system. Times have changed: RAM is dirt cheap, DayStar has slashed the prices of its pioneering Genesis MP line, and now UMAX has released the SuperMac S900DP/200 and S900DP/250 RAID. So what are you waiting for? / Jeff Miesliski and Rik Myleswki


DOUBLE YOUR PLEASURE / twice the processors, not twice the performance

A dual-processor system boosts the performance of applications that have been MP-enabled, but don't expect two processors to give you twice the speed — there are simply too many other factors involved, such as the efficiency of the MP-enabled application, the overhead of the OS and its MP-enabling extensions, and such nonprocessing factors as hard-drive speed. Even with these limitations, however, the new UMAX SuperMac systems performed impressively on various Photoshop and ElectricImage Animation System tasks. Each system had 256 MB of RAM, and Photoshop was allocated 192 MB of RAM. We used a 50-MB image in Photoshop testing; the ElectricImage Animation System test frame was 2.8 MB and included 68,712 active facets with volumetric smoke and 29 textures.

<table>
<thead>
<tr>
<th>ROTATE 3 DEGREES</th>
<th>FEATHER SELECTION</th>
<th>UNSHARP MASK (2.6 PIXEL RADIUS)</th>
<th>GAUSSIAN BLUR (2.6 PIXEL RADIUS)</th>
<th>MODE CHANGE RGB TO CMYK</th>
<th>RESIZE 50 PERCENT</th>
<th>ELECTRIC IMAGE CAMERA RENDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMAX SuperMac S900DP/250 RAID</td>
<td>23.8</td>
<td>8.6</td>
<td>26.6</td>
<td>19.6</td>
<td>14.2</td>
<td>16.3</td>
</tr>
<tr>
<td>UMAX SuperMac S900DP/200</td>
<td>27.0</td>
<td>9.5</td>
<td>26.6</td>
<td>21.0</td>
<td>17.8</td>
<td>17.2</td>
</tr>
<tr>
<td>REFERENCE SYSTEMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple Power Mac 9500/180MP</td>
<td>28.3</td>
<td>9.6</td>
<td>26.6</td>
<td>22.2</td>
<td>18.5</td>
<td>18.1</td>
</tr>
<tr>
<td>Apple Power Mac 9500/200</td>
<td>32.2</td>
<td>11.7</td>
<td>34.5</td>
<td>28.3</td>
<td>20.9</td>
<td>20.9</td>
</tr>
<tr>
<td>BEST PERFORMER IN EACH TEST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Photograph: J. Guillen/Redwood, Inc.

34 MacUser / May 1997
A mixture of tools so powerful...

we should put asbestos gloves in every box!

top toying with feeble graphics programs that sap your creative energy. Canvas 5 puts everything you need to realize your artistic vision into one integrated program that's ready to rock the second inspiration hits. • Say goodbye to concentration-zapping "launch and quit" cycles. With Canvas 5, absolutely stunning illustration, photo editing, and page design tools are always right at your fingertips. • In addition, Canvas 5 works with any file (from Photoshop™ to CorelDraw™ to GIF, TIFF, and JPEG) and any Photoshop-compatible plug-in. You also get over 20,000 clip art images and 2,000 premium URW™ fonts. • Simple, flexible, and relentlessly versatile, Canvas 5 is an industrial-strength graphics tool. So what are you waiting for? Put the awesome power of Canvas 5 under your creative control today.

If you already own a graphics application, trade up to Canvas 5 for just $149.95. See your favorite reseller, or visit us at www.deneba.com for complete product information and secure online ordering. For a Canvas 5 dealer near you, or to order by phone, call 1-800-6 CANVAS or 305-596-5644.
**Symantec Visual Café for Macintosh**

Powerful new Java tool stumbling, through no fault of its own.

**IF YOU’RE CRAVING A JOLT** of Java but don’t want to arm-wrestle with compilers and syntax errors, check out Symantec Visual Café for Macintosh, a full development environment for creating Java applications and applets via point, click, and drag. But be advised: Although this approach has several benefits, it’s not the best choice for everyone.

First, don’t confuse Visual Café with Café for Macintosh. The latter is Symantec’s traditional, source-code-oriented integrated development environment, which would appear quite similar to the UI elements created with Visual Café. For Macintosh, Cafe allows you to create relationships, such as actions that happen as a result of a button click, among the elements — it just takes a bit of clicking and dragging, often with no manual coding at all.

Mac developers typically use graphical tools and a resource editor such as ResEdit or Mathemaesthetics’ Resorcerer for creating windows and dialog boxes. However, there is no standard resource format for Java. Although visual interface elements, such as buttons and labels, are part of Sun Microsystems’ standard Java class library, some of the more complex elements offered by Visual Café are supplied as prefabricated Java class files. When you’re creating Java applets, these class files must be placed in a directory on the same Web server as the applets themselves.

**Visual Tools**

Visual Café is a full-fledged integrated development environment (IDE) that uses a project metaphor similar to that of other IDEs — but the similarity to conventional development tools ends there. Instead of listing the various source files that constitute the final software, Visual Café project files show, in a hierarchical view, the various user-interface elements that make up the final Java applet or application. For example, an applet’s window can contain buttons, labels, data-entry fields, and other bits and pieces, visible in a Finder-style collapsible outline view.

Creating a user interface (UI) with Visual Café is easy. Once the backdrop of a UI, typically a window or a frame, is defined, positioning elements is a straightforward matter of selecting them from the tool palette and then placing them within the window or frame. After the elements are in place, Visual Café allows you to create relationships, such as the applets themselves.

One drawback of the lack of a standard Java resource format is that the Visual Café development environment for making user interfaces is not — and cannot be — truly WYSIWYG, since each Java VM (virtual machine, the software engine built into Web browsers that actually executes the Java applets) provides a different version of the standard user-interface elements. Even when you compare the look of a simple Java applet running under Symantec’s VM with the same applet running under Netscape’s VM, differences are immediately visible.

Although Visual Café’s drawing-style tools allow you to create applets without writing a single line of code, the code Visual Café itself generates is accessible and editable. Care must be taken when editing these files directly, however, since further changes made with Visual Café can obliterate any manual changes. This issue highlights one of Visual Café’s problems: documentation.

**Instructions Not Included**

Visual Café comes on a CD-ROM, accompanied by a pamphlet of minimal installation instructions. After you’ve installed the software from the CD-ROM, no other documentation is immediately evident. Further exploration reveals a comprehensive Apple Guide that contains a great deal of useful information, in the typical bite-sized amounts for which Apple Guide was designed.

A rich development tool such as Visual Café needs good documentation, for novices as well as for professionals who might be unfamiliar with this particular environment. Although development-tool documentation, especially frequently used references, can be more useful in searchable electronic form, some documentation, such as tool references or tutorials, is considerably more useful in paper form. Although Symantec seems to be delivering the missing documentation piecemeal on its Web site, this product should have shipped without it.

Visual Café also suffers from a limitation that’s not Symantec’s fault: Its Java component, including the Java VM, is based on Sun’s Java Development Kit (JDK) 1.0.2, whose Mac version is notoriously slow and fraught with problems. And although Symantec’s adaptation of the Sun tool set is usable, it lacks support for more-advanced Java technologies, such as database-connectivity software, that are already available for Windows and UNIX platforms.

**The Bottom Line**

Visual Café for Macintosh shows great promise, but it suffers from teething problems common to 1.0 products. Once its initial issues have been resolved and Java on the Mac has matured, Visual Café should become a worthwhile addition to your Java-development tool set, especially if you’re primarily interested in constructing Java-based forms and user interfaces with a minimum of hand coding.

//Stephan Somogyi

EVEN BLACK AND WHITE CAN BE COLORFUL. WHEN IT'S GCC.

Put the power of GCC black and white printing right at your fingertips. 1200 dpi. AccuGray for superior halftones. Up to 11.69" x 20" full bleed output with registration and crop marks. The GCC Elite XL printer series.

1-800-422-7777

GCC TECHNOLOGIES
www.gcctech.com

CIRCLE 101 ON READER SERVICE CARD
Put our labs in your machine
Did you know you can test your computers using the very same benchmarks the Ziff-Davis experts do? Absolutely. You can run the same scientific performance tests that make our product reviews so reliable and so successful. You too will get dependable results. What's more, Ziff-Davis benchmarks incorporate real-life computing tasks. No wonder they’re such a worldwide success.

With over 7 million copies distributed in the last three years, they’re the industry standards for measuring hardware performance.

Where do we get objective benchmarks of such high quality? We create them. Through the Ziff-Davis Benchmark Operation, the world’s largest independent benchmark research and development team. Entirely dedicated to developing benchmarks you can trust.

**Ziff-Davis Benchmarks:**
**The Whole World Watches**
NetObjects Fusion

Clumsy interface mars powerful Web-site-creation tool.

LONG-SUFFERING DESIGNERS of Web sites have anxiously awaited NetObjects Fusion, a Web-site-layout program that cleverly gets around the limitations and intricacies of HTML. The program lets you design Web pages by arranging objects on a page grid, just as you would in Adobe PageMaker or QuarkXPress. Perhaps even more compelling, Fusion lets you create, manage, and update entire Web sites. For all its power and convenience, however, Fusion suffers from its lack of support for Mac-standard interface conventions.

Taming HTML

HTML wasn't designed with snazzy page designs in mind. If you want to create lively, graphical layouts with HTML, you have to embed text and graphics within tables, a difficult process even with the help of a visual HTML editor such as Adobe PageMill 2.0. Fusion takes a different tack: It looks at where you've placed your text and graphics on a page-layout-style grid and then generates exact table definitions, saving you time and brain power.

At first glance, Fusion looks a lot like print-based page-layout programs. You have a pasteboard, complete with a layout grid and a tool palette. The palette includes tools for placing and manipulating text and pictures and adding sound, Java applets, browser plug-ins, interactive form fields, buttons, and menus. Once placed, any of the items can be dragged anywhere on a Fusion page — except that objects can't overlap. That's one limitation of HTML that even Fusion can't get around.

However, Fusion also has the feel of a program incompletely ported from Windows. Most noticeably, it doesn't support standard Mac conventions for editing text. To make selected text bold or italic or to adjust text alignment, you have to click on icons in a floating palette. Equally bizarre, double-clicking on the Fusion application's icon brings up a New Site dialog box, and if you click on the Cancel button, the application will quit. If you want to open a site you've created, you must either double-click on its icon or create a blank site from the New Site dialog box and then open your existing site. Fusion has only one window, which must be open at all times, another vestige of its Windows 95 roots.

We also missed some of PageMill's features, such as the ability to create a horizontal rule with one button click; in Fusion, you have to painstakingly draw a straight line with the drawing tool. We found Fusion slow at times too, even on a relatively speedy Power Mac.

A Site to See

Perhaps even more compelling than Fusion's page-layout metaphor is its ability to create and maintain not just pages but also entire Web sites. Fusion's site view lets you organize your Web site's pages by using either a tree metaphor or an outline. You can drag and drop pages anywhere in the hierarchy. Also, Fusion can automatically generate running navigational headers and footers, either as text hyperlinks or linked buttons, for every page of your site.

Fusion comes with 50 site styles containing coordinated banner graphics and navigational buttons; you can also import graphics to create your own site styles. Once you've selected a site style, Fusion will automatically generate banner and navigational text and place it on the graphical elements, thereby creating a site that appears custom-built but saving you hours of text and GIF editing — although we weren't pleased that Fusion doesn't anti-alias the text it generates.

Fusion keeps track of all the pages of your Web site, so if you move a page around in the site hierarchy, all the links to that page will be updated automatically. However, unlike the upcoming revision of Fusion's Windows version, Fusion for the Macintosh isn't capable of importing existing Web sites, making converting to Fusion a difficult proposition for anyone already in charge of a large site. NetObjects says that site importing will be possible in Fusion's next Mac version.

Once your site has been created (or updated), Fusion can automatically upload all the files in your site to your Web server via FTP. After you've set up your server name, log-in name, and password, uploading your site to a temporary staging area or to your production server requires just one button click.

The Bottom Line

By eliminating the need to depend directly on HTML, Fusion has raised the bar for all other Web authoring packages. But Fusion is not without its limitations, chief among them the inability to import existing Web sites and a clunky interface lacking in the niceties we've come to expect from Mac applications. It's also a bit overpriced, given that most full-featured Web authoring tools are under $100. For site designers frustrated by the word-processor-like feel of other Web tools and a lack of site-management tools, Fusion is an intriguing product with a lot of potential — but it's not yet time to throw out your copies of PageMill and BBEdit. / Jason Snell

It's art. It's your image.
Trust it to Tektronix color printers.

More design professionals choose a color printer from Tektronix, the leader in workgroup color printing, than from anyone. It is because they want the richest, most vibrant, and controllable color in the world. The fastest. The brightest. And the most versatile. All these color printers are cross-platform and connect to networks in a snap. They're economical and reliable. And they'll make all your comps and pre-film proofs worthy of a standing ovation.

Which one is best for you? Get your free Power of Color interactive CD with print samples and find out!

NEW Phaser 600
NEW Phaser 350
NEW Phaser 450
Phaser 480X
Phaser 300X
Phaser 550

Poster-sized prints On any paper
Fastest color Pennies a page
Photographic print quality Letter bleed
Photographic print quality Tabloid bleed
Brilliant color Any paper both sides
1200 dpi color laser Office workhorse


© 1997 Tektronix, Inc. All rights reserved.

CIRCLE 124 ON READER SERVICE CARD
Human Models

Fractal Design Poser 2.0

Life Forms 2.0

Two packages offer different takes on human-form modeling.

THE HUMAN FIGURE IS infamously difficult to simulate on a computer, but both Fractal Design Poser and Credo Multimedia's Life Forms let you create and manipulate 3-D human figures with relative ease. Comparing the two, the more-realistic figures in Poser, coupled with a lower price and a solid, new animation engine, give it a definite edge.

Poser 2.0, a significant update to the first version of the program, offers keyframe-based animation, can import and export files in a greater variety of formats, and has improved rendering quality. The new human-body models, which include some clothed figures, are of excellent quality and have accurately rendered muscles and joints. You can replace any portion of a figure's anatomy with an imported 3-D object. Poser now also shows vanishing points and perspective lines, which let you accurately align a figure to an imported background image.

Body parts that are linked to another part of the body that's moving will likewise move and rotate; this type of hierarchical linking and inheritance of motion is called inverse kinematics. Poser figures also have limb constraints, which prevent joints from rotating or bending beyond what is realistic. Parameter Dials give you numeric control over figure geometry and position.

Life Forms' models are much simpler: The highest level of detail possible is a wire frame. Posing Life Forms figures is as easy as it is in Poser, and the program also uses inverse kinematics. Limb constraints, however, are conspicuously absent, even though they're vital for positioning and moving human figures.

Body Building

Poser's rendering capabilities are robust enough to generate models and rough drafts you can enhance with better rendering and place in more-complex scenes with other objects in another 3-D program. You can specify the surface characteristics of figures as well as of whatever they're standing on. You can export Poser figures and their texture maps as 3DMF, DXF, Detailer text, RenderMan RIB, or Wavefront OBJ files.

Rendering a Life Forms figure is quite fast, but all you can specify is the wire frame's color and resolution. You can render the figures in PICS, PICT, or QuickTime format or use the included plug-ins for Specular's Infini-D and Macro-media's Swivel 3D and Extreme3D to render the figures in a modeling program. Nonetheless, Life Forms' wire-frame forms aren't detailed enough to let you generate realistic models.

Poser has a simple keyframe-based animation system, which is great for basic human motion but which may leave experienced animators wanting more. There are no ease-in/out, curve-based motion or velocity controls, much less features for editing velocity or motion through nonlinear interpolation (which makes motion smoother and more realistic by simulating gradual movement). You can get nearly realistic movement, but you need the tighter controls of other 3-D-animation packages to achieve truly realistic motion.

Life Forms' keyframing techniques have little in common with those in other applications. For example, if the position (or geometry) of a character has changed from the previous keyframe, the change is indicated by tiny, difficult-to-decode thumbnails of the wire-frame character in the timeline. Life Forms lacks any real-time, interactive previews and doesn't have numeric controls that allow you to rotate or zoom its display increments large enough to accommodate long animations — this makes it difficult to see even a short sequence on a 17-inch monitor. You can create and see motion paths in either program, but they're strictly linear: There is no support for user-definable curve-based motion or velocity. Unlike in other animation programs, such as Adobe After Effects, the rotation controls in Poser and Life Forms can't produce anything greater than a single 360-degree rotation in a single step.

The Bottom Line

If you need to visualize human motion on your computer for choreography, say, and you don't need to model realistic human figures, Life Forms is an alternative to more-complex and more-expensive animation programs. By comparison, Fractal Design Poser's detailed models plus its new animation capabilities make it a winner hands (and feet) down.

David Biedny and Nathan Moody


You have a need—to update, to enter, to access your information, and all away from your PC. The new PalmPilot connected organizer is how you do it. PalmPilot puts contacts, e-mail, schedules, right in your hand. And HotSync technology lets you synchronize that data with your PC. PalmPilot is the one link to your most important information. Anywhere.

Optional links are available to Schedule+, Lotus Organizer, Symantec ACT!, Ascend 97, and others (sold separately).

Call 1-800-881-7256 ext. 21 or visit our web site at http://www.usr.com/palm for the PalmPilot retailer nearest you.

PalmPilot Personal $299*
- Backlit display for low-light viewing
- Instantly syncs data with your PC
- Easy expense tracking
- Stores thousands of entries
- User upgradable to Professional Edition

PalmPilot Professional $399*
- All PalmPilot Personal features plus:
  - Pocket e-mail
  - Internet ready (TCP/IP support)
  - Twice the memory
Nisus Writer 5.0

Full-featured word processor bursts at the seams.

FOR THOSE WHO WRITE in Hebrew or need to type complex, quadratic equations, Nisus Writer is an impressively nimble multifaceted, multilingual word processor. However, some of the new features of the latest version of this powerful program, notably its support for HTML, are surprisingly shaky.

Nisus Writer is the only Mac word processor that lets you select sections of noncontiguous text, so you can, for example, change the style of several important words at once. It also lets you set up (and now, save the specifications for) remarkably intelligent searches: For example, simply by choosing a few built-in commands in its PowerFind window, you can instantly change all the numbers in an outline to bullet points; furthermore, a powerful built-in scripting language lets you do even more complex searches as well as automate many tasks and create basic multimedia presentations. Like most other high-end word processors, Nisus Writer lets you create style sheets, graphics, and tables and drop in sounds and QuickTime movies. It's also one of the few word processors that lets you write in multiple languages, including languages that read from right to left, and it now no longer requires an annoying dongle to work in non-Roman languages. (The sole exception is the Hebrew version sold in Israel.)

If you don't require many of its unique features, Nisus Writer's breadth of commands and functions can be dizzying, but Nisus Software has done a fine job of streamlining the program, making some commands available only when you need them. For instance, when you want to place a recorded sound bite in your document, you click on a small sound icon at the top of the right scroll bar. This brings up a ribbon with buttons for recording sound and adds a sound menu to the end of the main menu bar.

Nisus Writer avidly embraces Apple's technologies and includes support for AppleScript, publish-and-subscribe, Macintosh Drag and Drop — even the now defunct PowerTalk — so it's no surprise that the PowerPC version supports OpenDoc Live Objects, albeit imperfectly. Nisus Writer 5.0 ships with a handful of Live Objects you can embed into your documents, including the ubiquitous Cyberdog browser, Apple Live Objects Essentials, a Java tool, and a game.

The main appeal of the Live Objects technology is that it allows you to pick and choose just the features you need, so you don't end up paying in RAM for the copious feature set of an application such as Microsoft Word 6, to take an obvious example. But how well Live Objects complement Nisus Writer and vice versa remains to be seen. Nisus Writer has relatively low RAM requirements despite its many talents, and it's so full-featured that we have to wonder what independent Live Objects can offer. For example, you can create tables with titles, aligned text, and more, using Nisus Writer's built-in Table Tool. In comparison, the included demo of Corda Technologies' C-Table Live Object was underwhelming — and it didn't help that its tables had the annoying habit of floating above the text even when we had switched out of C-Table and were working within Nisus Writer.

Missing links

Nisus Writer's HTML features are even more of a disappointment. For example, to create a link on your Web-page-in-progress, you're required to enter URLs as footnotes to selected text or objects and then select the HTML Style called Link from the Style menu. The situation isn't improved any by the fact that Nisus Writer's documentation doesn't correspond to the application's actual HTML styles — and that even Nisus' own technical-support department wasn't able to tell us how to create HTML links. Even worse, when we saved documents with links and other HTML features as HTML (both as Nisus HTML and as WWW HTML), we consistently ended up with a hodgepodge of misplaced links, mangled text, and links that didn't make it to the HTML version at all. Nisus Writer is also supposed to be able to convert embedded graphics to GIF format automatically, but in our experience, it sometimes only created references to the graphics, as if they'd been converted, but didn't actually convert the graphics themselves.

The Bottom Line

Space doesn't permit us to cover all of the many excellent features that have been a part of Nisus Writer for years. Suffice it to say that this program is in a league of its own, especially for the linguistically inclined. Just don't count on it as a WYSIWYG Web authoring tool. / Carolyn Bickford

In our testing, Nisus Writer 5.0.1 consistently mangled the conversion of a word-processed document (top) into an HTML document (bottom); reading the document in a Web browser revealed misplaced URLs and shifted graphics.
The new Mac OS 7.6. 
Now, wherever your mind goes 
your computer will follow even faster.

Enhance your performance on your Mac OS computer.

The job of a great operating system is to get out of the way. To let you fashion ideas, unencumbered by process. Nothing does that job better than Mac OS 7.6. It not only raises 'intuitive' to new and exciting heights, it's also a major advance in the ease with which powerful new functions can be deployed on your desktop.

Now you can bring live web pages into your OpenDoc compatible documents and have them automatically updated. New virtual memory management allows you to launch your applications up to 40% faster, and your “Print” commands will execute up to 35% faster. And you can open PC files (including Windows 95 files) without the applications in which they were created. Mac OS 7.6 also makes the installation of an operating system simpler than it has ever been: in just a few steps you'll have access to QuickTime® applications, Apple® Open Transport, the OpenDoc® program, Cyberdog® software... all the latest advances from Apple.

Enrich your ideas by enhancing your computer. Buy the pleasingly affordable Mac OS 7.6 at your local Apple software reseller or call 1-800-482-6376 ext. 1421. For more information, visit us on the web at www.apple.com.
You've read the reviews...

- **MacWeek** called the PressView 17sR "a display to die for."
- The PressView 17sR was the winner of the 1995 MacUser Eddy Award.
- Winner of the 1996, and now the 1997 MacWorld WorldClass Award.

A Radius PressView 17sR on your scanner workstation will save you money. PressView soft proofing means less film and proofing materials, fewer rescans, and faster color correction—all of which go directly to your bottom line.

PressView displays automatically calibrate to the Radius ColorMatch® RGB Standard—the widest color gamut of any display. Radius ColorMatch profiles with our exclusive perceptual-matching technology provide an unsurpassed proofing solution. See on screen what your scan will look like on press, or as an Imation MatchPrint III or Fuji ColorArt proof.

The 1600 x 1200 super-resolution capability means that every pixel of a 4 x 5" transparency at 300 ppi will fit on your screen with room to spare. PressView is a ColorSync 2.0-savvy display system providing compatibility with all ICC-compliant applications including scanner software from Lino-Hell, Agfa, ScanView, and many others.

For more information about Radius products, or the location of your nearest authorized reseller, call us at 1-800-5RADIUS or visit our web site at www.radius.com.
REVIEWS / WORD PROCESSORS / DESKTOP DIVERSIONS

WAV

Word processor fulfills much of OpenDoc's promise.

OLD PROMISES ARE finally coming true: Products using OpenDoc, Apple's answer to Microsoft's OLE 2.0, are beginning to trickle into the marketplace. One of the slickest implementations of OpenDoc technology is the recently released WAV, an attractive, flexible word processor from Digital Harbor that offers an excellent, inexpensive introduction to OpenDoc.

OpenDoc itself may take some getting used to. You open not WAV per se but rather an OpenDoc document you modify with installed OpenDoc parts such as WAV, for word processing, and C-Table, for tables. The document's menu bar changes to reflect the object you're working on. If you have ever edited, say, a spreadsheet frame in ClarisWorks 4.0, you have some idea of the dynamic menus in the OpenDoc environment. WAV comes with OpenDoc itself; Cyberdog, for Internet connectivity; and a complementary assortment of other third-party OpenDoc software.

WAV offers a basic set of features, including extensive support for Macintosh Drag and Drop (even for URLs and pages or selected text from Cyberdog), dynamic text wrap (the text redraws as you move a graphic or other object), sections, columns (with automatic rules, if desired), and basic low-end editing/formatting capabilities. It also has some attractive built-in designer lines and frames (even drop shadows) for sprucing up objects on the page.

Besides Cyberdog, other included OpenDoc parts (some of which are simply demos) supply added capabilities. Among them are C-Table (Tables), C-Graph (charts), and LEXI (spell checking). The FolderBay at the top of every document has tabs for installed OpenDoc parts and project folders that can include graphics, text, sounds, and video files you might want to have handy. You just drag an object or OpenDoc part onto the page to use it in the current document.

WAV does not support footnotes, endnotes, or style sheets. A Digital Harbor spokesperson said the company planned to incorporate these key features and WorldScript before the end of 1997 but stressed that, in keeping with the OpenDoc vision, it will not put every conceivable feature into its products. Other functionality will be achieved through other OpenDoc parts.

WAV can import only WordPerfect 3.5 and Microsoft Word 5.0 and 5.1 word-processing files. Although WAV costs only $69.95, by the time you add on and pay for other parts, which range from $10 to $30, the price can creep well over $100 — still a good deal, but the added cost should be kept in mind.

WAV won't replace Word or WordPerfect. Its feature set, even with other available OpenDoc parts added to the mix, is far too limited for professional writers, the corporate set, or university students. The lack of style sheets and footnotes/endnotes, in particular, currently rule it out for many users.

The Bottom Line

The collapse of Copland, the acquisition of NeXT, and uncertainty over Apple's plans for merging NeXT's technology with the aging Mac OS all cast some doubt over OpenDoc. But if you want to explore what Apple still claims will be part of the next-generation Mac desktop, there is no better way than through WAV. Check it out yourself: A demo is available at Digital Harbor's Web site. / Gregory Wassen


La Cie FM Radio Module

Turn your $2,500 Mac into a $20 radio with this $50 gadget.

YOUR MAC CAN TUNE IN a TV station, connect to a fax machine or telephone, and tap into the Internet, but until now — with the arrival of the FM Radio Module, from La Cie — there has been no way for it to ride the FM airwaves.

The FM Radio Module is a plastic box, about the size of a deck of cards, equipped with a thin, 5-foot antenna wire. Its companion application, FM Tuner, lets you scan stations, store up to 50 station presets, and adjust the radio's sound settings.

Cables on the module plug into your desktop Mac's microphone jack (the FM Radio Module doesn't work with PowerBooks) and into the ADB port. In a poor design move, La Cie provides no pass-through port for your Mac's internal speaker, or external speakers, FM stereo signals come in loud and clear.

We had hoped the FM Tuner software would do nifty things that no standard radios can, but we were disappointed. It's little more than a digital version of the same old analog controls: Sliders let you select station frequency (numbers appear in an "LED" display) and adjust volume and tone. The few items you won't find in a Radio Shack special include those 50 presets (which are hard to organize after they're entered via a spreadsheetlike interface), a pop-up menu that lists ten entries in your presets list, a Control Strip module that lets you adjust volume and switch among those first ten presets, and a mute button.

The Bottom Line

The $50 FM Radio Module gives you little benefit over what you'd get from a less expensive transistor radio and makes you sacrifice the use of your Mac's microphone jack to boot. Until its software gains more features, we'll stick with the old standby. / Jim Shatz-Akin


MAY 1997 / MacUser 47
Image Alchemy

Multitalented graphics-file-format converter adds color, size controls.

**Image Alchemy's creators** strive to have their file-format converter read and write every type of image file in the world. They're off to a good start, with support for some 65 formats, including such esoterica as ADEX, CALS, QDV, and VIF as well as the more common TIFF, EPS, JPEG, and GIF. If you need to send images to or receive them from a Windows, DOS, or UNIX application, you'll find that Image Alchemy almost certainly supports a format that will allow you to do so.

Image Alchemy doesn't stop at format conversion. It lets you resize images; adjust brightness, contrast, and gamma; apply convolutions such as sharpen or blur; change the number of colors in an image; convert between RGB and CMYK; and if the output file format supports it, apply compression.

Image Alchemy has sophisticated controls for converting true-color images to paletted ones. It has a variety of dithering techniques and several color-reduction algorithms. But it can't calculate a single optimum palette for a series of images, as does its strong competitor Equilibrium Technologies' Debabelizer.

Some controls are extremely powerful but difficult to adjust. The program ships with three convolution kernels — Sharpen, Blur, and Edges — which are roughly equivalent to Photoshop's Unsharp Mask, Gaussian Blur, and Find Edges filters. But the Image Alchemy kernels are simply text-format tables, which you can modify. Similarly, the RGB-to-CMYK conversion uses undercolor-removal tables that provide both RGB-to-CMYK correction and black-generation tables. You can create your own tables, but the learning curve for doing so is quite steep.

For repetitive tasks, you can write Apple-Script scripts or record scripts from within Image Alchemy. For speedy operation, Image Alchemy allows you to open and convert images without viewing them. You can open multiple images simultaneously this way and designate a default script to be applied to each image. Taken together, these features make it possible to convert a folder full of images very quickly with a minimum of intervention.

**The Bottom Line**

Image Alchemy can't replace a full-blown image editor, but when you need to make minor contrast and sharpness adjustments in addition to converting files, it will do everything you need and do it quickly. / Bruce Fraser


Reader Service: Circle #419.
A refreshing new idea in monitors.

Don’t rub those tired eyes. Relief is on the way. The new Panasonic S21 monitor combines the features of a high performance 21” (viewable display area 20.0”) monitor with an affordable price.

Introducing the new PanaSync™ S21 Monitor

The S21 offers features found on much higher priced models. Like an ultra fine .25 mm dot pitch, PanaPerfect™ controls and 95kHz horizontal refresh rate. The S21 is flicker free even at 1,600 x 1,280 resolution. All this performance, and it meets TCO ’92 compliance too.

As always, we back our monitors with Panasonic’s 3-year limited warranty and industry leading 24-hour/7-day customer service and 48-hour swap program.*

So don’t settle for a high price, low-featured monitor. The new S21 monitor from Panasonic, Easy on the eyes. Even easier on the budget.

Find out more about the S21 by calling 1-800-742-8086 ext. MN12-PCW.

*Contact dealer for details.
Robert Dietz
Principal, Dietz Design, Atlanta, GA

Clients:
Adobe, Adobe Magazine, MSN, Excite
Photoshop, Union Bay Sportswear
Addison-Wesley Publishing, Lexington

Systems:
Power Computing Power Center 250
Apple Power PC 600 and 640 ADAM PaintStar;
TwinTurbo 128 MB, and as much RAM as we can get.

“No matter how much we invest in equipment it seems like we’re always needing more power. And more speed. Because clients demand fast turnaround, and I’m striving to do breakthrough creative in new media. Which means working in programs like Photoshop” and Director”. So we’ve installed the TwinTurbo 128 in every machine possible. That way, when we need to move an outrageous high-end image fast, we can.”

Photo realistic image quality from 640x480 to 1920x1080. 180 Mbyte/sec image scroll rate. And the ability to move 24-bit images in real-time. Plus QuickTime compatible acceleration for true-color, full-screen, real-time video playback at 30 fps. Available with 2, 4 or 8 Mb of VRAM.
 REVIEWS / AUDIO SOFTWARE

Audiotracer

Elegant software makes it easy to create custom audio CDs.

REMEMBER THOSE AFTERNOONS you spent sitting on the floor in front of your stereo, buried in piles of CDs, as you labored to create custom audio compilations? If carpet lint in your tape deck isn’t your thing, you’ll be pleased that Microtest’s Audiotracer software has moved the process from your living-room floor to your 68040 or PowerPC system.

Audiotracer lets you use your Mac, a CD-ROM drive, and a CD-R drive to make your own compilation audio CDs — a far more durable repository for your creative arrangements than a flimsy cassette doomed to inferior sound and a limited life span.

Making compilations is traditionally cumbersome. You need to arrange, time, and juggle CD tracks so everything fits; assemble and queue the CDs; set input levels; double-check everything (twice); and then hit Record and Pause for the next two hours. After all that, you often still end up with a pale imitation of the original CD’s sound quality.

Audiotracer replies to these drawbacks with a simple drag-and-drop process and produces a durable recording to boot. The program’s simple interface provides a straightforward creation environment. Drop a blank CD into your CD-R drive, pop an audio CD into your CD-ROM drive, and simply drag and drop numbered tracks from one window to the other. (You need to name the tracks, since they are identified only by number in the audio-CD format.)

Audiotracer adds up track times as tracks accumulate, keeping tabs on the total time. Remove the first audio CD and put in another, and Audiotracer retains track information from the first. Add more tracks from more CDs, and change the order of the tracks on the compilation at any time with simple drag-and-drop. This process creates a catalogued queue, which serves as the blueprint for your ultimate CD-to-be.

Set the session specifications — read/write speed and cache size — in another window. You can even automate the recording process, including confirm, test, finalize, and eject. When you start the session, Audiotracer asks for the original CDs one by one, based on your preprogramming. Copy quality mirrors that of the original CD, since Audiotracer duplicates tracks bit for bit.

All this takes a serious amount of hard-disk space, however. The fastest way to complete your recording session is to let Audiotracer cache the data to your hard disk before copying it onto the blank CD. Microtest recommends allowing 10 MB of disk space per minute, or 740 MB for a full 74-minute audio CD. If you record with a smaller hard-disk cache, recording speed is sacrificed. Even with an ample disk cache, recording a complete compact disc takes several hours.

The Bottom Line
As simple as Audiotracer is to use, making your own CDs is still expensive and time-consuming. A CD-R drive will run you $800 and up, and you’ll probably want to add a high-capacity hard drive ($250 to $300 for a 1-GB drive) or devote a large portion of your existing disk to recording. Thankfully, blank CDs cost only about $9 apiece. / Shelly Brisbin

Live Picture XT

Take a closer look at images in QuarkXPress with hi-res zoom.

PHOTO EDITORS, COMPOSITORS, and other graphic designers can now crop, magnify, and manipulate images quickly and precisely in QuarkXPress, thanks to Live Picture XT (LP XT). This XTension lets you magnify images up to 1,200 percent, without losing visual detail or requiring incredible amounts of RAM.

To view images in this way, you first convert them to Live Picture's IVUE format in LP XT. (You can direct LP XT to create IVUE-formatted copies of images automatically whenever you place them in QuarkXPress.) You can also convert already placed images, but conversion takes about 30 seconds for a moderate-sized image, so you will probably want to take advantage of LP XT's batch-conversion feature.

LP XT integrates nicely with QuarkXPress, letting you use that program's own zoom tool.

Chromatica

One hit, one miss in pair of Photoshop plug-ins.

CHROMATICA CONTAINS A PAIR of mismatched Photoshop plug-ins: the powerful ChromaColor and the lightweight ChromaPalette. ChromaColor is an alternative to Photoshop's Color Range and Replace Color tools. It lets you change an object's color within an RGB image quickly and easily and blend the recolored image to the original background with the nifty Edge Wizard feature.

The ChromaColor plug-in has two panes, ChromaMask and ChromaColor, each accessible via a tabbed palette. The first step in changing an object's color is to drag ChromaMask's masking tool over the object you want to recolor; the mask is calculated automatically. The Contiguous Selection option masks only those pixels adjacent to the ones you select; with the option unchecked, all the pixels in the selected color range are masked. You are able to fine-tune the mask by Shift-clicking to add pixels or by using the eraser tool to remove pixels.

After selecting the object, you switch to the ChromaColor pane, which lets you select a new color to replace the original. The program does an excellent job of maintaining texture and tone while changing the hue.

EdgeWizard is the feature that really differentiates ChromaColor from the built-in tools in Photoshop. It calculates smoothly blended, natural-looking edges between the recolored object and the background.

Although ChromaColor tackles recoloring tasks that would be extremely difficult, if not impossible, with Photoshop's built-in tools, it can't work miracles. It did a good job of turning a blue sweater green, for example, but when we tried to turn the sweater yellow — an extreme color change — we ended up with a fairly unnatural-looking result. We hasten to add that this has been true with any tool we've tried. Making extreme color changes look natural is challenging, and ChromaColor goes further than most tools before it fails.

The uses for ChromaPalette are less obvious. It allows you to replace all the colors in an image with those from another image or from a predefined palette, either created with the plug-in or selected from one of the thousand palettes shipped as part of the package. The results tend to be lurid and weird, although we were able to create some interesting false-duotone effects.

The Bottom Line

Although its ChromaPalette plug-in has only limited usefulness, the ChromaMask/ChromaColor color-adjustment combination alone is worth Chromatica's price. / Bob Schaffel

Are you the kind of person who always wants everything your own way?

Cool!

EarthLink's Internet access now includes your Personal Start Page.
MACUSER LABS REPORT

CD-ROM Drives

IN JUST A YEAR, we’ve seen the speeds of CD-ROM drives increase dramatically. Just when 4x CD-ROM drives were settling in as the norm, 8x and 12x drives, promising blazing speeds, started to appear. With every software package now being released on CD-ROM, should you be content with your current drive or spend the money on a faster one? How much of an increase in speed will you really see if you use an 8x or 12x CD-ROM drive rather than a 4x one?

For this month’s report, MacUser Labs tested six 8x and three 12x drives in order to help answer these questions — as well as a few others. We found that although the faster drives do provide a speed boost, it’s not as much as the names imply.

The New Math

The very first generation of CD-ROM drives transferred data at a rate of 150K per second. Ensuing generations increased in multiples of the same rate — a 2x drive delivers data at 300K per second, an 8x drive at a rate of 1,200K per second (or 1.2 MB per second), and a 12x drive at a rate of up to 1.8 MB per second. Keep in mind that these are theoretical, best-case, data-transfer rates. Access time, buffer size, and driver caching are also determinants of a drive’s overall speed.

You’ll immediately benefit from upgrading to a drive with a higher data-transfer rate if you spend a lot of time installing applications or moving large (over 10 MB) files. But when dealing with smaller files or doing random reads, you’ll want to be sure the drive has a short access time as well. We recommend that your drive come with a cache buffer of at least 256K, to help the drive read and temporarily store data.

A drive’s overall speed is affected by the caching method it uses, as you can see from our test results for drives that have similar mechanisms. The differences in speed can be attributed to the efficiency of the driver software’s data caching. All the drivers except that of the La Cie drive let you adjust the size of the cache, but La Cie’s driver is very

FEATURES AND SPEED OF CD-ROM DRIVES

TO GAUGE THE SPEED of each CD-ROM drive, we ran our MacBench 4.0 CD-ROM test. A higher score signifies a faster drive. MacBench 4.0 scores are relative to that of a 4x CD-ROM drive in a Power Macintosh 6100/60, which has a score of 100.

We tested all the drives with a Power Mac 7600/132 and with their default driver settings. For reference purposes, we’ve also included the scores of a 4x internal CD-ROM drive in a Power Mac 7500/100 and an 8x internal CD-ROM drive in a Power Mac 7600/132.

<table>
<thead>
<tr>
<th>RATING</th>
<th>PRODUCT</th>
<th>LIST PRICE</th>
<th>MECHANISM</th>
<th>SPEED</th>
<th>TRY LOAD</th>
<th>AUXILIARY</th>
<th>CONTROLS</th>
<th>WARRANTY</th>
<th>CD-ROM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>La Cie 12x CD-ROM</td>
<td>$599</td>
<td>Toshiba KM-5701TA</td>
<td>12x</td>
<td>●</td>
<td></td>
<td></td>
<td>1 year</td>
<td>310</td>
</tr>
<tr>
<td></td>
<td>MicroNet Advantage 650</td>
<td>$199</td>
<td>Philips PCA805C</td>
<td>8x</td>
<td>●</td>
<td></td>
<td></td>
<td>1 year</td>
<td>289</td>
</tr>
<tr>
<td></td>
<td>APS CDI</td>
<td>$179</td>
<td>Philips PCA805C</td>
<td>8x</td>
<td>●</td>
<td></td>
<td></td>
<td>1 year</td>
<td>242</td>
</tr>
<tr>
<td></td>
<td>Mirror 8x CD-ROM</td>
<td>$209</td>
<td>Philips PCA805C</td>
<td>8x</td>
<td>●</td>
<td></td>
<td></td>
<td>1 year</td>
<td>241</td>
</tr>
<tr>
<td></td>
<td>NEC MultiSpin 8x</td>
<td>$449</td>
<td>NEC CDR-462</td>
<td>8x</td>
<td>●</td>
<td></td>
<td></td>
<td>1 year</td>
<td>322</td>
</tr>
<tr>
<td></td>
<td>DynaTek CSS502</td>
<td>$199</td>
<td>Toshiba KM-5701TA</td>
<td>12x</td>
<td>●</td>
<td></td>
<td></td>
<td>1 year</td>
<td>357</td>
</tr>
<tr>
<td></td>
<td>Plextor 8PleX</td>
<td>$449</td>
<td>Plextor PX-8KLS</td>
<td>8x</td>
<td>●</td>
<td></td>
<td></td>
<td>1 year</td>
<td>281</td>
</tr>
<tr>
<td></td>
<td>Philips PCA805C</td>
<td>$299</td>
<td>Philips PCA805C</td>
<td>8x</td>
<td>●</td>
<td></td>
<td></td>
<td>1 year</td>
<td>243</td>
</tr>
<tr>
<td></td>
<td>Plextor 12PleX</td>
<td>$399</td>
<td>Plextor PX-12KLS</td>
<td>12x</td>
<td>●</td>
<td></td>
<td></td>
<td>1 year</td>
<td>381</td>
</tr>
</tbody>
</table>

LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.
efficient at caching. FWB Software's CD-ROM ToolKit, which ships with the DynaTek, Mirror, and Plextor drives, offers a variety of caching options. MicroNet uses proprietary software, CD Utility, and NEC uses an OEM version of DriveCD, from Casa Blanca Works. The drives from APS and Philips come with driver software from CharisMac. During our testing, we found an incompatibility between the CharisMac software and MacBench 4.0, which gave us erroneous results. To get numbers for these two drives, we used FWB's CD-ROM ToolKit (which is available as a separate product). CharisMac is working on the incompatibility and should have it fixed by the time you read this.

How Fast Is Fast?

We used MacBench 4.0's CD-ROM test to evaluate the two most important aspects of each drive's performance: data-transfer rate and access time. We then arrived at an overall comparative measure of the drives' performance. For reference, we also ran the CD-ROM test on the 4x internal CD-ROM drive in a Power Mac 7500/100 and the 8x internal CD-ROM drive in a Power Mac 7600/132.

The fastest drive was the Plextor 12PleX, which has a 12x mechanism and a generous 512K buffer. The DynaTek and La Cie drives, which each have a Toshiba mechanism, gave slightly differing results. The La Cie drive, which lacks caching control, did a surprisingly efficient job of controlling the drive, which finished the tests slightly ahead of the DynaTek drive.

In looking at the average speed difference between the 12x and 8x drives, we found that the 12x drives were only 37 percent faster—not as much as we expected. If you already own an 8x drive, upgrading to a 12x drive may not be worth it.

