SAY GOOD-BYE TO YOUR CD COLLECTION:
NAPSTER LETS YOU STEAL YOUR SONGS, PAGE 68
Peripheral

Take a quick look around. You’ll find a Mac®-compatible Canon peripheral for just about any purpose you can imagine. From high-resolution printers and scanners to the world’s best-selling portable printer, we’ve got what it takes to keep Mac users smiling. And with

High-Performance Desktop Printers
Choices abound. Now Mac users can pick from an extensive selection of Canon Color Bubble Jet™ Printers. All with photo-quality imaging and razor-sharp black text.

Award-Winning Portable Printer
Need a traveling companion for your iBook™ or PowerBook® G3? Our 3.1 pound* BJC-85 Color Bubble Jet Printer was pronounced “Best of Show” at the Macworld 2000 San Francisco Expo.

*4.5 pounds with AC adapter and optional battery pack. ©2000 Canon Computer Systems, Inc. Canon, BJC, Bubble Jet, Canon Know How, CanoScan, MultiPASS, and VMOS are trademarks of Canon Inc. Mac and the Mac logo are trademarks of Apple Computer, Inc.
more than sixty years of imaging expertise
built into every single detail, the term "state-
of-the-art" is somewhat of an understatement.
Come and see for yourself. Visit us on the
Internet at www.ccsi.canon.com/macfriendly,
or call 1-800-OK-CANON for more information.

Canon KNOW HOW™

Advanced Flatbed Scanners
Our colorful CanoScan® FB 630Ui Scanner was designed with the
iMac™ in mind. And for graphics professionals, there's our CanoScan
FB 1200S Scanner featuring groundbreaking VAROS™ technology.

Superior Multifunction Printers
Print. Fax. Copy. Scan. After introducing the world's first
Mac-compatible multifunction printer, one good thing led to
another: our new MultiPASS™ C545 Multifunction Printer.
Features

Cover Story

68 Steal This Song
By Christopher Breen
Born in a Boston dorm room, the little program Napster is changing the way we get music—and it's making record execs quake in their boots. Find out how it will affect you and read what musicians are saying.

76 Make Some Noise
By Jim Heid
Now you, too, can set up a home recording studio—for a fraction of what you might think. Take a look at powerful Mac software that's changing the way you'll make music.

Create

Graphics

101 Make the Most of FreeHand 9
By Olav Martin Kvern
Put FreeHand's best new features to work for you.

Legal

105 Stay on the Right Side of Copyright Laws
By Susan P. Butler
Use others' artwork fairly and legally.

Web

109 Create a Barrier-Free Web Site
By Jim Heid
Make your site accessible to visually impaired users, and you'll get some unexpected benefits.

Lab Test

84 Your PC Passport
By Adam C. Engst
Travel freely between the Mac and Windows worlds with our cross-platform guide. Learn the best ways to convert and transfer files, emulate Windows, and share hardware.
Opinion

19 Letters

27 The Vision Thing
by Andrew Gore
MacBench, your time has come.

63 The Game Room
by Christopher Breen
Four ways to make sure game developers don’t forget about the Mac.

176 The Desktop Critic
by David Pogue
Will Apple ever make those error messages more user-friendly?

12 How to Contact Macworld

News

31 USB versus FireWire:
The Debate Heats Up
Intel is touting USB 2.0 as a high-speed connectivity standard that could rival Apple’s FireWire. Do Intel’s arguments measure up?

33 Here Today, Still Here Tomorrow
Fading prints are the bane of digital photographers everywhere. Epson wants to solve the problem with longer-lasting inks.

33 OS X Gets Closer to Reality
Apple’s next-generation operating system won’t launch this year, but a public beta will be out this summer.

34 Opera Sings a Wireless Tune
A small and speedy browser named Opera will soon hit the Mac platform. Is the wireless world next?

Secrets

95 Save Time in Microsoft IE 5
by Ted Landau
Find your way around Web pages more quickly with a few insider tricks.

99 Quick Tips
by Lon Poole
Tips, tricks, and shortcuts.

Reviews

38
- Hewlett-Packard P910;
- Hitachi CM771;
- Mitsubishi Diamond Plus 91;
- Mitsubishi Diamond Pro 900u;
- NEC Technologies FE950;
- Princeton Graphic Systems AGF900;
- Samsung SyncMaster 900 IFT;
- Sony Electronics Multiscan E400;
- Sony Electronics Multiscan G400;
- Viewsonic PF795
19-inch flat-screen CRT displays

42 iMovie 1.0
Digital video-editing software

44 Adobe InDesign 1.5
Desktop publishing software

46 Newer Technology Maxpowr G3-G3;
- PowerLogix PowerForce G3;
- Sonnet Technologies Encore G3;
- XLR8 Mach Carrier G3
500MHz G3 upgrade cards

48 Animation Master Millennium
Character-animation software

50 Hawking Technology PN9225;
- Linksys EtherFast;
- Macsense XRouter;
- Macsense XRouter Pro;
- Netgear RT311;
- Umax U-Gate 300
Broadband Internet routers

52 America Online 5.0
Online service

54 Now Up-to-Date & Contact 3.9
PIM

54 FaxElite 5.0
Fax software

55 IntelliNews 2.0;
- MacTicker 1.6
News and stock tickers

56 FTP Client Pro 3.0.1
File-transfer software

56 Cinema 4D XL 6.0
3-D-modeling, -rendering, and -animation software

58 3Com HomeConnect USB
- iRez Kitter USB
USB Web cameras

58 NetTen 1.4
Unx-based mail server

60 EndNote 4.0
Bibliography manager

60 Ferazel’s Wand
Adventure game
With mimio, any whiteboard becomes a digital
Every idea should be this good.
If you’ve ever missed information or lost a great idea written on a whiteboard, then you need a mimio™. Whether you’re leading the meeting or transcribing the notes, mimio will truly amaze you. Attach mimio to any whiteboard and it captures everything you write or draw in color and transfers it to your Mac in real time. Print, fax, e-mail, drag and drop it into any Mac application, or send notes across the Internet. With mimio, you can collaborate and share ideas easily, accurately and instantly. And another amazing thing: mimio is only $599 complete. Don’t wait. Get one for your next meeting.