The NEC MultiSpin 8Xe finished ahead of the pack of 8x drives, although the internal 8x drive in the Power Mac 7600/132 was right on its heels (keep in mind that the Mac's internal SCSI bus transfers data at 1.0 MB per second compared to the external SCSI bus' rate of .5 MB per second).

Comparing our results for the 8x drives, the MicroNet and Plextor drives finished in the middle of the pack, about 10 percent slower than the NEC drive. The Mirror drive, which is based on a Philips PCA80SC mechanism, offered disappointing speed; the drive was about 15 percent slower than the average and only 30 percent faster than the Power Mac 7500/100's internal 4x drive. We found that the 8x drives were about 50 percent faster on average than the Apple internal 4x drive. And if you look at the numbers closely, you can see that the 12x drives really offer double the speed of 4x drives, or what you might expect from an 8x drive.

Case Design

Although speed is key, you'll be dealing with your drive on a daily basis, so case design is also important. All the drives we tested had a few basic features in common: RCA jacks, a headphone jack, and volume control. The Plextor drives also come with audio cables for their RCA inputs.

Being able to control audio capabilities directly from the drive's front panel is an added benefit. Mirror, NEC, and Plextor all provide some control on the front of the case; DynaTek's and La Cie's cases have only a simple volume control and an eject button. All the drives come with some sort of software for playing audio CDs.

The presence of a built-in CD-ROM tray seems to be common in these drives, except for those from Plextor, which require the use of a caddy (the 12x drive is also available with a built-in tray, but the 8x drive is not). Some people prefer to keep their discs in caddies for protection from scratches and dings, but others consider having a built-in tray a luxury that eliminates the expense of buying extra caddies.

The Bottom Line

The newest generations of drives offer some distinct speed gains, but whether or not you'll be able to take advantage of this new speed depends on the tasks you'll be using the drive for.

If you're still in the world of 2x, getting an 8x drive would be a vast improvement. If you have a 4x drive, you're better off upgrading to a 12x drive. But remember: Most CD-ROMs developed today are optimized to run at 4x, so casual users may not be able to take advantage of the speed increase 12x drives offer. For users who install a lot of applications regularly manipulate large files, an 8x or 12x drive could speed things up.

If you're looking for either a new CD-ROM drive or an upgrade for your 4x drive, take a look at the fast $199 La Cie 12x CD-ROM drive. But remember that the La Cie drive doesn't have control caching and it has just a bare-bones case design.

Perhaps the biggest factor that may influence your purchasing decision is the introduction of DVD (see "Apple, Power to Take DVD Lead," March '97, page 30). You may want to wait and see how DVD pans out before you upgrade. / MARTIN WONG

5 questions to ask when you're buying a CD-ROM drive:

1. Can you configure the drive's software settings?
2. What is the cache-buffer-size setting, and is it adjustable?
3. What type of SCSI connection does the drive have, and is an appropriate cable included?
4. What types of hardware controls are offered on the drive's front panel?
5. Does the drive have RCA jacks?

smart shopper

DIRECTORY

<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Phone Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS Technologies</td>
<td>Kansas City, MO</td>
<td>800-235-8935</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.apstech.com">www.apstech.com</a></td>
<td></td>
</tr>
<tr>
<td>La Cie</td>
<td>Beaverton, OR</td>
<td>800-999-1179</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.lacie.com">www.lacie.com</a></td>
<td></td>
</tr>
<tr>
<td>DynaTek</td>
<td>Bedford, NS</td>
<td>800-820-4109</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dynatek.ca">www.dynatek.ca</a></td>
<td></td>
</tr>
<tr>
<td>MicroNet</td>
<td>Irvine, CA</td>
<td>800-809-3475</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.micronet.com">www.micronet.com</a></td>
<td></td>
</tr>
<tr>
<td>Mirror Technologies</td>
<td>Boxborough, MA</td>
<td>800-622-4667</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.mirrortechnologies.com">www.mirrortechnologies.com</a></td>
<td></td>
</tr>
<tr>
<td>Philips Consumer Electronics</td>
<td>Knoxville, TN</td>
<td>800-531-0039</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.philips.com">www.philips.com</a></td>
<td></td>
</tr>
<tr>
<td>Plextor</td>
<td>Irvine, CA</td>
<td>800-830-1549</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.plextor.com">www.plextor.com</a></td>
<td></td>
</tr>
<tr>
<td>MicroNet</td>
<td>Irvine, CA</td>
<td>800-809-3475</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.micronet.com">www.micronet.com</a></td>
<td></td>
</tr>
<tr>
<td>Mirror Technologies</td>
<td>Boxborough, MA</td>
<td>800-622-4667</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.mirrortechnologies.com">www.mirrortechnologies.com</a></td>
<td></td>
</tr>
<tr>
<td>Philips Consumer Electronics</td>
<td>Knoxville, TN</td>
<td>800-531-0039</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.philips.com">www.philips.com</a></td>
<td></td>
</tr>
<tr>
<td>Plextor</td>
<td>Irvine, CA</td>
<td>800-830-1549</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.plextor.com">www.plextor.com</a></td>
<td></td>
</tr>
</tbody>
</table>

MAY 1997 / MacUser55
What's the future of Mac hardware? MacUser Labs takes a sneak peek at what could be sitting on your desktop in the years to come.

APPLE'S ACQUISITION OF NEXT HAS MADE A LOT OF NOISE LATELY. but an earlier cooperative effort will soon have its effect on Macintosh hardware. Three years ago, Apple, IBM, and Motorola got together to create an open computer-hardware platform based on PowerPC processors. This new platform would make it easier for companies other than Apple to create Mac OS-compatible systems. The trio dubbed this new hardware design CHRP (pronounced "chirp"), for Common Hardware Reference Platform. However, after lawyers and marketers got through talking, the official name was changed to the more cumbersome PPCP, which stands for PowerPC Platform.

PPCP, the companies claimed, would offer Mac-clone vendors two major advantages. PPCP systems would run not only the Mac OS but also Windows NT, AIX (IBM's version of UNIX), and a handful of other operating

By Henry Bortman
systems. And because it was an open specification, PPCP would make it easier for clone makers to differentiate their products from Apple's and would enable Apple and its licensees to quickly bring out innovative new models.

**WON'T DO WINDOWS ANYMORE**

Of course, since the birth of PPCP, times have changed — PPCP systems won't do Windows in the future. Despite costly efforts by IBM, Microsoft, and Motorola to modify Windows NT 4.0 for PowerPC processors (Motorola has been shipping Windows NT-compatible PowerPC-based computers for years), neither customers nor developers have shown much interest. Late last year, IBM and Motorola announced that their PowerPC-based systems would not run versions of Windows NT after version 4.0. Microsoft followed suit early this year by abandoning plans to develop a PowerPC version of Windows NT 5.0.

IBM still plans to incorporate elements of PPCP into its RS-6000 systems, which run AIX. But AIX never got Mac users excited about a multi-OS PPCP system; rather, it was the dream of hardware that would be able to run both the Mac OS and Windows NT. That dream has died.

Nevertheless, the ability of PPCP systems to let users choose among multiple OSs at boot time will still provide Mac users with OS alternatives — just not the alternatives initially envisioned. For example, it's reasonable to assume that PPCP systems will let users choose between the Mac OS and Rhapsody, Apple's next-generation OS. NeXTstep, which Apple is planning to port for PowerPC Macs, may offer another choice. But there is one more OS, the one Apple rejected for the Mac's future, that will definitely be an alternative: the BeOS.

Be is fully committed to having its operating system run as an equal OS citizen on PPCP systems.

Despite the Windows NT setback, plans to deliver PPCP Macs remain on schedule — well, OK, not exactly on schedule. But even the most pessimistic prognosticators now agree that PPCP systems will ship in the second half of this year. Even without Windows NT, PPCP remains a compelling architecture for Mac-clone vendors and for Apple itself. If PPCP fulfills its promise, you can expect to see more Mac-clone vendors, faster innovation, better performance, and lower prices. And who could complain about that?

**THROTTLED INNOVATION**

Today, there are a handful of Mac logic-board designs, each with its own custom ROM, all initially developed by Apple. In addition, Mac OS systems contain several customized Apple chips: GeoPort serial controllers, Mac-proprietary sound chips, custom SCSI controllers, custom IDE controllers — the list goes on. On today's systems, the relationships among Mac ROMs, Apple's custom chips, and the Mac OS are hopelessly codependent.

That situation makes innovation difficult. If system hardware changes, the custom chips have to change; if the custom chips change, the ROM has to change; if the ROM changes, the OS has to change. Even Apple has a hard time keeping all these changes straight. That's why the company's basic Mac models tend to stick around for a year or two before they get replaced.

The problem is even worse for clone makers. They're stuck with what Apple decides to do or not do. Clone makers can't touch Mac ROMs or the Mac OS — consequently, the hardware changes they can make are extremely limited. Sure, clone makers can beat Apple to the punch with faster processors. They can offer larger 1.2 caches than Apple or higher-capacity disk drives and RAID arrays. They can be first to offer such options as Zip drives, or they can choose to bundle graphics accelerators. They can design their enclosures for easier access to internal parts. And they can undercut Apple's pricing.

But clone makers cannot, for example, reduce a system's overall cost by replacing Apple's custom IDE controller with a lower-cost PC-standard part. Or deliver a new high-performance memory architecture that boosts the speed of high-end systems. And in some cases, when clone vendors do decide to innovate, such as by increasing bus speed on an existing Mac design to enable the use of faster processors, they must go through a tortuous and time-consuming certification process before they get the nod from the big guns in Cupertino.

**BARGAIN MACS**

PPCP changes the rules. The whole idea behind PPCP is to free the Mac OS from its incestuous ties to proprietary Apple hardware. In fact, the PPCP specification contains very little that is Macintosh-specific (see the "PPCP: Under the Hood" figure). Although you can expect most Macs for the foreseeable future to include ADB and LocalTalk ports, PPCP also enables the use of standard PC components, such as sound chips, floppy drives, keyboards, and mice, in Mac OS-compatible systems. The ability to use these readily available low-cost PC parts may finally make the sub-$1,000 Mac a reality.

The potential benefit increases when you consider that many customers, especially home buyers, purchase printers along with their computers. Today, the choice of Mac-compatible printers is limited — many more printer models are available for the PC market. PC-compatible printers have parallel ports, which are standard on PCs but are absent from today's Macs. But PPCP Macs, especially low-end models, will have parallel ports. Customers will be able to get not only less expensive Macs but also less expensive printers.

As part of our investigation into PPCP, we met with engineers from Apple, Motorola, and UMAX, who showed us working prototypes of PPCP computers. They looked like Macs, felt like Macs, and sounded like Macs, although in many cases, they were using standard PC parts internally and were connected to standard PC devices. We saw prototypes being driven by IBM mice and keyboards and printing to a variety of PC printers via parallel ports.
**PPCP: Under the Hood**

THE POWERPC PLATFORM GIVES MAC-CLONE MAKERS new freedom from having to rely on Apple's Macintosh logic-board designs. PPCP enables licensees to engineer new ways of handling memory, I/O, and other system functions as well as to bring innovative products to market faster and reduce the overall cost of Mac OS systems. In addition, Mac OS ROM independence provides even more freedom to clone makers.

A. The Mac Toolbox ROM has been an essential element of every Mac since the first 128K Mac. In PPCP systems, Toolbox instructions may be implemented in software.

B. Every PPCP system will contain one or more PowerPC processors.

C. An L2 cache, which improves system speed, will be an option in PPCP systems.

D. In PPCP systems, the Boot ROM is responsible for the early stages of system startup, before the operating system has been loaded into memory. On systems with more than one OS installed, the Boot ROM will let users choose which operating system to load. When a PPCP system starts up, the Boot ROM also "examines" the system's hardware configuration and passes that information to the chosen OS.

E. RAM, or system memory, will be upgradeable in PPCP systems, as it is in today's Macs.

F. The system bus connects elements such as the cache and RAM directly to the processor. In PPCP systems, bus speeds will start at 66 MHz.

G. The CPU-to-PCI (a.k.a. north) bridge is a chip or a set of chips that controls the flow of data between the system bus and the PCI bus. Motorola and VLSI are two companies that make this chip set; some system vendors may opt to design their own north bridge.

H. Most PPCP systems will contain one or more PCI expansion slots.

I. The PCI bus is the primary expansion bus for PPCP systems.

J. The optional IDE controller will allow system designers to include IDE hard-disk and CD-ROM drives, which cost less than their SCSI counterparts. As with today's Mac models, expect to see IDE drives in low-end systems.

K. The PCI-to-ISA (a.k.a. south) bridge is a required chip set for PPCP-compliant systems. It connects the primary PCI bus to the ISA bus. Elements connected to the south bridge are standard PC ports that are widely available and typically cost less than their Mac analogs.

L. Many PPCP systems will implement 16-bit sound by using standard PC Sound Blaster chips instead of proprietary Mac sound chips.

M. The ISA bus, a standard PC expansion bus, enables PPCP systems to incorporate a wide variety of low-cost PC parts.

N. Now that future versions of Windows NT will not be supported for PPCP systems, Mac-clone makers may omit this section, which supports PC keyboard, serial, and mouse ports.

O. National Semiconductor's Super I/O chip is a low-cost peripheral controller found in most PC systems today and is a likely candidate for inclusion in PPCP systems.

P. The use of PC-style floppy drives will enable PPCP system vendors to reduce overall system cost.

Q. Expect to see standard PC parallel ports on many PPCP systems, especially low-end machines.

R. The Mac I/O controller, a common chip in today's Macs, will provide support for common Mac ports in PPCP systems.

S. Until new I/O interfaces such as USB and FireWire become popular, PPCP systems will continue to include traditional Mac-style ADB, GeoPort, and SCSI ports.
During our visit to Apple, we used MacBench 4.0 to test a prototype PPCP system, and we were impressed with what we saw (see the "PPCP: Peak Performance" sidebar).

It is important to emphasize that the unit we tested was a demonstration model, based on the Viper logic-board design developed by Apple and Motorola. Apple has no plan to ship such a system to customers. Furthermore, although the version of the Mac OS running on this machine was still in late alpha, it was not ROM-dependent.

Regardless, we saw significantly higher speed from this PPCP prototype than from shipping Macs. The Apple prototype we tested contained the same processor (a 200-MHz PowerPC 604e) and the same-size L2 cache (512K) as an Apple Power Mac 9500/200. However, in MacBench 4.0's Processor test, the PPCP prototype was over 25 percent faster than the Power Mac 9500/200.

Part of this speed gain was due to the faster system bus in the PPCP system. Whereas the bus speeds of today's Macs are typically in the range of 40 to 50 MHz, the PPCP spec calls for a system-bus speed of 66 MHz or higher. The system we tested had a 66-MHz system bus, which will be typical of the first shipping PPCP systems. But clone vendors are already talking about bus speeds of 75 MHz, 83 MHz, and possibly even 100 MHz in second- and third-generation PPCP systems.

The speed improvements are also a result of work Apple has done to remove bottlenecks from the Mac OS. To get the Mac OS to run on a PPCP system, Apple had to pore through huge sections of the OS and ROM, tracking down and removing any and all dependencies on Apple-proprietary chips. In the process, Apple engineers also uncovered and eliminated numerous performance bottlenecks. As fine-tuning proceeds, PPCP systems should show even more-impressive speed gains.

Clone vendors too are looking for ways to boost the speed of PPCP systems. One of the more interesting approaches is by redesigning the memory architecture. There is a complex interaction among a system's memory controller, processor, L2 cache, system RAM, and devices on the PCI bus. Mac OS licensees are hard at work designing improvements in memory architecture that will allow more data to move simultaneously in and out of RAM, thereby increasing the overall system speed.
WHO'S DOING WHAT

Although it's unlikely that any PPCP systems will ship before August or September, every system vendor in the Mac market is already making plans. After all, it's hard to argue with a new architecture that offers both lower cost and better performance. Here's a look at what the major Mac OS-system manufacturers are working on:

Apple. Curiously, after spearheading the whole move toward PPCP, Apple's current plan is to borrow some technology from PPCP designs but not to deliver a fully PPCP-compliant Mac.

That begs the question of just what is a fully PPCP-compliant Mac. Per the PPCP spec, a system must be able to run all six of the possible OSs — Mac OS, AIX, OS/2, Solaris, Windows NT, and Novell's NetWare — to qualify as PPCP-compliant. Given that future versions of Windows NT for the PowerPC have met their maker, that definition may no longer be valid, so Apple may have lost interest in its future Macs being able to run any non-Mac-specific operating systems.

But Apple still has an interest in lowering the cost of its Mac systems by adopting some of the PC standards PPCP supports. Apple will probably ship hybrid systems that incorporate some PPCP chip sets but that will most likely also contain some Apple-proprietary hardware (as for PC ports, don't count on them). Look for the first such system, a Power Mac 7300-class machine, in early August.

DayStar Digital. Of all the Mac-done vendors, DayStar has the most aggressive schedule for delivering PPCP systems. The company hopes to deliver its first offering as early as June.

DayStar hopes to utilize PPCP technology to create a workstation-class system that can challenge those from Sun and Silicon Graphics in the digital-video market. DayStar is talking to IBM and UMAX about the design of new memory architectures tuned to improve multiprocessor performance and will likely license a logic-board design from one of the two firms. DayStar believes that the combination of memory-architecture improvements and faster PowerPC processors can result in a system that performs multi-processor-savvy tasks two to three times as fast as today's quad-processor Macs.

Motorola. Motorola's first PPCP system, due this fall, will likely be based on the company's Viper logic-board design, which has a 66-MHz system bus. Motorola plans to quickly follow its initial PPCP offering with systems designed with a higher-performance logic board that has a bus speed as high as 83 MHz.

Motorola's PPCP machines will include a parallel port, and the company is working on a deal to bundle drives for a host of popular PC printers. It will offer PC keyboard, mouse, and serial ports as an option. Motorola's first PPCP machine will be in the midrange, with a processor speed starting at 200 MHz. Over time, the company will move its entire Mac OS product line over to PPCP.

Power Computing. Power was the least definite about its PPCP plans. It said only that its first PPCP machines would be midrange and high-end. But don't mistake the company's lack of specifics for a lack of interest — Power is actively pursuing a variety of PPCP options. It's looking at IBM's and Motorola's logic-board designs and at various chip sets and is also seriously considering creating its own.

At press time, Power hadn't decided which approach would best let it meet its goal of offering high performance for a low price.

UMAX. The high-end-workstation market is the first target for UMAX's PPCP systems, due out in the fall. UMAX is working on a new memory architecture that it claims will deliver significant performance gains over today's Mac OS systems. The company also plans to incorporate Ultra SCSI, DVD, and USB (a high-speed serial peripheral bus) in its initial PPCP offering. It may even ship its systems with USB keyboards and mice. There's a good chance that UMAX's PPCP systems will have a parallel port, but they're unlikely to have PC serial, mouse, and keyboard ports.

THE BIG PICTURE

The early returns for PPCP are encouraging. Even with prototype hardware and alpha system software, PPCP systems have already demonstrated significant performance improvements. And from the details clone vendors have shared with us about their PPCP plans, it looks as though we're on the brink of a new era of Mac hardware innovation. PPCP could well be the means by which the Mac restores its claim to leadership in the personal-computer market.

WHILE EVERYONE HAS BEEN paying attention to Apple's Rhapsody plans (when they haven't been paying attention to Apple's stock price), the PowerPC Platform has been slowly — too slowly — edging closer to its debut. PPCP systems were originally due to ship a year ago. Ironically, the holdup isn't the hardware; it's making the Mac OS run on a PPCP system — and this requires a major OS rewrite.

As the task of porting the Mac OS to this new hardware platform has dragged on, customers have all but forgotten about Apple's PPCP effort. Yet the arrival of PPCP systems and enabling software later this year will be as significant a step forward for the Mac as the release of Rhapsody in 1998.

Why? Because Apple's decade of refusal to license the Mac OS has resulted in an OS that is completely dependent on proprietary Apple hardware. Clone vendors haven't been able to expand the possibilities for Mac OS systems, and even Apple has been trapped by its own legacy, delivering new system designs only occasionally. PPCP will let clone makers fill in the gaps, expanding customer choices far beyond today's range of options and bringing innovation to market at an accelerated pace. PPCP will be the key that lets licensees deliver everything from sub-$1,000 Mac OS systems (finally) to high-performance workstation-class machines that can give those from Sun and Silicon Graphics a run for their money.

But without a PPCP-compliant OS, PPCP hardware is nothing. There are signs that Apple is at last ready to set a date for delivering the Mac OS for PPCP — and to ship it on schedule, come hell or high water. We support this strategy. It may mean, as it did with Mac OS 7.6, that the first release of the Mac OS for PPCP doesn't include everything on the original feature list. And this in turn may mean that clone vendors will remain more restricted in what they can accomplish than they would like in the first round of PPCP systems. It's unfortunate, but not as unfortunate as continued delay.

Clone vendors are chomping at the bit to ship PPCP systems. Some of them have hardware that's ready to go out the door once the OS is finished. But when asked when they'll have systems available for customers to purchase, they all sing the same refrain: When Apple gets us system software.

Our advice to Apple: Ship it, and move on.

Henry Bortman is MacUser's technical director.

The latest version of the MacBench benchmark software is available online on ZD Net from Ziff-Davis Benchmark Operation at http://www.zdnet.com/zdbop/.
Network bottlenecks? **GONE.**

Sluggish file transfers? **EXTINCT.**

New storage technologies combine the convenience of networking with file-transfer speeds faster than you ever thought possible.

**THE FUTURE OF STORAGE**

**THE BIGGER THEY ARE, THE SLOWER THEY MOVE.** Yes, we mean files. The kind of files you know all too well if you work with digital artwork, audio tracks, or video clips. When you open a 100+–MB Photoshop file that’s stored on even the speediest hard-disk drive, you’d better be prepared to wait. And when you try to upload that same pixel-packed behemoth onto your workgroup server over your Ethernet LAN, you might want to slip out for a burger and fries while your artwork competes for bandwidth with all the rest of the network traffic.

The situation’s even worse — much worse — if you’re a digital-video professional. Not only are your files gargantuan — a ten-minute full-screen video can easily consume over 5 GB of RAID real estate — but, more important, your video-editing card also needs digital-video data right now; not whenever your hard drive and SCSI cable can manage to deliver it. Real-time video editing requires steady, reliable, ultrahigh-speed data flow. And if you want to share a massive video file with another Mac, you can forget about your LAN — why do you think MicroNet, MegaDrive, and others make removable-mechanism hard-disk subsystems?

**BY RIK MYSELEWSKI AND KRISTINA DE NIKE**
No, if you’re a content-creating professional, a local hard drive or RAID system attached to your workgroup’s Ethernet network just doesn’t cut it anymore. You and your coworkers need shared access to multiple gigabytes of image, audio, and video files that’s as quick as though each of you were individually connected to one of the fastest storage systems available today. In other words, you need network convenience at RAID-system speed.

If we’ve just described your predicament, we’ve got some good news and some bad news: The good news is that help is on the way, in the form of a handful of competing high-speed storage-network technologies. The bad news is that we just spent a couple of weeks testing a few representatives of this new generation, only to discover that they’re still more than a little bit wet behind the ears.

THE END OF THE PARALLEL UNIVERSE

Before we begin to explain what the storage-technology revolution is all about, we should clarify what it’s not about: the death of SCSI (Small Computer System Interface). It’s only the death of SCSI as we know it — SCSI based on moving separate, parallel streams of data.

If you’ve ever looked at a SCSI port — and you probably have, since they’ve been on every Mac since the Plus appeared, in early 1986 — you know it’s built to hook up to a thick cable full of wires. The port accepts a 25-pin connector, with each pin leading to a wire in that heavily shielded, chubby cable. The wires carry signal, control, or address information; provide termination power; or supply a universal ground. The 25-wire requirement blossoms to 50 when ground wires are added for each signal, as required by most storage devices. The situation gets worse when the storage device to be connected is of the Wide SCSI type, in which 16 bits of information are passed in parallel, as opposed to 8 in standard SCSI; the wire count jumps to 68.

That’s a lot of expensive wire, connectors, and shielding. When SCSI first appeared, this expense was necessary, because silicon chips couldn’t work as fast as they do today. (The microprocessor in the Mac Plus, for example, lumbered along at 8 MHz.) Back then, controller chips, which are silicon-based, couldn’t handle a bunch of data coming in one very fast data stream but they could cope with slower streams of data delivered in parallel. As silicon-chip speed increased, however, and allowed for faster parallel streams, parallelism became a liability. It became harder and harder to keep all those parallel signals marching along in perfect harmony, and the distances they could travel before they got out of sync became shorter and shorter (see the “Battling Storage Standards” table).

Clever engineers have developed improvements to parallel-SCSI technology that battle the speed and cable-length limits of traditional,
single-ended, SCSI. One solution is differential SCSI, which is based on measuring the difference between two signals rather than measuring the difference between one signal and ground. This gives engineers more-precise control over each signal pulse, thus allowing higher speeds as well as longer cables. The next improvement, scheduled to appear later this year in a new parallel-SCSI implementation called Ultra2, will be low-voltage differential, which — because it uses shorter, more closely spaced signal pulses — promises even greater speed.

Despite all this engineering ingenuity, though, the need for parallelism is fading. Now that chips can handle bits at rates unheard of ten years ago, it's more effective just to line up bits of data one behind another and ram them down a simple digital pipe as quickly as possible. That's the beauty of the new serial technologies: no costly cables, no minuscule bus lengths, no complex parallel choreography, no termination hassles, no conflicting SCSI-ID numbers. Just a lot of data moving very quickly down a long, thin, cheap cable.

SHARE AND SHARE ALIKE

Data zipping down serial cables still obeys SCSI commands, as set out in a new set of specifications called SCSI-3 (which also includes an updated parallel-SCSI specification). But although SCSI-3 doesn't ignore parallel SCSI, it offers much more in the way of serial schemes — three options, in fact. And these schemes offer a big advantage for users who want to share fast access to storage devices.

Serial SCSI can ride on top of any of three rapidly maturing data-transfer technologies: SSA (serial storage architecture), FC-AL (fibre channel — arbitrated loop), and IEEE-1394 — more snappily known by the name of Apple's implementation: FireWire. A fourth serial technology, FC-EL (fibre channel — enhanced loop), is a planned hybrid of SSA and FC-AL that holds great theoretical promise, but it's a long way from reality — it won't even reach final specification approval stage until late this year at the earliest. A fifth, USB (universal serial bus), is a low-cost, low-speed interconnect designed to connect PCs to keyboards, mice, joysticks, telephones, and end-scanners. Due to its low speed, its storage use will be limited to midrange CD-ROM drives — if that. No Mac specification currently exists.

SSA, FC-AL, and FireWire each have unique strengths and weaknesses, but — possibly most important — they also share a common advantage over parallel SCSI: the ability to transparently and easily share multiple storage devices (and other types of devices) among multiple Macs, PCs, and other workstations. We're not talking only about small workgroups either. SSA and FC-AL max out at a full 127 devices per setup; FireWire can handle a cool 63. All files on all

---

**Battling Storage Standards / which bus will your data get on?**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PARALLEL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCSI-1</td>
<td>now</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>NA</td>
<td>External port on all Mac OS systems.</td>
<td>Slow.</td>
</tr>
<tr>
<td>Fast SCSI</td>
<td>now</td>
<td>10</td>
<td>8</td>
<td>3</td>
<td>NA</td>
<td>Internal port in many Mac OS systems.</td>
<td>Too slow for most DTP and all DTV uses.</td>
</tr>
<tr>
<td>Fast Wide SCSI</td>
<td>now</td>
<td>20</td>
<td>16</td>
<td>8 or 4, depending on bus length</td>
<td>1.5 (if 8 devices max.) or 3 (if 4 devices max.)</td>
<td>Acceptable speed for DTP and some DTV uses.</td>
<td>Cabling becomes a major problem when using any type of SCSI system faster than Fast SCSI. Maximum total bus length shrinks dramatically on traditional single-ended systems, and cable costs increase. Also, high-speed SCSI fulfills its promise only when costly RAID arrays are used.</td>
</tr>
<tr>
<td>Ultra SCSI</td>
<td>now</td>
<td>20</td>
<td>16, 8, or 4, depending on bus length</td>
<td>NA (if 16 devices max.) or 1.5 (if 8 devices max.) or 3 (if 4 devices max.)</td>
<td>NA</td>
<td>Acceptable speed for DTP and some DTV uses.</td>
<td>Very good speed for DTP and many DTV uses.</td>
</tr>
<tr>
<td>Wide Ultra SCSI</td>
<td>now</td>
<td>40</td>
<td>16, 8, or 4, depending on bus length</td>
<td>NA (if 16 devices max.) or 1.5 (if 8 devices max.) or 3 (if 4 devices max.)</td>
<td>NA</td>
<td>Very good speed for DTP and many DTV uses.</td>
<td>Very good speed for DTP and many DTV uses.</td>
</tr>
<tr>
<td>Ultra2 SCSI</td>
<td>late 1997</td>
<td>40</td>
<td>8</td>
<td>NA</td>
<td>NA</td>
<td>Excellent speed. Supports up to 16 drives.</td>
<td></td>
</tr>
<tr>
<td>Wide Ultra2 SCSI</td>
<td>late 1997</td>
<td>80</td>
<td>16</td>
<td>NA</td>
<td>NA</td>
<td>Excellent speed. Supports up to 16 drives.</td>
<td></td>
</tr>
</tbody>
</table>

**SERIAL**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SSA (serial storage architecture)</td>
<td>now</td>
<td>80*</td>
<td>127</td>
<td>25</td>
<td></td>
<td>Easy to use and manage. Highly efficient in multidisk setups.</td>
<td>Slower technology than FC-AL. Only one major drive vendor (IBM).</td>
</tr>
<tr>
<td>FC-AL (fibre channel — arbitrated loop)</td>
<td>mid-1997</td>
<td>200*</td>
<td>127</td>
<td>30</td>
<td></td>
<td>Highest speed of all existing technologies. Multiple drive vendors.</td>
<td>More expensive than SSA. Current systems not yet reaching full potential.</td>
</tr>
<tr>
<td>USB (universal serial bus)</td>
<td>1998</td>
<td>1.5</td>
<td>127</td>
<td>5</td>
<td></td>
<td>Very inexpensive serial bus for mice, keyboards, joysticks, phones, and so on.</td>
<td>Only appropriate storage use is for CD-ROM drives. No Mac specification yet.</td>
</tr>
<tr>
<td>FC-EL (fibre channel — enhanced loop)</td>
<td>1999 - 2000</td>
<td>200 - 400 (est.)</td>
<td>undetermined</td>
<td>undetermined</td>
<td></td>
<td>Combines the best of SSA and FC-AL. Will be very fast and versatile.</td>
<td>Too early to estimate cost. Backward compatibility and final speed unclear.</td>
</tr>
</tbody>
</table>

Maximum Distance Between Devices (Meters)

<table>
<thead>
<tr>
<th>Technology</th>
<th>Maximum Distance Between Devices (Meters)</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSA</td>
<td>127</td>
<td>Easy to use and manage. Highly efficient in multidisk setups.</td>
<td>Slower technology than FC-AL. Only one major drive vendor (IBM).</td>
</tr>
<tr>
<td>FC-AL</td>
<td>127</td>
<td>Highest speed of all existing technologies. Multiple drive vendors.</td>
<td>More expensive than SSA. Current systems not yet reaching full potential.</td>
</tr>
<tr>
<td>USB</td>
<td>127</td>
<td>Very inexpensive serial bus for mice, keyboards, joysticks, phones, and so on.</td>
<td>Only appropriate storage use is for CD-ROM drives. No Mac specification yet.</td>
</tr>
<tr>
<td>FireWire</td>
<td>63</td>
<td>Easy to use. Promoted by Apple. Sony support as digital-video standard.</td>
<td>Modest speed compared to other serial technologies. No storage-vendor support.</td>
</tr>
<tr>
<td>FC-EL</td>
<td>63</td>
<td>Combines the best of SSA and FC-AL. Will be very fast and versatile.</td>
<td>Too early to estimate cost. Backward compatibility and final speed unclear.</td>
</tr>
</tbody>
</table>

*Two channels, each reading and writing at 20 MB/second simultaneously. *Two channels, each reading or writing at 100 MB/second simultaneously. *Specification allows for 50 MB/second; hardware under development.
Finally, a product that lends more muscle to your PCI Mac. ATI's XCLAIM VR. It’s five
must-have graphics and multimedia functions revved up into one complete solution,
giving you the power to conquer it all. Play, create, view, display or output 3D, 2D
and video. This is full-out 3D acceleration, heart-stopping graphics performance, high-gear
video playback, MAC2TV capabilities and more for just $269*. See your dealer today,
check out www.atitech.com, or call us at (905) 882-2600 (press 2 for faxback).

© ATI Technologies Inc., 1997. All Rights Reserved. XCLAIM VR and New TV are trademarks of ATI Technologies Inc. All other
product names and logos are trademarks of their respective owners. *Suggested (SIS) retail price for 2MB upgradeable version.
StudioPro 2.0 knows that you live in a world of deadlines, rendering times and bezier splines. **It knows you live** in a digital world. Online. You live to create. VRML for the web. QuickTime VR for games. Special effects for movies. It knows you need a stable 3-D product that you can rely on...and **2.0 satisfies your cravings.** You want fast and accurate in-context modelers so all the modeling power is right at your fingertips. 2.0 knows you need precision control—of models, of cameras and lights, of every object in your animation. And **everything timing varies so everything can be easily animated.** It knows you hunger for realistic 3-D effects through a custom particle generation system. It knows you want volumetric effects like mist, fog and haze. You crave 3-D textures and the ability to apply multiple textures, to visually map textures on objects. You need **UV mapping.** You want the broadcast quality of real-time rendering. You want real-world camera features and smooth motions like pan, crane, dolley, pitch, yaw and roll. You also want motion blur, lens flare and depth of field! Well, 2.0 knows. It also knows that you need all of this power in an interface that is easy to use. Intuitive. No compromises. And you want a powerful plug-in architecture so extensions will continually deliver even more power. We believe it could get any better! **StudioPro 2.0 knows your cravings and desires.** It knows you won't be satisfied until you have the **best.** Check out the relentless 3-D power for yourself.

For the name of a Strata Authorized Reseller in your area, please call 1-800-STRATA3D, 801-628-5218 or see us at http://www.strata3d.com For academic pricing call 1-800-531-3227

StudioPro 2.0 is available for Power PC Macintosh.

CIRCLE 110 ON READER SERVICE CARD
devices are always accessible — theoretically — at full serial speed.

The advantages are obvious — but so are the challenges. If all users have access to all files, for example, what is there to stop two users from reading, modifying, and overwriting the same file at the same time? Don’t ask the SSA-, FC-AL-, or FireWire-hardware vendors; they’ll say, and rightly so, that it’s a software problem. Unfortunately, it’s one that the Mac’s aging file system makes fiendishly difficult, and one that hasn’t yet been adequately addressed in the few pioneering serial-SCSI storage systems currently available for the Mac (see the “Future’s Not Here Yet” sidebar).

SERIAL SOAP OPERAS

An entire made-for-TV miniseries could be written about the alliances made and broken, careers created and destroyed, promises made and ignored, and intricate behind-the-scenes machinations that have led to the current state of serial storage technology. Of course, none of this intrigue means much to you as you plug in your new serial storage system — except that decidedly non-technical influences continue to shape the serial-storage landscape.

Take SSA, for example. It was introduced by IBM in 1992 as a high-end storage interconnect and was soon championed by such drive-manufacturing powerhouses as Connor and Micropolis. Today, however, Connor has been absorbed into FC-AL-loving Seagate, where its SSA efforts were terminated. Ailing Micropolis was recently bought by Singapore Technologies, where its SSA efforts have become, shall we say, less than fully vigorous. That leaves IBM as SSA’s sole champion. Granted, many technologies with less powerful friends have flourished, but SSA’s single-source status is an inarguable drawback.

FireWire, on the other hand, has lots of friends — the problem is that none of them make storage systems. Sony is putting FireWire interfaces on its latest digital-video cameras, and Adaptec, Miro, Radius, and Texas Instruments are showing or shipping FireWire PCI cards for the Mac. But despite Apple’s enthusiastic backing — or, if you like conspiracy theories, because of it — FireWire-based hard drives have yet to emerge from manufacturers’ labs. Apple has promised that FireWire is in line to become its standard consumer-level storage and video interconnect, but the lack of currently shipping products keeps us from holding our breath.

FC-AL, on the other hand, is gaining momentum. Although it was originally developed by IBM, FC-AL is now being championed by a legion of manufacturers. Seagate, Hewlett-Packard, and Quantum, for example, are just a few of FC-AL’s heavyweight friends.

Although IBM has already shipped multiple terabytes’ worth of SSA drives, mostly for high-end systems, and despite the fact that Pathlight Technology has shipped a high-quality SSA card for the Mac, it’s a fair bet that the FC-AL juggernaut will come rolling into your Mac-based workgroup within the year. SSA is easy-to-use, solid technology, but FC-AL has a bigger army.

THE DEVIL IS IN THE DETAILS

FC-AL partisans argue that their technology is fated to win the serial wars, due to its higher speed: A dual-channel FC-AL system can theoretically achieve an astonishing 200-MB-per-second transfer rate. A dual-channel SSA setup, in contrast, currently maxes out at 80 MB per second. SSA proponents willingly concede FC-AL’s brute power
but counter that theirs is a more subtle technology, better suited to multinode workgroup environments.

To follow the argument, you need to understand just how different the two technologies are and how different they are from parallel SCSI (see the "Parallel Challengers" sidebar). Unlike parallel SCSI, both FC-AL and SSA are loop-based technologies—that is, both require that data circulate in a loop, with each node taking its place on the loop's circumference. In most FC-AL setups, the loop itself is within a hub, but the topology remains loop-based. The AL in FC-AL stands for arbitrated loop, meaning that only one node at a time can use the loop to read data from or write it to another node. If another node tries to use the loop during this transfer, it's told to wait. Fortunately for FC-AL proponents, the speed of FC-AL makes that wait a short one. A very short one.

SSA is more efficient. Each SSA device—card or drive—has two ports. Each port has two channels. At SSA's current level of development, each channel can pump data at 20 MB per second. 20 MB times two channels times two ports equals SSA's maximum total throughput of 80 MB per second. What's more, each SSA port can read and write data simultaneously, enabling an SSA loop to carry on four data conversations at each node at any one time—a trick, by the way, that the Mac OS's current clunky file-management system can't take advantage of.

SSA enthusiasts claim that their system's trump card is that its loop is not limited to one node's use at any time, as is an FC-AL loop. A much debated SSA concept called spatial reuse holds that the entire loop, at any instant, can be filled with multiple read/write conversations originating from or bound for any other node. Sure, SSA fans say to FC-AL proponents, your technology is great for simple high-speed file transfers, but ours is better for multiple transactions among multiple nodes.

To find out just how far along serial-SCSI system engineers are in their ongoing efforts to bring SSA to the Mac, we assembled and tested a group of high-powered storage systems—two ambitious parallel-technology systems and the only three serial-technology systems shipping at press time.

Representing the state of the art in parallel SCSI was a StreamLogic SledgeHammer PCI Differential Wide Ultra SCSI RAID system connected to a StreamLogic JackHammer PCI card. We also looked at an innovative attempt to provide shared parallel-technology storage by testing the ATTO AccelNet Differential Fast Wide SCSI networking hub connected to a SledgeHammer-Pro and an ATTO ExpressPCI-PScd card.

Our serial-technology competitors included two SSA systems—a La Cie Speed2 SSA system and a Pathlight ImageNET-1 PCI card coupled with a Siemens Nixdorf SSA Disk Drawer 4 array—and a Transoft StudioBOSS FC-AL system. All testing, both parallel and serial, was done on Power Mac 9500/200s.

To get a feel for how each system would perform in a single-user publishing environment, we used MacBench 4.0's Publishing Disk test, which replays File Manager calls from Photoshop and QuarkXPress. To mimic digital-video-editing use, we used MacBench 4.0 to clock each system's speed when reading and writing large-block (1,024K) files.

We then compared the Pathlight/Siemens Nixdorf and Transoft StudioBOSS systems, both using Transoft's StudioBOSS multiuser software, in a multinode video-editing environment (La Cie's idea—too bad the buggy ATTO AccelNet system wasn't mature).
FC-AL advocates pooh-pooh the spatial-reuse concept. They also point to studies that show their technology to hold up just fine, thank you, under enormous transaction loads. As might be guessed, SSA backers counter with their own graph-crammed white papers, claiming that FC-AL, despite its superior bandwidth, isn't intelligent enough to take full advantage of complex RAID subsystems. What's more, they say, SSA is cheaper — and the FC-AL folks can't argue with that.

THE BOTTOM LINE

At this early phase in the serial-SCSI horse race, handicapping a winner requires examining each contestant's lineage and weighing the claims of its fans. The real race is yet to be run. With products only now taking their first faltering steps into the Mac market, our testing was doomed to be inconclusive regarding the SSA-versus-FC-AL battle (see the "Future's Not Here Yet" sidebar) — even though we were able to prove the viability of both technologies and to contrast them in their nascent state with the speedy, mature Wide Ultra SCSI.

But perhaps a more telling gauge of the value of SSA and FC-AL is that representatives from Adaptec, Seagate, IBM, and other interested parties are hunkering down together as you read this, working away on FC-EL, a Grand Unified Theory of serial storage that will combine the most effective and efficient aspects of both SSA and FC-AL into a high-performance serial storage technology for the next millennium.

But what if you and your workgroup can't wait for that proverbial bridge to the 21st century before you invest in a fast file-transfer system? Our advice: If all you need to do is blast files from one Mac to one local RAID array, stick with parallel Wide Ultra SCSI — or, soon, Ultra2 SCSI. You'll save money and still be able to use your old pre-Ultra SCSI drives (although if you do, your entire SCSI chain will drop to the speed of the slowest protocol for all attached SCSI devices).

However, if you're a deep-pockets digital-video or publishing professional who needs to share large files at high speed with members of your workgroup, look into serial systems — SSA today and FC-AL later in the year.

Executive Editor Rik Myslewski's first storage system was an 8-inch, 128K floppy drive. MacUser Labs Test Manager Kristina DeNike was once nearly electrocuted when she slipped her hand into a drive enclosure.

and serial-SCSI systems

SERIAL SYSTEMS

Pathlight Imagenet-1 PCI Card/Siemens Nixdorf SSA Disk Drawer 4

Pathlight is the leader in serial-SCSI technology for the Mac. Combining its Imagenet-1 card and Transoft's StudioBOSS software with a rugged multidrive assembly from Siemens Nixdorf creates a fast, reliable multi-Mac storage network. We were especially impressed with how easy the entire system was to configure.

La Cie Speed2

La Cie has put its label on a Pathlight PCI card and an IBM minitower SSA RAID array and given the pairing a price substantially lower than that of the Pathlight/Siemens Nixdorf combination. The only missing piece is multuser software, currently under development. Once La Cie finishes that chore, the Speed2 should increase SSA's acceptance in the Mac content-creation community.

Transoft StudioBOSS FC

FC-AL should scream. The Transoft StudioBOSS FC doesn't — both because its first-generation FC-AL hardware is not up to snuff and because the Mac's PCI controller can't keep up with the Transoft FC-AL PCI card's method of caching and then bursting data streams. Transoft's StudioBOSS multuser software may be inelegant and expensive, but using it is currently the only reliable way to take advantage of serial technology's multuser, multidrive functionality.

TESTING THE TECHNOLOGIES / single-user and multuser results differ widely

TO SIMULATE THE SITUATION OF A SINGLE USER with high-throughput needs, we set up the following configuration for each of the five systems tested: a RAID Level 0 array of four disks attached to each vendor's PCI card in a Power Mac 9500/200. Perhaps not surprisingly, given the newness of SSA and FC-AL and their multuser orientation, the SSA and FC-AL-based systems couldn't match those based on parallel-SCSI technology for speed — but all these systems provided better speed than you'd get by accessing the internal drive on the 9500.

THE FACT THAT MULTIPLE USERS can share the same volumes is potentially a big advantage of serial architectures. Based on their specifications, SSA and FC-AL should each provide better throughput than Ethernet, saving your office time as well as money. But what happens to that throughput when multiple users are accessing a disk array simultaneously — and really pounding it?

To answer this question, we set up a loop of three computers and one four-disk RAID tower (partitioned into three volumes). Each volume in the RAID tower was striped across all four disks. The first computer was running an Apple Power Mac 6100/60 with a 30-MHz memory bus, a 250-MB hard drive, 2 MB of built-in graphics RAM, and no L2 cache. This system is given a score of 100 for all tests. Our test platform was a Power Mac 9500/200 with 128 MB of RAM, running System 7.5.5.

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>PUBLISHING DISK</th>
<th>SEQUENTIAL READ (1,024K)</th>
<th>SEQUENTIAL WRITE (1,024K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTO AccelNet Fast Wide SCSI</td>
<td>409</td>
<td>34,888</td>
<td>22,412</td>
</tr>
<tr>
<td>La Cie Speed2 SSA</td>
<td>317</td>
<td>21,061</td>
<td>16,534</td>
</tr>
<tr>
<td>Pathlight Imagenet-1 SSA</td>
<td>318</td>
<td>20,797</td>
<td>18,068</td>
</tr>
<tr>
<td>Streamlogic StudioHammerPro Wide Ultra SCSI</td>
<td>449</td>
<td>34,540</td>
<td>28,978</td>
</tr>
<tr>
<td>Transoft StudioBOSS FC Ultra SCSI</td>
<td>209</td>
<td>35,805</td>
<td>32,872</td>
</tr>
<tr>
<td>REFERENCE SYSTEM Apple Power Mac 9500 internal drive</td>
<td>176</td>
<td>3,857</td>
<td>3,799</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>PUBLISHING DISK</th>
<th>SEQUENTIAL READ (1,024K)</th>
<th>SEQUENTIAL WRITE (1,024K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pathlight Imagenet-1 (3 CPUs)*</td>
<td>72</td>
<td>7,914</td>
<td>7,264</td>
</tr>
<tr>
<td>Pathlight Imagenet-1 (1 CPU)*</td>
<td>318</td>
<td>20,797</td>
<td>18,068</td>
</tr>
<tr>
<td>Transoft StudioBOSS FC (3 CPUs)*</td>
<td>89</td>
<td>12,237</td>
<td>10,087</td>
</tr>
<tr>
<td>Transoft StudioBOSS FC (1 CPU)</td>
<td>209</td>
<td>35,805</td>
<td>32,878</td>
</tr>
<tr>
<td>REFERENCE SYSTEM Apple Power Mac 9500 internal drive (1 CPU)</td>
<td>176</td>
<td>3,857</td>
<td>3,799</td>
</tr>
</tbody>
</table>

MAY 1997 / MacUser 69
Using breakthrough LIMDOW® technology, Maxell brings you super-fast direct OverWrite Magneto Optical Disks.

LIMDOW (Light Intensity Modulation Direct OverWrite) technology boosts writing speeds by up to 100% over current Magneto Optical (MO) disks. That's because it requires only a single pass to rewrite new data to a disk—eliminating the need for erasing.

Now you can transfer data at an impressive 4.0 MB/second, and still have the security and convenience of a removable media with random access. Maxell's line of direct OverWrite MO disks are ideal for data storage, document imaging, file management, and multimedia applications.

On top of doubling your speed, Maxell's LIMDOW disks offer you the highest capacities available—640 MB on a 3.5-inch disk and 2.6 GB on a 5.25-inch disk. Plus, they'll be there for you down the road with durability rated at 1,000,000 rewrite cycles and an archival life of over 30 years! Look for LIMDOW capable drives from Nikon, Fujitsu, Hitachi, Pinnacle Micro, Most, Mitsubishi Chemical, Konica, and others.

Check out Maxell's entire line of data storage solutions. Whether you use floppies, cartridges, cassettes, CDs, optical disks or laser servo disks, you can count on Maxell's quality. Plus, Maxell products are backed by a lifetime warranty.

Put the "pedal to the metal" with the blazing rewrite speeds of Maxell's direct OverWrite MO disks. Got questions? Call our tech support center, or get our FREE product brochure by calling 1-888-2-Maxell (262-9355). Check out our Website at www.maxell.com
Web Color Wizardry

If Web color has you stumped, you're not alone. Maybe you're perplexed when Photoshop asks you to choose a “palette” for Web-ready GIF images, or maybe you're concerned when the site logo that looked great on your computer somehow looks dark and mottled on your neighbor's old Compaq. There's no magic to great Web graphics, but even if you're a pro at creating color graphics for print, creating color artwork for display on the Web requires a different way of thinking.

Unlike with print design, where the final publication looks the same to everyone, Web graphics' appearance varies depending on the operating system, video-card bit depth, and screen size the end viewer is using. As a result, the Web suffers from a central authoring irony — creators and end viewers of Web graphics almost always see a different picture.

Artists and designers who create images for the Web typically have higher-powered software and equipment than people who buy computers for general purposes. Anyone who's seriously involved in computer-based imaging probably has a Macintosh and a monitor that displays thousands or millions of colors. Many Web navigators use Wintel PCs with minimally configured systems that display graphics at 8 bits (256 colors). Ignoring how your pages will look on these low-end displays is like designing and proofing a magazine on thick glossy paper and then sending it off to your customers printed on newsprint.

In this article, you'll learn the ins and outs of color in the world of 8-bit graphics, so that you can create images that look great no matter who's viewing them.

Bits and Palettes

If you're used to working in Adobe Photoshop in RGB mode and have a 16- or 24-bit-color display (thousands or millions of colors), chances are you've never had to understand 8-bit graphics, because the colors assigned to your images have never been limited by the 256-color barrier. But understanding how these graphics work is critical to making good Web-design decisions, for two reasons: The predominant graphics file format, GIF, is 8-bit, and many viewers' monitors are 8-bit.

GIF images include color palettes, or predetermined sets of as many as 256 colors, which define which colors they will use. (These palettes are also called “color lookup tables,” known in the industry as CLUTs, which rhymes with *mutts*). You can reduce an image to 256 colors or fewer by using one of two types of palettes — an adaptive palette, based on the colors already in the image, or a system palette, based on a computer platform's preset group of 256 colors. Adaptive palettes usually get the best results when the graphic is viewed on a monitor that has thousands or millions of colors (see figures 1 and 2).

The trick is that each operating system, be it the Mac OS, Windows, or Windows 95, also has its own palette that Web browsers use to reduce color information for 8-bit monitors. When people with 8-bit monitors view your site, their browsers — whether they're using Netscape Navigator, Microsoft Internet Explorer, or Spyglass Mosaic — convert the images to one of the system palettes, regardless of any adaptive palettes you might have used. In some cases, this hardly affects the way your images look, but in others, it wreaks havoc with your intended colors and image quality.

There's only one way to sidestep this risk effectively — by using a palette that is "browser-safe.”

Fortunately for Web authors, the system palettes have 216 colors in common. All color monitors can display them, and all browsers on all platforms will show each color as is.
These colors were chosen not for their beauty and usefulness; they were chosen from a mathematical color cube based on multiplying six values of six colors—red, green, blue, cyan, magenta, and yellow. This is why the browser-safe palette is sometimes called the 6x6x6 palette. It's also frequently called the Netscape palette.

Take a look at figure 3 to see the browser-safe palette. Also, check out the sidebar review of Pantone ColorWeb, a handy tool that adds the palette to the Apple Color Picker extension, making the palette a lot easier to use.

The browser-safe palette can save you much of the hassle and heartache of mangled graphics, but to get the best results, you need to know exactly how and when to use it. Follow these three general guidelines to create Web color everyone will see as you intended.

**Three Steps to Better Web Color**

1. **Use browser-safe colors for text and backgrounds.**
   If you don't use browser-safe colors when you select your site's background and text colors, the browser will convert the colors to browser-safe values for you. This can be problematic if a browser converts your text to the same color as the background, thereby making your page unreadable!

   Web browsers use HTML (HyperText Markup Language) to display colored text, links, and background colors. There are two ways to specify color in HTML, either with hexadecima values or with color names such as red, green, or lemonchiffon. Unfortunately, few of the named colors are browser-safe, so it's best to stick to browser-safe hexadecimal values when specifying HTML-based color.

   The problem is that most Web authoring programs don't use hexadecimal values. Instead, they let you choose your background and text colors with the Apple Color Picker. The Color Picker works with RGB colors and displays these values in percentages instead of as numbers from 0 to 255. To translate from the color-picker percentages to browser-safe hexadecimal values, use the table in figure 4.

2. **Create graphics with browser-safe colors.**
   Line art, illustrations, cartoons, logos, and any artwork with a lot of solid color are best suited to GIF files, but it's very difficult and time-consuming to convert an existing graphic's color to fit the browser-safe palette and make it look good. You're better off building art with browser-safe colors from the ground up.

   If you don't use browser-safe colors with graphics, the browser will convert your art to browser-safe colors, and this will cause ugly dots, resulting from dithering, to appear in the solid colors of your image. See figure 6 for an example—the bottom logo was created with browser-safe colors but the top logo was not.

   If you use Photoshop to create your graphics, there's an easy way for you to get started using browser-safe colors right away. Download a palette named bclut2.aco (ftp://luna.bearnet.com/pub/lynda/). You're in luck if you own Photoshop 4.0, since it comes with this palette (Mode: Indexed Color: Palette: Web). Once you have the palette, load it into the Swatch palette. Then use the eyedropper tool to select and paint with the correct colors.

   **Important Warning!** If you have a 16-bit display (thousands of colors), you will not be able to select or save the 216 colors reliably unless you switch your bit depth to 8 bits (256 colors) or 24 bits (millions of colors) before you save the artwork.

3. **Save photographic images as JPEGs if you can, or save them as GIFs with adaptive palettes.**
   JPEG is not an 8-bit format and therefore does not have a palette. As a result, if end viewers do have a monitor with thousands or millions of colors, they'll be able to see all the photo's colors. If the viewers don't, a browser will apply a system palette to your image on the fly, but unlike with colored text or nonphotographic images, this will cause ugly dots to appear in the solid colors of your image.

**Colorful Examples**

![Figure 1](image1.png)

**Figure 1** This 8-bit image looks good because it was created with an adaptive palette. An adaptive palette includes colors weighted in favor of those in the original image.

![Figure 2](image2.png)

**Figure 2** The same image, saved with the Mac OS system palette, dithers unattractively. The system palette includes fewer browns and earth tones than the image requires.

![Figure 3](image3.png)

**Figure 3** The browser-safe palette has 216 shared colors that work consistently across operating systems.

![Figure 4](image4.png)

**Figure 4** Here's a handy table to help you convert the browser-safe RGB color values to their hexadecimal and percentage counterparts.
images, the browser will do a better job than you could.

There are times when you must save a photographic image as a GIF file, when you want to create an animation or a transparency, for instance. However, in such cases you will actually create a worse-looking image if you save a photo as a GIF file with the browser-safe palette. You will have forced the image into the lowest common denominator, even though end viewers with 16-bit or 24-bit systems could have seen better-looking results.

If you have to save a photographic image as a GIF file, do so with an adaptive palette. The adaptive image will not look much worse than the browser-safe one would on an 8-bit monitor, but it will look better on a 24-bit monitor. Take a look at figure 5.

**File Size: One More Reason to Understand 8-Bit Graphics**

What many Web authors don't realize is that the number of colors in a GIF image's palette affects not only its looks but also its file size. Basically, the fewer colors used in the image, the smaller the file size. For this reason, we recommend that in addition to using the browser-safe palette for graphics, you remove as many extraneous colors from the image's palette as you can. A few products can help you do this, including Digital Frontiers' HVS WebFocus (http://www.digfrontiers.com/) and Boxtop Software's PhotoGIF (http://www.aris.com/boxtop/PhotoGIF/).

**Putting the Bits Together**

Most designers like to have as much control as they can over how their Web pages look. For this reason, it's worth taking the time to pay attention to 8-bit-authoring issues. In the end, your site will benefit if you design it to look like you want it to over the widest range of operating systems and browsers.


---

**Pantone ColorWeb / welcome color tool for Web designers**

PICKING THE RIGHT COLOR CAN BE DIFFICULT when you're designing for print, but at least there are tools to help. The same hasn't been true for the Web, until now. Pantone's ColorWeb, based on the company's line of print products, is an excellent and inexpensive tool that makes Web design easier.

ColorWeb has two parts: a printed swatch book, for picking combinations of browser-safe colors, and software that lets you access the 216 colors directly from the Apple Color Picker.

The addition to the Color Picker is most essential. Web authoring programs, including Adobe PageMill and Bare Bones Software's BBEdit, don't let you define colors by RGB values or percentages, and this can make it difficult to choose precisely. The swatch book eases design decisions by organizing samples of the colors in chromatic order and listing their equivalents in RGB, CMYK, hexadecimal, and Hexachrome. Unfortunately, there's no accurate way to convert between CMYK values, which represent printing inks, and RGB values, which represent monitor colors, since some RGB colors can't be printed. The swatch book's numbers are really approximations. The printed swatches, although enhanced by special inks, aren't exact.

Despite these limitations, ColorWeb goes a long way toward giving Web designers a basic set of color-picking tools comparable to those widely available for print.

---

**figure 5 / If you must save a photographic image as a GIF file, use an adaptive palette. When viewed on a monitor with millions of colors (a), a GIF image with an adaptive palette looks noticeably better than a GIF image saved with a system or browser-safe palette. When viewed on an 8-bit monitor with 256 colors (b), the GIF image with the adaptive palette looks as good as the GIF images with system and browser-safe palettes.**
From Line Art to Fine Art

Follow these steps to transform a simple line drawing into something special.

THINK SIMPLY. You don’t always have to strain your brain for newer and cooler artistic effects, nor do you have to empty your pockets by paying someone to make something for you. When you need an illustration quickly that looks handmade, the solution may be no more complicated than using the preset brushes in Fractal Design Painter and an old-fashioned pencil.

In this piece, we’ll show you how to take a scan of something you’ve sketched yourself (or a piece of black-and-white clip art) and turn it into a unique piece of art. Whether you’re a novice or a pro, a little experimentation with Painter’s standard brushes and a variety of colors and textures can get striking results. If you like, you can even open your Painter file in Adobe Photoshop to apply artistic filters.

Here we try three ways of enhancing one drawing and then combine sections of each version to create an eye-catching composite image on our own.


STEP BY STEP

1. DRAW, SCAN, AND TRACE A SIMPLE SKETCH. Use a pencil or a pen to make your own drawing, or find a piece of clip art. Scan the sketch in grayscale mode (a), open it in Painter, and create a copy (File: Clone). You’ll want to create a ghost of the image to trace over; so select the image, delete it, and then choose Tracing Paper from the Canvas menu (Canvas: Tracing Paper). A faint copy of the sketch will appear. Use your mouse or, better yet, a pressure-sensitive tablet and stylus to trace over it with the Sharp Chalk brush (b).

2. TURN THE SKETCH INTO A TRADITIONAL WATERCOLOR DRAWING. Painter’s chalk and watercolor brushes imitate basic and familiar art materials, so they can be good tools with which to start your experiments. To build up color gradually, set the brushes at less than 100-percent opacity in the Controls palette (Window: Controls). Fill in white areas with the Large Chalk brush set at 60-percent opacity, and then smudge the chalk strokes with the Just Add Water brush set at 50-percent opacity (a). To complete the digital watercolor, select a Hatching paper texture from the Paper palette (Window: Art Materials: Paper) and apply a color overlay (Effects: Surface Control: Color Overlay) at 40-percent opacity (b).

3. MAKE ANOTHER VARIATION WITH BRIGHT PAINTED COLORS. To create a different version of your artwork, begin with the colored line drawing you created (1b). Use Painter’s Brushy brush tool to add colors broadly to white areas (a). Then exaggerate those colors by increasing the Dye Concentration (Effects: Surface Control: Dye Concentration). Create highlights along the outlines of the image and splotches of contrasting
3. MAKE ANOTHER VARIATION WITH BRIGHT PAINTED COLORS.

4. USE PHOTOSHOP TO CREATE A DRAMATIC INVERSION. For a more dramatic effect, begin by opening your smudged chalk drawing (2a) in Photoshop. Add a soft color to the background by selecting the white background with the magic wand and applying a wide feather (Select: Feather). The feather will fade the color around the object's edges. Use the eyedropper to sample a color from your image (in our case, yellow), and then choose Fill (Edit: Fill). In the Fill dialog box, set opacity at 50 percent and choose Darken in the mode pop-up box (a). Next, make the color more vivid by increasing the image's contrast (Image: Adjust: Levels). Last, create a dramatic negative (Image: Adjust: Invert) of your image (b).

5. COMBINE YOUR VARIATIONS TO MAKE A STRIKING COMPOSITE. Can't decide which variation you like best? Combine several in Photoshop. Start by inverting the original line drawing (Image: Adjust: Invert). Use this image as your base. Use the marquee tool to create a rectangular selection area that takes up a quarter of the image. If you have Photoshop 4.0, turn on the grid (View: Show Grid) to measure accurately. Save your selection area (Select: Save Selection). Then open a color variation and load the selection area (Select: Load Selection), making sure to choose the base image as the source in the pop-up menu. Use the selection area to copy a quarter of the color variation, and paste the corner into the base image (Edit: Paste Into). Repeat this process to paste different color variations into the other two corners of the base image.
EXPERT TIPS / By Bob Schaffel and Chuck Weger

Publishing’s NeXT Life

What does Apple’s acquisition of NeXT mean for publishing professionals? The stakes are high.

THE DUST HAS SETTLED from the Mac OS stampede. After toying with the BeOS, Apple has decided to buy NeXT and the OS Steve Jobs built. But you know that by now.

The real news in all this is OpenStep (née NeXTstep), which Apple will now somehow fold into a new system release called Rhapsody. This new release will give us all those cool multitasking, multiprocessing, multidimensional features Mac users have been asking for.

The item of most interest to us in the graphic arts (aside from obvious questions such as, Can Apple really pull this off?) is, Will this new OS use QuickDraw or Display PostScript? In other words — and here’s a $20 term — what will its imaging model be?

In the last two issues, we discussed debugging PostScript files (March ’97, page 116, and April ’97, page 82), a ritual that’s been required since the Dawn of Desktop Publishing. One of the reasons we have to debug PostScript is because things often get lost in the translation from QuickDraw (the Mac’s native graphics language) to PostScript (the language of laser printers, imagesetters, and digital plate-setters). That’s when the WYSIWYG model breaks down: What you see on the screen isn’t always what you get on the page.

Software vendors and Apple have gone to great lengths to address these conversion issues, but there are still times when things don’t print the way they appear on-screen, so you end up with unusable printouts. When that happens, the user’s typical solution is to start dismantling the file to see which component caused the problem. Was it that gradient? Or that included EPS image? Or perhaps this screen font doesn’t match the printer font (even though they have the same name).

What could help prevent this media and time waste and give us a more WYSIWYG environment? Reducing the conversion steps between the WYS and the WYG, for one. What if the Mac’s native graphics format were the same as the format used by printers? That’s the promise of Display PostScript.

Display’s Da Thing

Display PostScript is the graphics language inside NeXT’s OS. Today on the Mac, whenever an application wants to draw a line, paint a pixel, or type a character, it calls on QuickDraw, the imaging model built into the Mac OS since Day 1. On a NeXT machine, that same application would call Display PostScript. The same graphics would appear on-screen, but the guts of the program would be different. And (more important) the application wouldn’t have to change anything when it came time to send the output to a PostScript printer instead of to the screen.

What a concept! We would finally have true, not just simulated, WYSIWYG. If something looked right on the screen, you could be pretty darn sure that it would print right as well.

Years ago, various people urged Apple to license Display PostScript from Adobe and use it as its imaging model. For several technical and economic reasons, Apple decided not to do this back then. But now things are different: The CPU, the OS, and the market have evolved to a point where perhaps PostScript on the screen makes sense.

There’s quite a lot of ground to cover between saying this and making it a reality, though. Display PostScript is somewhat of a moribund, orphaned product; no one except NeXT and Sun (which made its own version) ever really used it. So who knows what shape the code is in, compared to more-recent Adobe efforts such as Acrobat and similar imaging models in Illustrator and other PostScript-based applications.

To complicate matters, there’s the QuickDraw GX camp. QuickDraw GX, an advanced-technology version of QuickDraw, has lots of cool features but has never really caught on in the application community. And there are no high-end output devices (such as imagesetters) that support native QuickDraw GX files — this despite Apple’s best efforts at evangelizing it in the developer community. But QuickDraw GX still might be better than Display PostScript, if only because it’s a more modern incarnation of what an imaging model should be.

The other counterargument is that users outside the graphic-arts fields (the owners of all those Performas, for example) don’t really need PostScript and shouldn’t have to pay a premium for a printer with a PostScript interpreter, just because the internal imaging model is PostScript. Of course, the Display PostScript interpreter could send pixels only out to the printer instead of to the screen, but would that method be fast enough on low-end systems?

As users and writers (and users of writing tool), we don’t have to make any of the hard decisions that Apple docs about how to do any of this. All we would ask is that, as the NeXT Mac approaches, we be given a robust, well-supported, high-performance graphical environment that will help keep the Mac the premier platform for the graphic arts. What do you think of Display PostScript? What’s on your wish list of features? Send us an e-mail at experttips@macuser.com.

Bob Schaffel is emerging-technologies consultant for R. R. Donnelley & Sons. Chuck Weger is a graphic-design consultant and a partner in Genex Media, a company specializing in new media and Web design. Write to them at experttips@macuser.com.

76 MacUser / MAY 1997
While you're sitting there, something is happening in the world. It's called "the news." With PointCast, the Internet news network, you can get it broadcast straight to your desktop: weather updates, world news, sports, stocks, industry news and more. And suddenly your computer screen is transformed into a dynamic, multi-colored newswire complete with flying headlines, vibrant graphics and scrolling stock ticker. PointCast is completely customizable so you can get exactly the news you want. CNET awarded it the Best Internet Application of 1996 and The Wall Street Journal gives PointCast "must-have' status for in-the-know computer owners." You can find PointCast at your local retailer or download it free at www.pointcast.com.
CorelDRAW™ 6 Suite for Power Macintosh®—the first complete graphics and word-processing package for Macintosh® users. The marriage of world-famous Corel® WordPerfect® with award-winning CorelDRAW™—bundled together for the very first time—is a powerful union. This incredibly comprehensive suite combines innovative illustration, image editing, photo editing and 3D rendering with the efficiency of intuitive document creation.

CorelDRAW 6 Suite for Power Macintosh—marking the dawn of a new era in graphics software for Macintosh users.

INCLUDES:
- CorelDRAW™ 6 for Power Macintosh®
  Illustration and Page Layout
- Corel® WordPerfect® 3.5
  Powerful Word Processing
- CorelDREAM 3D 6
  3D Modeling and Rendering
- Corel TEXTURE™ 6
  Realistic Texture Creation
- Corel ARTISAN™ 6
  Photo Editing and Bitmap Creation
- Netscape Navigator™

INCREDIBLE VALUE!
- 9 powerful applications and utilities
- Over 25,000 clipart images
- Over 1,000 high-resolution photos
- Over 1,000 Type 1 fonts
- Over 700 TrueType® fonts
- Over 750 3D models
Making sure everyone in your company has the latest software is a whole lot easier when you have a little help from your network.

Software by LAN

KEEPING UP WITH THE JONESES — or with the latest versions of software, from operating systems to word processors to spreadsheets — gets more difficult all the time. Software vendors release larger, more frequent updates each year, and network administrators must contend with the complexities of installing applications, control panels, and other files on each machine they manage. Whether you’re the system administrator in your office or just happen to take care of the Macs in your spare time, you don’t have to wear out your shoes to keep everyone’s Mac current — you can use software-distribution applications to install new or updated software, right from the comfort of your own Macintosh.

There are two basic ways to install software on a group of computers: the sneakernet way and the automated way. Although using sneakernet is a great way to get acquainted with everyone in the office as you install a new application from floppies or a CD-ROM, it isn’t very efficient: You waste your officemates’ work time as well as your own. For most networks of more than three or four Macs, the automated way makes the most sense. Using the network and a software-distribution tool, you can keep everyone’s applications up to date and yourself organized. Here is your guide to choosing and using a software-distribution application.

Programs that automate software distribution all do pretty much the same thing: They create and deliver software packages to Mac OS systems via the network. Packages consist of applications, support files, and system items — anything you want to distribute to a group of users all at once. After the package is delivered, the software-distribution tool puts applications, control panels, fonts, and other files in their proper places and trades old files for new ones. Some software-distribution tools even allow you to keep track of how many users are running a particular application and allow you to change users’ control-panel settings to ensure compatibility.

Tools of the Trade

We took a look at three software-distribution programs: LAN Commander, from Power On Software; FileWave, from Wave Research; and NetOctopus, from DataWatch. Although each application has a different approach to the task at hand, their basic functions are the same. Each program includes an administration application (used by the network manager to create and distribute software updates) and a control panel that must be installed on each Mac OS system you intend to update remotely. The administration application communicates with remote users’ Macs through the control panels and uses the client software to gather information about the users’ computer and software.

Differences among software-distribution tools start to become evident when you examine how intelligently they distribute files and applications and how much work and time they save an administrator. The tool you choose should be the one that best matches both the size of your network and the amount and complexity of software you intend to distribute. Fortunately, several choices are available, ranging from a basic tool that essentially replaces outdated files and folders on the remote user’s Macintosh to sophisticated offerings that can manage complex tasks such as system-software installation and application updates based on the contents of a user’s machine.

On the low end, LAN Commander is inexpensive and very easy for novice software distributors to use. At the opposite end of the...
spectrum is FileWave Enterprise Edition, which can support several thousand Macs, using multiple FileWave distribution servers. (The company also offers a Workgroup Edition of FileWave, which is included with Apple's Workgroup Servers.) The whole system can be administered from a single Mac. Between LAN Commander and FileWave, in terms of complexity and power, is NetOctopus. It can support several hundred Mac OS systems and is the only distribution tool that supports PCs as well as Macs.

Plan of Action
Regardless of the automation tool you decide to go with, planning for efficient software distribution is essential. Software installations are complex, and so is the task of updating all the Macs in your office. You need to decide what to distribute, when to do it, and how much control you wish to exercise over your coworkers' computers. Some choices will be determined by the tool you buy, whereas others will depend on an analysis of your network and need for information.

One of the most notable distinctions among the three current Mac software-distribution tools is the sophistication with which they can install complex software packages on users' machines. Installing system software, and many business applications, requires copying files to several folders on the target hard disk and replacing the outdated files. Software-distribution tools can do this, to varying degrees. NetOctopus, for example, can completely automate software updates by running an application's installer program over the network. It can also deposit installer packages in a folder on each user's hard disk. You can then instruct the users to run the installer at their convenience. A utility called File Scripter allows you to create your own AppleScript-based installation sequences. You can create scripts to install a customized set of software or to deliver company documents to everyone on the network.

Of the three programs, FileWave has the most sophisticated approach to custom software distribution and is ideal for organizations in which each Macintosh contains the same, company-approved software. With FileWave's FileSet Magic utility, you can scan a hard disk connected to your Macintosh and use the result to produce a standard configuration for each user on the network. You can add to this configuration by installing a copy of new or updated software. FileSet Magic then creates a package you can use to update everyone's Macintosh from the FileWave server. Updates happen automatically, according to the schedule you've set. FileWave also comes with precreated file-set templates for popular software, including ClarisWorks and Microsoft Excel 5 and Word 6.

For those who have only a few networked Macs to update and don't plan to perform frequent, complex distributions, LAN Commander is a simple-to-use alternative to NetOctopus and FileWave. LAN Commander can't use installer scripts to perform complex installs, but its straightforward approach makes it a good choice for part-time administrators who have simple needs. You can, for example, use a single menu command to install a single folder containing new or updated software. FileWave and NetOctopus require a bit more work.

Consider the Users
Delivering software over networks is a productivity boon to network administrators, but it has the potential to interrupt your colleagues' workday if not done carefully. Copying large files, even when it's done in the background, can slow the target Mac to a crawl. It's best to distribute software when users aren't working at their desks. NetOctopus lets you schedule installations and can therefore copy files at night or over the weekend, as long as the target Mac is turned on. LAN Commander has no scheduling feature and, since it is the most intrusive of the three packages, works best at lunchtime or at the end of a workday. You can set LAN Commander to lock a user's screen and keyboard during installation. This speeds up the file transfer but also makes the target Mac completely unusable. It's best to start distribution when your users leave and let LAN Commander run while you're gone.

FileWave provides the most sophisticated approach to scheduled installation. If you schedule a FileWave update, each Mac's client software will detect whether or not the Mac is in use, transferring files to the user's hard disk only when the Mac is idle. FileWave temporarily discontinues installation if the user presses a key, clicks the mouse, or shuts down the Mac. FileWave resumes copying where it left off when it senses that the Mac is running and idle again. This feature makes using FileWave a great way to update PowerBooks as they appear on the network.

Control Freaks
The ability to add software to remote computers gives network administrators a lot of control over Macs on the network. Besides the ability to tie up everyone's machine while software is updated, administrators have the power to wreak havoc with System Folders and application configurations. It's very important to thoroughly understand the capabilities of your software-distribution tool and

### RATING SOFTWARE-DISTRIBUTION TOOLS

<table>
<thead>
<tr>
<th>Tool</th>
<th>Edition</th>
<th>Price</th>
<th>Pros</th>
<th>Cons</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>FileWave</td>
<td>2.6</td>
<td>$495-$1,995</td>
<td>Good configuration and reporting abilities.</td>
<td>Requires separate Macs for server and administrator. Server setup is complex.</td>
<td><a href="http://www.waveresearch.com/">FileWave</a></td>
</tr>
<tr>
<td>LAN Commander</td>
<td>1.02</td>
<td>$29.99 per user</td>
<td>Simple interface. Inexpensive.</td>
<td>No scheduling. Lacks sophisticated installation features.</td>
<td><a href="http://www.datawatch.com/">LAN Commander</a></td>
</tr>
<tr>
<td>NetOctopus</td>
<td></td>
<td>$20-$60 per user</td>
<td>Good configuration and reporting abilities.</td>
<td>Works with installer applications. Supports PCs.</td>
<td><a href="http://www.datawatch.com/">NetOctopus</a></td>
</tr>
<tr>
<td>Wave Research</td>
<td></td>
<td></td>
<td>Requires separate Macs for server and administrator. Server setup is complex.</td>
<td></td>
<td><a href="http://www.waveresearch.com/">Wave Research</a></td>
</tr>
</tbody>
</table>

---

**Software-Distribution Tools**

- **FileWave 2.6**
  - **Pros**: Effectively automates large, complex software installations. Installs only when Mac is idle. Advanced scheduling. Supports thousands of Macs.
  - **Cons**: Requires separate Macs for server and administrator. Server setup is complex.

- **LAN Commander 1.02**
  - **Price**: $29.99 to $49.90 per user.
  - **Pros**: Simple interface. Inexpensive.
  - **Cons**: No scheduling. Lacks sophisticated conditional-installation features.

- **NetOctopus**
  - **Price**: $20 to $60 per user.
  - **Pros**: Good configuration and reporting abilities. Works with installer applications. Supports PCs.
  - **Cons**: Setup of complex software packages is tedious.

---

80 MacUser / May 1997
A DuoScan™ they tell you. A desktop scanner with two loading areas? A two-bed scanner? Yes, they say. So you can load transparencies while you scan reflective art. And with a dedicated bed for each, you can get better scans from both.

Then you look at the dynamic range. And you look at the resolution. And the speed. And then you know exactly what it is. It's something that's going to make your life a lot easier.
the consequences of adding, removing, or updating files on users' hard disks.

The System Folder is the biggest minefield for would-be software distributors. Since the many generations of Macs require different combinations of extensions and control panels, it's possible to cause conflicts and errors by installing the wrong software inadvertently. An administrator using LAN Commander carelessly can, for example, replace a user's System Folder — and any control panels, fonts, and preference files the user may have installed — with a copy of the System Folder on the administrator's Mac. If your network includes both PowerPC- and 680x0-based Macs, you'll also need to make sure the source Mac contains fat-binary versions of system software and applications you want to install.

With FileWave, you can create different System Folder file sets for different kinds of Mac OS systems. However, a few applications, such as Apple Remote Access, make changes to the System file itself. Because FileWave doesn't run the installer scripts, you'll have to replace the user's System file with the altered one.

**Keeping Track of Your Users**

You can't efficiently distribute software unless you have some understanding of which applications and System Folder files need updating. It's also helpful to know configuration details, including the amount of disk space and RAM each system on the network includes.

Software-distribution tools gather this information, using the control panels installed on each Mac. You can even locate and modify system settings to accommodate new software. For instance, learning that Modern Memory Manager is turned off might explain problems with launching a certain application.

LAN Commander has the simplest set of reporting and configuration capabilities. It can turn file sharing on and off, set the sound level, set monitor parameters, and launch applications remotely. FileWave and NetOctopus can report on dozens of configuration aspects, including software versions, TCP/IP addresses, expansion cards installed, and lists of control panels. NetOctopus even allows you to configure users' TCP/IP and MacTCP settings.

Monitoring has another important function: software-license management. Tracking both the software you install remotely and the applications already stored on users' hard disks can prevent your organization from exceeding the number of licensed copies on the network. If you find unlicensed software, you can use a software-distribution tool to remove it. NetOctopus and FileWave can provide reports identifying software on each Mac. NetOctopus can also tell you what installed software is not being used. FileWave also enables the administrator to copy-protect any file it installs, preventing users from duplicating software. LAN Commander's reporting is more basic. The Application Status window shows you which Macs are currently running which application.

**Automate Your Life**

It's safe to say that software packages won't become smaller or simpler anytime soon, and no automated system can completely replace a system administrator traveling from Mac to Mac. Fortunately, software-distribution tools can free an administrator's time for troubleshooting and other important tasks.
Don’t Miss the **PERFORMANCE** of a Lifetime!

Ladies and Gentlemen, FWB is proud to announce the industry’s premiere Trade-Up Offer! Save 50% on the #1 selling disk utility software during this limited time engagement. Our award-winning cast features the biggest stars in storage management.

**RAID TOOLKIT 2.0** tops the bill with RAID Level 0 data striping for double the performance, and RAID Level 1 disk mirroring for ultimate data protection. And now, with removable array support, you can swap RAID canisters (and Jaz” array cartridges) “on-the-fly”.

Find out why nearly a million loyal fans have switched to **HARD DISK TOOLKIT**. Our new 2.0 is the most powerful disk management package available—with universal SCSI and IDE support, one-step disk set-up, and faster I/O for your Mac. Also, be sure to catch our newest rising star, **TURBO TOOLKIT**, as it works behind the scenes to optimize disk performance, accelerate system start-up, and make all your applications smarter and faster. But hurry, this stellar performance is sure to sell-out fast.

**COMPETITIVE UPGRADE**

RAID TOOLKIT **$149**

TURBO TOOLKIT

HARD DISK TOOLKIT **$99**

Eligible products include:

- DiskWorks™
- Remus™
- Corda RAID™
- Anubis RAID™
- Express Stripe™

Must fax proof of completing product ownership (disk or manual cover).


© 1996, FWB Software, LLC. FWB is a registered trademark of FWB Software, LLC. RAID Toolkit, Hard Disk Toolkit, and Turbo Toolkit are trademarks of FWB Software. Mac and MacOS are trademarks of Apple Computer, Inc. and may be registered in certain jurisdictions. All other trademarks are property of their respective owners. All rights reserved. Specifications subject to change without notice.

CIRCLE 71 ON READER SERVICE CARD
The general-purpose MiniCad went toe-to-toe against industry-specific CAD programs nearly six times as expensive—and came out on top—at the first-ever Designers CAD Shoot-Out for Architectural CADD Systems. In this advent of “architecture as a spectator sport,” the audience at Boston’s World Trade Center awarded MiniCad 6, fittingly, six first-place awards:

- Most Cost Effective
- Easiest to Use
- Best at Cross-Platform Operation
- Best Floor Plans
- Best Elevations
- Best Sections

MiniCad also placed a close third in the Overall Winner category (gaining 21% of the audience vote compared to Arris’ 25% and ArchiCad’s 24%).

To find out more about the CAD Shoot-Out or how professionals in more than 80 countries have used MiniCad—designing everything from a guitar to a zero-gravity manufacturing device; building houses, luxury high rises, shopping centers, and hockey arenas; planning the stage set and lighting for worldwide Metallica tours; even helping reconstruct Shakespeare’s historic Globe Theatre—check out our web page (www.diehlgraphsoft.com) or call 1-800-695-7318.

MiniCad has a suggested retail price of $795, and it comes with 18 months of free tech support and a 30-day money-back guarantee from participating dealers. MiniCad 6 supports Windows 95, NT, 3.1, and Macintosh OS.

Diehl Graphsoft Inc
Software for Today’s CAD Professional

MiniCad is a trademark of Diehl Graphsoft, Inc. All other brands and product names are trademarks of their respective holders. This building, designed by David A. Brooks, Fanning & Wadsworth, Architects.

MiniCad 6 — The only thing small is the price.
Java: Strange Brew
Can a caffeinated programming language save the Macintosh?

TALK TO ANYONE about the Internet, particularly a software vendor or a trend watcher, and that person will mention the growing importance of Java. Talk to Apple about its future operating-system strategy, and you'll hear that it's vital for Rhapsody, the company's planned NeXTstep-based OS, to be fully Java-enabled. Not that Apple will give you any specifics about it, of course, but whether it's in your Web browser or within the operating system itself, Java is coming to a Macintosh near you. The question is, Should you care?

A Cup of Java
If you've been so overwhelmed by the buzzwords that you've yet to hear a clear explanation of what Java is and why it's good for you, here's the digest definition: Java is a programming language created by Sun Microsystems that's similar to C and other languages used by computer programmers today. Unlike applications written in other languages, which must be painstakingly ported to each new platform, Java programs can run immediately on any computer that supports the Java language. Once Java support is enabled in a Web browser or application, or integrated into the Mac operating system, Java-based software written by a Windows programmer who has never even seen a Mac should run flawlessly on a Mac.

At least, that's how it's supposed to work. However, the way a Java program runs on a computer depends on the quality of the Java Virtual Machine, the software that translates Java programs into a computer's native language. That's why Mac users have essentially been second-class citizens in terms of Java: Mac implementations of Java have lagged far behind those on Windows and UNIX systems, whether those implementations are on the Web or stand-alone Virtual Machines capable of supporting full-fledged applications. In the past, many Web-site owners have gone so far as to suggest that Mac users avoid their Java-based areas, because Mac Java just couldn't cut the mustard.

These days, the state of Mac Java is improving, and the language may soon emerge from the shadow of the Web. In January, Microsoft released its Internet Explorer 3.0 Web browser, with by far the fastest Java yet seen on the Mac — it uses something called a Just-In-Time compiler to make Java applets run ... well, Java. It's harder to write the kind of software that will make Java vital to everyone — full-blown productivity applications like those you and your Windows-loving colleagues use every day to get work done. When software developers are able to write a single Java-based version of an application, the old problem of deciding whether it's cost-effective to write software for the Mac as well as Windows machines will be a thing of the past.

Real Java-based applications are on the horizon: RandomNoise's Coda, written in Java, will let you create dynamic, interactive Web pages, all in a program that runs identically on Macs and PCs. Corel's forthcoming Corel Office for Java promises to bring platform independence to core business applications. Since Java will let Macs run applications they might never otherwise be able to run — such as most of Corel's suite — being a great platform for Java is a goal Apple should strive for. It could just save the company's bacon. After all, the inability to run a key piece of software is often cited as the reason to choose a Windows-based PC over a Mac.

Before you run out and sell your Intel stock in order to finance a humongous purchase of Apple shares, take heed. It's unlikely that Java alone will bring PC users to the Mac en masse. Java applications won't be able to take advantage of any unique Mac technologies, because that would prevent them from being platform-independent. Supporting Java will help Apple keep Mac owners happy and might prevent people from jumping ship to the PC world, but viewing Java as a magic bullet that will let Apple slay Microsoft isn't very realistic. Mac users may be out of the root cellar, but we're still going to have quite a fight to get a good seat at the dinner table.

I Prefer Cocoa
Me, I'm not even a coffee drinker — you won't find me spending all my time at the corner coffeehouse like half the characters on prime-time TV. But even a hot-chocolate type like me has to sit up and take notice when Ellen Hancock, Apple's chief technology officer, says: "Over time, more and more of the [Mac] system will be Java-based."

So why is Java so important? Right now, the applets Web authors are embedding in their pages aren't much to write home about — stuff such as animated stock tickers, news tickers, and sports tickers. Tickers proliferate because it's relatively easy to create them in Java. It's harder to write the kind of software that will make Java vital to everyone — full-blown productivity applications like those you and your Windows-loving colleagues use every day to get work done. When software developers are able to write a single Java-based version of an application, the old problem of deciding whether it's cost-effective to write software for the Mac as well as Windows machines will be a thing of the past.

Real Java-based applications are on the horizon: RandomNoise's Coda, written in Java, will let you create dynamic, interactive Web pages, all in a program that runs identically on Macs and PCs. Corel's forthcoming Corel Office for Java promises to bring platform independence to core business applications. Since Java will let Macs run applications they might never otherwise be able to run — such as most of Corel's suite — being a great platform for Java is a goal Apple should strive for. It could just save the company's bacon. After all, the inability to run a key piece of software is often cited as the reason to choose a Windows-based PC over a Mac.

Before you run out and sell your Intel stock in order to finance a humongous purchase of Apple shares, take heed. It's unlikely that Java alone will bring PC users to the Mac en masse. Java applications won't be able to take advantage of any unique Mac technologies, because that would prevent them from being platform-independent. Supporting Java will help Apple keep Mac owners happy and might prevent people from jumping ship to the PC world, but viewing Java as a magic bullet that will let Apple slay Microsoft isn't very realistic. Mac users may be out of the root cellar, but we're still going to have quite a fight to get a good seat at the dinner table.

I Prefer Cocoa
Me, I'm not even a coffee drinker — you won't find me spending all my time at the corner coffeehouse like half the characters on prime-time TV. But even a hot-chocolate type like me has to sit up and take notice when Ellen Hancock, Apple's chief technology officer, says: "Over time, more and more of the [Mac] system will be Java-based."

So why is Java so important? Right now, the applets Web authors are embedding in their pages aren't much to write home about — stuff such as animated stock tickers, news tickers, and sports tickers. Tickers proliferate because it's relatively easy to create them in Java. It's harder to write the kind of software that will make Java vital to everyone — full-blown productivity applications like those you and your Windows-loving colleagues use every day to get work done. When software developers are able to write a single Java-based version of an application, the old problem of deciding whether it's cost-effective to write software for the Mac as well as Windows machines will be a thing of the past.

Real Java-based applications are on the horizon: RandomNoise's Coda, written in Java, will let you create dynamic, interactive Web pages, all in a program that runs identically on Macs and PCs. Corel's forthcoming Corel Office for Java promises to bring platform independence to core business applications. Since Java will let Macs run applications they might never otherwise be able to run — such as most of Corel's suite — being a great platform for Java is a goal Apple should strive for. It could just save the company's bacon. After all, the inability to run a key piece of software is often cited as the reason to choose a Windows-based PC over a Mac.