Be amazed. See the new mimio for Mac at www.mimio.com or call 1.877.696.4646 for a live demo.

mimio™
Think it. Share it.

Circle 43 on card or go to www.macworld.com/getinfo
In color matching, "close enough" just doesn't cut it. When color is critical, count on the Tektronix Phaser® 780 tabloid color laser printer, now part of the Xerox family. With PhaserMatch™ ICC custom profile software, you can match the output of a specific press, paper or ink. And with built-in automatic color calibration, you'll get accurate, photographic-quality color at up to 1200 dpi from your first print to your last, on everything from postcards to 12" x 18" full bleeds.

To see what a difference precise color can make, call 1-877-507-4657 ext. 1720 or visit us at www.xerox.com/officeprinting/match1720
SHE PUSHED THE BUTTON

THAT PRINTED THE COMP

THAT MATCHED THE EXACT COLOR

THAT THE CLIENT DESCRIBED

AS MORE FROM A DREAM

THAN REALITY.
I'm not a project management expert, but everyone thinks I am. Most of my time is spent completing tasks, so I need a scheduling tool that's easy, fast, and flexible.

FastTrack Schedule 6.04 fills the bill. It keeps me organized and in control displaying all my project details in rich, colorful timelines. FastTrack Schedule provides just the right amount of power because it's more sophisticated than day-planners, but easier to use and half the price of traditional, high-end project managers.

The presentation-quality schedules clearly illustrate project objectives and deadlines keeping team members and clients informed and up-to-date. In a single schedule, I can outline multiple projects, make assignments, track cash flows, set up dependencies—even add graphics. Whether I use it once a week or every day, FastTrack Schedule makes project scheduling easy.

**NEW Version 6.04**
- ExpressDate™
- FastSteps™
- Open/Export MS Project MPX files
- Full AppleScript Support
- Histograms + Hyperlinks + and more!

FastTrack Schedule 6.04 fills the bill. It keeps me organized and in control displaying all my project details in rich, colorful timelines. FastTrack Schedule provides just the right amount of power because it's more sophisticated than day-planners, but easier to use and half the price of traditional, high-end project managers.

The presentation-quality schedules clearly illustrate project objectives and deadlines keeping team members and clients informed and up-to-date. In a single schedule, I can outline multiple projects, make assignments, track cash flows, set up dependencies—even add graphics. Whether I use it once a week or every day, FastTrack Schedule makes project scheduling easy.

**TRY IT & BUY IT!**
Download the demo and order online today at www.aecsoft.com.
Introducing a work of pure genius. Prius, the world’s first production car to combine a super-efficient gasoline engine with an advanced electric motor that never needs to be plugged in. No recharging stations. No plugs. No compromises. Prius is powered by the revolutionary Toyota Hybrid System, which stores the energy produced during deceleration and converts it back into electric power. It’s fast, fun to drive and produces up to 90% fewer harmful emissions. Prius. This changes everything.

The new Prius. Starting at $19,995. Destination Charge $485. Total MSRP $20,480.** Visit www.toyota.com/prius or call 800-GO-TOYOTA.

*Based on EPA estimates. Actual results may vary. **Based on manufacturer’s suggested retail price. Excludes taxes, license, title and other optional, or regionally required equipment. Actual dealer price may vary. ©2000 Toyota Motor Sales, USA, Inc.
Laptop Storage Cart
for the iBook!

Looking for a safe, secure place for your iBooks? Store, move and charge your iBooks with this new Cart from Anthro!

- Compact and mobile!
- Secure locking hardware!
- Handles to push or pull!
- Holds up to 20 iBooks!
- Vents for airflow!
- External power and telephone outlets!
- Place for AC Power Adapter and cords!
- Room for AirPorts on top!
- Wrap your cables neatly!
- Big wheels go everywhere!

Tour Anthro World at our eye-opening web site.

www.anthro.com

or call us at 800-325-3841
6:00 AM to 6:00 PM PST, M-F

Anthro Corporation® Technology Furniture® Since 1984.
Available for Educational Discounts

iBook is a registered trademark of Apple Corporation.
new!

ACD See
For Mac

The Perfect Software Solution for
Digital Image Management

Image viewing at its very best

Supports over 40 image formats

Visit us at Macworld
New York, July 19 - 21 2000
Booth # 1949

Download ACDSee For Mac trial version at

www.ACDSYSTEMS.com/mw

ACD Systems
PO Box 36, Saanichton, BC, V8M 2C3
T1.800.579.5309  F1.800.819.2207

Circle 30 on card or go to www.macworld.com/getinfo
Conquer Disk Damage

Introducing DiskWarrior™, a revolutionary new way to restore damaged disks!

DiskWarrior is a revolutionary new utility that combats disk damage. It quickly rebuilds, recovers and optimizes your HFS and HFS Plus disk directories, eliminating all directory errors and recovering lost files. Other utilities attempt to repair disks by patching the damage. Patching can result in more damage and permanent loss of files.

100% Recovery Assurance

Only DiskWarrior builds a new optimized directory using data recovered from the damaged directory. You have 100% assurance that DiskWarrior will always restore your disks and recover your files when directory damage is your enemy.* You’ll also have 100% confidence that you’re getting the desired results. DiskWarrior’s exclusive Preview ability lets you preview the restoration. You can examine your damaged disk in the Finder as it will appear after the directory is restored but before any changes are made to your disk.

Routine Maintenance

DiskWarrior is your first line of defense against unseen disk damage. Running DiskWarrior regularly prevents small unseen problems from becoming large ones by keeping your directories error free. You’ll also keep your directories optimized to speed up overall disk performance.

©1999 Alsoft, Inc. PO Box 927, Spring, Texas 77363-0927 USA. 1-813-353-9868. DiskWarrior is a trademark of Alsoft, Inc. Visit our web site or call for requirements. DiskWarrior is not a magician. No utility can restore directories that have been written over.