Before you run out and sell your Intel stock in order to finance a humongous purchase of Apple shares, take heed. It's unlikely that Java alone will bring PC users to the Mac en masse. Java applications won't be able to take advantage of any unique Mac technologies, because that would prevent them from being platform-independent. Supporting Java will help Apple keep Mac owners happy and might prevent people from jumping ship to the PC world, but viewing Java as a magic bullet that will let Apple slay Microsoft isn't very realistic. Mac users may be out of the root cellar, but we're still going to have quite a fight to get a good seat at the dinner table.

I Prefer Cocoa
Me, I'm not even a coffee drinker — you won't find me spending all my time at the corner coffeehouse like half the characters on prime-time TV. But even a hot-chocolate type like me has to sit up and take notice when Ellen Hancock, Apple's chief technology officer, says: "Over time, more and more of the [Mac] system will be Java-based."

So why is Java so important? Right now, the applets Web authors are embedding in their pages aren't much to write home about — stuff such as animated stock tickers, news tickers, and sports tickers. Tickers proliferate because it's relatively easy to create them in Java. It's harder to write the kind of software that will make Java vital to everyone — full-blown productivity applications like those you and your Windows-loving colleagues use every day to get work done. When software developers are able to write a single Java-based version of an application, the old problem of deciding whether it's cost-effective to write software for the Mac as well as Windows machines will be a thing of the past.

Real Java-based applications are on the horizon: RandomNoise's Coda, written in Java, will let you create dynamic, interactive Web pages, all in a program that runs identically on Macs and PCs. Corel's forthcoming Corel Office for Java promises to bring platform independence to core business applications. Since Java will let Macs run applications they might never otherwise be able to run — such as most of Corel's suite — being a great platform for Java is a goal Apple should strive for. It could just save the company's bacon. After all, the inability to run a key piece of software is often cited as the reason to choose a Windows-based PC over a Mac.

Before you run out and sell your Intel stock in order to finance a humongous purchase of Apple shares, take heed. It's unlikely that Java alone will bring PC users to the Mac en masse. Java applications won't be able to take advantage of any unique Mac technologies, because that would prevent them from being platform-independent. Supporting Java will help Apple keep Mac owners happy and might prevent people from jumping ship to the PC world, but viewing Java as a magic bullet that will let Apple slay Microsoft isn't very realistic. Mac users may be out of the root cellar, but we're still going to have quite a fight to get a good seat at the dinner table.
SORRY FIDO, CD-REWITABLE MEANS A LOT FEWER FRISBEE FOR YOU.

The Ricoh CD-RedeWritable (CD-RW) rewrites CDs so you don't have to throw away discs.

Fido likes to play Frisbee with old CDs that were ruined in the recording process or store out-of-date data. But the CD-RedeWritable (CD-RW) disc he's chewing on is different. Introducing the Ricoh CD-RedeWritable (CD-RW). It can write and rewrite! So you have the advantages of a CD—long life, portability and high capacity (650MB)—along with the flexibility of a floppy. It's the ideal medium for multimedia, recording, and storing graphics and other data.

Ricoh is a leader in CD recorders. Our SCSI drive with 2MB buffer (select models) ensures uninterrupted recording. And the Ricoh MP6200 Series not only creates CD-RedeWritable discs (readable by Multi-Read CD-ROM drives and DVD-ROM drives), it also creates CD-RedeRecordable (CD-R) discs, too.

Go with the newest CD technology. Go with Ricoh. Call 1-800-967-UNDO (8636).
Or visit us at www.ricoh.com. As for Fido, there's always the postman.

RICOH®

All trademarks and service marks are the property of their respective companies.
CIRCLE 160 ON READER SERVICE CARD
**The Ergonomic Mac**

**Work is a pain, you say?** Try to squeeze your body into an ill-fitting workspace, and you'll start to mean that literally. Your body's fluid dynamics and subtle intolerances clash with rigid, poorly positioned office gear. Awkward keyboarding, a too-low chair, or a too-high monitor may seem like just a nuisance, but they're likely culprits in back and neck problems, headaches, eyestrain, and nerve and muscle damage.

Office ergonomics is an evolving science that's inspiring new products that prevent the strains caused by sitting in front of your computer — but, there is still no definitive solution for everyone. You'll have to try out products to see how they feel before you'll know if they'll really work for you. To get you started, here are some of the best products we've seen to help alleviate pains from head to toe.

**From the Top: Head, Eyes, Neck**

Eyestrain, neckaches, and headaches can be blamed largely on your monitor. The wrong monitor height or tilt strains your neck and eyes. The position that feels best is subjective, but you can start with the suggestion of many medical sources we surveyed — keep the top of the monitor at eye level. This creates a comfortable angle between your eyes and the monitor and helps keep your neck straight.

You can create your own makeshift monitor stand, but it may be easier to buy products ready-made to position your monitor. Stackable Steel Risers ($22 each), from Mead-Hatcher (see photo 1), let you raise your monitor in 2-inch increments and support up to 75 pounds. It's not hard to find stands that allow you to adjust tilt as well as height, but you should be prepared to pay more and expect more-difficult installation. For instance, Rubbermaid's Height Adjustable and Height Selectable Monitor Arms allow you to adjust monitor angle, but they cost between $50 and $250 and require either drilling or clamping for installation.

The position of your monitor shouldn't be your only source of concern. Glare from lights or windows reflected from your monitor can produce eyestrain, blurred vision, and headaches. Screen filters, such as Polaroid's CP-Series Glass Filters ($40 to $200), reduce glare and reflections and fit all monitor sizes. The less pricey ones hang from the top of your monitor, and the more expensive fit snugly over it. Cheaper mesh screens, such as Kensington's Mesh Antiglare Filters ($30 to $37), help reduce reflections but don't provide the sharpness of glass screens.

Spare yourself further neck pains and eyestrain by placing papers at an easy glance with document holders. If you find desktop stands hard to position effectively, try one that attaches to your monitor. You can find them in abundance at office-supply stores. If you want a deluxe stand, look for 3M's Standard Document Holder ($53). It adjusts to any angle, holds up to 150 papers on its bottom ledge, and folds away when not in use.

**Off the Cuff: Arms, Wrists, Hands**

If you yourself don't suffer from wrist or hand pains, chances are you know someone who does. Repetitive-stress injuries (RSI) are among the most common ailments of computer users. One method suggested in medical literature is to keep your wrist straight while typing and mousing. Since it's hard to hold your hand in that position all the time, you may need a device to do it for you.

Among the more unique wrist pads we've seen is Kensington's Contour Wrist Pad, for laptop keyboards ($29.95), desktop keyboards ($18.95), and mouse ($18.95). They're slightly inclined, have a funky curved shape, and come...
in bright colors (see photo 2). Still they're not earth-shatteringly different from any other wrist pad out there.

If you want something truly different, even odd-looking, try out GBM Design's Comfortery ($150). It's a pair of sliding hand supports you rest your hands on while you type (see photo 3). You may feel they make typing more difficult, since you must carefully fit your hands into them. That can be especially annoying if you need to switch often between typing and mousing. You can also get a single version of this same wrist support — the Comfort Point ($25) — to attach to your mouse. Either product may be just what you need to keep your wrists straight. Regardless, you're sure to make new friends as people drift over to check out your bizarre new toy.

Great alternatives to deskbound wrist pads are MouseMitt Keyboarders ($19.95 per pair), little hand-mitts with cushions built into the wrist (see photo 4). They're comfortable enough to wear throughout the day. One pair of MouseMitts replaces numerous wrist rests, perfect for those who need a wrist rest for multiple keyboards or for a keyboard and a mouse.

Mice have gotten ergonomically revamped and now come in sleek designs and have programmable buttons to minimize extraneous pointing-and-clicking. But take care in your choice of mouse or trackball: Some can create troubles, especially if they work a weak part of the hand. We got thumb cramps, for instance, from using Logitech's TrackMan Marble ($100). Its trackball sits to one side of the unit, so you manipulate it with only your thumb. We had the easiest time with the ZackBack supports the lumbar region without applying pressure to the area.

Using a tray that pulls out from under the desk, such as Fellowes' Underdesk Articulating Keyboard Holder with Gliding Mouse Tray ($110) or Ring King's Ergonomic Keyboard Cradle ($90), is a good solution if your keyboard sits too high. Any tray will involve some clamping, drilling, or screwing to install, but you'll feel the difference.

Watch Your Back Side

Bad posture while you're working can snowball into other pains and problems, but proper posture sets the foundation for optimal comfort. Chairs can be a pricey addition to your workplace, but they can also make a significant difference.

Many people concentrate just on lumbar (lower back) support, but some back problems require support of the upper back (thoracic region) as well. If you suspect you need the full back treatment, you can turn to the tall-backed Executive Ergo Posture Chair ($750 to $1,100), from BackSaver Products. This chair comes with an adjustable back and optional headrest (for an additional $60). It has movable armrests that extend and swivel.

Another back supporter is the ZackBack Computer Posture Chair ($800 with adjustable armrests, $700 without), from ZackBack International. It has two separate supports for the lower thoracic and sacral (sublumbar) areas of your spine (see photo 6). The supports sit above and below the lumbar area, to support it indirectly, which you may find is more comfortable than direct support.

Wrap-up back supports and chair cushions are a less expensive way to get ergonomic support, but choose carefully or you may create...
new problems. Little pillows that support only the small of your back may not be the right kind of support. Many back cushions concentrate on lumbar support, so look for a full-back model such as the larger Adjustable Back Support ($139), from 3M. Its nylon-covered molded foam covers more back area (see photo 7).

Footrests can also help rescue your aching back. They can reduce pressure on your lower back and thighs by elevating your feet and knees. Safco's lightweight Ergo-Comfort Adjustable Footrest ($39) tilts to support your feet, although only at a fixed height ($34 for 5 inches; $39 for 8 inches). A better option may be the Computerware Premier Footrest ($55), from Fellowes, which lets you adjust both angle and height.

### The Best Fit

This is only a small sampling of all the ergonomic products available. To search for other products that will soothe you while you work and to stay up to date on the most-current ergonomic issues, get yourself online. The Typing Injury page (http://www.cs.princeton.edu/~dwallach/tifaq/general.html) has an extensive list of ergonomics Web-site links dealing with all kinds of office-related injuries. We also recommend visiting ErgoWeb (http://www.ergoweb.com/). It has a list of ergonomic products as well as current events and case studies.

Learning good work habits and investing in a comfortable work space are worth it in the long run. Seemingly minor pains can balloon into a real medical problem, with only a surgical solution. A comfy Mac space isn't a luxury — it's a necessity.

---

MacUser assistant editor Brooke C. Wheeler also recommends singing show tunes at work to release tension and improve posture.

---

**Polaroid**  
800-343-5000 or 716-256-4436  
http://www.polaroid.com/  
**CP-Series Glass Filters**

**Ring King Visibles**  
800-272-2366 or 319-263-8144  
Ergonomic Keyboard Cradle

**Rubbermaid**  
330-264-7592  
http://www.rubbermaid.com/  
Height Adjustable Monitor Arm  
Height Selectable Monitor Arm

**Safco**  
800-328-3020 or 612-536-6700  
Ergo-Comfort Adjustable Footrest

**3M**  
800-332-7483  
http://www.mmm.com/ergonomics  
Adjustable Back Support  
Standard Document Holder

**ZackBack International**  
800-748-8464 or 507-252-9293  
http://www.zackback.com/  
ZackBack Computer Posture Chair
Get a clear view of publishing technology at the highest level.

If you’re into publishing, including graphics, printing, prepress, advertising or photography, see how technologies like the Internet and computer-to-plate are totally transforming your future.

The world’s premier publishing event, Seybold Seminars gives you visionary educational programs and a look at the hottest products. All in the center of the publishing universe—New York City.

- 50+ powerhouse Conference sessions on publishing, the Internet and more
- Special Interest Seminars on printing, the Internet and digital photography
- In-depth Tutorials taught by experts that’ll make your job skills soar
- Dynamite Keynotes, plus the chance to network with 1000s of colleagues
- 300 top exhibitors demonstrating the latest products and solutions

**FREE GUIDE & EXPO PASS—SAVE $50**

For your detailed educational guide and FREE 3-day Expo pass:

CALL: 888-800-8922
INT’L: +1-415-372-7072
WWW.SEYBOLDSEMINARS.COM

SEYBOLD SEMINARS NY

JACOB JAVITS CONVENTION CENTER

Main Conference: April 22-24, 1997
Seminars/Tutorials: April 21-25, 1997
3-Day Exposition: April 23-25, 1997
Help Folder

Talking to the Net, and how not to barbecue your Mac.

Browser, Can You Hear Me?

Q. I've got Speech Recognition running on my Power Mac. Is there any way I can use it to navigate the Web?

Sheldon Banebridge
via the Internet

CHRIS: In a limited fashion, yeah. Speech Recognition is still an infant technology and not terribly well supported, so you shouldn't expect to yak your way from hither to yon across the vast reaches of the Internet. Currently you can orally navigate within a few select sites, and to do so, you'll need some special tools.

BOB: Which we'll get to in a minute. Before we do, you should know that you can talk to your Mac until you're blue in the face but it won't do you much good unless you have a Quadra AV or Power Mac, a PlainTalk microphone, and Apple's Speech Recognition software installed. You'll know you're on the right track if you find Speech Manager and Speech Recognition in the Extensions folder and Speech in the Control Panels folder.

These are all parts of Apple's English Speech Recognition — the software that allows your Mac to understand spoken commands. The whopping 10-MB full version of PlainTalk 1.5 also includes English Text-to-Speech and Mexican Spanish Text-to-Speech. As you can probably guess, these text-to-speech utilities are for those times when you want the Mac to talk.

CHRIS: As we scurried among the various online software depots looking for this stuff, we discovered that not all sites are completely up to date on speech software. If you want the most recent version of Speech Recognition — and believe me, you do — point your browser to http://www.speech.apple.com/

Truth be told, earlier versions of such speech-heap games as IndyCar Racing II don't dig the lingo unless you're using version 1.5 of the Speech Recognition extension.

Now that we've laid the groundwork, can we give this poor guy the answer?

BOB: Sure, go ahead.

CHRIS: Currently you have two browser-plug-in options for prattling about the Web — Digital Dreams' ShockTalk (http://www.surfstalk.com/SurfTalk/index.html) and Bill Noon's ListenUp (http://snow.cit.cornell.edu/noon/ListenUp.html). ShockTalk is an add-on to Macromedia's Shockwave plug-in that allows you to move around within a site by speaking the name of the site's links. Of course, that site has to be ShockTalk-savvy. Developers interested in making their sites ShockTalk-smart simply have to embed the 9K shocktalk.dcr movie in their Web page and add ten lines of HTML code. The movie file is included in the Shocktalk package.

ListenUp is even easier to use — no Shockwave plug-in necessary. You simply download either version 1.4.1 or 1.5a1 of the ListenUp plug-in (the ListenUp version you'll choose depends on whether you use Speech Recognition 1.4.1 or 1.5), toss it into the browser's Plug-ins folder, and you're off. Support for developers is likewise straightforward. You merely add a couple of lines of HTML to the Web page (you can find these lines at the ListenUp site), and your visitors will be able to talk the talk.

BOB: By the way, you can also use Speech Recognition with MT-NewsWatcher — a modified version of John Norstad's classic Internet newsreader. You will find MT-NewsWatcher at http://www.santafe.edu/~smfr/mtnw/mtnewswatcher.html.

Tips / America Online 3.0

System Information

America Online 3.0 includes a very handy utility for people who want to know more about their Macs. Open the Online Tools Folder inside the America Online 3.0 folder, and double-click on the AOL Diagnostic application. This utility tests your modem and provides details regarding system, volume, and gestalt information.

Randy M. Zeitman
via AOL

Spelling Checker for the Masses

AOL 3.0's Spell Checking feature is a wonderful addition to the application, but gee, it's a shame to limit a perfectly good spelling checker to a single program — particularly if you don't have another program that includes spell checking. Here are the simple steps for using AOL 3.0 as a universal spelling checker:

In its native application, open the document you want to spell-check; select and copy the text; and open the AOL 3.0 application. Press Command-M to create a new mail message, and press Command-V to paste your text. Click on the Spelling button and spell-check your text. When the spelling check is complete, select the text and cut it. Quit AOL without saving the mail message, switch back to the application you originally took the text from, and paste.

Tom Kennedy
via AOL
Chicken-Fried Mac

Q. I know plugging a SCSI or ADB device into or unplugging it from a Mac while the Mac is on is a bad idea. Does this rule apply to the microphone and the speaker jacks too?

Grant McKercher
Calgary, AB, Canada

BOB (pulling out Power Macintosh User’s Guide): Well, it says right here on page 38, “Follow these steps to connect the microphone. Step 1: Shut down the Macintosh.” And page 39 warns you to turn off the Mac before connecting external stereo speakers.

I’d believe the book if I were you.

CHRIS: That was nice. Short but sweet. Perhaps a bit too short. So in a blatant ploy aimed at propping up our word count, I ask you this: Do you always — without fail — follow that advice, good doctor?

BOB: Hrmph. For nine years, I’ve been lucky. I’ve disconnected and reconnected more stuff to my Mac than Carter has little liver pills, only occasionally taking the time to shut down first. Although I publicly professed that it’s never a good idea to plug anything into or unplug it from your Mac while it’s running, I have often ignored my own advice. Until last week and the fateful morning my daughter’s Mac froze.

It started up just fine and got all the way to the desktop, but the keyboard and mouse wouldn’t work. I began by tracing cables. From mouse to keyboard, from keyboard to Mac. Then there it was. The keyboard cable had come unplugged from the back of the Mac. Disregarding my own oft given advice, I casually reached around the back and reconnected the cable without bothering to shut down.

That turned out to be my big mistake. The Mac still refused to recognize the mouse or the keyboard, so I tried a different mouse and keyboard. That didn’t help. A few hours later, I gave up and took the Mac to an authorized Apple dealer.

My number had finally come up. It turned out that my casual keyboard connection had blown the ADB chip on the Mac’s logic board. And, since Apple dealers don’t perform what they call “board level” repairs, the chip can’t be replaced and I need a brand-new logic board, at a cost of almost $1,000!

CHRIS: Ouch. So? What are you going to do?

BOB: That’s easy. I’m going to strip out the RAM and the hard drive — the only parts of the darn thing that are worth anything — and then use the remains of the machine for target practice.

A thousand bucks for a logic board? They have a lot of nerve . . . And I have learned a valuable lesson: I’ll never, ever connect or disconnect ANY device from my Mac without shutting down first.

And so, gentle reader, I implore you, do as I say, not as I did.

CHRIS: Bob’s story touches me deeply, and his lesson is one you should take to heart: Better to play it safe than be left with a dead logic board.

However, I wouldn’t feel as if I were earning my daily bread unless I dipped my oar in and mentioned the following:

1. According to Mac guru David Ramsey in the sixth edition of Peachpit Press’ venerable Macintosh Bible, “hot swapping” ADB cables was a problem with the Mac II, IIx, and IIcx. It’s not supposed to be a problem with modern Macs (although I’ll be darned if I’ll sacrifice my Mac in order to test it — and if you try it and your Mac blows up, send David your nasty letters, not me).

2. APS makes a little thingamajig called the SCSI PowerPlug that lets you hot-swap SCSI devices. The PowerPlug comes in two flavors — terminated ($99.95), for use at the end of the SCSI chain, and unterminated ($79.95), for use in the middle of the chain. Unless you have one of these devices, always power down your computer and SCSI devices before swapping SCSI cables.

BOB: Bold advice, but I still say the only safe swap is a cold swap.

Saved by the Mac

Q. One of my first word processors on the PC had an Automatic Save feature that could be set to save files at user-defined intervals. Is there any way to do this on the Mac?

Hermann Schmid
via AOL

CHRIS: Any way? Any way? Hermann, baby (if I can call you baby), sweetie (see previous parenthetical thought), although we’re a high-toned magazine and the sterner members of the Copy Edit department collectively cringe their brows in a disapproving manner when we break into the vernacular, your question absolutely demands this response: “Well, da uh!”

BOB: If I can step in for a moment — and save at least one loyal reader from canceling his subscription — I believe that Chris is saying there are several solutions to this problem.

CHRIS: No, I’m not. I’m saying “da uh!” as in: Da uh! Mac users have been able to perform this trick in a variety of ways since the days of the Plus and SEs. Your PC application could do it too? Whooop-dee-doo! Stop the darned presses, and hold me back — I’m gonna run Windows from this day forward!

BOB: You’ve been listening to talk radio again, haven’t you?


BOB: I thought so. Say you’re sorry to the nice reader, and move on.

CHRIS: I’m sorry, Hermann, and to prove it, we’ll provide you with several answers — each better than the last.

To begin with, most modern word processors allow you to autosave documents. I found this capability in all the word-processing programs on my shelf — Microsoft Word 6, Nisus Writer, and Corel’s WordPerfect. These apps allow you to set the interval between saves. Nisus Writer even lets you space saves according to the number of keystrokes you type. Pretty keen.

BOB: Keen enough, but that feature helps only...
TUNE IN TO THE ONLY NIGHTLY SHOW ABOUT COMPUTER TECHNOLOGY AND THE INTERNET.

THE SITE

Every Night on MSNBC
7PM, 1AM & 4AM et
4PM, 10PM & 1AM pt

Emmy Award-Winning Host, Soledad O’Brien

www.thesite.com
ZDNet.
All the computing information you need, packed into one dynamic Web site.

World-famous software library.
Get ready to download! ZDNet has thousands of the highest-rated shareware programs, all virus-tested and reviewed — and the latest commercial demos, too!

Enroll in ZDNet University.
Be one of the first to join our online university and take courses in Java, C++, HTML, and more! Learn from expert instructors in the comfort of your own home or office.

Industry-standard product reviews.
Which products are best for you? Turn to ZDNet for expert product reviews of everything from the latest tools for power users to the best software for kids.

The latest news 24 hours a day.
From breaking technology news to your own FREE customized news feed, ZDNet delivers the in-depth coverage you need, from the sources you can trust.

Powerful search engine.
No time to browse? Use ZDNet Find It to quickly locate the specific computing information you need.

ZDNet Community Center.
Join in! With 500+ journalists and more than 3 million users, ZDNet is an active community with unmatched computing expertise.

Explore ZDNet today at www.zdnet.com!
No matter what you use your computer for, you need a source of comprehensive computing information you can count on. When you log on to ZDNet, you'll find the latest news, product reviews, top-rated shareware, lively discussions and more. It's all brought to you by Ziff-Davis, the world's leading provider of computing and Internet information. Visit ZDNet today at www.zdnet.com and explore the world's most trusted computing site!

ZDNet www.zdnet.com
The world's most trusted computing site.

All companies, products and services are registered trademarks of their respective companies.
if you're using one of those programs. If you process your words with an app, such as ClarisWorks or Microsoft Word 5, that doesn't have an autosave option, you'll have to look at more-global solutions.

One such solution is included in Now Utilities. It's called Now Save and automatically issues the Save command to any applications you choose. As in Nisus Writer, saving is based on time or keystrokes, and the utility can even save according to the number of times you've clicked the mouse. If you'd rather just be reminded to save, Now Save will nag you rather than save automatically. Also, Now Save has Key Capture (see figure 1), a function that saves all your keystrokes to a text file. This can be a real lifesaver if you've crashed without having saved.

CHRIS: A cheaper solution — although less thorough — is Scott Mitchell's Save-On-Time. This $15 shareware control panel does just about what you'd expect — it saves your files automatically at user-defined intervals.

Better than cheap is free, and if you already have a macro program such as QuickKeys, OneClick, or Tempo II, you've got your autosave solution in hand. All these utilities allow you to create macros that save your files whenever you please. OneClick — a utility I'm quickly becoming enamored of — even has a preconfigured autosave button that can be added to any application. UltraKeen!

BOB: One last thing, Chris: My favorite spelling checker and thesaurus, Casady & Greene's SpellCatcher, includes perhaps the best implementation of keystroke saving, in its GhostWriter feature. Although it can't automatically save your document, it does save every keystroke to a text file.

**Disk-Cache Conundrum**

Q. Let me start by saying I'm no newbie! So, I was wondering: What is Disk Cache in the Memory control panel? What does it do?

A. The disk cache is a portion of RAM set aside to hold recently used instructions. In theory, increasing it should make your Mac feel as if it's running faster. In reality, many people can't tell the difference.

CHRIS: The first important thing to know is that the memory used by the disk cache is added onto the RAM used by the system software. Therefore, memory assigned to the disk cache is not available for programs to use. So if your system software uses 6 MB of RAM with the disk cache set to its minimum setting (32K), it will use 7 MB of RAM if you set the disk cache to 1.024K.

BOB: The next thing to know is that the old rule of thumb about the disk cache — which says you should allow 32K per megabyte of installed RAM — is bunk. Many people can't detect a speed difference between a 32K disk cache and a 1.024K disk cache, so why should they waste a megabyte of perfectly good RAM on a speed increase they can't feel?

That said, I have to admit that the disk cache in Mac OS 7.6 feels a bit zippiest than earlier disk caches. I notice a definite speedup with the disk cache set to 512K. Under old versions of System 7, the speedup didn't feel as great to me.

CHRIS: As Bob just said, some people don't notice the speed improvement provided by a larger disk cache. So the first thing you want to do is determine whether you can tell the difference. Here's how:

1. Open the Memory control panel.
2. Click on the Cache Size up-arrow key repeatedly until it reads 1.024K or higher.
3. Restart your Mac.

You now have a huge disk cache, larger than you would actually use in real life. But let's exaggerate its effects for the purposes of this experiment.

When your Mac has restarted, try this:

4. Open the System Folder, noticing how long it takes for the window to appear completely (stopwatch optional).
5. Close and then reopen the System Folder window, again noticing how long it takes to open the second time.

The difference in speed (the second time, the System Folder should have opened noticeably faster) is a result of the increased size of the disk cache.

You should also notice a speed improvement when you scroll through documents. So launch your favorite application, and try scrolling around within a document for a while.

BOB: If you don't notice any speed improvement in the Finder or in your favorite application, return to the Memory control panel, set the cache size to its lowest setting (32K), and be done with it.

If you notice (and like) the speed improvement, you still have a little more work to do. As you may remember, memory assigned to the disk cache is not available for applications. Consequently you want the disk-cache setting to be the lowest-possible number that still feels fast to you.

To lower the size of the disk cache, repeat the preceding steps, lowering the disk-cache number one or two clicks each time. Restart after each change. Then close and reopen the System Folder two times and note the difference in speed the second time. Next open a large document and scroll through it several times. When you begin to notice sluggishness when closing and opening or when scrolling through documents, then you've discovered your threshold. Go back to the Memory control panel, and increase the cache size by one click.

For what it's worth, I've got 32 MB of RAM and my cache is set at 512K for now. I may even decide to bump it up to 1.024K. That still leaves me plenty of RAM for applications, and I'm willing to trade a few hundred K of RAM for the speedup I feel. Your mileage may vary.


You can find the shareware and freeware programs referenced in this article at MacUser's Software Central (http://www.zdnet.com/macuser/software/). You can also find them in the MacUser area on CompuServe (GO ZMC:MACUSER).
For many of you, mail order is your primary means of purchasing Macintosh products and services. That’s why MacUser has put together the following special section.

It’s what you’ve been demanding—a convenient place to quickly find the products you need from the vendors you want to buy from. MacUser’s Direct Line to products is just one more reason to turn to MacUser for the relevant information aimed at the serious user.
### MicroPulsar Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>Sizevio</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3GB Micron 324AV</td>
<td>5.5ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$865</td>
</tr>
<tr>
<td>4.3GB Micron 324AW</td>
<td>8.6ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$875</td>
</tr>
<tr>
<td>4.3GB Micron 324AX</td>
<td>5.5ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$865</td>
</tr>
<tr>
<td>4.2GB Micron 324BW</td>
<td>5.5ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$865</td>
</tr>
<tr>
<td>4.2GB Micron 324BX</td>
<td>5.5ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$865</td>
</tr>
<tr>
<td>4.2GB Micron 324AX</td>
<td>5.5ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$865</td>
</tr>
<tr>
<td>4.2GB Micron 324AW</td>
<td>8.6ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$875</td>
</tr>
<tr>
<td>4.3GB Micron 324AV</td>
<td>5.5ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$865</td>
</tr>
<tr>
<td>4.3GB Micron 324AX</td>
<td>5.5ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$865</td>
</tr>
<tr>
<td>4.3GB Micron 324AW</td>
<td>8.6ms</td>
<td>1.6MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$875</td>
</tr>
</tbody>
</table>

### Barracuda Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Sizevio</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barracuda ST15150W</td>
<td>8ms</td>
<td>12.2MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$1095</td>
</tr>
<tr>
<td>Barracuda ST15150W</td>
<td>8ms</td>
<td>12.2MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$1095</td>
</tr>
</tbody>
</table>

### Apple PowerMac

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>9500 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$2849</td>
</tr>
<tr>
<td>9500 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$2849</td>
</tr>
</tbody>
</table>

### Quantum Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>Sizevio</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fujitsu 4.5GB Fujitsu</td>
<td>6.5ms</td>
<td>15MB/Sec</td>
<td>F/W SCSI 2</td>
<td>$1565</td>
</tr>
<tr>
<td>Fujitsu 9 GB</td>
<td></td>
<td></td>
<td></td>
<td>$1565</td>
</tr>
</tbody>
</table>

### IBM UltraStar Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultra Star ES (5400 RPM)</td>
<td>8.5ms</td>
<td>F/W SCSI 2</td>
<td>$480</td>
</tr>
<tr>
<td>Ultra Star z 5400Z</td>
<td>8.5ms</td>
<td>F/W SCSI 2</td>
<td>$480</td>
</tr>
<tr>
<td>Ultra Star z 5400Z</td>
<td>8.5ms</td>
<td>F/W SCSI 2</td>
<td>$480</td>
</tr>
<tr>
<td>Ultra Star z 5400Z</td>
<td>8.5ms</td>
<td>F/W SCSI 2</td>
<td>$480</td>
</tr>
</tbody>
</table>

### SCS1 ACCELERATORS

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTO Express PCI Ultra SCS1</td>
<td></td>
<td></td>
<td>$269</td>
</tr>
</tbody>
</table>

### Fast & Wide Ultra SCS1 3

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$3925</td>
</tr>
</tbody>
</table>

### SCSI RAID Controllers

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$3925</td>
</tr>
</tbody>
</table>

### Power Mac Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32MB RAM Tower Atlas 1GB Wide HD</td>
<td></td>
<td>8X CD</td>
<td>$2849</td>
</tr>
<tr>
<td>32MB RAM Tower Atlas 1GB Wide HD</td>
<td></td>
<td>8X CD</td>
<td>$2849</td>
</tr>
</tbody>
</table>

### Power Computing

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$3925</td>
</tr>
<tr>
<td>PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$3925</td>
</tr>
</tbody>
</table>

### Value Drives from Quantum

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantum 4.5GB Atlas</td>
<td></td>
<td></td>
<td>$899</td>
</tr>
<tr>
<td>Quantum 4.5GB Atlas</td>
<td></td>
<td></td>
<td>$899</td>
</tr>
</tbody>
</table>

### Memory |

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>8MB DIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>16MB DIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>32MB DIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>64MB DIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>8MB SIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>16MB SIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>32MB SIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>64MB SIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
</tbody>
</table>

### IBM Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$2849</td>
</tr>
<tr>
<td>IBM PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$2849</td>
</tr>
</tbody>
</table>

### SCS1 Accelerators

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTO Express PCI Ultra SCS1</td>
<td></td>
<td></td>
<td>$269</td>
</tr>
<tr>
<td>ATTO Express PCI Ultra SCS1</td>
<td></td>
<td></td>
<td>$269</td>
</tr>
</tbody>
</table>

### SCS1 ACCELERATORS

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTO Express PCI Ultra SCS1</td>
<td></td>
<td></td>
<td>$269</td>
</tr>
<tr>
<td>ATTO Express PCI Ultra SCS1</td>
<td></td>
<td></td>
<td>$269</td>
</tr>
</tbody>
</table>

### Power Mac Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32MB RAM Tower Atlas 1GB Wide HD</td>
<td></td>
<td>8X CD</td>
<td>$2849</td>
</tr>
<tr>
<td>32MB RAM Tower Atlas 1GB Wide HD</td>
<td></td>
<td>8X CD</td>
<td>$2849</td>
</tr>
</tbody>
</table>

### Power Computing

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$3925</td>
</tr>
<tr>
<td>PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$3925</td>
</tr>
</tbody>
</table>

### Value Drives from Quantum

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantum 4.5GB Atlas</td>
<td></td>
<td></td>
<td>$899</td>
</tr>
<tr>
<td>Quantum 4.5GB Atlas</td>
<td></td>
<td></td>
<td>$899</td>
</tr>
</tbody>
</table>

### Memory |

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>8MB DIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>16MB DIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>32MB DIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>64MB DIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>8MB SIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>16MB SIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>32MB SIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
<tr>
<td>64MB SIMM</td>
<td></td>
<td></td>
<td>$41</td>
</tr>
</tbody>
</table>

### IBM Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$2849</td>
</tr>
<tr>
<td>IBM PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$2849</td>
</tr>
</tbody>
</table>

### SCS1 Accelerators

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTO Express PCI Ultra SCS1</td>
<td></td>
<td></td>
<td>$269</td>
</tr>
<tr>
<td>ATTO Express PCI Ultra SCS1</td>
<td></td>
<td></td>
<td>$269</td>
</tr>
</tbody>
</table>

### Power Mac Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32MB RAM Tower Atlas 1GB Wide HD</td>
<td></td>
<td>8X CD</td>
<td>$2849</td>
</tr>
<tr>
<td>32MB RAM Tower Atlas 1GB Wide HD</td>
<td></td>
<td>8X CD</td>
<td>$2849</td>
</tr>
</tbody>
</table>

### Power Computing

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$3925</td>
</tr>
<tr>
<td>PowerEdge 2000MHZ 604e</td>
<td></td>
<td>6X CD</td>
<td>$3925</td>
</tr>
</tbody>
</table>

### Value Drives from Quantum

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed</th>
<th>Interface</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantum 4.5GB Atlas</td>
<td></td>
<td></td>
<td>$899</td>
</tr>
<tr>
<td>Quantum 4.5GB Atlas</td>
<td></td>
<td></td>
<td>$899</td>
</tr>
</tbody>
</table>
Are you in the market for a Hi-End graphic system and tired of not knowing what to get? Digital GraphiX has done the work for you and has designed the Ultimate Graphics system. You get everything you need to meet your demanding design deadlines.

### Specifications
- PowerPC 9000/180 MHz
- 4GB Hard Drive & 8x CD ROM
- 272MB RAM
- 4GB internal Stripped Disk Array
- Adaptec Disk Array Controller/SW
- IMS Twin Turbo 8MB PCI Video Card
- Radius PrecisionView 21 Trinitron Monitor 1600x1200
- Epson Stylus Color Pro XL 11x17 wide color printer, E-Net, PSRip
- IOMega JAZ 1GB with 1 cartridge
- Microtek ScanMaker 3 with Transparency and Full Photoshop
- GCC XL 808 800dpi, 11x17 Printer, E-Net, Cables/Connectors
- 12x12 Graphics Tablet

### Features
This system can handle all of your in-house publishing chores, printing 11x17 in both BW and color, scanning, and back up your work onto a JAZ cartridge. We even give you all of the ethernet cables and connectors for hi-performance printing. The IMS 8MB Video card provides the fastest accelerated display of your hi-resolution images. With a built-in Fast & Wide 4GB Array, the Ultimate Graphics SuperStation is the fastest system available today for a low monthly payment of:

**Only $459 per Month**

### Need Financing? We can help!

**Why Finance Computer Equipment**
- 0 Down 100% Business Financing No Payments for 90 days. You can lease hardware, software and extended warranties.
- Converts a large cash purchase into low monthly payments.
- Leasing allows your business to pay for equipment as it generates income, not before.
- Computer equipment depreciates rapidly, so don't spend your hard earned capital, it's the most important asset your company has.
- When you finance computer equipment, you are using the technology to make money. At the end of 3 or 5 years, the equipment is worthless, so just return it and upgrade to the fastest and best technology available at that time.

### NEW BUSINESS Financing Available!

Your Value Added Macintosh Source

Digital GraphiX

*800-680-9062*

30,000 Products on the Internet

http://www.DigitalGraphiX.com
**Graphix Systems**

**7300/180**  
**ENTRY LEVEL SYSTEM**  
$129 Per Month

- PowerMac 7300/180  
- 12 x CD ROM  
- 80MB RAM  
- 2GB hard drive  
- Extended keyboard  
- Viewsonic 17EA AV Monitor  
- 4MB VRAM  
- ScanMaker II E6 color Scanner  
- Okidata 600dpi/ps Laser Printer  
- 6x8 Graphics Tablet  
- 10Mega Zip 100 with 1 cartridge

**FREE!**

- FreeHand v5.5 with Every Graphix System Lease
- $359 Value

**9600/233**  
**HI END DTP SYSTEM**  
$339 Per Month

- PowerMac 9600/233  
- 12 x CD ROM  
- 160MB RAM  
- 4GB internal hard drive  
- Extended keyboard  
- RasterOps 20HR Monitor  
- IMS 8MB PCI Video Card  
- Agfa Studio Scan It/Isaw Trans  
- Sony 6GB DAT tape drive  
- SyJet 1.3GB Drive/2 cartridges  
- GCC 808 600dpi, 11x17 Printer  
- 12x12 Graphics Tablet

### Ultimum Designers Special

- PowerMac 6600/200  
- 12X CD ROM  
- 64MB RAM  
- 4GB internal hard drive  
- Extended keyboard  
- Sony 20SF II Monitor  
- ATX Xtreme PCI Graphics 4MB  
- Microtek Scanmaker 13E  
- Int ZIP 100 with 1 cartridge  
- Okidata 6100/ps 600dpi Laser Printer with AppleTalk connectors  
- 12x12 Graphics Tablet  
- $179 Per Month

**Monitors**

- Sony 100SX 15" $389  
- ViewSonic 17EA AV $629  
- RasterOps MC 801HR $2049  
- Sony 200SF 17" $789  
- Sony 20SF II-300 $1619  
- Radius PressView 17SR $1789  
- Radius 21 PrecisionView $2329  
- Radius PressView 21SR $2989

**Hard Drives**

- Internal  
  - Quantum 1.2GB $239  
  - Quantum 2GB $399  
  - Quantum 3GB $459  
  - Quantum 4GB $885  
  - Fujitsu 4GB $879  
  - Seagate 4GB Barracuda 4 $1149  
  - Seagate 6GB $1999

- External  
  - Quantum 4GB $939  
  - Fujitsu 4GB $945

**Memory**

- DIMMs 72pin SIMMS  
- 4MB $39  
- 8MB $59  
- 16MB $99  
- 32MB $179  
- 64MB $379

**SyQuest & ZIP Drives**

- ZIP 100 Ext/with cart $139*  
- SyJet 1.3GB Ext/with cart $449  
- 200MB Ext/with cart $449

**SyQuest Cartridges**

- JAZ 1GB $89  
- 200MB $61  
- 88MB $41  
- 44MB $37

**Optical & CDR Drives**

- Jaz 1GB with 1 cartridge $449  
- Olympus 230MB with 1 cartridge $479  
- Olympus 2.6GB with 1 cartridge $1769  
- JVC 4x/2xCDR with Toast $439  
- Yamaha 4x/4xCDR with Toast & Director $1199

**Optical Cartridges**

- OEM 12MB $8.99  
- OEM 230MB $11.99  
- OEM 600/650MB $24  
- OEM 1.2/1.3GB $39

**Optical Cartridges**

- 74 MINUTE CD ROM RECORDABLE MEDIA $64.99 BOX OF 10

**Lasers Printers**

- HP 6MP, 8.5x11 $889  
- Okidata 600dpi/ps, 8.5x11 $599  
- Epson Stylus Color Pro XL, 11x17 $1729  
- Epson Stylus 500, 8.5x11 $279  
- GCC XL 608, 600dpi, 11x17 $2339  
- GCC XL 808, 800dpi, 11x17 $2989  
- GCC XL 1208, 1200dpi, 11x17 $4169

**Scanners**

- Agfa Studio Scan It LE $609  
- Agfa StudioStar LE $819  
- Agfa Arcus II/Transparency $1889  
- Microtek ScanMaker II E6 $489  
- Microtek Scanmaker III/Trans $1479  
- Microtek Scanmaker E3 $1899

**Sonic & RAM**

- 8.5x11 print size  
- 250 sheet capacity  
- Okidata 600/ps, a5x11 $599  
- Epson Stylus Color Pro XL, 11x17 $1729  
- Epson Stylus 500, 8.5x11 $279  
- GCC XL 608, 600dpi, 11x17 $2339  
- GCC XL 808, 800dpi, 11x17 $2989  
- GCC XL 1208, 1200dpi, 11x17 $4169

**Optical & CDR Drives**

- Jaz 1GB with 1 cartridge $449  
- Olympus 230MB with 1 cartridge $479  
- Olympus 2.6GB with 1 cartridge $1769  
- JVC 4x/2xCDR with Toast $439  
- Yamaha 4x/4xCDR with Toast & Director $1199

**Optical Cartridges**

- 74 MINUTE CD ROM RECORDABLE MEDIA $64.99 BOX OF 10

**Digital GraphiX**

800-680-9062 SALES. USA & CANADA  
310-783-1525 FAX  
310-783-1515 INTERNATIONAL

Order from 5:30am - 5:30pm M-F pst, 9:00am - 12:00am Sat pst

Prices subject to change without notice. Not responsible for typographical errors. Call for an RMA number before returning equipment.

CIRCLE 33 ON READER SERVICE CARD  
MAY 1997 / MacUser 99
Limited Time!  
While supplies last!

StarMax 3000/160  
160MHz PowerPC, 16MB RAM, 1.2GB hard drive, 8X CD-ROM  
only $1095!  
Ask for item # CPU 0447

3 Ways to Order:  
1. Call: 1-800-434-3037  
2. FAX: 1-908-905-9279  
3. MacWAREHOUSE is now on the Internet

http://www.warehouse.com  
✓ Hundreds of shareware and demo titles for you to download!  
✓ Latest information on the newest products!

PowerBase SERIES

NEW LOW PRICES!

PowerBase Low Profile 180MHz  
Ask for item # CPU 0412  
$1299

PowerBase Low Profile 200MHz  
Ask for item # CPU 0409  
$1499

PowerBase Low Profile 240MHz  
Ask for item # CPU 0407  
$1599

PowerBase Mini-Tower 180MHz  
Ask for item # CPU 0414  
$1499

PowerBase Mini-Tower 200MHz  
Ask for item # CPU 0410  
$1599

PowerBase Mini-Tower 240MHz  
Ask for item # CPU 0407  
$1999

30 DAY GUARANTEE

IBM Zip Drive  
$99.95  
(lowest price ever!)

Includes your first disk FREE

SoftWindows 95 4.0  
Upgrade for only $99.95

Macromedia Director 5  
Upgrade for only $369.95

30 DAY GUARANTEE

Upgrade to NEW PAGEMAKER 6.5  
For only $99.95

Adobe Photoshop 4.0  
New!  
Upgrade only $149.95

GET MarathonInfinity FREE!  
when you buy a 12X CD-ROM Drive  
for only $249.95

AS LOW AS $1095!

Includes 28.8 Modem!

SoftWindows 95 4.0  
Serial number required at time of purchase

Macromedia Director 5  
Serial number required at time of purchase

17" Color Display

15.6" Viewable display area, resolutions up to 1024 x 768

Only $449!
a full line of Macintosh™ and Mac OS computers!

**DeskWriter 600**
88W, 600dpi! *Color: 300 x 600dpi*  
**$149.95**
Sold with pack!  
For item # WRP 042

**TelePort Platinum Fax/Modem**
Only **$99.95**
Ask for item # BNW 1787

**JAZ DRIVE**
Store up to 16GB on one 3.5" cartridge!  
**$499.95**
Includes software, full warranty, and shipping.
Ask for item # DDR 1119

**SIMMS as low as**
**$19.95**
Ask for item # CIP 0022

**SuperMac C500/180**
**$1299.95**
- 180MHz PowerPC G3 Processor!  
- 16MB RAM (expandable to 144MB!)  
- 8X CD-ROM Drive!  
- 1.2GB Internal Hard Drive!  
For item # CPU 0590

**SuperMac C600**
**$1499**
- 180MHz/633MHz/1.2GB/16MB/8X CD  
- Mac # CPU 0470(with 24.8 modes)  
- 16MB RAM (expandable to 144MB!)  
For item # CPU 0591

**JAZ Drive WAREHOUSE**
Store up to 1GB on one **$29.95**  
Includes software, full warranty, and shipping.
Ask for item # JAP 0380

**Microsoft Office 4.2.1 Upgrade**
Ask for item # CPU 0277

**Symantec Norton Utilities 3.2 Upgrade**
Ask for item # CPU 0279

**Get a Power User's Tool Kit**
**FREE** with every order!  
Demo loads of powerful programs for **FREE**—some authors ask that you pay a small fee. (8-521) The Power User's Tool Kit is **FREE** when you order from MacWAREHOUSE. You pay only $2.55 shipping and handling. If you would like the disk, please ask for item #  
Ask for item # AAM 0422, 51 programs work with System 7.

To order, call toll-free 24 hours a day, 7 days a week
**1-800-434-3037**

FREE CATALOG SUBSCRIPTION! Check the appropriate box(es) to receive your FREE 1-year catalog subscription(s) and mail this coupon to: 1720 Oak Street, P.O. Box 3013, Lakewood, NJ 08701

Name  
Address  
City  
State  
Zip

(Expect to receive your first issue(s) within 4-6 weeks.)

☐ Yes, send me my FREE Power User's Tool Kit. Enclosed is my check for $2.95 to cover shipping & handling.

☐ MacWAREHOUSE  ☐ MicroWAREHOUSE  ☐ DataConm WAREHOUSE  ☐ MacSystems WAREHOUSE  ☐ MicroSystems WAREHOUSE

For your FREE Canadian Catalog, call toll-free 1-800-603-5139!
TWENTY ONE INCH DISPLAYS

21 Inch DiamondTron Monitor
• Rated Superior to Trinitron
• 2 year Mfr's Warranty on some models
• Largest Aperture Grille monitor available
• Up to 1600x1200 on Macs and PCs
• Full Digital Control from Keyboard

$1599*

Radius SuperMatch 21 TXL from $1699*
Radius PrecisionView 21 $1499*
Radius PressView 21sr $1299*
NEC 20" & 21" Displays $1499*
Radius PrecisionColor Display 21 $1499*
RasterOps SuperScan MC 21 $1299*
Radius Multiview 21 $899*
Radius 21 inch Grayscale Display $799

TWENTY INCH DISPLAYS

TRINITRON BLOWOUT-LOWEST PRICE EVER!

$999*

White Supplies Last!
20" SCN* Trinitron Technology
• Industrial Grade CRT
• High brightness output

SuperMac SuperMatch 20 Plus $999*
Radius PrecisionColor 20v $1099*
Digital 20 inch Display Up to 1280x1024 $1399
RasterOps 20 Multimode $1299
Radius PrecisionColor 19 $899*

Radius IntelliColor Display 20 $1499*
• MacUser, MacWorld, MacWeek Editor's Choice
• 1600x1200 to 640x480
Apple Multiple Scan 20 Display $1099
SuperMac Trinitron $699
Radius 20 inch Grayscale Display $499

SEVENTEEN INCH DISPLAYS

SuperMac/E-Machines T161iMr $599*
• Studio Grade Trinitron CRT
• 0.26 Dot Pitch
SuperMatch 17" TRINITRON $699
PrecisionColor Display 17 $899
PrecisionView 17 $1299
Radius PressView 17sr $499*
SuperMac SuperMatch 17 $499*

PORTRAIT DISPLAYS

Radius Pivot Display
We have cards for SE/30, LC, IIsi
Nubus, and Quadras

$199*

*With purchase of video card.
PrecisionColor Pivot $599
Color Pivot LE $399
Radius Full Page Display $299
Apple Portrait Display $399
Portrait Display Labs 1700 $499
E-machines ColorPage 15 $499

www.cra-sys.com
### UMAX COMPUTER CORPORATION
#### SUPERMAC SERIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price/Bundle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>500/180 603e/180</td>
<td>$1349/$1149</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>500/180 603e/180</td>
<td>$1695/$1285</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>500/200Mt 603e/200</td>
<td>$1995/$1899</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>500/240 603e/240</td>
<td>$2295/$1549</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>700/150 60Me/150</td>
<td>$2795/$1285</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>S900/180 604e/180</td>
<td>$2595/$1215</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>S900/200 604e/200</td>
<td>$2595/$1215</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>S900/225 604e/225</td>
<td>$2595/$1215</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>S900/180DP 604e/180</td>
<td>$2595/$1215</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>S900/200DP 604e/200</td>
<td>$2595/$1215</td>
<td>CPU ONLY</td>
</tr>
</tbody>
</table>

---

### MOTOROLA SERIES
#### StarMax

<table>
<thead>
<tr>
<th>Model</th>
<th>Price/Bundle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000/160 603e/160</td>
<td>$11995/$10299</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>3000/180 603e/180</td>
<td>$11995/$10299</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>3000/200 603e/200</td>
<td>$11995/$10299</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>3000/220 603e/220</td>
<td>$11995/$10299</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>3000/240 604e/240</td>
<td>$11995/$10299</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>4000/160 604e/160</td>
<td>$11995/$10299</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>4000/200 604e/200</td>
<td>$11995/$10299</td>
<td>CPU ONLY</td>
</tr>
</tbody>
</table>

---

### APPLE SYSTEMS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price/Bundle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4400/200MHz</td>
<td>$1699/$1429</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>7200/120</td>
<td>$1699/$1429</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>7300/180</td>
<td>$1699/$1429</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>8600/200</td>
<td>$1699/$1429</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>9600/200</td>
<td>$1699/$1429</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>9600/20MP</td>
<td>$1699/$1429</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>8500/120</td>
<td>$1699/$1429</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>7600/132</td>
<td>$1699/$1429</td>
<td>CPU ONLY</td>
</tr>
</tbody>
</table>

---

### PCIMAC

<table>
<thead>
<tr>
<th>Model</th>
<th>Price/Bundle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6100/60</td>
<td>$1999/$1795</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>6100/66</td>
<td>$1999/$1795</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>6100/70</td>
<td>$1999/$1795</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>6100/80</td>
<td>$1999/$1795</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>6100/100</td>
<td>$1999/$1795</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>6100/120</td>
<td>$1999/$1795</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>6100/160</td>
<td>$1999/$1795</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>6100/330</td>
<td>$1999/$1795</td>
<td>CPU ONLY</td>
</tr>
</tbody>
</table>

---

### NUBUS MAC

<table>
<thead>
<tr>
<th>Model</th>
<th>Price/Bundle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000/160</td>
<td>$1395/$11355</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>3000/180</td>
<td>$1395/$11355</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>3000/200</td>
<td>$1395/$11355</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>3000/220</td>
<td>$1395/$11355</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>3000/240</td>
<td>$1395/$11355</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>4000/160</td>
<td>$1395/$11355</td>
<td>CPU ONLY</td>
</tr>
<tr>
<td>4000/200</td>
<td>$1395/$11355</td>
<td>CPU ONLY</td>
</tr>
</tbody>
</table>

---

**Guaranteed Lowest Price on All Digital Video!**

### TRUEVISION Targa 2000

- **NEVER UNDER SOLD!**
- 16-bit audio up to 48kHz
- NTSC: 30 frames/60 fields per second,
- Supports PAL broadcast standards

### Trueview Products:

- Targa 1000/2000 Pro
- BRAVADO/Targa 1000

### Video Vision Studio, PCI and Nubus

- 24-bit Full-Screen, Full-Motion Video
- Includes Adobe Premiere and VideoFusion
- Breakout bar supports dual input

### Video Vision Studio Array 4-12GB

- **CALL FOR BEST PRICE!!**
- **$2999 $1299**

### RADIUS 81/110

- **Full Digital Video Workstation**
- for less than a PCI Digital Video card alone!!
- **SAME TECHNOLOGY FOR HALF THE PRICE!!**

**BEST DIGITAL VALUE ANYWHERE!**

**$2998 only**

**PowerMacs from $799**

**New and Factory Recertified Models of Most Items Available**

**DEALER AND EDUCATIONAL DISCOUNTS AVAILABLE ON MOST ITEMS!**

---

**CRA Systems, Inc.**

300 South 13th St., Waco, TX 76701

Monday thru Friday 9AM to 7PM CST

Saturday 10AM-4PM Sales Dept.

Domestic Sales sales@cra-sys.com Fax 817.750.9050

Consultants/Dealers 817.754.2120 International Sales 817.754.2120

Prices reflect 2% cash discount. Prices subject to change. Not liable for typographical errors. All shipping charges for COD orders to be secured by credit card.

Dealers and consultants call for quantity pricing. We ship anywhere.

---

**STOP!! LOOK!!**

**REBATES ON CPUs!!**

---

**Circle 50 on Reader Service Card**

---

**February Specials!**

**SET UP WAIVED TO FREE DAYS**

**WHILE SUPPLIES LAST!**
<table>
<thead>
<tr>
<th>Product Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe Photoshop 4.0</td>
<td>$139.99</td>
</tr>
<tr>
<td>New Mega Gallery CD</td>
<td>$64.99</td>
</tr>
<tr>
<td>PageMaker 6.5 Deal!</td>
<td>$99.99</td>
</tr>
</tbody>
</table>

**MacMall has it**

**15" Color Monitor**
- 15" color monitor '439' $90463
- 15" color monitor '439' $90462

**CD-ROM Drives**
- 12X External SCSI, 100ms access, 1800kb/sec transfer rate $199.99
- 4X External SCSI, 150ms access, 614kb/sec transfer rate $129.99

**Express 33.6kps Fax Modem**
- 28.8kps PC Card Fax Modem $119.99

**Power Center 150 LP**
- 150MHz PowerPC 604
- 16MB RAM/1.0GB HD/6X CD
- 512K Cache/low profile
- $2045

**PowerTower 166**
- 166MHz PowerPC 604/16MB RAM
- 26GB HD/4X CD/512K L2 Cache
- $2645

**PowerTower Pro 200**
- 180MHz PowerPC 604/16MB RAM
- 260Hz Drive/6X CD-ROM Drive
- 9MB RAM/1MB Cache L2 Cache
- $3745

**UMAX**
- SUPERMac C600/180
- 180MHz PowerPC 603e
- 16MB RAM/2.0GB HD/8X CD
- Mini-Tower Case $1449
- $3149

**STORAGE**
- 1GB Max diskette
- 10GB of hard disk storage
- 20GB max CD storage
- CD-ROM drive
- $199.99

**SCANNERS**
- 2400X Scanner $299
- $197.61

**MODEMS**
- 2400bps modem
- $82.63

**MONITORS**
- MAGNUS 17" Color Monitor
- $197.61

**SOFTWARE UTILITIES**
- Program Manager $89.99
- $89.99

**PRINTER**
- HP Deskjet 580 Printer $28.99
- $79.99

**GRAPHICS**
- Ghostscript $189.99
- $84.73

**INTERNET**
- Netcom Cancel $10.99
- $10.99

ORDER TODAY GET IT TOMORROW by 10:30 a.m. OPEN 24 Hours

For US availability, please call 800-289-1008. For Canada availability, please call 800-289-1007.

---

**NOTICE:** MacMall, Inc. is a retail dealer of Macintoshes and Apple products. MacMall, Inc. is not affiliated with Apple Inc. Apple products are sold "as is" and are not covered by any warranty from Apple Inc. If you need a product with a warranty, please contact Apple Inc. directly.
**SUPER SYSTEM SAVINGS!**

**MOTOROLA**

**StarMax 3000 DT/200**
- 200MHz PowerPC 603e
- 16MB RAM/1.2GB HD/8X CD
- 28.8 Modem/256K Cache

**Price** $1645!

**PowerBase 180**
- 180MHz PowerPC 603e
- 16MB RAM/1.2GB HD/8X CD

**Price** $1199!

**StarMax 1000 DT/120**
- 100MHz PowerPC 603e
- 8MB RAM/1GB HD/6X CD

**Price** $1065!

**SuperMac C500/160**
- 160MHz PowerPC 603e
- 16MB RAM/1.2GB HD/8X CD

**Price** $1199!

**UMAX**

**SuperMac 7200 300dpi Printer**
- 300dpi 4ppm black

**Price** $149!

**Microsoft**

**Encarta Deluxe 97**
- Latest Version!

**Price** $49!

**FREE CATALOG SEE BELOW**

Four reasons why MacMall® is the best choice for all your computing needs:

1. **THE FASTEST OVERNIGHT DELIVERY AVAILABLE**
   - A MacMall® Exclusive! Call as late as 11:00 p.m. EST and get your order by 10:30 a.m. the next day via FedEx Priority Overnight.

2. **CUSTOM CONFIGURATION**
   - Have the system you want, custom-configured by our factory-trained technicians.

3. **EXCLUSIVE DEALS & SPECIAL OFFERS**
   - We always give you more for your computing dollar.

4. **OVER 20,000 PRODUCTS**
   - You can count on us to have the products you want, when you want them.

Get your **FREE** issue today!

Please check issue(s) you wish to receive:
- MacMall®
- PC Mall
- DataCom Mall

Name ____________________________
Address ____________________________
City ____________________________ State ______ Zip ___________

Mail to: MacMall, Dept. ADV, 2645 Maricopa St., Torrance, CA 90503

**MacMall®**

**Place Your Order 24 Hours a Day**

1-800-217-9498
CALL CLUBMAC FIRST!

REMOVABLE STORAGE

Zip 100MB Drive

Includes One Free Cartridge

$149.95

Jaz 1.0GB Drive

Includes One Free Cartridge

$499.95

CD-ROM DRIVES

ClubMac

$229.95

12X

100MM/sec data transfer

140ms avg access time

Caddy-less design

CD RECORDABLE

$449.95

Includes One Free Cartridge

ClubMac CD Recorder

2XAX

CD PLAYER

MEMORY

ClubMac Stashes Memory Prices

Memory prices fluctuate frequently, please call for latest prices.

4-Bit 72pin SIMMS

M101-100 4MB 16x72 SIMM $25

M101-101 8MB 32x72 SIMM $45

M101-102 16MB 64x72 SIMM $99

M101-103 32MB 128x72 SIMM $199

8-Bit 60pin SIMMS

M101-104 1MB 16x60 SIMM $22

M101-105 2MB 32x60 SIMM $25

M101-106 4MB 64x60 SIMM $45

M101-107 8MB 128x60 SIMM $99

04-Bit 16pin DIMMS

(PCl PowerMac, Omm, PowerComputing)

M101-108 8MB SIMM $55

M101-109 16MB SIMM $99

M101-110 32MB SIMM $199

M101-111 64MB SIMM $455

PowerBook 1400

S451-1008 8MB Module $95

S451-1012 16MB Module $175

S451-1024 32MB Module $215

PowerBook 2300

S451-1104 8MB Module $95

S451-1109 16MB Module $175

S451-1120 32MB Module $215

PowerBook 3400

S451-1204 8MB Module $95

S451-1208 16MB Module $175

S451-1216 32MB Module $215

Video RAM

S451-1304 8MB VRAM for ATI XClaim GA $95

S451-1307 512K VRAM 8100 & 605 $30

S451-1308 1M VRAM 7200, 7500, 7600, 8500 $39

Cache Memory for PowerMac & PowerPC Performers

S451-1309 256K 16 cache 7500, 8100 $73

S451-1310 512K 32 cache 7500, 8100 $155

POWER BACKUP

APC

nPower 400 Dual Processor Card for PowerPCI!

$295

ACCELERATORS

nPower 400+

Dual Processor Card for PowerPCI!

$479

TOSHIBA TravelStar

2.5" SCSI

$549.95

Ultra SCSI

$810MB

New

$1799

HARD DRIVE STORAGE

Quantum

TEMPEST 1280MB

128K CACHE 4300 RPM

$269

Quantum

TEMPEST 3.2GB

128K CACHE 4300 RPM

$379

Quantum

Atlas II™

3.2GB

4GB

$899

TOSHIBA TravelStar

2.5" SCSI

$549.95

Ultra SCSI

$810MB

INQUIRIES & INTERNATIONAL SALES

(714) 768-8130

M-F: 5am - 5pm PST

CORPORATE/EDUCATIONAL SALES

(800) 258-2622

24 Hours a Day 7 Days a Week

Order 24 Hours a Day - 7 Days a Week

1-800-258-2622

Order On-Line at www.club-mac.com

(Inquiries & International Sales)

4940 Orange Avenue

Costa Mesa, CA 92626

106 MacUser / May 1997

1-800-258-2622

In Stock

$99

In Stock

$99

In Stock

$499.95

In Stock

$199

8-Mb Module

$25

16-Mb Module

$25

32-Mb Module

$25

64-Mb Module

$25

8-Mb Module

$99

16-Mb Module

$199

32-Mb Module

$399

64-Mb Module

$499

8-Mb Module

$199

16-Mb Module

$399

32-Mb Module

$799

64-Mb Module

$999

8-Mb Module

$499

16-Mb Module

$899

32-Mb Module

$1399

64-Mb Module

$1899

8-Mb Module

$899

16-Mb Module

$1499

32-Mb Module

$2499
**PowerComputing**

<table>
<thead>
<tr>
<th>PowerBase, PowerCenter and PowerTower Computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Upgradable PowerPC 603e processor running at up to 240MHz</td>
</tr>
<tr>
<td>• 16 or 32MB RAM, expandable to 144MB</td>
</tr>
<tr>
<td>• Up to a spacious 2.1GB hard drive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PowerComputing Model</th>
<th>Processor</th>
<th>RAM/Hard Drive</th>
<th>CD-ROM</th>
<th>Order #</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerBase 160 DT</td>
<td>100MHz 603e</td>
<td>10MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
<td>$1495</td>
</tr>
<tr>
<td>PowerBase 160 MT</td>
<td>100MHz 603e</td>
<td>10MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
<td>$1495</td>
</tr>
<tr>
<td>PowerBase 200 DT</td>
<td>150MHz 603e</td>
<td>10MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
<td>$1495</td>
</tr>
<tr>
<td>PowerBase 200 MT</td>
<td>150MHz 603e</td>
<td>10MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
<td>$1495</td>
</tr>
<tr>
<td>PowerCenter 240 DT</td>
<td>200MHz 603e</td>
<td>20MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
<td>$1995</td>
</tr>
<tr>
<td>PowerCenter 240 MT</td>
<td>200MHz 603e</td>
<td>20MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
<td>$1995</td>
</tr>
<tr>
<td>PowerCenter 240 VT</td>
<td>200MHz 603e</td>
<td>20MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
<td>$1995</td>
</tr>
<tr>
<td>PowerCenter 240 PV</td>
<td>200MHz 603e</td>
<td>20MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
<td>$1995</td>
</tr>
<tr>
<td>PowerCenter 240 PV 25</td>
<td>225MHz 603e</td>
<td>33MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
<td>$1995</td>
</tr>
</tbody>
</table>

---

**SuperMac Computers**

<table>
<thead>
<tr>
<th>Processor</th>
<th>RAM/Hard Drive</th>
<th>CD-ROM</th>
<th>Order #</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerBase 160 DT</td>
<td>100MHz 603e</td>
<td>10MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
</tr>
<tr>
<td>PowerBase 160 MT</td>
<td>100MHz 603e</td>
<td>10MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
</tr>
<tr>
<td>PowerBase 200 DT</td>
<td>150MHz 603e</td>
<td>10MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
</tr>
<tr>
<td>PowerBase 200 MT</td>
<td>150MHz 603e</td>
<td>10MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
</tr>
<tr>
<td>PowerCenter 240 DT</td>
<td>200MHz 603e</td>
<td>20MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
</tr>
<tr>
<td>PowerCenter 240 MT</td>
<td>200MHz 603e</td>
<td>20MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
</tr>
<tr>
<td>PowerCenter 240 VT</td>
<td>200MHz 603e</td>
<td>20MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
</tr>
<tr>
<td>PowerCenter 240 PV</td>
<td>200MHz 603e</td>
<td>20MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
</tr>
<tr>
<td>PowerCenter 240 PV 25</td>
<td>225MHz 603e</td>
<td>33MB/120GB</td>
<td>BX CD</td>
<td>A87279</td>
</tr>
</tbody>
</table>

---

**Software**

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe Acrobat 3.0</td>
<td>$184.45</td>
</tr>
<tr>
<td>Adobe Illustrator 3.0</td>
<td>$399.95</td>
</tr>
<tr>
<td>Adobe PageMaker 6.0</td>
<td>$399.95</td>
</tr>
<tr>
<td>Adobe PageMaker 6.0 Upgrade</td>
<td>$399.95</td>
</tr>
<tr>
<td>Adobe PageMaker 6.0</td>
<td>$399.95</td>
</tr>
<tr>
<td>Adobe Photoshop 4.0</td>
<td>$399.95</td>
</tr>
<tr>
<td>Adobe Photoshop 4.0 Upgrade</td>
<td>$399.95</td>
</tr>
<tr>
<td>Adobe Premiere 3.0</td>
<td>$479.95</td>
</tr>
<tr>
<td>Adobe Premiere 3.0</td>
<td>$479.95</td>
</tr>
<tr>
<td>Adobe Premiere 3.0</td>
<td>$479.95</td>
</tr>
<tr>
<td>Adobe Premiere 3.0</td>
<td>$479.95</td>
</tr>
<tr>
<td>Adobe Premiere 3.0</td>
<td>$479.95</td>
</tr>
<tr>
<td>Adobe Premiere 3.0</td>
<td>$479.95</td>
</tr>
<tr>
<td>Adobe Premiere 3.0</td>
<td>$479.95</td>
</tr>
</tbody>
</table>

---

**Call MAC BARGAINS before you buy!**

**1-800-407-7404**

Additional sale as of 1/7/95. All shipments are subject to the "in stock" terms, saving system basics, etc. Not responsible for typographical errors. Credit cards are not charged without the order is shipped. MacBargains reserves the right to end the sale any day, without notice. Items are subject to change without notice. Specials and promotions may be limited to stock on hand.
For the Best Deals Around!

1-800-407-7404

Discount on the Complete Line of Apple Computers

Reg price $597.00
SAVE Over $50 What supplies last!

Only $605.95

Quarkquik

- Easily adds links, video and sound
- Author projects for viewing on all platforms
- Use QuarkXPress' typography and design controls and apply them to interactive projects

Iomega Zip and Jazz Drives

- Faster than most hard drives
- 100MB of space on each Zip Cartridge
- Provides 1GB of space on each Jazz Cartridge
- For more information, e-mail: ZIPSCSI@JAZZCOM

Iomega

For the Best Deals Around!

HP DeskWriter 680C Color Printer

- 600 dpi black up to 600x600 dpi color
- Up to 5 ppm 8.5x11, 15 ppm color
- Memory: 512 KB
- 27 TrueType fonts

Heuwelt-Packard

89150 HP DeskWriter 1600CM Color Printer...

For the Best Deals Around!

HP DeskWriter 680C Color Printer

- 600 dpi black up to 600x600 dpi color
- Up to 5 ppm 8.5x11, 15 ppm color
- Memory: 512 KB
- 27 TrueType fonts

Heuwelt-Packard

89150 HP DeskWriter 1600CM Color Printer...

For the Best Deals Around!

HP DeskWriter 680C Color Printer

- 600 dpi black up to 600x600 dpi color
- Up to 5 ppm 8.5x11, 15 ppm color
- Memory: 512 KB
- 27 TrueType fonts

Heuwelt-Packard

89150 HP DeskWriter 1600CM Color Printer...

For the Best Deals Around!

HP DeskWriter 680C Color Printer

- 600 dpi black up to 600x600 dpi color
- Up to 5 ppm 8.5x11, 15 ppm color
- Memory: 512 KB
- 27 TrueType fonts

Heuwelt-Packard

89150 HP DeskWriter 1600CM Color Printer...

For the Best Deals Around!
The APS M•Power Line of Hi-End Macs

All M•Power systems are shipped complete with a floppy drive, ADB keyboard, ADB mouse, printer port, modem port, ADB port, SVGA monitor port (supporting 14", 15", 17" & 21" monitors), 2 PS/2 ports, SCSI port, IDE bus, ATAPI bus, 16-bit sound output port, rear headphone jack and a microphone jack to make computing much more enjoyable. All M•Power systems are ready to grow with you—the M•Power 603e180 and M•Power 603e200.

**APS M•Power 603e180**
- 180MHz Motorola® PowerPC 603e processor
- 1.2GB hard drive
- 10X CD-ROM
- 16MB of DRAM
- 1MB of VRAM
- Desktop enclosure w/3 PCI slots
- 2 year parts & labor warranty

$1299*

**APS M•Power 603e200**
- 200MHz Motorola® PowerPC 603e processor
- 1.2GB hard drive
- 10X CD-ROM
- 16MB of DRAM & 256K L2 Cache
- 1MB of VRAM
- Desktop enclosure w/3 PCI slots
- 2 year parts & labor warranty

$1499*

---

**JUST THE RIGHT CAPACITY! APS Q 2100**
- MR heads, PRML and Ultra SCSI Technology
- Reliable 4500 rpm mechanism
- Works on SCSI-2 and Ultra SCSI busses

Give your Mac the extra storage space it needs by installing the new APS Q 2100. At only 16c per MB internal, the APS Q 2100 is the value leader in 2GB SCSI hard disk drives.

**MIND-BLOWING 4.3 GIG DELIVERS APS WD 4300**
- Time tested 7200 rpm
- Ultra SCSI interface with a 5 year warranty

Put this 7200 rpm dynamo on your desktop, get ready for action. It delivers over 4.2GB of formatted capacity to quench the thirst of your data needs. Combining a 312K cache buffer and an Ultra SCSI interface, this drive is perfect for heavy duty storage on just about any PowerPC system.

---

**APS IDE DRIVES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Internal</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS 12.1</td>
<td>2047MB</td>
<td>5999</td>
</tr>
<tr>
<td>APS WD 3000</td>
<td>3020MB</td>
<td>3999</td>
</tr>
<tr>
<td>APS I 4000</td>
<td>4330MB</td>
<td>4999</td>
</tr>
</tbody>
</table>

---

**APS DESKTOP DRIVES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Internal</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS Q 1280</td>
<td>1228MB</td>
<td>$249</td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$299</td>
<td></td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$379</td>
<td></td>
</tr>
<tr>
<td>APS Q 2100</td>
<td>720MB</td>
<td>$499</td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$699</td>
<td></td>
</tr>
<tr>
<td>APS WD 2000</td>
<td>3995</td>
<td>$999</td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$479</td>
<td></td>
</tr>
<tr>
<td>APS Q 3200</td>
<td>4248MB</td>
<td>$999</td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$1049</td>
<td></td>
</tr>
<tr>
<td>APS MS 4300</td>
<td>3020MB</td>
<td>$1099</td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$2149</td>
<td></td>
</tr>
</tbody>
</table>

---

**APS HIGH-PERFORMANCE DRIVES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Internal</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS WD 4300</td>
<td>4248MB</td>
<td>$999</td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$999</td>
<td></td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$1049</td>
<td></td>
</tr>
<tr>
<td>APS Q 4300</td>
<td>720MB</td>
<td>$999</td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$1099</td>
<td></td>
</tr>
<tr>
<td>APS MS 4300</td>
<td>3020MB</td>
<td>$999</td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$1049</td>
<td></td>
</tr>
<tr>
<td>APS MS 4300</td>
<td>4330MB</td>
<td>$999</td>
</tr>
<tr>
<td>Quantum Fireball TM</td>
<td>$1049</td>
<td></td>
</tr>
</tbody>
</table>

---

MacUser • MAY 1997

Call 800-289-5385 • 24 Hrs x 7 Days a Week
Performance Mac OS Computer Systems!

The 603e200 desktop systems have four internal bays, while the M•Power 603e240 and the 604e200 tower systems have eight internal bays. These features and many more make the APS M•Power system the best value.

Monitors are not included. Filling all available drive bays may exceed power limitations.

**APS M•Power 603e240**

- 240MHz Motorola® PowerPC 603e processor
- 2.5GB hard drive
- 10X CD-ROM
- 24MB of DRAM & 256K L2 Cache
- 1MB of VRAM
- Tower enclosure w/5 PCI slots
- 2 year parts & labor warranty

$1999*

**APS M•Power 604e200**

- 200MHz Motorola® PowerPC 604e processor
- 2.5GB hard drive
- 10X CD-ROM
- 24MB of DRAM & 512K L2 Cache
- 2MB of VRAM
- Tower enclosure w/5 PCI slots
- 2 year parts & labor warranty

$2399*

---

**BEST VALUE IN CD-R!**

**APS CD-R**

- 2X record, 6X read mechanism
- Your choice of Toast, Discibe or Retrospect
- 2X recording and 6X CD-ROM playback, makes this drive ideal for creating multimedia CD's or backing up a hard disk drive at double speed.
- The APS CD-R includes your choice of Toast, Discibe mastering software or Retrospect backup software.

$499.95

---

**1GB REMOVABLE!**

**APS Jaz**

- Hard drive performance
- Huge 1GB capacity on removable media

Jaz has changed the removable storage market forever! The APS Jaz's performance rivals that of most fixed-platter hard disk drives.

$599.95

---

**APS QIC & DAT BACKUP SYSTEMS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity/Awards</th>
<th>Internal</th>
<th>SR2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS HyperQIC</td>
<td>4mm DAT-2</td>
<td>1GB</td>
<td>$349.95</td>
</tr>
<tr>
<td>APS HyperDAT</td>
<td>8mm DAT-2</td>
<td>2GB</td>
<td>$749.95</td>
</tr>
<tr>
<td>APS HyperDAT+</td>
<td>8mm DAT-2</td>
<td>2GB</td>
<td>$849.95</td>
</tr>
<tr>
<td>APS HyperDAT+ II</td>
<td>8mm DAT-2</td>
<td>4GB</td>
<td>$1149.95</td>
</tr>
<tr>
<td>APS MiniLibrary</td>
<td>4mm DAT-2, 2 Autoloader</td>
<td>N/A</td>
<td>$259.95</td>
</tr>
<tr>
<td>APS M 15</td>
<td>8mm W15C</td>
<td>N/A</td>
<td>$399.95</td>
</tr>
<tr>
<td>APS D11</td>
<td>4mm DAT-2, 2 Autoloader</td>
<td>N/A</td>
<td>$499.95</td>
</tr>
</tbody>
</table>

**APS REMOVABLE DRIVES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity/Awards</th>
<th>SR 1000</th>
<th>SR 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS M540</td>
<td>4mm-2</td>
<td>$299.95</td>
<td>$379.95</td>
</tr>
<tr>
<td>APS M540</td>
<td>5mm-2</td>
<td>$299.95</td>
<td>$379.95</td>
</tr>
<tr>
<td>APS SQ 2000</td>
<td>N/A</td>
<td>$389.95</td>
<td></td>
</tr>
<tr>
<td>APS Jaz (4 cartridges)</td>
<td></td>
<td>$499.95</td>
<td></td>
</tr>
<tr>
<td>APS Jaz (8 cartridges)</td>
<td></td>
<td>$599.95</td>
<td></td>
</tr>
</tbody>
</table>

**APS CD-ROM DRIVE**

<table>
<thead>
<tr>
<th>Model</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS CD12</td>
<td>$179.95</td>
</tr>
<tr>
<td>APS CD Changer</td>
<td>$299.95</td>
</tr>
<tr>
<td>APS CD-R</td>
<td>$499.95</td>
</tr>
</tbody>
</table>

---

**APS CD-R Mastering System 4**

- 2X record/5X read CD-R
- 2X record/5X read CD-R

$1999.95

---

**APS Jaz/CD-R System**

- 2X record/5X read CD-R
- 2X record/5X read CD-R

$1999.95

---

**APS CD-ROM**

- 2X record/5X read CD-R
- 2X record/5X read CD-R

$1999.95

---

**Call 800-289-5385**

Visit our Web Page at http://www.apstech.com/

International Sales: (816) 920-4109

Circle 148 on Reader Service Card
# Product Index

## ADVERTISER

<table>
<thead>
<tr>
<th>Display Systems &amp; Video</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corel Systems Corporation <a href="http://www.corel.com">http://www.corel.com</a></td>
<td>78</td>
</tr>
<tr>
<td>Epson America 800-GO-EPSON</td>
<td>15</td>
</tr>
<tr>
<td>Panasonic <a href="http://www.panasonic.com/alive">www.panasonic.com/alive</a></td>
<td>49</td>
</tr>
<tr>
<td>Radius, Inc. 800-5-RADIUS</td>
<td>46</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mindscape 800-234-3088</td>
<td>153</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial Management</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palm Computing 800-881-7256</td>
<td>43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Hardware &amp; Accessories</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Software, Claris 800-950-5382 ext. 784</td>
<td>45</td>
</tr>
<tr>
<td>ATI Technologies 905-882-2600</td>
<td>65</td>
</tr>
<tr>
<td>GCC Technologies 800-422-7777</td>
<td>37</td>
</tr>
<tr>
<td>Motorola Computer Group 800-759-1107 ext. MWU</td>
<td>22-23</td>
</tr>
<tr>
<td>Orange Micro 714-779-2772</td>
<td>82</td>
</tr>
<tr>
<td>Power Computing 800-405-7693</td>
<td>Cover 5-8</td>
</tr>
<tr>
<td>Ricoh System Corporation 800-967-UNDO</td>
<td>86</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graphics &amp; Design</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binuscan 800-881-2352</td>
<td>7</td>
</tr>
<tr>
<td>Corel Systems Corporation <a href="http://www.corel.com">http://www.corel.com</a></td>
<td>78</td>
</tr>
<tr>
<td>Deneba Software Inc. 800-7-DENEB</td>
<td>35</td>
</tr>
<tr>
<td>Diehl Graphsoft 410-290-5114</td>
<td>84</td>
</tr>
<tr>
<td>Engineered Software 910-299-4843</td>
<td>6</td>
</tr>
<tr>
<td>Integrated Micro Solutions 888-IMS-8282</td>
<td>50</td>
</tr>
<tr>
<td>Linotype-Hell 800-842-9721</td>
<td>48</td>
</tr>
<tr>
<td>Quark 800-788-7835 ext. 3017</td>
<td>10-11</td>
</tr>
<tr>
<td>Strata 800-STRATA-3D</td>
<td>66</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input Devices</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visioneer 800-787-7007 ext. 704</td>
<td>18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internet/Online Products</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EarthLink Network 800-395-8425</td>
<td>53</td>
</tr>
<tr>
<td>GoLive Systems <a href="http://www.golive.com">http://www.golive.com</a></td>
<td>9</td>
</tr>
<tr>
<td>Microsoft Corporation 800-967-5363 ext. 433</td>
<td>2-3</td>
</tr>
<tr>
<td>PointCast <a href="http://www.pointcast.com">http://www.pointcast.com</a></td>
<td>77</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mail Order</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BottomLine Distribution 800-990-5699</td>
<td>126</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Networking &amp; Connectivity</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DataViz, Inc. 800-270-0030</td>
<td>51</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Organizational Tools</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEC Software 800-450-1983</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output Devices</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCC Technologies 800-422-7777</td>
<td>37</td>
</tr>
<tr>
<td>Tektronix 800-835-6100</td>
<td>41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance Enhancers</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DayStar Digital 770-967-2077</td>
<td>20</td>
</tr>
<tr>
<td>Orange Micro 714-779-2772</td>
<td>82</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Programming &amp; Systems</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Computer, Inc. 800-538-9696</td>
<td>16-17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resources</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEC Software 800-450-1983</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scanners</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGFA Corporation 800-685-4271 ext. 5644</td>
<td>81</td>
</tr>
<tr>
<td>Visioneer 800-787-7007</td>
<td>18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage Systems</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS Technologies 800-235-3707</td>
<td>110-111</td>
</tr>
<tr>
<td>FWB Software <a href="http://www.fwb.com">http://www.fwb.com</a></td>
<td>83</td>
</tr>
<tr>
<td>GCC Technologies 800-422-7777</td>
<td>37</td>
</tr>
<tr>
<td>Maxell Corporation of America 888-2-MAXELL</td>
<td>70</td>
</tr>
</tbody>
</table>
Keep your Mac safe with software solutions from SYMANTEC.

SAM V4.5
Maximum Internet virus protection
SAM is maximum Mac virus protection, keeping your files safe from viruses hidden in Internet downloads, compressed files, shared files and e-mail attachments. SAM’s new SafeZone acts as a virtual clean room so copies or downloaded files can be scanned in isolation before you use them. SAM hunts down viruses before they damage your files. It keeps your protection up to date—just click on Auto Update to download the latest definition files free. SAM also repairs infected files so you can open and work with them safely. Everything is automatic, so you can focus on what you want to do.

- SafeZone Internet protection automatically protects the desktop, or any folder, from infection from downloaded files
- Scan on open or shared documents—allows scanning of MS Word and Excel files shared via File Sharing on open
- Expanded modem compatibility—easier to update virus definitions with Auto Update
- MS Office Installer support
- Improved ease of customization
- Improved alerting—longer custom alert messages

Norton Utilities V3.2
The comprehensive data protection and recovery tools for Macintosh
Norton Utilities™ V3.2 by Symantec proactively prevents trouble by immediately alerting you when problems arise. It recovers data when disaster strikes. It even rescues data from totally trashed disks. Not only does it scan for disk errors in the background—alerting you to any problems before data is harmed—but it also automatically notifies you when maintenance is recommended. Put these tools to work for you and never fear data loss again.

Disk repair
- Improved Norton Disk Doctor™: The most effective technology for diagnosing and repairing disk problems, now analyzes and repairs more disk areas than any other product. Identifies problems and recommends solutions with easy-to-expert-level error messaging.
- Rebuild Desktop: Norton Disk Doctor now completely rebuilds your desktop file, eradicating any damage. You can even add a single file or save your finder comments.
- Norton Disk Editor: Enables experienced users to explore and edit the structure and content of files and disks.

Data recovery
- Volume Recover: Instantly restores crashed, accidentally erased or initialized hard disks; if disk is so badly damaged it cannot be repaired, recovers files to diskette automatically.
- UnErase: Now recovers more files than ever before; simple step-by-step recovery in a snap.
- Recover File: Quickly and effectively recovers data from damaged files of any type.
- Emergency Diskette included: Provides easy rebooting after a crash; includes Startup Disk Builder to build bootable floppy disks for even the newest machines.

Data protection
- FileSaver**: Now scans automatically in background; notifies you when repairs or maintenance are needed. Maintains a record of critical disk and file information for improved recovery.
- Norton Fastback: Provides fast, safe and automatic backup to floppy, hard disk or tape (sequential, DAT drives); self-restoring backups from floppy or hard disk.
- WipeInfo: Assures that deleted confidential information is never recovered.

$64.17
CDW 75075

$94.27
CDW 61695

*$15 mail-in manufacturer rebate when CDW 61695 is purchased with a tax preparation software package (CDW 80322, 80323 or 82278). Purchases must be made by 4/15/97. Other restrictions apply.