THE UTILITY COMPANY

ALSOFT www.Alsoft.com 800-257-6381

Circle 140 on card or go to www.macworld.com/getinfo

Macworld

HOW TO CONTACT MACWORLD

Subscription Services
Phone 800/427-2247 or 303/665-8930, North America only
303/401-7445, outside North America
U.S. Mail Macworld Subscription Services
PO. Box 5452, Boulder, CO 80322-4529
World Wide Web www.zdnet.com/2sub/macworld/service

Subscription Rates
The one-year (12-issue) subscription rate is $34.97 in the United States and $54.97 for all other countries (send $50.97 for air mail). The rate for a one-year (12-issue) subscription with the monthly CD-ROM is $49.97 in the United States and $69.97 for all other countries (air mail not available at this time). Checks must be made payable in U.S. currency to Macworld. Please allow 6 to 8 weeks to receive your first issue.

Back Issues of Macworld
Back issues (subject to availability) are $8 per issue for U.S. delivery ($12 outside the United States); prepayment in U.S. currency to Macworld is required. Send check or money order to Back Issues Department, Ziff-Davis Inc., PO. Box 53131, Boulder, CO 80322-3131.

Reprints and Permissions
You must have permission before reproducing any material from Macworld. Write to Reprints and Permissions, 301 Howard St., 16th Fl., San Francisco, CA 94105, include a phone number. To order reprints of your company’s editorial coverage, call Reprint Management Services at 717/399-1900, fax 717/399-8900; e-mail reprints@zdnet.com.

Mailing Lists
We periodically make lists of our customers available to mailers of goods and services that may interest you. If you do not wish to receive such mailings, please write to us and include a copy of your mailing label.

Macworld on Microfilm
Macworld is available on microfilm and microfiche from UMI, 300 N. Zeeb Rd., Ann Arbor, MI 48106-1346; 734/761-4700.

Macworld Editorial
The editors of Macworld welcome your tips, compliments, or complaints. Stories and product reviews from past issues can be located at www.macworld.com. We are unfortunately unable to look up stories from past issues; recommend products; or diagnose your Macintosh problems by phone, e-mail, or fax. Contact Apple toll-free at 800/538-9696, ext. 500, or Macworld Editorial, 301 Howard St., 16th Fl., San Francisco, CA 94105; include a phone number. To order reprints of Macworld, call Reprint Management Services at 717/399-1900, fax 717/399-8900; e-mail reprints@zdnet.com.

Back Issues of Macworld
Back Issues of Macworld (subject to availability) are $8 per issue for U.S. delivery ($12 outside the United States); prepayment in U.S. currency to Macworld is required. Send check or money order to Back Issues Department, Ziff-Davis Inc., P.O. Box 53131, Boulder, CO 80322-3131.

LETTERS TO THE EDITOR

All letters published in Macworld or Macworld Online become the property of Macworld. We reserve the right to edit all submissions. All letters published in Macworld or Macworld Online become the property of Macworld.

Quick Tips
Send your questions or tips on how to use Mac computers, peripherals, or software to Macworld, Quick Tips, 301 Howard St., 16th Fl., San Francisco, CA 94105; fax 415/424-0766; e-mail quicktips@macworld.com. Please include your name, address, and telephone number.

MACWORLD EXPO

As the flagship sponsor of Macworld Conference and Expo, Macworld encourages all subscribers to attend this exciting business industry event. For information about registration, exhibitor lists, conference schedules, dates, and much more, please visit www.macworldexpo.com.
If a picture is worth a thousand words, this camera is worth a thousand dollars. With 3.34 megapixel resolution, the Olympus C-3030 Zoom is the fastest digital camera in its class. With an f2.8 3x zoom, Wide View LCD, full user-control (automatic or manual) and a longer-life battery, one thing is clear: You have every reason to be overprotective. For more details, visit www.olympus.com
"I used to think, 'If I have to be the lone holdout and try to use something other than Excel, then so be it.' Then I realized I may be a rebel, but I've also got a job to do."
name: "Jill"
age: 32
hobbies: Indie bands
        Organic gardening
        Kick boxing
APC introduces the best available for your Mac.

8 million computer users can’t be wrong about APC power protection

Don’t let a lightning storm destroy your Mac system in the blink of an eye. Your hard drive, modem and RAM are all at risk, not to mention peripherals like your zip drive, scanner, monitor and printer. Rely on an APC SurgeArrest® or an APC Back-UPS Pro® to save your investments from high voltage surges.

APC power protection also provides clean, continuous power that lets you function without frustrating interruptions, unlike cheap power strips that don’t prevent any of the power problems that can cause keyboard lock-ups, systems crashes, and lost Internet connections.

And if your system is ever damaged by a surge, even lightning, APC’s Lifetime Equipment Protection Policy will pay up to $25,000 to replace your equipment.* (see policy for details)

Discover why 8,000,000 customers trust in APC’s Legendary Reliability and protect your Mac system with an APC power protection unit today.

An APC Professional SurgeArrest Pro8T2 gives you:

• Enough outlets to protect your Mac system including displays, printers, scanners and more

• Telephone protection from surges and spikes

• Green “Protection Working” LED warns you if your APC circuitry has been damaged

• Red “Site Wiring Fault” LED automatically detects potentially dangerous wiring problems in the wall circuit

• $10,000 Equipment Protection guarantee purchased

• APC will replace your SurgeArrest free of charge under its lifetime product warranty

• Master on/off switch with an iMac colored configurable switch guards to prevent accidental turn-off

• Internet ready with two-line (4-wire) internet/fax/modem surge suppression

An APC Back-UPS Pro 500 USB also provides:

• Emergency battery power for continuous uptime to help save your data through brief power outages

• Auto-shutdown software that saves your files and data, even when you’re away from your computer

• Audible and visible alarms alert you to power events as they occur

• $25,000 Equipment Protection guarantee

• 2 year comprehensive warranty

• iMac colored configurable speaker guards to match your computing environment
Enter to win a clear APC Back-UPS Pro® 500 for your Mac!

Enter to win APC's legendary power protection for your Mac, a $179.99 value!
All entrants will also receive an "Are You at Risk" Kit. (See APC's Web site for complete promotion details)

Enter now: Visit http://promo.apcc.com  Key Code u145z  Call 888-289-APCC x8983  Fax 401-788-2797

©2000 American Power Conversion. All Trademarks are the property of their owners. APC/DIGITAL-US  •  Phone: 401-788-2797  •  Fax: 401-788-2797  •  E-mail: apcinfo@apcc.com  •  132 Fairgrounds Rd., West Kingston, RI 02892 USA

Circle 72 on card or go to www.macworld.com/getinfo
Knees Banging Your Chin?