800-291-4239
www.cdw.com
## Computers

<table>
<thead>
<tr>
<th>Product</th>
<th>Price (in $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>StarMax Series Desktops</td>
<td>$2399.04</td>
</tr>
<tr>
<td>Display</td>
<td>CDW 76826</td>
</tr>
</tbody>
</table>

## Video Displays

- **400/200 mini-tower**
- High performance, aggressive price
- 200MHz PowerPC 604e processor
- 32MB RAM standard
- 2.4GB hard drive
- 8X CD-ROM drive
- Software: Mac OS version 7.5.3

## Data Storage

- **Kodak TV external hard drive** $1,441.84
- **Kodak 2D 4MB** $229.99
- **Kodak 3MB 8MB** $219.99
- **Kodak VR 2MB** $199.99
- **Kodak VR 4MB** $199.99

## Integrated Micro Solutions

- **Diamond**
  - Thunder 30/1600: $849.88
  - ThunderColor 310/151: $1,685.73
  - Thunder 310/1600: $1,290.25
- **Supra Express**
  - SupraExpress 35/16 3.3 internal: $119.33
  - SupraExpress 35/16 3.3 external: $179.32
  - SupraExpress 33.3 internal: $223.41
- **PowerPort Platinum**
  - PowerPort Platinum 28.8 PC Card: $269.97
  - PowerPort Platinum Pro 28.8 PC Card: $429.87
  - TelePort Speakerphone Edition 33.6: $246.42
- **ACCURIA 33.3 external**
  - ACCURIA 33.3 external: $150.00
  - OPTIMA 33.3 internal: $245.09
- **Matrix**
  - MatrixClass 33.3 V.4 MiniTower II: $124.66
  - MatrixClass 33.3 PC Card: $149.35
- **Megabyte**
  - Megabyte Plus 28.8n compatible Osborne/Apple: $2,299.30
  - Megabyte PlusEthernet 10/100: $349.95
  - PC Card + WUI: $299.95
  - Megabyte AllPoints wireless PC Card: $464.12
  - TeleStar Mac/Amiga/PC/Novell: $399.99
  - Sportster 3.3: $199.99
  - Sportster 3.3 Plus: $199.99
  - Sportster 3.3 Ethernet: $199.99

## Printers

- **Sonic**
  - E841 14" 28mm: $254.00
  - E581 16" 28mm: $254.00
  - M500 15" 28mm $289.99
  - T770 25" 28mm: $609.14
  - T772 30" 28mm: $609.14
  - 3D-Direct 444.78

## Carrying Cases

- **ViewSonic**
  - E841 14" 28mm: $254.00
  - E581 16" 28mm: $254.00
  - M500 15" 28mm $289.99
  - T770 25" 28mm: $609.14
  - T772 30" 28mm: $609.14

## Miscellaneous

- **3M**
  - 400/200 mini-tower
  - High performance, aggressive price
  - 200MHz PowerPC 604e processor
  - 32MB RAM standard
  - 2.4GB hard drive
  - 8X CD-ROM drive
  - Software: Mac OS version 7.5.3

## Discount Pricing

- **CDW 81425**
  - Internet connectivity requires access service from an external access provider.
  - Contact your local access provider for rates, terms and conditions.
<table>
<thead>
<tr>
<th>Product Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corel CD Creator CD</td>
<td>154.42</td>
</tr>
<tr>
<td>Corel Galaxy V1.0 CD</td>
<td>21.05</td>
</tr>
<tr>
<td>Corel Mega Galaxy CD</td>
<td>9.00</td>
</tr>
<tr>
<td>Corel Paint House PC</td>
<td>9.71</td>
</tr>
<tr>
<td>Corel Photo Paint 3.0 CD</td>
<td>89.95</td>
</tr>
<tr>
<td>Corel Photo Paint 3.0 LWP</td>
<td>89.95</td>
</tr>
<tr>
<td>Corel Super Paint Animals CD</td>
<td>37.28</td>
</tr>
<tr>
<td>Corel Super Great Works of Art CD</td>
<td>37.28</td>
</tr>
<tr>
<td>Corel Super Select Photos CD</td>
<td>37.29</td>
</tr>
<tr>
<td>Corel WordPerfect V5.0 CD</td>
<td>74.61</td>
</tr>
<tr>
<td>Corel WordPerfect V5.0 Upgrade CD</td>
<td>35.62</td>
</tr>
<tr>
<td>CorelDRAW 8 Suite Upgrade DC</td>
<td>136.37</td>
</tr>
<tr>
<td>Dantz Retrospect Remote V3.0</td>
<td>135.50</td>
</tr>
<tr>
<td>Datawatch Vx5.0</td>
<td>99.19</td>
</tr>
<tr>
<td>Deneba Canvas V5.03.5 CD</td>
<td>379.88</td>
</tr>
<tr>
<td>Deneba Canvas V5.0 compact</td>
<td>149.79</td>
</tr>
<tr>
<td>Eduation Activation Mechanic 2.5</td>
<td>423.79</td>
</tr>
<tr>
<td>Berkeley After Dark V3.3 CD</td>
<td>323.79</td>
</tr>
<tr>
<td>Broderbund M/VST CD</td>
<td>323.79</td>
</tr>
<tr>
<td>CorelDRAW 4.0</td>
<td>199.67</td>
</tr>
<tr>
<td>CorelDRAW 9.0</td>
<td>116.14</td>
</tr>
<tr>
<td>ClarisWorks V4.0 CPU bundle</td>
<td>312.05</td>
</tr>
<tr>
<td>ClarisWorks V4.0 Lamar bundle</td>
<td>148.14</td>
</tr>
<tr>
<td>ClarisWorks V4.0 Weightless</td>
<td>148.14</td>
</tr>
<tr>
<td>ClarisWorks V1.1</td>
<td>41.05</td>
</tr>
<tr>
<td>ClipMaker Pro V3.3</td>
<td>176.25</td>
</tr>
<tr>
<td>FileMaker Pro V3.0</td>
<td>176.25</td>
</tr>
<tr>
<td>FileMaker Pro V3.3 server</td>
<td>176.25</td>
</tr>
<tr>
<td>FileMaker Pro V3.3 user server</td>
<td>176.25</td>
</tr>
<tr>
<td>Home Office V1.1</td>
<td>89.82</td>
</tr>
<tr>
<td>Home Office V2.0</td>
<td>89.82</td>
</tr>
<tr>
<td>Home Office V3.0</td>
<td>87.14</td>
</tr>
<tr>
<td>Home Office/V3.0 Edit bundle</td>
<td>265.51</td>
</tr>
<tr>
<td>QuickCard V1.1.1</td>
<td>31.77</td>
</tr>
<tr>
<td>RAM Doubler 2</td>
<td>55.74</td>
</tr>
<tr>
<td>Speed Doubler 2</td>
<td>55.74</td>
</tr>
<tr>
<td>VideoPhone (software only)</td>
<td>55.74</td>
</tr>
<tr>
<td>Adobe Acrobat V3.0</td>
<td>179.41</td>
</tr>
<tr>
<td>After Effects V3.0</td>
<td>624.65</td>
</tr>
<tr>
<td>Illustrator V5.0</td>
<td>383.67</td>
</tr>
<tr>
<td>Illustrator V6.0 (3.5&quot; CD)</td>
<td>359.08</td>
</tr>
<tr>
<td>Illustrator V6.0 3X to 6.0 (3.5&quot; CD)</td>
<td>114.26</td>
</tr>
<tr>
<td>Illustrator V6.0 5X to 6.0 (3.5&quot; CD)</td>
<td>114.26</td>
</tr>
<tr>
<td>Illustrator V6.0 (5X to 6.0 CD only)</td>
<td>114.26</td>
</tr>
<tr>
<td>PageMaker V6.0 (3.5&quot; CD)</td>
<td>545.78</td>
</tr>
<tr>
<td>PageMaker V6.0 Upg</td>
<td>128.91</td>
</tr>
<tr>
<td>PageMaker V6.0 CD</td>
<td>128.91</td>
</tr>
<tr>
<td>PageMaker V6.0 comp upg</td>
<td>114.26</td>
</tr>
<tr>
<td>PageMill V2.0 comp upg</td>
<td>94.84</td>
</tr>
<tr>
<td>PageMill V2.0 upg comp</td>
<td>94.84</td>
</tr>
<tr>
<td>PageMill V2.0 upg</td>
<td>94.84</td>
</tr>
<tr>
<td>Persuasion V4.0</td>
<td>75.81</td>
</tr>
<tr>
<td>Persuasion V3.0</td>
<td>35.82</td>
</tr>
<tr>
<td>CorelWeb GALLERY</td>
<td>83.98</td>
</tr>
<tr>
<td>CorelWeb GALLERY comp upg</td>
<td>83.98</td>
</tr>
<tr>
<td>PhotoDeluxe V5.0</td>
<td>49.24</td>
</tr>
<tr>
<td>Photoshop V4.0 comp upg</td>
<td>49.24</td>
</tr>
<tr>
<td>Photoshop V4.0 upg comp</td>
<td>49.24</td>
</tr>
<tr>
<td>Premier V4.0 comp upg</td>
<td>487.76</td>
</tr>
<tr>
<td>Premier V4.0 upg</td>
<td>487.76</td>
</tr>
<tr>
<td>Premier V4.0</td>
<td>487.76</td>
</tr>
<tr>
<td>StreamIns V3.1</td>
<td>119.08</td>
</tr>
<tr>
<td>TypeManager Deluxe V4.0 CD</td>
<td>47.83</td>
</tr>
<tr>
<td>TypeManage Deluxe V4.0 comp upg</td>
<td>47.83</td>
</tr>
<tr>
<td>TypeReunion Deluxe V2.0 CD</td>
<td>36.70</td>
</tr>
<tr>
<td>Apple Macintosh V3.0</td>
<td>29.49</td>
</tr>
<tr>
<td>Apple Internet Connection Kit V1.1 CD</td>
<td>43.85</td>
</tr>
<tr>
<td>Apple MacOS 7.5 CD</td>
<td>43.85</td>
</tr>
<tr>
<td>Apple MacOS 7.5 CD (server)</td>
<td>43.85</td>
</tr>
<tr>
<td>Apple Newton Print Kit V1.1</td>
<td>61.92</td>
</tr>
<tr>
<td>Apple Remote Access Client V1.2</td>
<td>116.57</td>
</tr>
<tr>
<td>Apple Remote Access Personal Server V2.1</td>
<td>116.57</td>
</tr>
<tr>
<td>Omnisphere V2.0</td>
<td>169.47</td>
</tr>
<tr>
<td>Omnisphere Direct V2.0</td>
<td>77.30</td>
</tr>
<tr>
<td>Omnisphere Pro V3.2</td>
<td>473.05</td>
</tr>
<tr>
<td>Omnisphere Pro V3.0</td>
<td>473.05</td>
</tr>
<tr>
<td>Omnisphere Pro V4 CD</td>
<td>473.05</td>
</tr>
<tr>
<td>Omnisphere Print Station V3.0</td>
<td>114.98</td>
</tr>
<tr>
<td>ConfigDitch 3.3</td>
<td>54.84</td>
</tr>
<tr>
<td>ConfigDitch comp upg</td>
<td>35.15</td>
</tr>
<tr>
<td>ConfigDitch comp upg</td>
<td>35.15</td>
</tr>
<tr>
<td>Let’s Keep It Simple Spreadsheet</td>
<td>199.67</td>
</tr>
<tr>
<td>ClarisDrive V1.1</td>
<td>178.70</td>
</tr>
<tr>
<td>ClarisWorks V4.0</td>
<td>79.00</td>
</tr>
<tr>
<td>ClarisWorks V4.0 bundle</td>
<td>332.15</td>
</tr>
<tr>
<td>ClarisWorks V4.0 Lamar bundle</td>
<td>148.14</td>
</tr>
<tr>
<td>ClarisWorks V4.0 Weightless</td>
<td>148.14</td>
</tr>
<tr>
<td>ClarisWorks V1.1</td>
<td>41.05</td>
</tr>
<tr>
<td>FileMaker Pro V3.0</td>
<td>176.25</td>
</tr>
<tr>
<td>FileMaker Pro V3.0 server</td>
<td>176.25</td>
</tr>
<tr>
<td>FileMaker Pro V3.0 user server</td>
<td>176.25</td>
</tr>
<tr>
<td>Home Office V1.1</td>
<td>89.82</td>
</tr>
<tr>
<td>Home Office V2.0</td>
<td>89.82</td>
</tr>
<tr>
<td>Home Office V3.0</td>
<td>87.14</td>
</tr>
<tr>
<td>Home Office/V3.0 Edit bundle</td>
<td>265.51</td>
</tr>
<tr>
<td>QuickCard V1.1.1</td>
<td>31.77</td>
</tr>
<tr>
<td>RAM Doubler 2</td>
<td>55.74</td>
</tr>
<tr>
<td>Speed Doubler 2</td>
<td>55.74</td>
</tr>
<tr>
<td>VideoPhone (software only)</td>
<td>55.74</td>
</tr>
</tbody>
</table>

**Total: $324.50**

**CDW Services You Better**

**CDW Carries Over 20,000 Products. If You Don't See It, Call!**

**800-291-4239**

**www.cdw.com**
# Advertiser Index

<table>
<thead>
<tr>
<th>RS#</th>
<th>ADVERTISER</th>
<th>PHONE NUMBER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>AEC Software</td>
<td>800-450-1983</td>
<td>12</td>
</tr>
<tr>
<td>169</td>
<td>AGFA Corporation</td>
<td>800-685-4271 ext. 5644</td>
<td>81</td>
</tr>
<tr>
<td>103</td>
<td>Apple Computer, Inc.</td>
<td>800-538-9696</td>
<td>16-17</td>
</tr>
<tr>
<td></td>
<td>Apple Software, Claris</td>
<td>800-950-5382 ext. 784</td>
<td>45</td>
</tr>
<tr>
<td>148</td>
<td>APS Technologies</td>
<td>800-255-3707</td>
<td>110-111</td>
</tr>
<tr>
<td>20</td>
<td>ATI Technologies</td>
<td>905-882-2600</td>
<td>65</td>
</tr>
<tr>
<td>133</td>
<td>Buscan</td>
<td>800-881-2352</td>
<td>7</td>
</tr>
<tr>
<td>19</td>
<td>Bottom Line Distribution</td>
<td>800-990-5699</td>
<td>126</td>
</tr>
<tr>
<td>120</td>
<td>ClubMac</td>
<td>800-258-2622</td>
<td>106-107</td>
</tr>
<tr>
<td>136</td>
<td>Computer Discount Warehouse</td>
<td>800-291-4239</td>
<td>113-115</td>
</tr>
<tr>
<td>77</td>
<td>Corel Systems Corporation</td>
<td><a href="http://www.corel.com">http://www.corel.com</a></td>
<td>78</td>
</tr>
<tr>
<td>50</td>
<td>CRA Systems</td>
<td>800-375-9000</td>
<td>102-103</td>
</tr>
<tr>
<td>163,164</td>
<td>DataViz, Inc.</td>
<td>800-270-0030</td>
<td>51</td>
</tr>
<tr>
<td>105</td>
<td>DayStar Digital</td>
<td>770-967-2077</td>
<td>20</td>
</tr>
<tr>
<td>125</td>
<td>Deneba Software Inc.</td>
<td>800-7-DENEBA</td>
<td>35</td>
</tr>
<tr>
<td>19</td>
<td>DGR Technologies</td>
<td>800-990-5699</td>
<td>126</td>
</tr>
<tr>
<td>10</td>
<td>Diehl Graphsoft</td>
<td>410-290-5114</td>
<td>84</td>
</tr>
<tr>
<td>33</td>
<td>Digital Graphix</td>
<td>800-680-9062</td>
<td>98-99</td>
</tr>
<tr>
<td>90</td>
<td>EarthLink Network</td>
<td>800-395-8425</td>
<td>53</td>
</tr>
<tr>
<td>123</td>
<td>Engineered Software</td>
<td>910-299-4843</td>
<td>6</td>
</tr>
<tr>
<td>73</td>
<td>Epson America</td>
<td>800-GO-EPSON</td>
<td>15</td>
</tr>
<tr>
<td>71</td>
<td>FwB Software</td>
<td><a href="http://www.fwb.com">http://www.fwb.com</a></td>
<td>83</td>
</tr>
<tr>
<td>101</td>
<td>GCC Technologies</td>
<td>800-422-7777</td>
<td>37</td>
</tr>
<tr>
<td>92</td>
<td>G4live Systems</td>
<td><a href="http://www.g4live.com">http://www.g4live.com</a></td>
<td>9</td>
</tr>
<tr>
<td>43</td>
<td>Integrated Micro Solutions</td>
<td>888-IMS-8282</td>
<td>50</td>
</tr>
<tr>
<td>11</td>
<td>Linotype-Hell</td>
<td>800-848-9721</td>
<td>48</td>
</tr>
<tr>
<td>23</td>
<td>LBB Company, Inc.</td>
<td>800-848-8967</td>
<td>120-121</td>
</tr>
<tr>
<td>108</td>
<td>Mac Bargains</td>
<td>800-467-7404</td>
<td>108-109</td>
</tr>
<tr>
<td>147</td>
<td>MacConnection</td>
<td>800-998-0071</td>
<td>124-125</td>
</tr>
<tr>
<td>18</td>
<td>MacMail</td>
<td>800-217-9498</td>
<td>104-105</td>
</tr>
<tr>
<td>117</td>
<td>MacMarket</td>
<td>888-202-1132</td>
<td>119</td>
</tr>
<tr>
<td>19</td>
<td>MacProducts, USA</td>
<td>800-990-5699</td>
<td>126</td>
</tr>
<tr>
<td>157</td>
<td>MacWarehouse</td>
<td>800-434-3037</td>
<td>100-101</td>
</tr>
<tr>
<td>153</td>
<td>MacZone</td>
<td>800-436-6000</td>
<td>122-123</td>
</tr>
<tr>
<td>22</td>
<td>Maxell Corporation of America</td>
<td>888-2-MAXELL</td>
<td>70</td>
</tr>
<tr>
<td>116</td>
<td>Microsoft Corporation</td>
<td>800-967-5363 ext. 433</td>
<td>2-3</td>
</tr>
<tr>
<td>95</td>
<td>Mindscape</td>
<td>800-234-3088</td>
<td>153</td>
</tr>
<tr>
<td>85</td>
<td>Motorola Computer Group</td>
<td>800-759-1107 ext. MWU</td>
<td>22-23</td>
</tr>
<tr>
<td>130</td>
<td>Orange Micro</td>
<td>714-779-2772</td>
<td>82</td>
</tr>
<tr>
<td>143</td>
<td>Palm Computing</td>
<td>800-881-7256</td>
<td>43</td>
</tr>
<tr>
<td>80</td>
<td>Panasonic</td>
<td><a href="http://www.panasonic.com/alive">www.panasonic.com/alive</a></td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>PointCast</td>
<td><a href="http://www.pointcast.com">http://www.pointcast.com</a></td>
<td>77</td>
</tr>
<tr>
<td>24</td>
<td>Power Computing</td>
<td>800-405-7693</td>
<td>Cover 2-4, 1</td>
</tr>
<tr>
<td>24</td>
<td>Power Computing</td>
<td>800-405-7693</td>
<td>Cover 5-8</td>
</tr>
<tr>
<td>75</td>
<td>ProDirect</td>
<td>800-555-1256</td>
<td>97</td>
</tr>
<tr>
<td>5</td>
<td>Quark</td>
<td>800-788-7385 ext. 3017</td>
<td>10-11</td>
</tr>
<tr>
<td>160</td>
<td>Radius, Inc.</td>
<td>800-S-RADIUS</td>
<td>46</td>
</tr>
<tr>
<td>110</td>
<td>Rich System Corporation</td>
<td>800-967-UNDO</td>
<td>86</td>
</tr>
<tr>
<td>124</td>
<td>Seybold Seminars</td>
<td>888-800-8922</td>
<td>90</td>
</tr>
<tr>
<td>150</td>
<td>Strata</td>
<td>800-STRATA-3D</td>
<td>66</td>
</tr>
<tr>
<td>150</td>
<td>Tektronix</td>
<td>800-833-6100</td>
<td>41</td>
</tr>
<tr>
<td>5</td>
<td>Visioneer</td>
<td>800-787-7007 ext. 704</td>
<td>18</td>
</tr>
<tr>
<td>150</td>
<td>ZDNet</td>
<td><a href="http://www.zdnet.com">www.zdnet.com</a></td>
<td>94</td>
</tr>
<tr>
<td>150</td>
<td>ZDTV</td>
<td><a href="http://www.thesite.com">www.thesite.com</a></td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>Ziff-Davis Benchmark Operation</td>
<td><a href="http://www.zdnet.com/zdbox">http://www.zdnet.com/zdbox</a></td>
<td>38-39</td>
</tr>
<tr>
<td></td>
<td>Ziff-Davis Reprints</td>
<td>800-825-4237</td>
<td>126</td>
</tr>
</tbody>
</table>

*Denotes no reader service number.
Founded in 1990, The LLB Co. Inc. is acknowledged by our customers and competition alike to be a leading reseller of memory upgrade products in the U.S.A.

Most competitive pricing: Our buyers keep abreast of developing trends, buy at the lowest possible price and pass the savings to our customers. You may shop the competition, but you will buy from The LLB company.

Experienced sales staff: Our sales associates who also provide customer service are Mac enthusiasts who know what you need from a unique but practical point of view.

Warranty & reliability: LLB sells only 100% tested brand name, brand-new products. All memory products carry a life-time warranty & replacement is hassle-free.

Product availability: LLB carries products in inventory that are advertised for sale. All orders are processed and products delivered the next day.

PO's are accepted upon approval.
The world is our market - we export to most countries.

---

**ACCESSORIES**

**PHOTO SERIES**

PB1504 PowerDuo Auto Adapter...$69
PB1513 Stylus 33 Blue Power Duo Adapter...$59
PB1515 Mini A/C Adapter for DUO...$50

**PB SERIES**

PB1503 Internal Battery Pack for PB 140.160c...$59
PB1511 Battery PB100...$69
PB1512 Slap-Ex Battery...PB100-180c...$79
VSTP100-1 VST ThingPac Complete...$115

**PB500 SERIES**

VSTP5000-VST PB150/5300 Battery...$163
VSTP5000-VST PB5300 Bat/Charg/AC Adapter...$329

**PB-DUO SERIES**

DUO 4MB...$75
DUO 8MB...$89
DUO 12MB...$105
DUO 20MB...$250
DUO 32MB...$365
DUO 36MB...$510

**PB 190 SERIES**

4MB/8MB...$70/105
12MB/16MB...137/191
32MB 7ONS...$349

**PB 150 SERIES**

4MB/8MB...$55/90
12MB/20MB...218/280
28MB...$390

---

**PRINTERS & SCANNERS**

Hewlett Packard

4MB 16PPM 600 DPI LASER...$2840
6MB 12PPM 600 DPI LASER...$2840

Lexmark

M3200 6PPM 1200 DPI...$2239

LBP1200 6PPM 1200 DPI...$2239

Lexmark

CVP 1200 6PPM 1200 DPI...$2239

LBP1200 6PPM 1200 DPI...$2239

Lexmark

CVP 1200 6PPM 1200 DPI...$2239

LBP1200 6PPM 1200 DPI...$2239

---

**POWERBOOK MEMORY!**

PB 5300

8MB...$79
16MB/32MB...$137/283
48MB...$506

PB 2300

4MB...$80
8MB...$115
16MB...$186
20MB...$250
32MB...$360
36MB...$365
48MB...$520

PB 5500

4MB/8MB...$74/86
16MB/32MB...$158/288

---

**DRIVES**

QUANTUM

IBM 2.1GB EXTERNAL DRIVE...$599
IBM 2.1GB INTERNAL DRIVE...$389
ATLAS 4.3GB EXTERNAL DRIVE...$970
ATLAS 4.3 INTERNAL DRIVE...$999

APPLE

EXTERNAL 4GB DRIVE...$1075
APPLE CD600 EXTERNAL 600MB 4X SCSI...$269

VERBATIM

720MB 12PPM 600 DPI...$28
1.4GB 12PPM 600 DPI...$38

VERBATIM

CDR 45MIN 74MIN...$9
CDR 80MIN 74MIN...$12

VERBATIM

CDR 52MIN...$15
CDR 74MIN...$18

VERBATIM

CDR 80MIN...$21
CDR 100MIN...$24

VERBATIM

CDR 80MIN...$21
CDR 100MIN...$24

VERBATIM

CDR 80MIN...$21
CDR 100MIN...$24

---

**MEDIA**

VERBATIM

4X 1200MB CDR...$169
4X 700MB CDR...$169

VERBATIM

4X 1200MB CDR...$169
4X 700MB CDR...$169

VERBATIM

4X 1200MB CDR...$169
4X 700MB CDR...$169

VERBATIM

4X 1200MB CDR...$169
4X 700MB CDR...$169

---

**Nikon**

COOLSCAN II EXT LS/20...$1125
COOLSCAN IV...$1835
COOLSCAN IV...$1835

---

**CIRCLE 23 ON READER SERVICE CARD**
## Video Cards

<table>
<thead>
<tr>
<th>Card</th>
<th>Memory</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWIN TURBO 128M PCI</td>
<td>2MB V</td>
<td>$370</td>
</tr>
<tr>
<td>TWIN TURBO 128M PCI</td>
<td>4MB V</td>
<td>$569</td>
</tr>
<tr>
<td>TWIN TURBO 32M PCI</td>
<td>8MB V</td>
<td>$995</td>
</tr>
<tr>
<td>TRUEVISION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV 281733 - TARGA 1000 PCI FOR MAC</td>
<td>$2459</td>
<td></td>
</tr>
<tr>
<td>TV 281732 - TARGA 2000 PCI FOR MAC</td>
<td>$4165</td>
<td></td>
</tr>
<tr>
<td>JV281749 - BRIDWAD 1000 MAC</td>
<td>$879*</td>
<td></td>
</tr>
</tbody>
</table>

*After Manufacturer’s Rebate

## Accessories

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>RADIUS</td>
<td></td>
</tr>
<tr>
<td>#0446 - THUNDER IV GX-1300</td>
<td>$995</td>
</tr>
<tr>
<td>#0485 - THUNDER IV GX-152</td>
<td>$815</td>
</tr>
<tr>
<td>#0513 - THUNDER IV GX-1600</td>
<td>$1085</td>
</tr>
<tr>
<td>#0528 - THUNDER GB-1600</td>
<td>$1085</td>
</tr>
<tr>
<td>#0531 - THUNDERCOLOR 30/1152 PCI</td>
<td>$2105</td>
</tr>
<tr>
<td>#0552 - PRECISIONCOLOR 8/1600</td>
<td>$1685</td>
</tr>
<tr>
<td>#0553 - PRECISIONCOLOR 24/1600</td>
<td>$545</td>
</tr>
<tr>
<td>RASERTOPES</td>
<td></td>
</tr>
<tr>
<td>#RO2562 - VIDEO TIME</td>
<td>$415</td>
</tr>
<tr>
<td>#RO2564 - 2XMTV</td>
<td>$799</td>
</tr>
<tr>
<td>#RO2567 - PAINTBOARD</td>
<td></td>
</tr>
<tr>
<td>#RO2567 - HORIZON 24</td>
<td>$1655</td>
</tr>
<tr>
<td>#RO2567 - LIGHTNING NUBUS</td>
<td>$745</td>
</tr>
<tr>
<td>#RO2722 - PAINTBOARD PRIS</td>
<td>$995</td>
</tr>
</tbody>
</table>

## Memory

### DIMMS

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>128MB 60NS</td>
<td>$1312</td>
</tr>
<tr>
<td>64MB 60NS</td>
<td>$480</td>
</tr>
<tr>
<td>32MB 60NS</td>
<td>$210</td>
</tr>
<tr>
<td>16MB 60NS</td>
<td>$99</td>
</tr>
<tr>
<td>8MB 60NS</td>
<td>$49</td>
</tr>
</tbody>
</table>

### 72-PIN SIMMS

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32MB 60NS</td>
<td>$220</td>
</tr>
<tr>
<td>16MB 70/60NS</td>
<td>$106/109</td>
</tr>
<tr>
<td>8MB 70/60NS</td>
<td>$49/52</td>
</tr>
<tr>
<td>4MB 70/60NS</td>
<td>$25/26</td>
</tr>
</tbody>
</table>

### 30-PIN SIMMS

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>16MB 70NS</td>
<td>$150</td>
</tr>
<tr>
<td>8MB 70NS</td>
<td>$78</td>
</tr>
<tr>
<td>4MB 80/70NS</td>
<td>$33/34</td>
</tr>
<tr>
<td>4MB PAL FOR II/IIIX60</td>
<td>$26/28</td>
</tr>
</tbody>
</table>

## PC SIMMS

### 9-BIT

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 PIN 4MB 70NS</td>
<td>$45</td>
</tr>
<tr>
<td>30 PIN 1MB 70NS</td>
<td>$15</td>
</tr>
</tbody>
</table>

### 36-BIT/32 BIT

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32MB 70NS/EDO</td>
<td>$250/249</td>
</tr>
<tr>
<td>16MB 70NS/EDO</td>
<td>$169/120</td>
</tr>
<tr>
<td>8MB 70NS/EDO</td>
<td>$72/58</td>
</tr>
<tr>
<td>4MB 70NS/EDO</td>
<td>$49/40</td>
</tr>
</tbody>
</table>

## 64-PIN SIMMS

### FOR IIFX

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>16MB70NS</td>
<td>$179</td>
</tr>
<tr>
<td>8MB 70NS</td>
<td>$110</td>
</tr>
<tr>
<td>4MB 70NS</td>
<td>$59</td>
</tr>
</tbody>
</table>

## Electronic Orders:

- E-Mail: 73423.1272@Compuserve.com
- FREE CATALOG: 1.800.848.8967

- PO's are accepted upon approval.
- All major credit cards accepted & charged when order is shipped.
- No surcharge on charge cards.
- Prices subject to change, not responsible for errors.
- We welcome International orders.
- Orders received before 8:00pm EST weekdays shipped same day.
- Open 6am to 7pm Mon-Fri 9am to 4pm PST
- Returns subject to a 15% restocking fee.

The LLB Co., Inc.
13228 NE 20th St., Ste. B
Bellevue, WA 98005

International: 206.746.0229
Fax: 206.746.5168
The digital photographer's DREAM bundle!

UMAX PowerLook II with Photoshop 4.0 full version

ONLY $1399
#83509

FREE Performance EZ 135MB Cartridge when you purchase any FreeHand product from this page!

Macromedia FreeHand 7 Version Upgrade

Features comprehensive design tools, multi-page layout, extensive special effects, full-color auto-trace, open architecture for plug-in Xtras, superior performance in print and on the Web, and more.

ONLY $1499
#81018

FreeHand Graphics Studio 7 Version Upgrade

Get a complete design solution for only $50 more than the price of the FreeHand 7 Upgrade!

ONLY $198
#81014

EXCLUSIVE! SAVE $574 on our super-cool multimedia bundle!

YOU GET:
- QuarkXPress 3.3
- Quarklndd
- Strata MediaPaint
- Strata Vision 3D 4.0
- Strata VideoShop 3.0
- Aura Multimedia Music Library

ONLY $998
#76217

Upgrade today and get connected tomorrow!

Mac OS® 7.5 to 7.6 Upgrade with Apple Internet Connection Kit 1.2

ONLY $68
#80148

Big Storage Solutions in Portable Sizes!

Iomega Jaz® Drive

- Super-fast 5.4MB/sec transfer rate and 12ms access time
- Each cartridge provides 1GB space
- Weighs a mere two pounds
- Rated most reliable in its class

ONLY $499
#29569

Iomega Zip Drive

- Unlimited storage on portable, inexpensive 100MB cartridges
- Super-easy to connect and setup
- Software to help you track, find and organize everything
- 100% Mac OS compatible

NEW LOW PRICE! ONLY $149
#91825

100MB cartridge included! with tools & utilities

GREAT PRICES on Cartridges too! Call us for more info!

122 MacUser / MAY 1997
Complete Solutions
FOR GRAPHICS PROFESSIONALS

ENTRY LEVEL

MID RANGE

HIGH END

We Carry the Full Line of Apple® Macintosh Computers

- Over 6000 Products to Choose From!
- Cool Bundles and Hot Specials!
- Low Prices Everyday!
- Overnight Delivery only $3 (up to 2 lbs)

Authorized Catalog Reseller

Overnight Delivery only $3 (up to 2 lbs)

Perfect for desktop publishing!

StarMax 3000DT with ViewSonic 17GS
- 180MHz PowerPC® 603e processor
- 16MB RAM, exp. to 160MB
- 256K Level-2 RAM cache
- 1.2GB IDE hard drive
- 8X speed CD-ROM drive
- 3 PCI expansion slots
- 2 ext. drive bays, 1 internal
- 33.5 Kbps ext. Faxmodem

ViewSonic 17GS Display
- 17" display, 16.0" viewable image
- 27mm aperture grille pitch
- 1152x870 max resolution at 75Hz
- TCO, MPR II and Energy Star® compliant

Ideal for digital photography and illustration!

PowerTower 604 with MultiScan 300sf
- 180MHz PowerPC® 604 processor
- 16MB RAM and 2MB VRAM
- 512K L2 RAM cache
- 20" display, 19.0" viewable image size
- 30mm aperture grille pitch

Sony MultiScan 300sf Display
- 1280x1024 maximum resolution at 80Hz
- TCO, MPR II and Energy Star® compliant

The ultimate multimedia powerhouse!

SuperMac S900L with Radius PrecisionView 21
- 200MHz PowerPC® 604e processor
- 32MB RAM, max 1GB!
- 512K L2 RAM cache
- 20" display, 19.0" viewable image
- 30mm aperture grille pitch

Radius PrecisionView 21 Display
- 1600x1200 maximum resolution at 69Hz
- TCO, MPR II and Energy Star® compliant

Call us for expert help with your purchase!

MEMORY PRICES HAVE NEVER BEEN LOWER!
Call today for current RAM pricing.

ORDERING FROM THE MAC ZONE IS EASY!

VISIT us @ www.maczone.com
or @ CompuServe, just GO MZ
FAX your order to 206.430.3500
CALL US TOLL-FREE! 1·800·436·8000
FREE CATALOG!

10,000 HOT PRODUCTS
24 HRS A DAY!

FREE!! Technical Support!
FREE!! System Customization Overnight!
FREE!! Catalog Subscription!
FREE!! Memory Installation Offer!

MORE!! Exciting Bundles!!
MORE!! Hot New Products!!

ALWAYS!! Open! 24 hrs. a day
ALWAYS!! Available! Knowledgeable sales reps ready to help you.

Best Mail-Order Company!!

MacConnection was awarded "Best All Around Company" for the second year in a row by The Boston Computer Society!!

OUR POWER!... Via MasterCard, American Express, and News Corp.

THEY SAY REACTIONS:
"A terrific mail-order company that has always answered my questions. They know what they're doing. I never have any problems. They are a pleasure to deal with and I couldn't ask for better service."

"I have never had a problem with MacConnection. Their customer service is excellent. They are fast, their prices are competitive, and they will even adjust their prices for you if you call them."

"MacConnection is first in my list of mail-order companies. I have been dealing with them for over three years and they have always been fast and courteous. They have a great price policy and take the Live Pay policy of Apple to heart."

"MacConnection is by far the best mail-order company I have ever dealt with. Their prices are very competitive and they deliver fast."

"I have been a satisfied customer of MacConnection for over three years and I have always been impressed with their service, their prices, and their knowledge of the products they sell."

THE 24 HOUR HOTLINE!... 1-800-852-8262

Customer Service Hours: 8:00 a.m. - 10:00 p.m. Eastern Sun-Thur.
8:00 a.m. - 6:00 p.m. Eastern Fri-Sat

Visit our web site at: http://www.maccnct.com
Free UPS Shipping When You Order Online http://www.blol.com/

Iomega Zip Drive
$139.00* 

Zip Internal 3.5" ................................................... 149* 
100MB Zip Disk 10-Pack ...................................... 119* 
Jaz Drive External ...................................................... 479 
MagicJaz Drive External ......................................... 489 
Jaz Drive Internal ....................................................... 889 
Zip Internal Mounting Kit ..................................... 99* 
1GB Jaz Disk .............................................................. 99 
1GB Jaz Disk 5-Pack ................................................. 479* 
*Price after Iomega Mail-In Rebate

Zip Disk 100M8 Zip Disk Pack ...................................... 53/86
1G8 Jaz Disk .................................................................... 99

16MB DIMM...$96

64MB DIMM...$356!

SRAMS

RAM Prices are on the way up! Call today for current prices.

2MB/8MB 72 Pin SIMMs ........................................ 36/56
1MB/2MB 72 Pin SIMMs ..................................... 76/76
8MB/16MB 168 Pin DIMMs .................................... 136/136
32MB/64MB 168 Pin DIMMs ................................ 186/186
256k/512k Cache PCI ............................................. 96/136

128k Cache PCI $11/2100 ....................................... 33.95

32k 16M Cache Starmac/PowerTools ........................ 25.95
32k 512k Cache Starmac/PowerTools ..................... 159
3.3v 4MB SGRAM Module ........................................ 199

High Quality Memory for PowerMac

Performa

$6960/160...$1169

Performa

Monthly Specials

3-Port Serial Switch Box ........................................... 33.95

Kodak DC25/50 Digital Camera .............................. 470/670

Compaq 4503 T/B/R/Sb/1/2/CD .................. 219.95

9.1 13/16" 320/2/CD ........................................... 219.95

1GB 7800/130 16/2.4/CD ...................................... 329.95

Apple 20/200 32/2/CD ........................................... 329.95

PowerTools DryLab ................................................. 199

PowerTools Infral ...................................................... 409

PowerTools Infral 42000 ......................................... 1599

Same price, cash or credit!

Same or Lower, Call for RMA

Texas residents add 8.25% sales tax. Prices subject to change. Call for RMA number. Must be in original condition, opened software is non-refundable. Subject to a restocking fee. Original packing is non-refundable. Apple brand products are not returnable for refund. Bottom Line Distribution cannot be held responsible for errors in typography or photography. Customer Service: 512-892-4009, International Sales: Bottom Line Distribution is committed to the needs of international Macintosh users. We offer discounted rates with 3 to 5 day delivery to most countries. Dealer inquiries welcome. Language interpreters available. Address: 454 S. Lamar Blvd., #100, Austin, TX 78745 Tel: 512-892-4405, Fax: 512-892-4406. 

CIRCLE 19 ON READER SERVICE CARD

A Great Review is Worth Repeating

Almost nothing influences buyers in the computer market as much as a great product review, particularly one in MacUser. That's because computer product buyers rely on these reviews to help them make informed purchase decisions. They know that our labs, writers and editors can be trusted to be thorough, fair and impartial in their testing and reporting. For a computer product marketer a great review is almost priceless.

Its Value Increases With Use

Reprints of your review are an invaluable sell-
Premier Classified

HARDWARE
Bar Coding 135
Boards/Components/Chips 127 135
CD-Rom 136
Computer Systems 128 137
General 127
Input/Output Devices 127
Multi-Media 130
Peripherals 130
Powerbook Products 133
SOFTWARE
Bar Coding 130 144
Business 145
CAD/CAM 145
CD-Rom 145
Communications/Networking 133 144
Education 134 144
Entertainment/Games 134 152
Foreign Languages/Translation 134 152
Graphics/Fonts 145
Programming Tools/Languages 145
Scientific/Engineering 145
Security 148
Adult 148

ACCOUNT REPRESENTATIVES
Massimo Bufalini 212-503-5941
Southwest 212-503-5941
Eric Birnbbaum 212-503-5043
Midwest 212-503-5043

CENTRAL ADVERTISING STAFF
Robert A. Bader 212-503-3802
Vice President, Central Advertising
Annuradha Kumar 212-503-3802
Director, Sales & Marketing
Lisala Beatty 212-503-5153
Alexandra D'Anna 212-503-5023
Central Sales Manager

AD SALES INFORMATION
One Park Avenue, Third Floor
New York, NY 10016
(212) 503-5115 or (800) 825-4ADS
David S. Martinez Debra Barrie
Sr. Production Coordinator Sr. Advertising Coordinator

PERIPHERAL ENHANCEMENTS CORPORATION
WORLDWIDE MEMORY MANUFACTURERS
800/640-0733

Founded in 1986, Peripheral Enhancements Corporation, formerly Peripheral Outlet, Inc., is a leading worldwide manufacturer of computer memory upgrades. Our ten-year relationship with our customers is one built on mutual trust and respect. You have no time for problems: that's why our salespeople don't make promises unless they can deliver. Top quality memory, delivered on time, at affordable prices, are the cornerstones upon which Peripheral builds its relationships.

Unsurpassed Technical Support. The Peripheral Enhancements Corporation tech support team stays abreast of the changing memory business, offering reliable, informed answers to your questions. Our easy-to-follow instructions are available with each shipment. Technical assistance calls are toll free!

Lifetime Warranty. Peripheral stands behind every product we sell. We test each and every module prior to shipping. If a problem ever arises with a part, send it back for prompt repair or replacement, often performed within 24 hours of our receiving the part from you.

100% Reliability. Our buyers source top-quality components worldwide and build modules with quality unsurpassed in the industry. Every memory module sold meets or exceeds all original equipment manufacturers specifications.

Aggressive Pricing. Peripheral sells millions of dollars in upgrades every week. Our consistent buying in large quantities assures you a competitive price, every time you order. Order by 6:00 PM CST for same day shipping. , Overnight delivery from $8.00

Visit our Web site at www.peripheral.com

Call toll free 1-800-258-2622
or 405-332-6581
Fax: 405-436-2245
sales@Peripheral.com

HOURS: Monday-Thursday 6AM-7PM, Friday 6AM-6PM CST

CIRCLE 171 ON READER SERVICE CARD

Mariner Write
...the word processor for the rest of us.

Mariner Write has all the features and speed you want from first-class word processing software, but uses about half the memory and disk space of its closest competitor.

Download a fully functional Mariner Write demo at www.marinersoft.com

$69.95 list!

Call toll free 1-888-617-4637
or 502-222-6695

"Mariner Write is software worth treasuring" —MacUser

- Low memory footprint: 1.298K for Macs and 1.850K for PowerMacs. Full install less than 2MB!
- MacLin Plus-X filters let you open and save in Microsoft Word, DBaseW, WriteNow, and WordPerfect formats.
- WorldScript and AppleScript savvy.
- Import EPS, PICT, JPEG or GIF graphics as objects or characters... text wrap tool.
- Ten levels of undo.
- Dynamic and accelerated scrolling.
- 80,000+ word spelling dictionary.
- Actual fonts in menu.
- Styles sheets and columns.
- Page view option and print preview.
- Footnotes and Endnotes.
- OnCall ClubMac

1-800-258-2622

MAY 1997 / MacUser 127
MacUser  MARKETPLACE

POWERtools

Base Systems 0 / 0 / floppy
Start Here

3180 603e/180  $999
3200 603e/200  $1099
3240 603e/240  $1299
4200 604e/200  $1499

Add a Bundle

NEW!

infiniti series PowerMac Clones
for Digital Desktop Video Production:

3200 dVp
603e/200 processor
32MB RAM
3.2GB super-fast drive
1.44 supper floppy drive
Miro Motion DC-20 Card
8X CD
512k L2
4MB VRAM
ADB KB & Mouse
Mini-Tower Case
$2299

4200 dVp
604e/200 processor
32MB RAM
3.2GB super-fast drive
(2) 2.1GB barracuda drives
fast-wide SCSI PCI card
8X CD
512k L2
4MB VRAM
ADB KB & Mouse
Miro Motion DC-20 Card
ADB KB & Mouse
Mini-Tower Case
$4499

All infiniti series computers can be upgraded
to faster processors and even CHP!

Ask about motherboard upgrades for all
StarMax and M-Power computers!

tel: 800-891-4307
512-891-0646

fax: 512-476-6399
Email: sales@pwrtools.com
url: www.pwrtools.com

SMART BUNDLE
$500
16MB RAM
2.5GB Hard Drive
8X CD Rom
2MB VRAM
256k L2 Cache
ADB KB & Mouse

PRO BUNDLE
$950
32MB RAM
3.2GB Hard Drive
8X CD Rom
2MB VRAM
512k L2 Cache
ADB KB & Mouse

ELITE BUNDLE
$1499
32MB RAM
3.2GB Hard Drive
8X CD-Rom
4MB 3D Video Card
2MB VRAM
512k L2 Cache
ADB KB & Mouse
100-Base-T Ethernet
33.6 Fax / Modem

SERVER BUNDLE
$2175
32MB RAM
3.2GB Hard Drive
8X CD Rom
2MB VRAM
512k L2 Cache
ADB KB & Mouse
AppleShare 4.0.2

128 MacUser / MAY 1997
**Run Your Mac Faster and Save!**

**Accelerate Mac LC, LC II, Color Classic, Iicci, Illsi, Ilvx, or Performa 600 to '040 Speed Starting at $199**

Sonnet Presto™ LC 604 50/25 MHz accelerators increase Mac LC, LC II or Color Classic performance 470% as fast as a stock machine (processor performance, MacBench2). Use RAMDoubler or Virtual Memory to break the 10MB barrier with the Presto LC (except Mac LC, OS 7.1+req’d). The Presto LC is only $199, or with hardware Floating Point Unit (FPU) $249.

The 80/40MHz version for the Mac Iicci, Illsi, Illvx, or Performa 600 increases processor performance by 250-500%. The 80/40 MHz Presto is only $299, or with FPU and 128K level 2 cache, $399.

All Prestos are 100% application software compatible and run through System 7.5.5*. The Prestos are easy to install in the Mac’s processor direct slot, and come with clear installation instructions. (* Some configurations are not compatible with RAMDoubler or Virtual Memory. Adapter req’d for some.)

**Upgrade Your PowerBook 520/540 to 100MHz 603e with 8MB Memory for $399**

This is the genuine Apple computer upgrade product designed to bring your trusted PowerBook 520 or 540 into the PowerPC generation with a speedy 100MHz 603e PowerPC processor. With this upgrade you can run all native PowerPC applications the way they were meant to be. Upgrade your reliable Ethernet-equipped PowerBook to PowerPC, and prepare for the MacOS future. The upgrade includes 8MB of memory and is compatible with your existing RAM expansion board. *Price after a $100 discount for trade-in of your existing 68LC040 card.

**Run the Fastest Quadra Ever! 100/50 MHz is Faster than 840AV**

Plug the Sonnet QuadDoubler™ into a Quadra 610, 660av, 700, 900, or Centris 610*, 660av, 650 and run virtually twice as fast as before for only $399. No software upgrades or changes are required. Just plug the QuadDoubler into your CPU socket and power up your Mac. A CPU extraction tool is even included to simplify installation. The QuadDoubler includes a Floating Point Unit for superfast rendering or calculations. A cache card is also available for the Quadra 700/900 for even more performance. *The Centris 610 QuadDoubler runs at 80/40 MHz and is value-priced at $299 (without FPU $199).