Bending your head over the handlebars and shouting out “Vroom, Vroom” won’t move you any faster — or get you any closer to your dream job.

Our clients value the time we spend getting to know you, your skills, and your goals, so that HireKnowledge associates are uniquely positioned ahead of the others as qualified, tested, guaranteed candidates.

Whether you’re looking for more challenging contract work — and more of it — or a permanent position that makes the most of your unique talents, we can get you there.

Visit www.hireknowledge.com or call 800-937-3622.

HireKnowledge. Putting Intelligence to Work.
Burn, Baby, Burn

I THOUGHT YOUR FEATURE ON DVD-RAM drives was great ("Hold Everything," May 2000). But I wasn’t clear on one thing. The writer claims that if you’ve been using a CD-R or CD-RW drive to burn discs or make music CDs, you won’t find the mechanics of DVD-RAM so foreign.

Does this mean I can use DVD-RAM drives to make audio CDs?

DALBELLO
Toronto, Ontario, Canada

Unfortunately, although DVD-RAM and CD-RW drives burn data in a similar way, you can’t burn your own music CDs with DVD-RAM drives. You can store audio on DVD-RAM discs, but only in data form—your music will not play back. Burning audio discs on the DVD-RAM media is impossible since they don’t conform to Red Book Audio encoding standards.—Kelly Lunsford

The MP3 Underbelly

WHAT SORT OF FANTASY WORLD IS Macworld living in? In “The Macworld Web Searcher’s Companion” (May 2000), I read that “most people are using MP3 programs just to rip their CD collections to their hard disks,” followed by a description of how struggling artists use MP3 technology to distribute their songs.

This may be Macworld’s dream of MP3 technology’s ideal use, but the reality is illegal exchange of copyrighted material.

BRIAN C. HALL
Notre Dame, Indiana

For coverage of the darker side of MP3s, check out our story “Steal This Song” elsewhere in this issue.—Ed.

Rocket in My Pocket

I’VE USED A ROCKET eBook FOR almost six months, and I have to disagree with your review of the NuvoMedia Rocket eBook Pro (Reviews, May 2000).

The reviewer’s main objections were to the Rocket eBook’s weight and its “bottom-heavy” curved shape. But it weighs about the same as a regular hardcover book, and I have no problem holding it, even with my tiny hands. My mom, who has arthritis, doesn’t either, and she certainly enjoys the nicely lighted screen and the larger fonts.

If the reviewer had experimented a bit longer than two hours or read the directions, he would have discovered that the Rocket eBook can rotate to suit the reader, so that the heavy bottom actually resembles the spine of a hardcover, fitting the reader’s hand just like a book. If the Rocket eBook were completely flat, as the reviewer would seem to prefer, the reading experience would be more like reading a tablet than a real book. I would find that tiring.

The inflated price of electronic books is a problem if you just want electronic reprints from traditional publishers, but there are other options. Companies that publish only to electronic formats offer good, reasonably priced e-books that don’t fit the neat niches of paper publishing. Free books in the public domain are another option.

MARILYNN BYERLY
High Point, North Carolina

T he rocket eBook Pro’s $269 price tag seems like quite a fee for a device designed to display electronic books. For years now, I have been able to carry around several electronic novels on my Palm III. With any Palm OS-based handheld and third-party shareware, you can have a Palm and an e-book in one device. Compared to loading novels on a PDA or just buying a paperback, the Rocket eBook seems like a bulkier, more expensive way to catch up on reading.

PHILIP MCCULLOUGH
Tucson, Arizona

Wrong Turn in GPS Review

I LOOK FORWARD TO READING YOUR reviews each month to help me make educated buying decisions. But after reading your review of the DeLorme Earthmate GPS (Global Positioning System) receiver (Reviews, May 2000), I will take reviews in your magazine with a grain of salt.

It appears to me that Macworld sent Ben Long out into the streets of San
LETTERS

Francisco to try this product without much knowledge about the needs of people who spend a good part of their lives on the road. I have used a GPS receiver with Street Atlas 6.0, and it is a good product that gets a bad rap from this reviewer.

Long’s comment that receivers can be off by as much as a city block shows his lack of experience on the road. If this system can get me within a block of my desired destination in a strange city, that will more than please me. As it is, on many occasions I have found that Street Atlas 6.0 put me right in front of the address—not a block away.

Long’s suggestion that users invest in a good road atlas again shows his lack of experience. A road atlas will not tell you which way to turn at the next intersection or, for that matter, in which direction you are actually traveling. And it is much easier to drive while following the arrow on the Street Atlas window than it is to drive while tracing your progress on a map or atlas.

Thank you for your article discussing all the recent good news—and bad news—for Mac gamers ("Careful What You Wish For," The Game Room, May 2000). Like many iMac owners, I also own a PC. I buy Mac-PC games whenever possible, particularly since the dual-platform version is often cheaper than the Mac-only version.

I do think sales of Mac games are somewhat underreported. Stores invariably ring up combination Mac-PC games as PC sales. When I fill out the registration card, often it doesn’t ask whether I’m using a Mac or a PC. These sales thus look to all the world like PC sales—despite the fact that I’m actually playing the game on my iMac.

Daniel Gonneau
Astoria, New York

To Partition or Not to Partition

My new G4 has a whopping 27GB hard disk, and I presumed that partitioning was a good idea. I rang Apple to ask for advice on how many partitions to make. To my surprise, the company said this wasn’t necessary. I know the size of blocks is no longer a problem with the new method of formatting. However, I thought dividing up the disk would speed performance. Everyone I ask tells me something different. Can you help?

Phillip Pulfrey
Moutreux, Switzerland

A partitioned drive may run slightly faster because the file directory is smaller, but you’d scarcely detect this difference on modern drives.—Ed.

DV Blues

Our office was considering the purchase of a digital video camera. Your April 2000 issue arrived in the mailbox just in time to help us make up our minds ("Camcorder Casting Call"). The Sony DCR-TRV10 was our final choice—partly due to the fact that you made it an Editors’ Choice.