**Add Math Coprocessor to 68040 Macs & PowerBooks**

Give your Quadra, Centris, or PowerBook 520/540 a math coprocessor for rendering, Photoshop, CAD, or other Math intensive applications. 25MHz 68040 $125*, 33MHz 68040 with heat sink $169*. Add a full 66/33MHz 68040 with FPU to your PowerBook 520 or 540 for $199*. This upgrade also speeds 520 to 66/33MHz 540 performance. Call for PB190, Duo280 or 68882 FPU. *68LC040 trade-in req’d.

**IMS Twin Turbo**

Accelerate graphics 270% in a PCI Power Mac with the fastest video accelerator. Scroll faster. Increase the speed, color depth and resolution on your big monitor. With 4MB/8MB VRAM... $399/699

**We Are Cache Kings**

We build 'em & will not be undersold! 256K-6100/7100/7200/7500... $40 512K-7275/76/85/8600...... $99 IM-7275/76/85/8600...... $199 256K-5260/5400/6360/6400... $99 512K-5260/5400/6360/6400... $149

**Run Faster!**

512K-7275/76/85/8600...... $199

**We Are Cache Kings**

We build 'em & will not be undersold! 256K-6100/7100/7200/7500... $40 512K-7275/76/85/8600...... $99 IM-7275/76/85/8600...... $199 256K-5260/5400/6360/6400... $99 512K-5260/5400/6360/6400... $149

**Run Faster!**

Sonnet Presto™ LC 604 50/25 MHz accelerators increase Mac LC, LC II or Color Classic performance 470% as fast as a stock machine (processor performance, MacBench2). Use RAMDoubler or Virtual Memory to break the 10MB barrier with the Presto LC (except Mac LC, OS 7.1+req’d). The Presto LC is only $199, or with hardware Floating Point Unit (FPU) $249.

The 80/40MHz version for the Mac Iicci, Illsi, Illvx, or Performa 600 increases processor performance by 250-500%. The 80/40 MHz Presto is only $299, or with FPU and 128K level 2 cache, $399.

All Prestos are 100% application software compatible and run through System 7.5.5*. The Prestos are easy to install in the Mac’s processor direct slot, and come with clear installation instructions. (* Some configurations are not compatible with RAMDoubler or Virtual Memory. Adapter req’d for some.)

**Upgrade Your PowerBook 520/540 to 100MHz 603e with 8MB Memory for $399**

This is the genuine Apple computer upgrade product designed to bring your trusted PowerBook 520 or 540 into the PowerPC generation with a speedy 100MHz 603e PowerPC processor. With this upgrade you can run all native PowerPC applications the way they were meant to be. Upgrade your reliable Ethernet-equipped PowerBook to PowerPC, and prepare for the MacOS future. The upgrade includes 8MB of memory and is compatible with your existing RAM expansion board. *Price after a $100 discount for trade-in of your existing 68LC040 card.

**Run the Fastest Quadra Ever! 100/50 MHz is Faster than 840AV**

Plug the Sonnet QuadDoubler™ into a Quadra 610, 660av, 700, 900, or Centris 610*, 660av, 650 and run virtually twice as fast as before for only $399. No software upgrades or changes are required. Just plug the QuadDoubler into your CPU socket and power up your Mac. A CPU extraction tool is even included to simplify installation. The QuadDoubler includes a Floating Point Unit for superfast rendering or calculations. A cache card is also available for the Quadra 700/900 for even more performance. *The Centris 610 QuadDoubler runs at 80/40 MHz and is value-priced at $299 (without FPU $199).

**Add Math Coprocessor to 68040 Macs & PowerBooks**

Give your Quadra, Centris, or PowerBook 520/540 a math coprocessor for rendering, Photoshop, CAD, or other Math intensive applications. 25MHz 68040 $125*, 33MHz 68040 with heat sink $169*. Add a full 66/33MHz 68040 with FPU to your PowerBook 520 or 540 for $199*. This upgrade also speeds 520 to 66/33MHz 540 performance. Call for PB190, Duo280 or 68882 FPU. *68LC040 trade-in req’d.

**IMS Twin Turbo**

Accelerate graphics 270% in a PCI Power Mac with the fastest video accelerator. Scroll faster. Increase the speed, color depth and resolution on your big monitor. With 4MB/8MB VRAM... $399/699

**We Are Cache Kings**

We build 'em & will not be undersold! 256K-6100/7100/7200/7500... $40 512K-7275/76/85/8600...... $99 IM-7275/76/85/8600...... $199 256K-5260/5400/6360/6400... $99 512K-5260/5400/6360/6400... $149
**Stop Pentium Chip Theft With The CoverLock™**

- **Locks CPU Case/CD ROM/Floppy Drive**
- Prevents Pentium processor and memory chip theft
- Secures all internal components
- Universal – Fits most CPU Models
- Locks in CD ROMs
- Optional security cable available to lock down equipment
- Locks available keyed alike, keyed differently, or master keyed
- Lifetime warranty on all components

**Quick And Easy To Install!**

Suggested Retail Price $29.95

Order now — Call 800-451-7592...

10 Maple Court, East Longmeadow, MA 01028, USA  phone 413-525-7039
FAX: 413-525-8807 EMAIL: secure-it@com.com INTERNET: http://www.secure-it.com

©1996 Secure-It, Inc.

---

**INTELLIGENT MEDIA**

Los Angeles’ leading High-End System Integrator configures new and existing systems for blazing Digital Video Animation & Graphic Design

800 DO MY MAC

**Digital Video Editing**

Turnkey pre-configured and tested Workstations

- Media 100 qx w/PowerMac 7300/180/48MB RAM/20GB HD/12XCDROM $5999
- Media 100 qx Component w/PowerMac 1600/200/64MB RAM/6GB/12XCD-ROM $8777
- Media 100 LE V3.0 1600/200/96MB RAM/6GB/12X-CD-ROM $8999
- Media 100 LX v3.0 1600/200/4GB/12X-CD-ROM $12799

All Workstations based with Adobe Premiere and Pipeline Digital PostVR

**Media 110LE LX, LE X & 15 available in St. Csl only.**

- Targa 2000 PCI w/PowerMac 7600/160/48MB RAM/2GB/12XCD-ROM $5799
- Targa 2000 Pro PCI w/640/200/6GB/12XCD-ROM $7777

**Video/Video**

- Ultra Vision PCI 7300/160-48MB RAM/3GB HD/12X-CD-ROM $6119

All Workstations based with Ultra Vision PCI

**Ultra SCSI**

- Intelligent Media 8GB Ultra Wide Array incl. Adapter/Ramos $2799
- FWB Sledgehammer 17400-Differential 17 GB Array/Single Channel $5277
- Micronet Data Dock Removable 17GB Array/Multi-Channel $5799

**Build Your Own Box with us**

- IM optimizes killer MAC systems
- 3-D/Motion Graphics/Compositing
  - Adobe After Effects Production Bundle $1599
  - MetaTools Final Effects/Studio Effects $499
  - Lightwave 3DMac $1299
- Call for Special Educational Pricing

Prices subject to change without notice.

Delivery subject to availability.

---

**COMPAQ**

L2 Cache

- 256k - 61/71/81/85 $25
- 256k - 72/75/85/89 $49
- 512k - 72/75/85/89 $99

VRAM

- 1MB DIMM 72/75/85/89 $25
- 4MB DIMM 72/75/85/89 $49
- 8MB DIMM 72/75/85/89 $99

---

**POWERBOOK RAM**

- 4 MB - $9
- 8 MB - $18
- 16 MB - $32
- 32 MB - $62
- 64 MB - $129

**MITSUBISHI**

- 256k - 61/71/81/85 $25
- 512k SIMM 61/71/81 $49

---

**SIMMS**

- 4 MB - $4.99
- 8 MB - $6.65
- 16 MB - $4.15
- 32 MB - $20.09
- 48 MB - $37.99

---

**Stop Pentium Chip Theft With The CoverLock™**

- Locks CPU Case/CD ROM/Floppy Drive
- Prevents Pentium processor and memory chip theft
- Secures all internal components
- Universal – Fits most CPU Models
- Locks in CD ROMs
- Optional security cable available to lock down equipment
- Locks available keyed alike, keyed differently, or master keyed
- Lifetime warranty on all components

**Quick And Easy To Install!**

Suggested Retail Price $29.95

Order now — Call 800-451-7592...

10 Maple Court, East Longmeadow, MA 01028, USA  phone 413-525-7039
FAX: 413-525-8807 EMAIL: secure-it@com.com INTERNET: http://www.secure-it.com

©1996 Secure-It, Inc.

---

**INTELLIGENT MEDIA**

Los Angeles’ leading High-End System Integrator configures new and existing systems for blazing Digital Video Animation & Graphic Design

800 DO MY MAC

**Digital Video Editing**

Turnkey pre-configured and tested Workstations

- Media 100 qx w/PowerMac 7300/180/48MB RAM/20GB HD/12XCDROM $5999
- Media 100 qx Component w/PowerMac 1600/200/64MB RAM/6GB/12XCD-ROM $8777
- Media 100 LE V3.0 1600/200/96MB RAM/6GB/12X-CD-ROM $8999
- Media 100 LX v3.0 1600/200/4GB/12X-CD-ROM $12799

All Workstations based with Adobe Premiere and Pipeline Digital PostVR

**Media 110LE LX, LE X & 15 available in St. Csl only.**

- Targa 2000 PCI w/PowerMac 7600/160/48MB RAM/2GB/12XCD-ROM $5799
- Targa 2000 Pro PCI w/640/200/6GB/12XCD-ROM $7777

**Video/Video**

- Ultra Vision PCI 7300/160-48MB RAM/3GB HD/12X-CD-ROM $6119

All Workstations based with Ultra Vision PCI

**Ultra SCSI**

- Intelligent Media 8GB Ultra Wide Array incl. Adapter/Ramos $2799
- FWB Sledgehammer 17400-Differential 17 GB Array/Single Channel $5277
- Micronet Data Dock Removable 17GB Array/Multi-Channel $5799

**Build Your Own Box with us**

- IM optimizes killer MAC systems
- 3-D/Motion Graphics/Compositing
  - Adobe After Effects Production Bundle $1599
  - MetaTools Final Effects/Studio Effects $499
  - Lightwave 3DMac $1299
- Call for Special Educational Pricing

Prices subject to change without notice.

Delivery subject to availability.
DV-Max® FireWire Digital Editing

Non-Linear Digital Video Editing System With Real-Time Decode/Encode


DV Workstation For Macintosh: See at NAB '97 Booth #M8329

Power Macintosh: 9600-233-56-4000-12x3D + 4 MB RGB Display Card + 17” RGB Monitor + Extended Keyboard and Mouse + S-Video UltraScsi Disk Array + DV-Max PCI Card + Adobe Premiere + Digieffects Mac System $11595

DV-Max Workstation For Windows NT: Delivery June, 1997

Pro-200 Jr Tower + 64 MB EDO + 2 GB EIDE + 4 MB ISA Display Card + 17” RGB Monitor + 1x CD-ROM Drive + Floppy + Extended Keyboard and Mouse + AT 40 + 9GB UltraScsi Drive + Adaptive 256MB Adapter + DV-Max PCI Card + Adobe Premiere + Power GS by Cymation + Vortex by Crystal + Flying Fonts

Windows NT System 10595

Sony DV Camera, DV Deck, and NTSC Studio Monitor: Sony PCM-1541NTSC Monitor + Sony DSR-200 DV Camera Added Components Sony PCM-1541NTSC Monitor $10595

Video Disk Storage

Macintosh or Window NT

Data Storage

3 Bay High Performance 10” Rack Mountable Arays
Red Swappable Fans and Load Sharing Power Supplies

16 GB UltraScsi RAIDrack Dual SCSI Gen-3 Shelves $9995
36 GB UltraScsi RAIDrack Dual SCSI Gen-3 Shelves 12995
72 GB UltraScsi RAIDrack Dual SCSI Gen-2 Shelves 29995
36x RAd/recks to 144 GB 7200 RPM UltraScsi Drives 8995

UltraScsi/Makes Video at 300 MB PFE Easy

ProMax on Approved List of FAST, Media 100, Previews, and Audio

4 GB Wide-40 UltraScsi (MAXS MAXC Gen-3 Shelves) $1195
4 GB Wide-40 UltraScsi (MAXS MAXC Gen-2 Shelves) 2395
8 GB Wide-40 UltraScsi (MAXS MAXC Gen-3 Shelves) 4495
8 GB Wide-40 UltraScsi (MAXS MAXC Gen-2 Shelves) 8995

Pinnacle 4.6 GB Optical Drive

Apex 4.6 GB System with Cache Media: 4.6 GB 1 Pack 1045 + 5 Pack 9729

Sony SDX-300C AIT Backup System

High Speed Fast/Wide SCSI-2 Interface • Optional Adapter: 2940W SCSI Host Adapter and Cable $95

Sony SDX-300C Backup System With Terabyte Software and AIT Blank Tape - 25 to 50 GB up to 300 MB minutes

Sony SDX-TAN AIT Blank Tape Cartridge - 25 to 50 GB of Storage Space + 1 Pack $95 + 5 Pack $490

Call 1-800-977-6629 • 7 to 6 M-F Pacific Time • Credit Cards Accepted

We Ship by Federal Express All Over The World and Offer Expert Technical Assistance

ProMax Technology

16 Technology Drive - #105 • Irvine, California 92618
(714) 727-3977 • DALLAS: 1-900-773-9324 • TEL: 800-773-9324
May 1997 / MacUser
**COMPUTER SYSTEMS**

**7200 120MHz/16MB/1.2GB/8XCD/1 MBVR................$1,299.00**

**7600 132MHz/16MB/1.2GB/8XCD/2 MBVR...............S1,349.00**

**9500MP 180MHz/32MB/2.0GB/8XCD/ .......................S3,599.00**

**L1J**

**4400 200MHz/16MB/2.0GB/8XCD/KYBD..................S1,599.00**

**7300 180MHz/16MB/2.0GB/12XCD/KYBD ................ S1,999.00**

**8600 200MHz/32MB/2GB/12xCD..............................$2,869.00**

**PERFORMAS**

**PERFORMA 6400**

- Power PC 603e 200MHz
- 16MB Memory
- 1.8GB HD
- 28.8Kbps Modem
- Software bundle

For Only $1,149

**APPLE SERVERS**

7250/120MHz
- 16MB/2.0GB/8XCD/256k-L2
- Ethernet AUI and 10baseT
- More than $400 in bundled Software.

For Only $1,699

**MEMORY**

**16 MB**

- PowerBook 17" "1400cs

**PRINTERS**

**Color StyleWriter 2500**

For Only $299

**INSIDE**

- Apple Color StyleWriter 1500...
- Color Laserwriter 4500...
- Color Laserwriter 5500...
- Color LaserJet 4500...

- DeskJet 870C...
- DeskJet 870C Plus...

- Epson Stylus Color 2000...
- Stylus Color 2000 Plus...

- Phaser 550...
- Phaser 550 Plus...

**MIDIM**

- 8 Megabytes...
- 16 Megabytes...
- 32 Megabytes...

- Apple Macintosh 15...
- Macintosh II...
- Macintosh IIci...
- Macintosh 20...

- Sony 100SX 15...
- 100SX 20...
- 2005X 17...
- 2005X 20...

**APPENDIX**

Apple Share Server Solution
- Apple Color One...
- Apple Color Laser...
- 3.6GB Int. HD...

**Apple**

- Agfa Sculpey...
- StudioScan...
- Arcus II...

**IOMEGA ZIP DRIVE**

For Only $133

- Iomega Drive...
- Syquest/Microtech Drive...

**MONITORS**

- Apple 15AV...
- Quark Xpress V3.32

**SOFTWARE**

- Apple...
- Adobe Systems...
- PageMaker...

**SCANNERS**

- Apple Color Scanner E4...
- Microtek ScanMaker E6...

**STORAGE**

- Sony...
COMMUNICATIONS/NETWORKING/PERIPHERALS/POWERBOOK PRODUCTS

Finally! Windows 95 and Macs Share Files and Printers Both Ways

Workgroups and small offices can now operate as efficiently as an enterprise with PC MACLAN for Windows 95. Low cost, plug and play installation, Network Neighborhood and long file name support, are just a few of the features that make sharing files, volumes and printers between Macs and PCs a snap.

"For peer-to-peer networking... PC MACLAN 6.0 is the only choice."

-November, Macworld

Create your own network or complement almost any pre-existing LAN. Sharing information between Windows 95 and Macintosh users is as easy as working off your local hard drive. Print jobs go to the printer of your choice regardless of its location on the network.

For ordering or information:
800-862-2526
e-mail: sales@miramarsys.com
Web: www.miramarsys.com

Visit us at: Seybold NY Booth #1332

PowerBook® Solutions
3400 Series PowerBook Accessories

VST Technologies is proud to announce our newest line of accessories for the PowerBook 3400. Once again VST has all the mobile solutions to make your PowerBook truly portable.

Visit our
Web site
http://www.vsttech.com

VST Technologies Incorporated
125 Nago Park • Acton, Massachusetts 01720
(508) 263-9700 • Fax (508) 263-9876 • http://www.vsttech.com
**VALUE WEB'S HOSTING SERVICE**

**IS THE MOST AFFORDABLE WAY TO PUT YOUR WEBSITE ON THE INTERNET**

- Domain name registration provided (http://www.your_name.com/)
- Access to our SSL secure server
- 13 connection to the internet
- 1000 Mb of data transfer per month
- E-mail forwarding
- Your own FTP account
- Daily tape backup
- Choice of UNIX and Microsoft® Front Page
- Your own CGI-bin directory
- Anonymous Virtual FTP
- 25 Mb of disk space
- Auto E-mail responders
- Detailed web usage statistics
- TrueSpeech® server support included (real time audio)
- Same day setup
- POP3 E-mail accounts

**Ask about our reseller program!**

1-888-WF-E3-HO-ST-7-E-U6

E-mail: sales@valueweb.net • Setup Fee $90-39

www.valueweb.net

---

**Full Color Business Cards & More**

Direct From Your Computer Files, from N0NEG PRESS

Real Offset Printing • Super Premium Card Stock • Professional Look & Feel

FREE File Trapping • 2540 dpi & 200 line-screen • SATISFACTION GUARANTEED

<table>
<thead>
<tr>
<th>No. of Different Sets</th>
<th>750 CARD SETS SHIPPED WITHIN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 Days</td>
</tr>
<tr>
<td>1-2</td>
<td>$99</td>
</tr>
<tr>
<td>3-4</td>
<td>$89</td>
</tr>
<tr>
<td>5-6</td>
<td>$79</td>
</tr>
<tr>
<td>7+</td>
<td>$69</td>
</tr>
</tbody>
</table>

FREE Samples & Info, Call 1-800-369-5706

Internet: http://www.business-card.com

---

**Image Alchemy PS for Macintosh**

- Import/Export
- EPS PDF PostScript
- TIFF GIF PNG PICT JPEG & 75 more
- Image Compression
- 7 different Dithers
- Scaling
- Palette matching
- Color Conversion and much more

Handmade Software, Inc.
1 800 252 0101 • info@handmadesw.com • www.handmadesw.com

---

**VALUE WEB'S HOSTING SERVICE**

**30-Day Money Back Guarantee!**

- Domain name registration provided (http://www.your_name.com/)
- Access to our SSL secure server
- 13 connection to the internet
- 1000 Mb of data transfer per month
- E-mail forwarding
- Your own FTP account
- Daily tape backup
- Choice of UNIX and Microsoft® Front Page
- Your own CGI-bin directory
- Anonymous Virtual FTP
- 25 Mb of disk space
- Auto E-mail responders
- Detailed web usage statistics
- TrueSpeech® server support included (real time audio)
- Same day setup
- POP3 E-mail accounts

Ask about our reseller program!

1-888-WF-E3-HO-ST-7-E-U6

E-mail: sales@valueweb.net • Setup Fee $90-39

www.valueweb.net

---

**The makers of the most powerful printing software in the world...**

**LaserMerge 'Electronic Paper**

now bring you the most powerful & the most easy-to-use printing software in the world...

- Create new paper sizes
- Control tone & a soft light
- Watermarks at any level
- Prevent printing with zoom
- Blacklist with built in 'paper spill'
- Automatically print into one box, basket, or prining
- Print next to PostScript® fonts
- Dump a database through a form
- Formats into: "PDF in the box"
- "Variable data" printing (test & easy)
- Create your own, more fonts
- Never fail up or partition layout
- Smart paper paper
- Print layout, range, color, print
- PS Level 1 terms (oz)
- Print different images for each customer, form, or one print image
- Print lagging with security & access
- Create your fonts from one font
- Simulation
- Sign letters & lines electronically
- Import EPS & PICT images
- Control vertical resolution
- 2048 process test commands & 100 database commands
- You can move, delete, and trim text objects.
- Duplicate each object to make your own authenticate, luminescent, color
- Embedded, named objects, lineart, bitmaps, and more
- Add transparency
- Use autostart,
- Use background,
- Create new background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
- Use background,
Bar Coding

For PC's and Macintosh
- Bar Code Readers
- Portable Readers
- Radio Frequency Readers
- Postscript Bar Code Fonts

Bar Code Readers
- Portable Readers
- Radio Frequency Readers
- Postscript Bar Code Fonts

PowerBook Memory

1400 (16/32/48MB) $139/259/349
5300/500/190
8/16/24/32/MB
180/180C/160C
4/8/10 MB
$119/159/210/259
ALL DUOs

Call us for info

MONITOR SOLUTIONS

http://www.nashville.net/~griffin

MAC SYNC ADAPTER sync on green circuitry allows almost all SuperMac, Radius, RasterOps, E-Machines and most other monitors to be used with PowerMac, PCI cards, and AV models.

MAC RES ADAPTER universal resolution adapter selects the proper resolution for your monitor and allows on-the-fly resolution switching.

MAC II SERIES allows all multiscan monitors, including Apple Multiple Scan 14 and 15 models to be used with the IIci, IIci & Mac II built in video.

MAC TO VGA universal Mac to PC adapter connects any PC monitor to your Mac.

Tel 615/255-0990 • Fax 615/255-8040 • Grifcom@aol.com

MEMORY

FREE Shipping

With On-Line Order

PowerComputing

YOUR MAC ANSWER FOR...

7200+7600+5850+9500 MONITORS • 60 SOFTWARE MONITORS • ALL STORAGE DEVICES

FIBER CANYON

1-800-844-8356
http://www.fibercanyon.com

RAM CHEAP!

THE FINEST QUALITY WITH
- LIFETIME WARRANTY

Zoom

OUR GOAL IS TO BEAT OUR COMPETITOR'S PRICES
CALL US LAST FOR A SPECIAL DISCOUNT!

MEMORY

30 PINS 72 PINS 168 PIN DIMMS

1MB 2MB 4MB 16 MB 32 MB 8 MB 32 MB 64 MB 64 MB

1MB 2MB 4MB 16 MB 32 MB 8 MB 32 MB 64 MB 64 MB

VIDEO RAM

256K SIMMs/DIMMs

512K SIMMs/DIMMs

CACHE CARD

128MB SIMMs

8128 SIMMs

POWERBOOK MEMORY

ALL SERIES AVAILABLE

FIBER CANYON

http://www.fibercanyon.com

RETURN ITEMS ARE SUBJECT TO APPROVAL AND RESTOCK. FEE. PRICES SUBJECT TO CHANGE.

MAY 1997 / MacUser 135
The Lowest Finance Rate Available
FREE Software SuperBundle - $3500 Value

Software SuperBundle - Adobe Premiere, Illustrator, PageMaker, Photoshop, Omni page Professional, DOS Mounter 95 Free with this Ultimate Graphics Workstation.

- External combo drive combo w/3dmax drive, Quantum 1.2, 2GB/3600MB
- DataProduct Typhone 11" x 17" 1200dpi 36MB RAM, printer w/one cartridge and cables
- Active SCSI terminator
- 32/50 SCSI cable, live 50/50 cables
- UPS Battery Back-Up
- Image Solutions Extended Services

Software Specials - MAC & Win.
Adobe Photoshop 4.0/LE $389/399
Adobe Illustrator 5.5/6.0 $199/299
Adobe PageMaker 6.0 $349
Adobe Premiere 1.8/1.4/2 $149/378
Adobe Gallery Effect/Type-On-Cash $33
Care OmniPage Pro/ProDirect $93/393
DOS Mounter 95 $49/520 with Drive
Omni Retrospect 3.8 $59
HSC Live Picture 2.0/2.2 $249/399
Kai’s Power Tools 2/3.0 $30/590
Astarte CDR Toast 5/6 $98
Microsoft Office 4.2.1 CD $249
Quark Express 3.3 $635
FWB H/D or CD-Disk Tool Kit. $29
Fretcal Design Painter v4.0 $275
Fretcal Design Power v2.0 $55
Fretcal Design Gribbler v3.0 $95
Clara Works / Internet Com. $65/353
DeBabler Toolbox v1.6 $245

Scanner
Epson 1000C/33E $580/780
Rollays Scopiro Scopus/Taurus $330/490
Epson 2424/2424T $269/279
Microlab E3/E6 $290/390
UMAX Vista 50/S12 $272/445
Agfa StudioStar / Arcus II $593/1725
Cool Scan/ Super $1149/1489

Memory: Viking, Kingston, Newer Tech. Available

Optical
DSC 10MB $29
DSC 20MB $49
DSC 60MB $69
DSC 1GB $89

Viking Memory
30 pin 2.5" 72 pin 1.8" $29
4MB $29
6MB $49
8MB $69
16MB $119
32MB $185
64MB $379

800-352-3420
Fax: 310-782-5974
Email: imagesol@earthlink.net
http://www.imagesolution.com
385 Van Ness Ave. #110 • Torrance, CA 90501

Software SuperBundle! $399 PER MONTH

UMAX S900/225
Internet Publishing Station

- SuperMac S900/225
- 2MB VRAM Graphics Card
- Internal CD-ROM
- 2.2GB AV internal hard drive
- Extended keyboard
- Support for 17" 200SX multi-sync monitor
- Microlab ScanMaker E3.300 3600 dpi scanner
- Apple Color ImageWriter 2280 (w/ inner card cage and two AppleTalk connectors)
- ISDN digital modem
- Image Solutions Extended Services

System Bundle w/20" monitor, Keyboard, Mouse

Printer
Apple STYW 2500 $349
GCC XL 609, 11x17/229MB $299
GCC XL 1209, 11x17/129MB $299
Typhoon 9.3MB $299
Typhoon16,64MB $399

Modems
Teleport Platinum 33.6 $165
Supra FaxModem 33.3/14.4 $125
USCR SportMaster w/Voice $185
SCCM Impact BSMN $129
Zoom FaxModem $169

U-2M, USCR, FaxModem

800-352-3420
wacom graphics prices

model pm15t .............................................. $419
model pm17t ............................................. $719
model pm17te+ ........................................... $899
model pm20t .............................................. $1599
model pm21t .............................................. $1647
model pm21t+ 25mm dot pitch ....................... $799

wacom accessories

artpad ii 4x5 erasing ultra pen ......................... $139
artpad ii 6x8 erasing ultra pen ......................... $199
artpad ii 12x12 erasing ultra pen & painter .... $439
artpad ii 12x18 erasing ultra pen ....................... $499

we carry all wacom accessories, pens and tablets! there is no one who knows more about wacom!

like this: would you rather order your mac from a telemarketer who has to read a green-lettered screen to find out what “after dark” is, or from a company that provides expertise, opinions and extra information at even better prices?

800-613-2063

call today for your free powermax catalog!

local line: (503) 624-1827 • fax (503) 624-1635

we accept: purchases orders • cd's • all major credit cards • we're also leasing experts!

prices subject to change without notice. prices reflect cash discount.

http://www.powermax.com

e-mail: powermax@europe.com

circle 227 on reader service card

macuser marketplace

section title

call the mac experts!

providing complete macintosh solutions for graphics, pre-press, and video professionals

powermax trinitron monitors

macuser labs says:

a powermax power play “not only do the powermax monitors display good-looking images, but (they) are affordably priced!” and “nice price, nice image quality, nice controls – nice monitor!”

powermax trinitron monitors are designed specifically for the rigorous demands of the macintosh. they ship complete with mac-ready cables and adapters, a three year warranty, and our satisfaction guarantee: if the monitor is not just right, we’ll replace it for you.

model pm15t .............................................. $419
model pm17t ............................................. $719
model pm17te+ ........................................... $899
model pm20t .............................................. $1599
model pm21t .............................................. $1647
model pm21t+ 25mm dot pitch ....................... $799

powermax special

immediate delivery • knowledgeable sales staff • volume pricing • all styles of print and compatible

powermac 7600/120 16/6/gig/cd .................................... $1399
powermac 7600/120 16/6/gig/cd .................................... $1399
powermac 7600/120 16/6/gig/cd ......................... $1399
powermac 7600/120 16/6/gig/cd ......................... $1399
powermac 7600/120 16/6/gig/cd ......................... $1399
powermac 7600/120 16/6/gig/cd ......................... $1399
powermac 7600/120 16/6/gig/cd ......................... $1399
powermac 7600/120 16/6/gig/cd ......................... $1399

wacom graphics

artpad ii 4x5 erasing ultra pen ......................... $139
artpad ii 6x8 erasing ultra pen ......................... $199
artpad ii 12x12 erasing ultra pen & painter ........ $439
artpad ii 12x18 erasing ultra pen & painter ........ $499

we carry all wacom accessories, pens and tablets! there is no one who knows more about wacom!

like this: would you rather order your mac from a telemarketer who has to read a green-lettered screen to find out what “after dark” is, or from a company that provides expertise, opinions and extra information at even better prices?

800-613-2063

call today for your free powermax catalog!

local line: (503) 624-1827 • fax (503) 624-1635

we accept: purchases orders • cd's • all major credit cards • we’re also leasing experts!

prices subject to change without notice. prices reflect cash discount.

http://www.powermax.com

e-mail: powermax@europe.com

circle 227 on reader service card

computer pros

your macintosh source.

we have been advertising for almost five years and could afford to pay for a full page, we’d rather pass the savings on to you.

1-800-329-4mac (4622)

we will beat any competitors price!

international orders (305) 825 9574

web site: http://www.synaptix-inc.com

e-mail: mailman@synaptix-inc.com

800-345-1234

http://www.datamicro.com

dealers • international sales welcome

gold u.s.a. & canada courier • fast service & speedy.
MARKETPLACE
COMPUTER SYSTEMS

CDR/JAZ COMBO
W/4X CDR TOAST & 1 JAZ CART
$1289

Quantum Fireball II
1.25B $250
1.1GB $187
3.2GB $363

Iomega Jaz $439

Extended Warranty

Syquest 200mb

Powerbooks
Performs
410/600/475 Call
500/560/190 Call
580/560/550
620/560/240 $750
700/620/240 $1100
720/620/240 $1550
540/560/240 $1650

Power Macs
Quodras
7200/6000 Call
7500/6000 Call
8500/16000 Call

MacGlobal

Phone: 1-800-772-8864
Fax: (408) 997-1400

Call us!

www.macinstock.com

That's www.macinstock.com
Register for free prizes!
BOOKMARK US NOW
AND CHECK OFTEN!!

954-784-1234
954-784-1232 Fax

1765 Pacific Coast Highway #178
Torrance, CA • 90505
Business or Personal Leasing Available

8128 Paczlcl Cml Highway #178
Torrance, CA • 90505
Business or Personal Leasing Available

Extended Warranty

MAGNETO-OPTICAL DRIVES

Menday & lay 7:10 & 7:00 PM, Saturday 10:00 & 7:00 PM

Power Macs Quodras

Call 650/800/1850 Call
Call 650/800/1950 Call

Printers

Macs

MacMail

CALL NOW
INT'L ORDERS
www.macmail.com

800-MAC-6844
WITH THE LOWEST PRICE EVER!!

WITH THE LOWEST PRICE EVER!

MEMORY

8MB Simm 72 Pin $45
16MB Simm 72 Pin $75
32MB Simm 72 Pin $149
16MB Dimm $572
32MB Dimm $135
64MB Dimm $727
PBOARD MEMORY

SupraExpress 33.6 F/M $90

PERIPHERALS

Iomega Zip 100MB Ext. $198
Iomega Jaz TE Ext. $343
Iomega Jaz 120MB $99
SupraExpress 250MB $528

MacMail

PMACS

MONITORS

PRINTERS

MEMORY

PERIPHERALS

MacMail

Epson

SONY

UMAX

NEC

Apple Multiscan 5" $1379
Apple Multiscan 15" $469
Apple Multiscan 17" $539
Apple Multiscan 20" $729
Apple Multiscan 27" $975
Apple Multiscan 28" $1820

Cyntek Agar II $1188

Iomega Zip 100MB $499
Iomega Jaz 120MB $99
Microtek Scanner 66 $795
HP Laser JET 2P $938

Sony 1000FX 10" $547
Sony 250SX 11" $792

SpectraView 800 6" $1898
Viewsicon TP 770 $749

ScreenTech 725 $795

VIDEO CARDS & ACCESSORIES

Prices - CALL!!

140 MacUser / MAY 1997
POWERMAC 7200/75
LOGIC BOARD SALE
$299
BRAND NEW!

Macintosh
Quadra 950
• 33-MHz CD68040
• 66 configuration
• 1MB VRAM
• 5 NuBus slots
• 16 SIMM sockets
• Two internal bays

Now Only
$1099
Power Macintosh AV Card
Give your 6100, 7100 or 8100 the gift of video. "6100 requires P63 adapter.
2MB AV Card DEMO UNITS ................. $249

Power Macintosh
HPV Card
Orginal Power Macintosh HPV high-performance video card for 6126, 7126 and 8126 series.
"6100 requires P63 adapter (6200 additional).
1MB HPV Card (upgradable to 2MB) DEMO UNITS ....................... $179

Apple TV Tuner System
Intelligent broadcast and capture up to 60 channels.
Macintosh compatible.
Includes Remote Control
DEMO UNITS ................................ $149

WE STOCK MAC PARTS!

1•800•227•3971
For your protection and ours all credit cards accepted, strictly verified.
FAX (318) 459.9771 • Technical Support (318) 445.3797
CUSTOMER SERVICE (318) 459.9771 • PURCHASE INFORMATION (318) 445.9771
1200 MARSHALL STREET • SHREVEPORT, LOUISIANA 71101

CIRCLE 239 ON READER SERVICE CARD

MAY 1997 / MacUser 141

THE TOW TRUCK IS BACK!
TRADE-IN SPECIAL

HOW IT WORKS: Get a $400 trade-in on your old color Mac system. To be eligible your complete system must be in good working condition and include these features:
• an i30 processor at 16MHz minimum
• minimum 8MB of RAM
• minimum 230MB hard drive
• Apple color monitor
• Apple keyboard & mouse

You can buy our system at the outright price and then, on return and approval of your trade-in, you receive a $400 refund OR you may opt to send in your trade first with payment. All trades must have an RMA number and are subject to final approval.

Macintosh CUPS
Performa 650/240CD $699
Performa 6200/240CD $799
Performa 6400/240CD $999
Centris 450 4.0 refurbished $599
Quadra 600 4.0 $699
Quadra 610 $599
Quadra 605 8.0 $899
Quadra 720 8.0 $899
Performa 630/6300/100 $899
PowerMac 7200/75/100/120 $1299
PowerMac 9000/1390 $499
PowerMac 9000/1490 $699

More Logic Board Upgrades
Personal ST to NT nr transfer upgrade $79
LaserWriter 9500 to 1500 for each $99
Mac II or III to IIC $29
Box or IIC to Centris 650 $29

NuBus Adapters/DOS Cards
Quadrant 600/650 NuBus Adapter $49
Quadrant 430 NuBus Adapter $60
360series DOO card $29

Video Cards
E-Machines DoubleGig II $199
Racer2100/2500 $249
SuperCard PCI $219
TurboCard 700/680 $399
6000 series AV Card with adapter $199
PowerMac HP2AV Card (2MB VRAM) $299
Apple QuickDraw 3D accelerator Board PCI $399

Monitors
Apple 14" CRT $199
Apple MultiSync 17 $199
Apple 15" Multisync $399
Radisys DualColor SX 8/12 16/2GB/CD $119
Hewlett-Packard 17" CRT with card $499

Printers
Apple StyleWriter 1200 Dc $199
Apple StyleWriter 2100 Portable $219
Apple Personal LaserWriter L $299
Apple LaserWriter Box 8000 $399
Apple LaserWriter Select 800 $599
Apple LaserWriter Portable $599
Apple LaserWriter Drive $799
Apple 11X7 Color InkJet $499
Hewlett-Packard DeskWriter $199
Hewlett-Packard DeskWriter C $299
Hewlett-Packard DeskWriter 550C $299

Laser inner cartridges sold separately.

PowerBooks
PowerBook 170/58 $699
PowerBook 530/220 New $1099
PowerBook 160/80 $899
PowerBook 190/120 New $999

READ ME: Products are refurbished unless indicated as "new." Prices reflect a 2% cash discount and are subject to change without notice. Returns are subject to a 15% restocking fee. All trade-ins subject to approval of management.
Computer Discounters

WE WILL SAVE YOU MONEY • THE TOTAL HARDWARE SOURCE! • NEW, REFURBISHED & DEMO EQUIPMENT IN STOCK.

MAC PRINTERS, COMPUTERS and POWERBOOKS IN STOCK, NAME BRANDS SYSTEMS from sm

$1995.

Call for Best Price!

Printers

Computers

Monitors

HP Series 2, 3, 4
AST Premium
Sony
Telecom
IBM/Valuepoint
NEC
Can
Heiland Packard
Mitsubishi
Okidata
Compaq

Macintosh

Lexmark

LG

S/2, S/3, S/4

14"/17" SVGA

CIRCLE 248 ON READER SERVICE CARD

Mac BYTE

AUTHORIZED APPLE & MOTOROLA RESSELLER

BUY • SELL • TRADE

CASH FOR MACS

New & Used & Demo

Macs with Warranties

FedEx OVERNIGHT SHIPPING

Visa/MasterCard/Amex/Discover

Diners Club/COO

Local Area On-Site Consulting

800-432-2983

1232 Glencoe Ave. Suite C210

Marina del Rey, CA 90292

FAX: 310-448-4194

E-MAIL: MacByteCo@aol.com

Call for Details

1024 x 768 refurbished.

17" Tilt Swivel Base

Only $699!

We also carry 17" Sony Monitors as low as $325

Call for Details

181 Salem Street, Malden, MA 02148

CIRCLE 249 ON READER SERVICE CARD

Mac II & Macintosh

COMPUTERS • PARTS EXCHANGE REPAIRS

Call for best price!

WE BUY MACS!

Office: 617-778-800 Fax: 617-778-4486

1-800-274-5343

NEW STORE LOCATION:

3383 Leesburg Pike, Vienna, VA 22180

Tel: (301) 552-9900 Fax: (301) 552-9177

CIRCLE 250 ON READER SERVICE CARD

300,000 Business People Worldwide Use Our Bar Coding Products!

Call To Find Out How. Order To Find Out Why.

3 Exciting New Products Available!

Call For More Information And Your FREE Catalog.

Or Visit Our Website www.bearrock.com

232 • 7625

CIRCLE 251 ON READER SERVICE CARD

Q RAM Specials

1x8 dalla $5.99/$3.99

4/16/93 72-pin NEW

Call for Best Price!

Mac & Peripherals

Perform V600 V612 CG/DC/XY (ref) $1099

Perf. V600/100 16/16 CG/DC/XY $1299

Newton 170 MP IMB RAM/130S $199

Mac He II 8800, 13"RGB & KB $429

Mac He II 8800, 13"RGB & KB $379

Mac LC 440, 14" NEC & KB $275

HP Scanjet Ix4 24-bit Scanner $775

Apple StyleWriter 1200 (New) $799.95

Apple StyleWriter 1700 (New) $289.95

Apple ImageWriter II $749.95

15" RGB Monitors $185

15" Apple Multiscan Monitor $389

20" SuperMac-Trinitron $699.95 and up!

Call for pricing on logic boards, power supplies & hard to find items!!

Que Computers 612-623-9093

Mac/PC, New/Used, Buy, Sell, Upgrade

CIRCLE 252 ON READER SERVICE CARD

CIRCLE 253 ON READER SERVICE CARD

CIRCLE 254 ON READER SERVICE CARD

CIRCLE 255 ON READER SERVICE CARD

Bar Code Pro

Create EPS graphics for your desktop publishing application. Call for free demo disk and information you'll need to make an intelligent purchase for Mac or Windows.

800.619.0299

718.499.6293

Or fax

718.768.3997

CIRCLE 256 ON READER SERVICE CARD

CIRCLE 149 ON READER SERVICE CARD

CIRCLE 260 ON READER SERVICE CARD
Put Your Customer's Thoughts at Your Fingertips

Introducing the world's easiest to use survey software.

- Expert Helper built-in
- fast and easy data entry
- one command tabulation
- works on the Web too!