Imagine our dismay when we discovered that the memory stick reader that ships with the DCR-TRV10 will only interface with a serial port and Windows software. Your reviewer mentioned that the memory stick needs a special reader. He did not mention that the shipped version is not Macintosh-compatible.

Sony would not exchange the serial device for a new USB reader or a PCM-CIA reader for my PowerBook. But the
company did finally sell us those items at a discount.

Macworld should have caught and mentioned this problem.

Thomas Jordan
Batavia, Illinois

Sony now sells the MS AC-US1 Memory Stick USB reader for about $70.—Ed.

You’re the Top, Mr. Pogue!

I know you can’t answer all your mail. Just take note somewhere that whatever you’re paying David Pogue can’t possibly be enough. I had a bad case of Mac sickness this morning, but his latest column healed me (“Secrets of the Software License Agreement,” The Desktop Critic, May 2000). I’m sending him love telepathically.

Bev Anderson
San Francisco, California

I just read your article on license agreements and how nobody reads them. Well, Apple has issued one for attendees of the Apple Worldwide Developers Conference 2000. Here is a little tidbit: “You also agree that you will not use these products for any purposes prohibited by United States law, including, without limitation, the development, design, manufacture or production of nuclear missiles, or chemical or biological weapons.”

Curses, I was really hoping to design something special with OS X. There goes my life’s purpose.

Nicholas Straker
Phoenix, Arizona

Letters should be sent to Letters, Macworld, 301 Howard St., 16th Fl., San Francisco, CA 94105; via fax, 415/442-0766; or electronically, to letters@macworld.com. Include a return address and daytime phone number. Due to the high volume of mail received, we can’t respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld.

CORRECTIONS

The review of Details 3.0.1 (Reviews, May 2000) referred to AEC’s project-management software as SureTrack. The correct name of the program is FastTrack Schedule. Primavera Systems produces SureTrack.
It's not easy being obsessive.

But most good designers are,

and the last thing you need is

a distorted image. Fortunately,

Sony's FD Trinitron® displays

feature a virtually flat screen,

high-contrast coating and

an ultrathin aperture grille.

Which produces enhanced

image definition and

astonishing detail. And now,

with the Multiscan® FW900

and its 16:10 double page

display, you have even

greater opportunity to obsess.

You can thank us later.
FX Trinitron

www.sony.com/obsessed
“So I’m talking to a client and I ask if she wants the files as a Word doc or something else? We had a good laugh over that one.”
name: "John"
age: 23
hobbies: Bauhaus design
        Poetry slams
        Lara Croft
Design is ever changing, dynamic. From initial concept, through production and revisions, the entire process becomes faster and easier with VectorWorks.

Productivity of Object-Based Design
VectorWorks' next-generation Object technology accelerates the design process. Now, creating common design elements is effortless. Objects such as doors, windows, nuts and bolts can be created and edited with a simple mouse click.

Strength and Proven CAD Technology
The Best Selling CAD software on the Mac and, an emerging standard on Windows, VectorWorks provides everything you need for 2D drafting and 3D modeling. But, that's not all. An integrated database tracks costs and materials, and built-in presentation capabilities can literally help you sell the job.

The VectorWorks Advantage
With VectorWorks you get it all—The productivity of Object-Based Design combined with the flexibility and control of proven CAD technology.

Giving you an extra edge, VectorWorks ships FREE solutions for Architecture, Landscape, DTM, Theatre Lighting and Mechanical Engineering among others. And, VectorWorks' built-in scripting environment makes creating custom solutions, and automating routine tasks easy. No other CAD program offers so much for so little!

Add-on Products Expand VectorWorks Core Capabilities

RenderWorks—Bring your designs and animations to life with realistic textures and dramatic lighting and shadowing effects.

VectorWorks ARCHITECT—The ultimate in architectural CAD. Integrate Design, Production and Project Management into a system delivering unparalleled productivity.
Memo to the CEO

SPEEDMARK'S REBIRTH HERALDS THE RETURN OF MEANINGFUL MAC BENCHMARKS

DEAR COLIN:

Read your note re: the status of Macworld benchmarks. Frankly, I've been a bit reluctant to respond because, as the old joke begins, I've got some good news and some bad news.

First, the bad news. As you know, Macworld has been using MacBench as our baseline Mac testing tool, primarily because it quickly delivers accurate, repeatable results. That our readers can also get a copy of MacBench and test their own Mac's speed is an added benefit.

MacBench was great in a world where multiple vendors all sold variations of one Mac platform. Unfortunately, we no longer live in that world.

MacBench Broke

Late last year, the arrival of the PowerPC G4 broke MacBench—the tool's internal algorithms were not designed to take the Velocity Engine into account, so test values returned looked exactly like the G3's (without the Velocity Engine, the G4 is basically a G3). So we studied what it would take to get MacBench to the point where its results would be relevant for all Macs. Here's what we found:

A complete rewrite of the CPU test and all CPU-dependent tests would be required to support the G4. As part of the update, we'd have to decide how sensitive the new test should be to the Velocity Engine. After all, not all Mac applications are currently Velocity Engine savvy—and some key applications will never be able to take advantage of the G4 subprocessor.

Multiprocessing is also a challenge for MacBench—a single-processor test. This hasn't been a problem because multiprocessing Macs have never been a major factor on the platform. It's clear now that will change this year. The challenge, then, is creating a CPU test that can gauge discrete G3 and G4 speeds and multiple G4 speeds—all on not one but two operating systems, Mac OS 9.X and Mac OS X.

On top of all this, if we go to the trouble to do a ground-up rewrite of MacBench, could we get it to deliver test results that make sense relative not only to other MacBench numbers, but also to a user's experience?

After many conversations with Apple, and much research and debate in the Lab, our answer was an emphatic no.

Experience the Difference

Then, it came to us. Speedmark, first developed four years ago, had been Macworld's suite of application-based tests that delivered a single number representing the performance of a system. Because it was based on applications, the results more accurately reflected a user's experience with a particular Mac model—the new Speedmark 2.0 tests things all users care about, including network, Finder, and game speeds. Yes, the difference between a 350MHz iMac and a 400MHz iMac won't look nearly as dramatic using Speedmark as it does using MacBench, but in the real world end users wouldn't see that dramatic a difference either.