PowerTab
Only $199

Try our FREE demo at: www.powerknowledge.com
Call toll-free to order: (888) PWR-KNOW
**Student - Teacher & School Discount**

**WE WILL BEAT ANY ADVERTISED PRICE!!**

![Image of software packages]

**101 Delmations Animated Story...** $39
**18 Perfected People**... $249
**3D VRML Visions**... $39
**3D Web Workshop**... $95
**4D Server 1.5**... $729
**4th Dimension 3.5**... $449
**A.D.A.M Essentials**... $299
**Alter Dark 4.0**... $39
**Agfa Arcus II**... $249
**Agfa ScanSnap**... $339
**Alias Sketch 2.0.2**... $199
**Ampel 3.0**... $249
**Archicad 5.0 Student**... $129
**AutoCAD 2.0**... $149
**Boris Effects 3.5.1**... $649
**Boris Interactive Studio**... $1979
**Bulletin Board 2.0.2**... $19
**Berserk 1.0**... $149
**Bravo! 1000 w/Premiere**... $699
**Bravo! 2000 w/Premiere**... $1299
**Camera Pro 3.5 Student**... $129
**Camera Office Pro 3.5 Student**... $299
**Chinese Language Kit 1.1.1**... $129
**Claris Draw 2.0**... $119
**Claris Emailer 2.0**... $299
**Claris Organizer 2.0**... $59
**Class Action**... $65
**Cliff Notes Calculus 4.0**... $135
**ClipArt Art Bytes**... $55
**CodeMaster 3.0**... $129
**College 2.0.1**... $69
**Color II 3.2**... $39
**ColorDrive 1.5.3**... $39
**Conflict Catcher 4.0**... $59
**CorelDRAW Suite 6**... $169
**CricIt Graph III 1.5.3**... $79
**Cubase Audio XT/VST**... $299
**Cubase Score VST**... $229
**Custom Web-Ready Art**... $69
**CyberPress 1.0**... $39
**CyberSound FX**... $65
**Cygnus**... $129
**DC20 Digital Camera**... $289
**Doblter 2.0**... $39
**Databases 5.0**... $369
**DeBabelizer Toolbox 1.6.5**... $219

**DeltaGraph 4.0**... $89
**Design Workshop 1.5**... $229
**Director Multimedia Studio 2.0**... $689
**DrawingBoard 11 tz/x**... $299
**DrawingBoard II 11 tz/x**... $499
**Elastic Reality 1.2**... $149
**ElectricImage Student 2.5**... $249
**Empower Pro**... $110
**Encore 4.1.0**... $249
**EndNote Plus 2.1 w/EndLink**... $165
**Envelopes Starter Pack III**... $65
**Expressionist**... $89
**FastTrack Schedule 4.01**... $129
**Felt 1.5**... $65
**FileGuard 3.0**... $119
**FileMaker Pro 3.0 Server**... $675
**Final Draft 4.1**... $125
**Flash 1.0**... $199
**Fontographer 4.1.3**... $149
**Form 2 2.8.2 W/Render Zone**... $599
**Form 2 2.8.2**... $599
**Frontal Daster 1.1**... $129
**Frontal Expression 1.0**... $199
**FreeHand 7.0**... $169
**Galaxy Plus Editors 2.1**... $499
**German Power Translator 1.0**... $99
**Grievor 1997 Mac Encyclopedia**... $45
**Hard Disk Toolkit 2.0.1**... $109
**Hayes Accura 336 Fax/Modem**... $155
**Helix Express 3.5**... $249
**HexWrench 1.0**... $249
**HomePage 2.0**... $249
**HyperCard 2.3.5**... $89
**HyperStudio 3.0**... $119
**IdeaFisher Pro 6.0**... $75
**Infini-D Production Studio**... $379
**Infinite fx**... $65
**Inspirations 4.1c**... $65
**Intelligence 2.0.1**... $85
**Internet Connection Kit 1.2**... $45
**Jazz II**... $55
**Japanese Language Kit 1.2**... $129
**Japanese Language Kit 1.2**... $329
**JavaBeans 3.1.5**... $329
**Javelin Rosebush Wildside Endle**... $99
**KPT Final Effects 3.0**... $349
**KPT Final Effects AP 1.0**... $105
**KPT Power Photos Vol 1,2,3 or 4**... $85
**KPT Vector Effects 1.0**... $85
**Kai's Power Goo 1.0**... $49
**Kai's Power Tools 3.0.2**... $85

**Visit our New Web Site!!**

http://www.swsonline.com

**SAME DAY SHIPPING ON MOST ITEMS.**
**ADOBE, SYMANTEC & MICROS0FT PRODUCTS AVAILABLE TO QUALIFIED STUDENTS, TEACHERS & SCHOOLS.**
**SCHOOL PURCHASE ORDERS WELCOME.**
**NO SURCHARGE ON CREDIT CARDS.**
**IBM & MAC PRODUCTS AVAILABLE.**
**Prices and availability subject to change.**
**Free AOL Starter Kit while supplies last.**

1-800-831-2940

1750 Brielle Ave, Unit A-2
Ocean, NJ 07712
PHONE (908) 695-2100
FAX (908) 695-9371
E-MAIL: SFTSWS@AOL.COM

---

[Image of software packages]
## Latest Versions & Full Packages

<table>
<thead>
<tr>
<th>Package Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaleidoscope 3.0</td>
<td>$89</td>
</tr>
<tr>
<td>Kidpix Studio</td>
<td>$35</td>
</tr>
<tr>
<td>Killer Transitions</td>
<td>$189</td>
</tr>
<tr>
<td>Korean Language Kit 1.0</td>
<td>$129</td>
</tr>
<tr>
<td>LabVIEW Student</td>
<td>$79</td>
</tr>
<tr>
<td>Lightning Draw Ox 1.0</td>
<td>$99</td>
</tr>
<tr>
<td>Live Picture 2.5</td>
<td>$75</td>
</tr>
<tr>
<td>Live Picture XT 1.0</td>
<td>$199</td>
</tr>
<tr>
<td>LogAnonymous 2.0</td>
<td>$69</td>
</tr>
<tr>
<td>M.O.B 7.0 w/Payroll</td>
<td>$49</td>
</tr>
<tr>
<td>MAX 3.5</td>
<td>CALL</td>
</tr>
<tr>
<td>Mitropolis 1.1</td>
<td>$499</td>
</tr>
<tr>
<td>Mac Academy Tutorial Videos</td>
<td>$35</td>
</tr>
<tr>
<td>MaxDraft 4.2.1</td>
<td>$199</td>
</tr>
<tr>
<td>MaxLink + Translator Pro 9.0</td>
<td>$55</td>
</tr>
<tr>
<td>Maple V 4.0</td>
<td>$599</td>
</tr>
<tr>
<td>MathType 3.1</td>
<td>$599</td>
</tr>
<tr>
<td>MathCad 6.0+</td>
<td>$149</td>
</tr>
<tr>
<td>Mathematica 3.0 Student</td>
<td>$149</td>
</tr>
<tr>
<td>Mathematica Professional 3.0</td>
<td>$779</td>
</tr>
<tr>
<td>Metafa 4.0 Student</td>
<td>$99</td>
</tr>
<tr>
<td>Mavis Beacon Teaches Typing 2.0</td>
<td>$535</td>
</tr>
<tr>
<td>MediaPaint 1.2</td>
<td>$199</td>
</tr>
<tr>
<td>MediaTool Kit 2.1</td>
<td>$339</td>
</tr>
<tr>
<td>MeshPaint 3D 1.6</td>
<td>$319</td>
</tr>
<tr>
<td>Metaphotos</td>
<td>$149</td>
</tr>
<tr>
<td>Micro Grade</td>
<td>$69</td>
</tr>
<tr>
<td>Minibit Release 10/xtra</td>
<td>$249</td>
</tr>
<tr>
<td>Mousepad Cordless</td>
<td>$69</td>
</tr>
<tr>
<td>MoviFlo 2.0.2</td>
<td>$349</td>
</tr>
<tr>
<td>Mymirond 1.1</td>
<td>$339</td>
</tr>
<tr>
<td>NeXTworks Fusion 1.0</td>
<td>$249</td>
</tr>
<tr>
<td>Nisus Language Dictionaries</td>
<td>$55</td>
</tr>
<tr>
<td>Nisus Writer 5.0</td>
<td>$99</td>
</tr>
<tr>
<td>Now Bundle 3.6</td>
<td>$69</td>
</tr>
<tr>
<td>Now Startup Manager 7.0</td>
<td>$499</td>
</tr>
<tr>
<td>Now Utilities 6.5</td>
<td>$129</td>
</tr>
<tr>
<td>OmniPage Pro 7.0 Upgrade</td>
<td>$129</td>
</tr>
<tr>
<td>OmniPage Pro 7.0</td>
<td>$329</td>
</tr>
<tr>
<td>Overdrive 1.0</td>
<td>CALL</td>
</tr>
<tr>
<td>Overture 2.0.1</td>
<td>$75</td>
</tr>
<tr>
<td>PageTools 2.0</td>
<td>CALL</td>
</tr>
<tr>
<td>PaperTools 2.0</td>
<td>$85</td>
</tr>
<tr>
<td>Photofactor 10.0</td>
<td>$129</td>
</tr>
<tr>
<td>Plugs20</td>
<td>$519</td>
</tr>
<tr>
<td>PowerPpi</td>
<td>$75</td>
</tr>
<tr>
<td>Presenter 3D 3.6</td>
<td>$99</td>
</tr>
<tr>
<td>Printshop Deluxe 1.1</td>
<td>$55</td>
</tr>
<tr>
<td>QuText Tools 2.0</td>
<td>$85</td>
</tr>
<tr>
<td>QuickSeat</td>
<td>$25</td>
</tr>
<tr>
<td>QuickServe</td>
<td>$89</td>
</tr>
<tr>
<td>QuickSilver</td>
<td>$99</td>
</tr>
<tr>
<td>QuicKeys 3.5</td>
<td>$35</td>
</tr>
<tr>
<td>Roid Toolkit Array 2.0</td>
<td>$169</td>
</tr>
<tr>
<td>Rom Double 2.0</td>
<td>$55</td>
</tr>
<tr>
<td>Ray Dream Studio 4.1</td>
<td>$199</td>
</tr>
<tr>
<td>Remote Access Personal Server 2.1</td>
<td>$155</td>
</tr>
<tr>
<td>SPSS 6.1 Student</td>
<td>$99</td>
</tr>
<tr>
<td>Sculpt 3D 4.1</td>
<td>$219</td>
</tr>
<tr>
<td>SigmaPlot 5.0</td>
<td>$199</td>
</tr>
<tr>
<td>Symbi 2000</td>
<td>$35</td>
</tr>
<tr>
<td>Soft Polish 1.2</td>
<td>$69</td>
</tr>
<tr>
<td>SoftWindows 3.0</td>
<td>$229</td>
</tr>
<tr>
<td>SoundEd 16 + Deck II</td>
<td>$249</td>
</tr>
<tr>
<td>Speed Doubler 2.0</td>
<td>$55</td>
</tr>
<tr>
<td>Spell Catcher 1.5</td>
<td>$49</td>
</tr>
<tr>
<td>Spring Cleaning 1.0</td>
<td>$49</td>
</tr>
<tr>
<td>Stencil It 1.0</td>
<td>$89</td>
</tr>
<tr>
<td>Studio Effects 1.0</td>
<td>$349</td>
</tr>
<tr>
<td>StudioVision 3.5</td>
<td>CALL</td>
</tr>
<tr>
<td>StudioVision 4.0</td>
<td>CALL</td>
</tr>
<tr>
<td>StudioVision Pro 3.5</td>
<td>CALL</td>
</tr>
<tr>
<td>StudioVision Pro 4.0</td>
<td>CALL</td>
</tr>
<tr>
<td>StudioVision Pro 5.0</td>
<td>CALL</td>
</tr>
<tr>
<td>Stylist 1.0</td>
<td>$85</td>
</tr>
<tr>
<td>SuperCard 3.0</td>
<td>$129</td>
</tr>
<tr>
<td>SuperCard Multimedia Studio 3.0</td>
<td>$329</td>
</tr>
<tr>
<td>SuproExpress 336 Modern</td>
<td>$139</td>
</tr>
<tr>
<td>System 7.6 Software</td>
<td>$85</td>
</tr>
<tr>
<td>TelePort Platinum 336</td>
<td>$169</td>
</tr>
<tr>
<td>TextBridge Pro 95</td>
<td>$159</td>
</tr>
<tr>
<td>Thinkster Pro 2.0</td>
<td>$69</td>
</tr>
<tr>
<td>The Teacher's Tool Kit</td>
<td>$69</td>
</tr>
<tr>
<td>Topdown Flowchart 4.5</td>
<td>$155</td>
</tr>
<tr>
<td>TransFX</td>
<td>$39</td>
</tr>
<tr>
<td>Tree Professional 4.0</td>
<td>$235</td>
</tr>
<tr>
<td>Turbo Mouse 5.0</td>
<td>$109</td>
</tr>
<tr>
<td>Turbo ToolKit 1.0</td>
<td>$49</td>
</tr>
<tr>
<td>Umax SuperMac 5900/1800</td>
<td>$429</td>
</tr>
<tr>
<td>Umax Vista 524/Scanner</td>
<td>$729</td>
</tr>
<tr>
<td>Umax Vista 524/84 Scanner</td>
<td>$229</td>
</tr>
<tr>
<td>Umax Vistascan 3.5</td>
<td>$99</td>
</tr>
<tr>
<td>Umax Robotsport 35</td>
<td>$209</td>
</tr>
<tr>
<td>VersaTerm Pro 5.0</td>
<td>$179</td>
</tr>
<tr>
<td>Virex 5.7</td>
<td>$49</td>
</tr>
<tr>
<td>VirusScan 2.0</td>
<td>$45</td>
</tr>
<tr>
<td>Vision 3.3</td>
<td>CALL</td>
</tr>
<tr>
<td>Vision 3.4</td>
<td>CALL</td>
</tr>
<tr>
<td>Wacom Art Z II 12 x 12</td>
<td>$399</td>
</tr>
<tr>
<td>Wacom Art Z II 8 x 8</td>
<td>$285</td>
</tr>
<tr>
<td>Wacom Art Pad II 4 x 5 w/Dabbler 2</td>
<td>$249</td>
</tr>
<tr>
<td>Walkthrough Pro 2.6</td>
<td>$229</td>
</tr>
<tr>
<td>WebPainter 7.0</td>
<td>$79</td>
</tr>
</tbody>
</table>

## Special Offers

### Artist’s Dream Bundle

- Fractal Painter 4 & Wacom Art Z II 6x8
- **Price**: $469

### FREEHAND GRAPHICS STUDIO 7

- Includes FreeHand 7, Fontographer, Extreme 3d and Xtras
- **Price**: $299

### DIRECTOR 5.0.1

- 2D/3D Graphics And Digital Video
- **Price**: $199

### CodeWarrior 11

- C&C++ Pascal and Java Development Environment
- **Price**: $129

### LIGHTWAVE 3D 5.0

- 3D Modeling, Rendering and Animation
- **Price**: $549

### KPT BRYCE 2

- 3D Rendering and Animation
- **Price**: $69

### SoftWindows 95

- Run Windows 95 on your PowerMac
- **Price**: $269

### INFINI-D 3.5

- 3D Animation and Design
- **Price**: $229

### StudioPro 2.0

- 3D Modeling and Rendering
- **Price**: $549

---

**Free America Online Starter Kit & 15 Free Hours with every order!**

**CALL FOR FREE CATALOG!!**

(800) 831-2940

INCLUDES COMPLETE PRICE LIST & FREE PRODUCT INFO.
ADULT SOFTWARE

THE ADULT MALL OF THE WEB

www.adultmall.com

2000+ Hard to find US or European Video, Toys and Magazines - Worldwide delivery - Secure transactions

LIVE VIDEO SEX
NO WAITING
2 GIRL SHOWS

LIVE NUDE WOMEN
ON YOUR MAC
NO SOFTWARE NEEDED
OVER 1000 EROTIC PICTURES TO DONWLOAD
http://www.liveacts.com
18 PLUS

NO SOFTWARE NEEDED
LARGEST SCREEN ON THE INTERNET
CHAT + DOWNLOAD FILMS
HOT PHOTOS + STORIES + LIVE INTERACTIVE - STRIP SHOWS
LEG SHOW + B & D + FETISH
WWW.PLATINUMPRIVATE.COM

THE BEST PLACE ON THE WEB TO SHOP FOR ANYTHING COMPUTER RELATED
http://www.zdnet.com/marketplace

THESE ADS ATTRACT BUYERS WHO BUY AGAIN AND AGAIN!
ON AVERAGE, THEY BOUGHT 10 DIFFERENT TYPES OF PRODUCTS MORE THAN ONCE FROM MARKETPLACE ADS IN THE LAST 12 MONTHS.

ADVERTISE HERE, WHERE BRAND SPECIFIERS BUY DIRECT! CALL 800-825-4237 TODAY!

Source: 1996 MacUser Marketplace Subscriber Study
MacUser's BusinessCard section is a forum for innovative, hard-to-find and low-cost Mac products and services. Ads are listed by product category and include Reader Service numbers to allow fast, easy response.

**RATES:**
- 1 issue-$60.50
- 6 issues-$350
- 12 issues-$650
- Multiple-ad per issue rates also available.
- Prepayment must accompany each insertion.
- AMEX/Visa/MC welcomed.

**AD FORMAT:**
- MacUser will typeset each BusinessCard ad.
- Advertisers should furnish typewritten copy. Ads include: 1) Headline (1 line, initial caps=30 characters max; all caps=25 characters max), 2) Descriptive copy (5 lines, 225 characters max), 3) Company name (same specifications as headline), and 4) Address and telephone number (2 lines, 40 characters per line). No logos, artwork or camera-ready ads. Publisher reserves the right to edit supplied copy to meet section specifications.

**DEADLINES:**
- MacUser is published 12 times a year.
- The BusinessCard closing is approximately two months prior to issue date.
- Please send copy and payment to: MacUser BusinessCard, One Park Avenue, 3rd Floor, New York, NY 10016.
- ATTN: Alexandra D'Anna
- For more information, call Alexandra D'Anna at 800-825-1237 or 212-503-5965, FAX: 212-503-5860.

**HARDWARE/PERIPHERALS**

**NEWLETT-PACKARD DEMO PRINTERS**
- All Macintosh/Apple Compatible Laser Printers, DeskWriter Inkjet Printers, PaintWriter Color Printers
- Fen Printers, DesignJet Inkjet Printers
- TED DASHER & ASSOCIATES
  - Email sales@dasher.com
  - (800) 636-4833 Fax (205) 591-1108

**CIRCLE 369 ON READER SERVICE CARD**

**SOFTWARE/BUSINESS**

**AutoMenus Pro**
- Menu enhancement Control Panel that makes menu navigation (especially those pesky hierarchical menus) much easier. What makes AutoMenus Pro so useful is that the menus stay down without the need to hold the mouse down.
- Night Light Software
  - 305 Orange Ave, Mt View, CA 94043
  - http://www.nllsoft.com

**CIRCLE 370 ON READER SERVICE CARD**

**CD-ROM PRODUCTION SERVICES!**
- All formats: Mac, ISO, Hybrid, Mixed Mode
- Pre-mastering, beta testing, or archiving
- Mass Replication available, any quantity
- Personal, Knowledgeable Service for 10 years!
- Certified Apple Developer/low prices/fast delivery

**Northeastern Digital Recording**
- 2 Hidden Meadow Ln Southboro MA 01772
  - 508-481-9322 x308 508-624-6437 CONDRT@aol.com

**CIRCLE 371 ON READER SERVICE CARD**

**GEOGRAPHIC SOFTWARE**

**REUNION the family tree software**
- Rated the BEST by MacUser (1.96), MacWorld (6/95) & MJH (4/95).
- Easily create large charts w/photo's-they're perfect for family reunions! To order call MacWarehouse (800) 250-6227. Free demo on CDS, MOL(baywood books) & Web site www.leisterpro.com

**CIRCLE 372 ON READER SERVICE CARD**

**VIDEO TRAINING FOR MACS**
- Clearly explained, easy-to-follow lessons.
- Covers Mac OS, ClarisWorks word processor and spreadsheet, file management, much more!
- 400 minutes training on 4 tapes only $89.95. 30-day money back guarantee. Visa/Mastercard.

**Sciblers Media, Inc.**
- 1775 N. State St., Girard, OH 44420
  - 800.360.2324 (24 hrs) •

**CIRCLE 378 ON READER SERVICE CARD**

**Scribblers Media, Inc.**
- Clearly explained, easy-to-follow lessons.
- Covers Mac OS, ClarisWorks word processor and spreadsheet, file management, much more!
- 400 minutes training on 4 tapes only $89.95. 30-day money back guarantee. Visa/Mastercard.

**Sciblers Media, Inc.**
- 1775 N. State St., Girard, OH 44420
  - 800.360.2324 (24 hrs) •

**CIRCLE 378 ON READER SERVICE CARD**

**BIBLE ON DISK or CD-ROM**
- Full-featured, fast & friendly Bible study software.
- As the leader in Bible study software since 1981 we have continued to listen to our customers & provide them with the tools they need. Call for a FREE catalog.
  - http://www.bible.org/bible

**BIBLE RESEARCH SYSTEMS**
- 2029 N. High St., PO Box 20211, Columbus, Ohio 43202
  - 1-800-SAFEWARE

**CIRCLE 376 ON READER SERVICE CARD**

**CIRCLE 377 ON READER SERVICE CARD**

**CIRCLE 378 ON READER SERVICE CARD**

**TRAINING**

**RENT MACACADEMY VIDEOS by MAIL**
- Video's the easy way to learn! All major Mac programs available: over 85 different titles, each 2 hours long. A two week rental including S&H, costs less than a dollar a day. Return postage is prepaid. Get a free catalog. Ask about our CD-ROM rentals.

**CareerTAPES® Enterprises**
- PO Box 309 Center Harbor, NH 03226
  - (603) 253-7470

**CIRCLE 378 ON READER SERVICE CARD**

**Scribblers Media, Inc.**
- Clearly explained, easy-to-follow lessons.
- Covers Mac OS, ClarisWorks word processor and spreadsheet, file management, much more!
- 400 minutes training on 4 tapes only $89.95. 30-day money back guarantee. Visa/Mastercard.

**Sciblers Media, Inc.**
- 1775 N. State St., Girard, OH 44420
  - 800.360.2324 (24 hrs) •

**CIRCLE 378 ON READER SERVICE CARD**

**TRAINING**

**RENT MACACADEMY VIDEOS by MAIL**
- Video's the easy way to learn! All major Mac programs available: over 85 different titles, each 2 hours long. A two week rental including S&H, costs less than a dollar a day. Return postage is prepaid. Get a free catalog. Ask about our CD-ROM rentals.

**CareerTAPES® Enterprises**
- PO Box 309 Center Harbor, NH 03226
  - (603) 253-7470

**CIRCLE 378 ON READER SERVICE CARD**

**Scribblers Media, Inc.**
- Clearly explained, easy-to-follow lessons.
- Covers Mac OS, ClarisWorks word processor and spreadsheet, file management, much more!
- 400 minutes training on 4 tapes only $89.95. 30-day money back guarantee. Visa/Mastercard.

**Sciblers Media, Inc.**
- 1775 N. State St., Girard, OH 44420
  - 800.360.2324 (24 hrs) •

**CIRCLE 378 ON READER SERVICE CARD**

**TRAINING**

**RENT MACACADEMY VIDEOS by MAIL**
- Video's the easy way to learn! All major Mac programs available: over 85 different titles, each 2 hours long. A two week rental including S&H, costs less than a dollar a day. Return postage is prepaid. Get a free catalog. Ask about our CD-ROM rentals.

**CareerTAPES® Enterprises**
- PO Box 309 Center Harbor, NH 03226
  - (603) 253-7470

**CIRCLE 378 ON READER SERVICE CARD**

**Scribblers Media, Inc.**
- Clearly explained, easy-to-follow lessons.
- Covers Mac OS, ClarisWorks word processor and spreadsheet, file management, much more!
- 400 minutes training on 4 tapes only $89.95. 30-day money back guarantee. Visa/Mastercard.

**Sciblers Media, Inc.**
- 1775 N. State St., Girard, OH 44420
  - 800.360.2324 (24 hrs) •

**CIRCLE 378 ON READER SERVICE CARD**

**TRAINING**

**RENT MACACADEMY VIDEOS by MAIL**
- Video's the easy way to learn! All major Mac programs available: over 85 different titles, each 2 hours long. A two week rental including S&H, costs less than a dollar a day. Return postage is prepaid. Get a free catalog. Ask about our CD-ROM rentals.

**CareerTAPES® Enterprises**
- PO Box 309 Center Harbor, NH 03226
  - (603) 253-7470

**CIRCLE 378 ON READER SERVICE CARD**

**Scribblers Media, Inc.**
- Clearly explained, easy-to-follow lessons.
- Covers Mac OS, ClarisWorks word processor and spreadsheet, file management, much more!
- 400 minutes training on 4 tapes only $89.95. 30-day money back guarantee. Visa/Mastercard.

**Sciblers Media, Inc.**
- 1775 N. State St., Girard, OH 44420
  - 800.360.2324 (24 hrs) •

**CIRCLE 378 ON READER SERVICE CARD**

**TRAINING**

**RENT MACACADEMY VIDEOS by MAIL**
- Video's the easy way to learn! All major Mac programs available: over 85 different titles, each 2 hours long. A two week rental including S&H, costs less than a dollar a day. Return postage is prepaid. Get a free catalog. Ask about our CD-ROM rentals.

**CareerTAPES® Enterprises**
- PO Box 309 Center Harbor, NH 03226
  - (603) 253-7470

**CIRCLE 378 ON READER SERVICE CARD**

**Scribblers Media, Inc.**
- Clearly explained, easy-to-follow lessons.
- Covers Mac OS, ClarisWorks word processor and spreadsheet, file management, much more!
- 400 minutes training on 4 tapes only $89.95. 30-day money back guarantee. Visa/Mastercard.
One of the best coping mechanisms for expectant parents is to turn to a Mac.

My husband and I refer to being pregnant as "the nine most confusing months of our lives." I'm already in the second trimester, and I still can't bear to look at certain foods without feeling nauseous. On the other hand, I crave unusual foods. Neither of us really understands it when I say, "Honey, I need cotton candy, and I need it now" (especially when I send him out twice in one evening).

We're helping each other through this exciting and stressful time, but we've both wondered at times about what to expect next and whether or not what we're experiencing is normal. My doctor gives some insight, but it's the information I've been able to get through my Mac that has put me the most at ease. There are lots of well-designed programs that explain what's going on during pregnancy as well as come to your aid after the baby's born. But be careful — there are also programs that are more a waste of your money than worth your while.

In Utero
The world's most famous Biblical pair, Adam and Eve, walk us through a multimedia experience from conception to birth in Nine Month Miracle (***); $45 estimated street), from A.D.A.M. Software (800-408-2326 or 770-980-0888). This software uses storytelling to take you through the events of pregnancy. In the first chapter, you hear the story of how Adam and Eve discover that Eve is pregnant. The software also lets you view animations of what's happening inside the couple's bodies. For instance, animations in later chapters show you what an embryo looks like during various stages of development. You also get to see photographs of a real fetus, accompanied by a video of a doctor explaining in detail what you're looking at.

The Nine Month Video Club section of this software spotlights five real-life couples. You get to see videos of many of the events they experienced, including baby delivery and learning practical stretching exercises for pregnant women. If you can stomach it, you can choose to go past the red warning labels and watch an actual cesarean birth.

A nice touch is that the software caters to children as well as to adults. It has a separate story to help kids understand what having a baby is all about. And it has a lockout feature for touchy subjects, such as Adam and Eve's sex life during pregnancy.

My biggest problem with this software is that it tends to drag. Videos load slowly, and actions as simple as turning the pages of its on-screen book take too much time, even on a Power Macintosh. The story itself is slow-moving. All too often, I felt as if I were taking a biology lesson rather than learning about what it's like to experience pregnancy.
For a more personal experience, you need The Girlfriends' Interactive Guide to Pregnancy ($39.95 list), from Simon & Schuster Interactive (800-910-0099 or 970-339-7137) — my favorite of the software I looked at. It gives you the nitty-gritty lowdown that only good friends can provide. It's based on a book by Vicky Lovine and is full of "attitude" and humor. It has a fountain of pregnancy facts, a few games for both parents-to-be, a link to an online support group, and entertaining graphics throughout.

Instead of animations, it relies most heavily on videos of Vicky, the girlfriends, and some husbands offering advice. From health (is it OK to eat mint-chocolate-chip ice cream at 2 A.M.?!) to sex (What's the best position, being that 30 extra pounds is between us?), they let you in on their most intimate details. The software also comes with a customizable calendar for recording the events of your pregnancy.

The Girlfriends' Interactive Guide is just as thorough as Nine Month Miracle at exploring every stage of pregnancy but is more personal, entertaining, and speedy.

Another thorough pregnancy guide that focuses on personal experience is Your Pregnancy, Your Newborn ($39.95 list), from Parenting Magazine (800-856-1351 or 212-840-4200). Instead of using attitude and humor to deliver its messages, it relies on soothing music, a beautiful interface, and an abundance of opinions. Everywhere you turn in this software, you see or hear an interview with new parents and birthing professionals. It's refreshing to hear such personal experiences as one of a woman who liked being fed ice cubes to kill pain during labor. It includes in-depth information on many other topics, such as fertilization, stress during pregnancy, communication with your doctor, breastfeeding, emotional changes for both mother and father, and sex after pregnancy.

You also get advice about your newborn's first three months — how your child develops and how to care for your new bundle of joy. If you're still hungering for insights from Parenting, you can use the software's direct online link to reach the magazine's Web site. The most impressive part of this CD-ROM for me was its more than 600 breathtaking photos. The intimate portraits of fathers and new mothers (sometimes naked) with their babies were inspirational. If you want current information now, rather than waiting to buy software, take a journey online. One of my favorite Web sites is ParentsPlace.com (http://www.parentsplace.com/). It offers information and support not only on pregnancy but also on raising children. There are live daily chats with various subjects, such as breastfeeding. It also has bulletin boards, a shopping mall (complete with baby clothes you can order), and articles from various contributors.

**Life After Birth**

Since the challenges don't stop after your baby is out of the womb, the help from your computer shouldn't stop either. Medical help is what I was looking for in A.D.A.M. Software's Pediatric Housecall ($45, estimated street), for those many times when my wee one has bewildering aches and pains. What I found in this software was a ton of information that was difficult to decipher.

Part of the problem is a dull interface. You begin each diagnosis by choosing your child's symptoms from lists on text-only screens. Then the software gives you a list of likely ailments, such as vertigo or inner-ear infection. The descriptions of the ailments and what to do about them also make the software difficult to use — the descriptions are clinical and often so technical they're confusing. Does it really help to know, for instance, that an ailment is associated with "transient ischemic attacks"?

The software does, however, contain volumes of medical info. If you're willing to read lots of dry text, you're likely to get some useful advice.

With a bad taste in my mouth from medical software, I decided to give the Web a chance to restore my faith instead of giving up. Restore my faith, it did. That's because I found KidsHealth.org (http://kidsHealth.org/). It's devoted to the health of children and teens and is intended for parents as well as children. There's information on growth, food, fitness, childhood infections, immunizations, lab tests, medical and surgical conditions, and the latest treatments.

**The Next Chapter**

After reviewing all this information, I knew all I wanted to know for a while about being pregnant, giving birth, and treating childhood diseases. What I needed was something simple that would help prepare me for motherhood. I was looking for the kind of simplicity and comfort you can find in a belly button. So, I settled down with one more piece of software: What Is a Bellybutton? ($15 estimated street). It's a book on disk from IVI Publishing (800-452-1332 or 612-996-6000) that's narrated by a teddy bear named Baxter.

Children can follow along with Baxter as he reads simple sentences on-screen, or they can explore this software's numerous "hot spots" (areas that become animated when you click on them). It's like to come to your aid when your children are driving you crazy with questions about everything. It won't come close to answering all their questions, but it does tackle several questions that are the most frequently asked. And it answers them in a language they can understand. "Why can't fathers have babies?" the girl in the story asks. Because they don't have a place to store them. Life is simple for now.

Teresa Lee Bojorges is a writer, actress, and mother of a six-year-old boy. She conceived her second child during the course of reviewing the software in this article. We make no guarantees, but using this software may work for you too.
The Game Room

BY ROMAN LOYOLA

I LIVE IN A FANTASY WORLD in the Game Room, and this month I'm dreaming of winning fabulous cash and prizes, investing that money in my own business, and then using my earnings to do what I've always wanted to do — create my own empire.

You Don't Know Jack Volume 2

Remember when Rolf Benirschke took over Wheel of Fortune? He just didn't have that Pat Sajakian quality required for the show. Or how about when Ray Combs took the helm of Family Feud? God rest his soul — he simply wasn't as fun to watch as Richard Dawson.

A great game show can be simple or tough to play, but it has to have the right host. And the host is what made the original You Don't Know Jack a must-have. He was wise-cracking; he had attitude; he was funny and energetic. In You Don't Know Jack Volume 2, the original host has been replaced, and it affects the whole game. The new host sounds like the old one, but at times he seems to be reading from a script and his sarcastic delivery lacks the sneer of the old host. Sometimes this new guy just plain isn't funny.

Regardless, the game is still great. As in the original version, one or more contestants compete to win points for ringing in first (by pressing a key on the keyboard) and correctly answering trivia questions. Volume 2 contains 800 new questions, ranging in topic from Humphrey Bogart films to the colors in the J. Crew catalog — enough to satisfy any pop-culture connoisseur. And although the questions in this version are a bit more risque, they're never offensive. There are also entertaining guest appearances by the likes of Erik Estrada (see background art) and Florence Henderson.

If you liked the original, you'll like Volume 2, especially if you play the game with a group of friends. Based on content alone, Volume 2 is another must-have. Unfortunately, the new host will probably be remembered like Rolf, Ray, and the many others who, despite their best efforts, just couldn't fill the shoes of their great predecessors.

Capitalism

If you think you've got the savvy and smarts it takes to be the next Sam Walton (the Wal in Walmart), you might want to try your hand at the simulation game Capitalism (shown below) before taking the entrepreneurial plunge. Unlike most simulators, in which you control a society, Capitalism lets you run a business. And although succeeding at Capitalism may not actually be a true indicator of your business savvy, it will certainly give you a glimpse of the complexities of big business.

The game is no visual feast — it uses simple graphics and static photos, but it shines in its presentation of the complex aspects of running a business. You must keep track of such business units as purchasing and retail sales and control inventory by tracking product demand. You can promote your products to increase sales; you can even deal stock for your company. You do all of this through a dense but easy-to-learn interface. (The tutorial games also help you familiarize yourself with Capitalism's controls.)

One particularly welcome aspect of Capitalism is its competitive feel, a game-play component rarely seen in other simulations. Most sims, such as SimCity 2000 and AfterLife, are based on the forces of supply and demand. In Capitalism those same forces are at work, but you also face competition from other businesses. Those competitors not only sell some of the same products you do but they can also engage in price wars. And if your business's stock is attractive enough, you may even find yourself in the throes of a hostile takeover.

Capitalism is one of the best sim games to be released since SimCity 2000. If you're looking for a challenging, realistic simulator that offers hours of entertainment, Capitalism will suit you just fine.

CAESAR II

With the sim game Caesar II (shown above), I can at last build an empire worthy of my name. That's because it's based on the ancient Roman empire. Your goal as governor is to build a Roman province and develop it into a prosperous society.

While playing Caesar II, you can't help but be reminded of SimCity 2000. The layout of the terrain is similar, with easy-to-view angles and buildings that bear some resemblance to those in SimCity — not a bad style to choose, since the structures are colorful and beautifully drawn. Caesar II has buttons that represent particular structures and resources your citizens need.

You monitor your empire's progress through an area called The Forums, where you can quickly gauge such factors as workforce numbers, security levels, tax rate, population, and your own popularity. As in SimCity 2000, you receive advice about your policies and your empire's needs. There are also nice-looking animations to alert you to good news or disasters.

Among Caesar II's most outstanding features are its battle sequences, in which you must defend your territory against those who attempt to invade your empire. To engage your troops, you simply point and click. The battles provide a nice change of pace from your continuous empire monitoring.

Caesar II is so similar to SimCity 2000 that you could mistake it for the same game, with some different graphics thrown in and without the terrain editor. The experience is similar to watching Die Hard 2 after already seeing Die Hard — it has the same basic elements but enough changes to make it feel like a new movie.
Whether you're learning to type or just want to improve, one program rises above the rest - Mavis Beacon Teaches Typing. Only Mavis adjusts to your skill level and continually monitors your progress like a good teacher should. Just ask her four million alumni. For more information on new version 5 and the name of your local retailer, call 800-234-3088. And type better, faster.

©1997 Mindscape, Inc. All rights reserved.
EXCEPT FOR THAT ONE GUY who ran out onto the field during the first quarter of this year's Super Bowl buck-naked, waving an enormous banner with the Mac OS logo on it and the legend "Just Wait till NeXT Year!", there is no one more committed to boosting The Cause of the Mac than I am. Nonetheless, there are those moments when I just have to make that two-mile hike through a nearby woods to a secluded lake, climb to the top of a rock, and shout, "It's entirely possible that Apple's future is significantly more bleak than I'm comfortable to admit!"

Factoring in all machines running the Mac OS, the Mac's market share actually increased during the last quarter. But the press has looked only at the market share of Apple Macs and thus is reporting a decrease.

Heidi Roizen, in the space of just one year as vice president of developer relations, made incredible strides toward mending the bridges between Apple and its community of developers. Instead of getting so fed up with Apple's closed-mouth policies and occasional undermining of their markets that they flee for more Microsofty pastures, developers are staying put. But she's not here anymore. Ellen Hancock, vice president of advanced technology, has impressed almost all the folks I've talked to as a capable technology czar who nevertheless can communicate effectively. But she's been pushed aside in the most recent reorg.

Apple has plenty of groundbreaking technologies and Way Cool Stuff in the hangar and on schedule for impressive rollouts. The fastest desktop machines on this planet run the Mac OS. The Mac is well poised to be the first platform to fully exploit Digital Versatile Disc. If the new OS is truly as rich as promised, it'll be a technological panting for all competitors. And the Newton 2000! Its handwriting recognition is almost psychic, and voice recognition is rumored to be around the corner. Apple and the Mac OS are where all the cool stuff is happening.

So if Apple can master all this technology, why can't it understand the fundamentals of the press release? When it announced that NeXT would be blacksmithing the next Mac operating system, didn't it foresee that the worst possible answer to the inevitable question "Will this new OS run the Mac OS or even look like it?" would have been "Haven't the foggiest. Sorry." As Gil Amelio's big speech to the shareholders last February was being printed out, didn't it occur to anyone that it would be perhaps counterproductive to have the big guy hint that — just a month before releasing a breathtaking overhaul of the platform — the Newton division would be sold off?

And although Intel is making a lot of strides with the Pentium, the chip can still barely achieve half the performance of an equivalent PowerPC. But who cares? Well, I mean from the public's point of view. Intel's all over TV and the newspaper with ads touting the things you can do with Pentiums. We know it's like bragging that your car can roll forward and backward, but the Huddled Masses out there don't and the press doesn't seem to care. The price of Apple stock is at an all-time low. But the low price means that no matter how skeptical you were last year about a takeover of Apple, the concept now demands serious thought. But unless the buyer were Apple itself — technically possible, given its latest financials — a buyout, to be blunt, would suck for all concerned.

What cameras from Nikon are to creating photos, Macs are to creating Web sites. We've got the most-secure servers available and the most-popular site- and content-development tools, and more of the Web's standards belong to Apple than to any other single entity. But so what? CNN will still be reporting that a shortage of ADB cables in Micronesia is Yet Another Blow for Struggling, Troubled Apple Computer. It's just that it'll look and sound really cool when posted on the CNN Web site.

The "1984" commercial, like the smash musical Cats, is forever. But man, why didn't Apple think of using Johnny Cash's "Ring of Fire" as the soundtrack of an ad promoting its game infrastructure? Kudos to Microsoft. Microsoft is eagerly and genuinely developing for the Mac, revamping the division and making sincere-ish announcements about its dedication to the platform. But its Mac products still look like Windows products, which is to say that at best they look like Mac products on an extremely bad hair day. And Microsoft Office has largely killed off all competing Mac word processors and almost completely killed off the rest of the spreadsheet market. You know how Microsoft could really hurt Apple? Terminate Office for Macintosh. Apple would lose a good deal of its entrée into Windows offices and two of its most important business products.

The Mac was crucial in the development of the digital effects for Star Wars: the Special Editions. Well, here there's absolutely no counterpoint to be made. The Force will be with us. Always.

"It is a dark time for the Rebellion" is usually my final thought as I climb down from the rock and take one last look around to make sure I wasn't observed. But I know in my heart of hearts that Apple will survive, that any thoughts of its demise are wholly premature.

"We Shall Prevail," I think as I trapse back through the woods. Then I remember that these were the last words of Big Brother before the lady in the Macintosh tank top nailed him with the sledgehammer.
This Is Where...
Introducing PowerBase™ from Power Computing.
180, 200, 240MHz Mac™ OS systems starting at just $1,295.

Meet PowerBase. While your kids sleep at night, this is where you will plan their future and chart your dreams. This is where you may write the next great novel or the business plan that changes your life.

PowerBase is a powerful Mac™ system that handles Photoshop™ as easily as Kid Pix™, edits real video as easily as it runs educational software, and plays the latest 3D games as easily as it surfs the internet and balances your checkbook.

MacUser magazine awarded PowerBase their coveted “five mice” rating and Macworld gave PowerBase their prestigious Editor’s Choice Award easily beating out all other 603e-based systems from Apple, Motorola and Umax.

PowerBase is simply the best Mac available for home, school or small business.

<table>
<thead>
<tr>
<th>PowerBase 180 Starter</th>
<th>PowerBase 200 Starter</th>
<th>PowerBase 240 Starter</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Upgradeable 180MHz 603e</td>
<td>• Upgradeable 200MHz 603e</td>
<td>• Upgradeable 240MHz 603e</td>
</tr>
<tr>
<td>• 16 MB RAM (160 MB Max)</td>
<td>• 16 MB RAM (160 MB Max)</td>
<td>• 16 MB RAM (160 MB Max)</td>
</tr>
<tr>
<td>• 1.2 GB IDE Hard Drive</td>
<td>• 1.2 GB IDE Hard Drive</td>
<td>• 1.2 GB IDE Hard Drive</td>
</tr>
<tr>
<td>• 8X CD-ROM Drive</td>
<td>• 8X CD-ROM Drive</td>
<td>• 8X CD-ROM Drive</td>
</tr>
<tr>
<td>• 256K Level 2 Cache</td>
<td>• 256K Level 2 Cache</td>
<td>• 256K Level 2 Cache</td>
</tr>
<tr>
<td>• 2 MB Accelerated Video (4 MB Max)</td>
<td>• 2 MB Accelerated Video (4 MB Max)</td>
<td>• 2 MB Accelerated Video (4 MB Max)</td>
</tr>
<tr>
<td>• Built-in 3D Video Acceleration</td>
<td>• Built-in 3D Video Acceleration</td>
<td>• Built-in 3D Video Acceleration</td>
</tr>
<tr>
<td>• 3 PCI Expansion Slots</td>
<td>• 3 PCI Expansion Slots</td>
<td>• 3 PCI Expansion Slots</td>
</tr>
<tr>
<td>• Extended Keyboard and Mouse</td>
<td>• Extended Keyboard and Mouse</td>
<td>• Extended Keyboard and Mouse</td>
</tr>
<tr>
<td>• ‘1,000 in Bundled Software</td>
<td>• ‘1,000 in Bundled Software</td>
<td>• ‘1,000 in Bundled Software</td>
</tr>
<tr>
<td>• Add Power 15” (w/13.7) Display ’379</td>
<td>• Add Power 17” (w/15.7) Display ’995</td>
<td>• Add Asante 10b/T Ethernet ’59</td>
</tr>
<tr>
<td>• Add 100MB Iomega Zip ’145</td>
<td>• Add 33.6 Global Village Modem ’159</td>
<td>• Add 100MB Iomega Zip ’145</td>
</tr>
<tr>
<td>• Add ’100 for Mini-Tower</td>
<td>• Add ’100 for Mini-Tower Enclosure</td>
<td>• Add ’100 for Mini-Tower Enclosure</td>
</tr>
</tbody>
</table>

$1295  $1495  $1895

To have any of these systems shipped direct in 48 hours or less, contact a Power Computing Consultant at 1-800-405-7693
PowerBase Features:

- Upgradeable CPU
- Exclusive 2D/3D Rage™ Video
- 2MB VRAM (Millions Colors on 17'')
- 8x CD-ROM
- $1,000 in Bundled Software
- PS/2 Mouse & Keyboard Support
- Only "Five Mice" Rated 603e System
ANNOUNCING THE FASTEST MAC ON THE PLANET - AGAIN.

THE POWERTOWER PRO 250 ONLY '4495

The fastest just go faster and the followers just fell further behind. Power Computing is pleased to unveil the PowerTower Pro 250, a machine that outperforms every single-processor desktop system on the planet.

With the PowerTower Pro 250, you will see noticeable increases in performance. Run filters, resize documents, manipulate layers and save all in record time. Progress bars and clocks will no longer be an issue.

Like its 225 MHz counterpart, the PowerTower Pro 250 runs a Power PC 604e chip. And just like on the 225 MHz model, a 1 MB Level 2 cache, a 7200 RPM AV-Capable Hard Drive and a Dual Fast Internal SCSI run in tandem with the CPU.

Combine this with Dual Processor capability, Ultra SCSI/RAID options, six PCI slots, nine drive bays and room for a Gigabyte of RAM memory and you have a system capable of doing anything your imagination tells it to do.

As always, each system includes a 30-day money back guarantee, toll-free lifetime technical support and a one year limited warranty.

Call 800 405-7693 to custom-configure your PowerTower Pro 250 today.

CALL 800-405-7693 TO ORDER DIRECT

Apple, Macintosh and Mac are registered trademarks, and the MacOS logo is a trademark of Apple Computer Inc. PowerTower and PowerCenter are registered trademarks of Power Computing Corporation. All other brand and/or product names are the property of their respective holders. Prices and specifications are valid in the U.S. only and are subject to change without notice.