And, because it's based on common tasks, it's processor and OS independent. To the degree that the applications and tasks it includes work with the Velocity Engine, Mac OS X, or multiple G4s, Speedmark will deliver an accurate number—both relative to other Speedmark numbers and to the experience of the user.

Real-World Testing

With this in mind, we've decided to drop further development of MacBench. Instead, we've developed a new version of Speedmark with an up-to-date suite of application and OS tests that can accurately profile the performance of any Macintosh (complemented by the appropriate individual application tests). Accordingly, we will standardize all system testing on Speedmark 2.0 as of the August 2000 issue.

With Speedmark 2.0, Macworld enters a new era of real-world benchmarks, where the results in print reflect real user experiences.

After all, how important is processor clock rate in measuring system performance? There are lots of reasons why a PowerPC clocked at a slower speed than an Intel chip runs faster: OS architecture, logic board design, I/O speed. A fast hard drive will affect the perceived speed of most computers much more than a 50MHz delta in clock rate. Now we'll have a way of factoring all these issues into a single number. And that will be the most useful benchmark for our readers.

The only thing remaining is to figure out how to explain this to our readers. An ad campaign? Expert testimonials? A "Try Speedmark" pavilion at Macworld Expo? I suppose I could always just publish this memo in the magazine.

But that would be too easy, right? m Benchmark Andy's column. Send your comments to visionthing@macworld.com.
"How the (expletive deleted) did they (expletive deleted) do that?"

Perhaps the highest praise in the Web industry.
Want people talking about your site? Consider our powerful Web software solutions to invigorate your Web site and your brand. Because if you want the best return on your investment, you might want to build a site that people will return to. For solutions to help you build, manage, personalize, analyze or make your site more engaging, visit macromedia.com. And see what the Web can be.
When good Macs go bad and fall from grace, it's good to know there's help nearby. Salvation is only a mouse-click away with the new TechTool Pro 3. Now featuring virus protection and conflict detection, TechTool Pro is the only program you need to help abolish the evil forces that have possessed your Macintosh. TechTool Pro 3 checks more aspects of your Macintosh than any other utility available. Period. Besides repairing and recovering damaged drives, eradicating viruses and catching the occasional software conflict; you can also test all those other critical parts of your system that other utilities simply ignore. Like RAM, logic board components, floppy drives, scanners, modems, internet connections and so much more. TechTool Pro even supports technologies like System 9.0.1, "Pure" HFS+, Firewire and USB drives, and all of the latest Macintosh models.

TechTool Pro can also help you in between times of trouble. Our disk and directory optimize features can help improve the performance of your Macintosh as well as help circumvent problems before they happen. The TechTool Protection control panel will regularly check your system so you don't have to. It will also back up critical directory data, so if something goes wrong, you'll be up and running in no time flat.

But just because TechTool Pro is the most advanced Macintosh troubleshooting utility available doesn't mean that it has to be difficult to use. Our easy-to-use interface makes checking and fixing your Macintosh as easy as pressing one button. For advanced users, expert access allows you to control and configure TechTool Pro in almost any way you wish.

So if Macintosh troubles are turning your life into a living Hades, check out the tool of the trade: TechTool Pro. After all, you have the most powerful computer in the world. Shouldn't you be using the most powerful utility?

*Purchase TechTool Pro 2 now and receive a free upgrade to TechTool Pro 3 when it ships in Q1 2000!
Politics and technology shouldn’t mix—but in Silicon Valley, they often do. Take Intel's quest to establish its own standard for plug-and-play peripheral connectivity. It created USB (Universal Serial Bus), a reliable if somewhat poky port for keyboards, mice, printers, and scanners. Then along came FireWire, an Apple-developed standard for high-speed peripherals and media devices such as hard drives, printers, and digital video cameras.

Call it connector envy or a sincere effort to improve its existing standard, but Intel is now developing USB 2.0, a high-speed version of its widely used serial connector. Who Wants to Go Faster? Intel claims that the increased speed will spur development of high-performance peripherals—everything from high-resolution videoconferencing cameras to more-advanced printers and scanners. Of course, FireWire already does that. What’s more, FireWire—also known as iLink in Sony products or IEEE 1394 on Windows-based computers—offers those connections in a variety of devices.

FireWire can reach theoretical speeds of 400 Mbps, even though there are no peripherals capable of testing that limit. And the specification will go up to 800 Mbps and 1,600 Mbps in the future. It offers the possibility of peer-to-peer connections, meaning that your DV camera can talk directly to your TV, stereo, and external hard drive without a computer.

USB Set Free? Despite the fact that FireWire is fast and is here now, Intel is pushing USB 2.0 as the real connection standard for both low- and high-speed devices on consumer PCs. The company promises speeds as fast as 480 Mbps from a flood of USB 2.0 peripherals that should hit the market in the next year or so.

Why is Intel pushing USB 2.0? It all comes down to the issue of cost. “Intel in general is very supportive of [FireWire] as a connection to consumer electronics,” says Jason Ziller, the company’s technology initiatives manager. “But today the additional cost of adding FireWire to the chip set has not been worth it.”

According to Intel, USB 2.0 will be less expensive to include on computer logic boards than FireWire, which comes with a hefty licensing fee. But avoiding the Apple tariff may not be enough to continues...
make USB 2.0 cheaper. To support older USB 1.1 devices on a new 2.0 system, the cards and hubs must support both speeds, which will result in a more complicated chip set. The same obstacles that make high-speed signals expensive in FireWire may also apply to USB 2.0. Still, if USB 2.0 is built into many PCs—and with Intel involved, that seems likely—its cost should drop quickly.

Then there's another small matter to consider: Intel, simply because it makes most of the computer logic boards in the world, can force the adoption of USB 2.0 by including it on all reference designs and by leaving out FireWire.

Publicly, Apple has been tight-lipped about the USB-FireWire debate. But privately, company executives are not impressed with USB 2.0. That makes Apple's public silence even more curious: if FireWire is a better choice for high-performance peripherals than even a souped-up version of USB, why not come out and say so?

The hype surrounding USB 2.0 may also be about Intel's pride. "Intel doesn't want to do it the FireWire way because it didn't invent FireWire," says Mike Mihalik, vice president of engineering at storage-device and peripherals maker LaCie. "What they're trying to do is control the technology. Intel can't do anything to alter the 1394 interface. . .[FireWire] was designed so that one day you could forget the computer altogether."

Intel says there's a place for both technologies, with USB dominating the consumer computer market while FireWire thrives in consumer electronics. "FireWire is far from seeing its doomday," observes Intel spokesman David Dickstein.

"Years ago I used to work with film, and I found that it got very cumbersome to shoot blind, develop the film, then edit manually," the 53-year-old resident of Portland, Oregon, says. "Now I can mix production and postproduction, changing the shooting halfway through if the editing or composition gives me a better idea."

The one drawback for Cohen? Powerful but affordable editing programs have been hard to come by. "Moviemaking is a hobby for me, and not something I can afford to pay the price for Final Cut or a similar application to do," he says.

But now Cohen has joined many other Mac users in taking advantage of Apple's (800/692-7753, www.apple.com) decision to release its iMovie video-editing software as a free download. More than 150,000 people downloaded iMovie the first week it was available.

Rated R for Restricted iMovie, which promises video assembly easy enough for everyday users, originally came bundled with the iMac DV. That left Power Mac and PowerBook owners with few video-editing options outside of low-end programs such as Strata's $249 VideoShop or high-priced packages like Apple's $999 Final Cut Pro.

Digital video has gained greater attention from Apple in recent months (see "Is Apple Going Hollywood?" News, July 2000). The company believes that desktop video will prove every bit as important to its fortunes as desktop publishing was more than a decade ago. "iMovie has taken that sphere of what you can use your computer for and blown it up to include more," says Jon Bass, group product manager of video applications for Apple.

Apple says the iMovie download will work on any Power Mac G4 or PowerBook with built-in FireWire, QuickTime 4.1, and Mac OS 9.0.4. But what Apple says its software requires and what that software will actually run on are not always the same thing.

G3 or Not G3? Indeed, Mac users on troubleshooting Web sites such as Macfixit.com and Macintouch.com have reported some success in getting iMovie up and running on both beige and blue-and-white G3s using operating systems as old as OS 8.5.3. "There are no technical reasons why users of G3s wouldn't be completely happy with iMovie," Bass says.

A few have even managed to install and run iMovie on
pre-G3 Macs with upgraded G3 processors and FireWire PCI cards. That doesn’t guarantee iMovie will work on older Macs. Some users who’ve ignored Apple’s system requirements report problems with speed and stability. Still, giving the software a try could be worthwhile if you’re an amateur director eager to make your first DV masterpiece. Best of all, you won’t have to risk a dime on untested software.

**Inks for the Ages**

Epson (800/873-7766, www.epson.com) thinks it has a solution in the form of longer-lasting inks—and studies from Wilhelm Imaging Research, which has a strategic partnership with the company, suggest that Epson may be on the right track.

The research firm, which tested the new inks for Epson’s Stylus Photo 870, 875DC, and 1270 printers, estimates that images produced with the inks can last from 6 to 26 years, depending on the paper used. Conventional “heirloom” photographs last longer, but the Epson prints were acceptable for consumer use and held up well compared with snapshots on traditional film. The 870, 875DC, and 1270 printers cost $299, $399, and $499, respectively.

Epson will target professional digital photographers with two new large-format printers. Special archival inks developed for the $4,495 Stylus Pro 7500 and the $8,995 Stylus Pro 9500 can last more than 100 years without fading if you use special papers, Epson says. (Add a Fiery RIP, and the prices rise to $9,495 for the 7500 and $13,995 for the 9500.) Both printers will ship in August.

For fine-art and portrait photographers who want print longevity at a lower price, Epson has developed the Stylus Photo 2000P. It can handle media (including photo-paper rolls) as wide as 13 inches and uses a new type of pigment ink to produce glossy, durable prints that reportedly can last 200 years on certain paper types. The printer retails for around $899 and should ship by early July.

**OS X Gets Closer to Reality**

EVPOLVING OS TO ARRIVE AS PUBLIC BETA

**by Philip Michaels**

For Avie Tevanian, Apple’s senior vice president of software engineering, it’s a light at the end of the tunnel. For CEO Steve Jobs, it’s “clearly the most important thing we’re doing at Apple.” It’s Mac OS X, the long-awaited upgrade to Macintosh Operating System.

Apple is planning to release a beta version of OS X to the public this summer. Continued...
Developers also have in hand OS X's fourth preview version, which contains several changes from the test version Apple has previously shown in public.

Ready, Set, Wait Apple calls the latest preview version "developer complete," meaning that software makers now have what they need to create applications that use OS X's Carbon and Cocoa APIs. "There are no more reasons you shouldn't be developing [for OS X]," Jobs told attendees at Apple's Worldwide Developers Conference in May.

But lost in the excitement is the fact that the company has delayed OS X's launch yet again. Jobs announced in January that a finished version would be ready this summer, but Apple would install the operating system on all Macs starting in January 2001. Now Apple doesn't expect completion of the final version of OS X before the end of 2000.

Aqua for the Rest of Us Still, the new developer preview is significant for the changes Apple has made to the Aqua interface. Previous versions of Aqua took a radical departure from Mac OS, but the latest edition of OS X contains several features that Mac users should find familiar.

Developer Preview 4 includes a more Mac-like Finder instead of the Next-style browser that appeared in earlier versions. Also, users can hide the browser toolbar and drag files onto the desktop. This edition restores the Mac OS 9 styles—dropped from previous versions of OS X—and the menu bar now displays the name of the application to which the active window belongs.

The Dock—the area at the bottom of the screen that offers a quick way to access applications, files, and windows—has undergone some tweaks as well. It now stores applications on the left side; files and windows go on the right. You can drag items out of the Dock to remove them, and you can store Web-site URLs there.

OS X also boasts tighter integration between Open GL and Quartz. For example, you can now use Quartz to create a 2-D image that can link with a 3-D Open GL image in a separate window. Modify the 2-D image, and the 3-D window instantly updates.

"We're creating a new OS and a new generation of applications," Jobs said.

for themselves, with not one but two ways to put the browser to good use.

Opera (www.opera.com) plans to release its first Mac browser this year, probably by the time you read this. The Norwegian company has also inked deals to make Opera the default browser on handheld devices under development by Psion and Ericsson.

Wireless World Opera seems like a natural fit for handhelds. At a time when the size of a browser such as Microsoft's Internet Explorer averages 5MB, Opera takes up only 2MB of a machine's hard drive. Besides its trim size, Opera boasts the most rigorous Web-standard compliance among browsers. It also offers full support for Wireless Markup Language, the markup component of Wireless Application Protocol (WAP). WAP is a set of technical specifications aimed at letting handheld users tap into a broad, universal set of services. Opera recognizes and complies with the standard, so users can do things like easily access WAP-enabled wireless networks.

Opera's support for these standards should come in handy with the Ericsson and Psion devices. Because those handhelds will include Opera—and because it supports a protocol that many wireless networks use—the slim browser is poised to become a key player in the growing market for mobile computing software.

Opera CEO Jon von Tetzchner says the company is concentrating not on dominating a specific market, but rather on making a good browser. "Our focus is always the browser," he says. "And our goal is to make surfing the Web on any device more efficient, more fun, and more productive."
Better analysis

The all-new, all-Mac SPSS 10 makes a difference

Get answers to your toughest business and research questions with SPSS 10 for Macintosh.

Work with large datasets. Conduct analysis and gain insight with visualizations, reports and statistics. Create models that more accurately predict the future. Publish a final report with interactive tables and charts.

Make better decisions when you provide better information about your customers, citizens, respondents or patients.

Read more about this analytical powerhouse and the hundreds of new statistics and other features now available via a true Macintosh interface. Visit www.spss.com.

What if you could access your data wherever it resides? What if you could produce “live,” interactive output for others to work with? What if you could classify respondents into clear, distinct segments? What if you could build accurate, predictive models for any type of outcome? What if you had the power to do all of this on your Macintosh? Chances are, you would discover better, more accurate answers — so you make better decisions.

As the leader in statistical analysis and data mining, SPSS' people, processes and technology take you beyond reporting to deliver in-depth analysis, predictive models and visualization, which enables you to take action faster and get better results.
Adobe LiveMotion.
Web animation.
Tight integration.
Killer.

Push your content to the extreme with Adobe® LiveMotion™ software—a brand new application for creating web graphics and interactive animation. Developed for seamless integration, LiveMotion has the Adobe interface you already know from Photoshop®, Illustrator®, After Effects® and GoLive™. Which means a fast learning curve. And some insane animation. It even supports many popular file formats, including Flash™ (.swf). Go see LiveMotion in action at www.shredtheweb.com

Inspiration becomes reality™
19-Inch Flat-Screen Displays

MONITORS OFFER PREMIUM QUALITY, LOW PRICE

Tempted by the high resolution of Apple's 21-inch Studio Display but lack the cash or desk space? Consider a more affordable and compact 19-inch monitor. The de facto standard for Windows PCs, the 19-inch display is equally at home on a Mac system. But the ten models we evaluated are no garden-variety displays; with their flat CRTs, they offer accurate color and reduced glare. The best news: you can have one for less than the price of Apple's 16-inch Studio Display.

It's about Control

What do you give up when you don't buy an Apple-branded display? Besides stylish plastics, you lose the ability to adjust the display via the Monitors control panel. And although all the models we reviewed have built-in controls that offer every imaginable adjustment, some of them are less than intuitive. With the Hitachi and Viewsonic models, for example, you have to pay close attention to whether you're selecting a control or changing a setting for a selected control, and we found Sony's novel DisplayMouse confusing to use. The other displays had more intuitive controls; those on the Hewlett-Packard, Samsung, and NEC models were the easiest for us to navigate and use.

One advantage of these displays is full compatibility with Windows computers. If you use a Mac and a PC and need a single monitor for both, consider the Mitsubishi Diamond Pro 900u, which offers dual upstream USB ports—a unique feature that earned this display a Macworld Editors' Choice Award in 1998.

To Our Readers

Macworld will no longer be using MacBench, as it does not adequately represent current applications or the way our readers use their Macs. We will be using Speedmark 2.0, a suite of common, everyday tasks. For more information about Speedmark 2.0, visit www.macworld.com/speedmark.

The True Test

To assess overall image quality, Macworld Lab assembled a jury of typical Mac users and asked them to rate each monitor's performance with both color and grayscale Adobe Photoshop images and a Microsoft Excel spreadsheet. We set all displays to 1,152 by 870 pixels and millions of colors (24 bits).

With the color scan, the jury scrutinized each monitor's sharpness, brightness, contrast, detail, overall color cast, color saturation, and color accuracy. Our testers found that all the displays produced excellent results, with the exception of the Hitachi CM771, NEC FE950, and Sony Multiscan G400. The NEC and Sony...
models exhibited a noticeable color cast, while the Hitachi had pronounced moiré distortion in the corners. Princeton's AGF900 was the leader, with the sharpest and most natural-looking image overall.

The Hewlett-Packard P910 did an excellent job of displaying our gray-scale images. The other monitors also performed well, although slight color casts on the NEC and the Sony Multiscan E400 earned them only fair scores, and the Hitachi scored poorly due to its moiré distortion.

In all cases, you can make adjustments to fix the color cast—and even the Hitachi's moiré problems—if you're willing to invest the time it takes to coax every ounce of performance from your display. However, adjustments can't help a monitor that inherently lacks sharpness. In our final and most telling test, we looked at a typical spreadsheet document and assessed each monitor's overall sharpness and text readability. The Diamond Pro 900u performed a tad better than the other displays that had excellent sharpness: the Hewlett-Packard P910, the Viewsonic PF795, and the Diamond Plus 91. The others received fair ratings, except for the Hitachi CM771, whose grainy phosphor pattern was readily apparent.

The Sony and Mitsubishi models have manuals with extensive Mac setup information. Mitsubishi includes a universal Mac adapter with the Diamond Pro 900u (it's optional with the Diamond Plus 91). Sony includes a Mac adapter with both models we tested, and NEC will provide a Mac cable when you call a special toll-free number. The other manufacturers leave it up to you and your dealer to source the correct adapter for your model.

Macworld's Buying Advice
If you spend most of your time editing images, consider the Hewlett-Packard P910 or Princeton AGF900—these models performed best with gray-scale and color images, respectively. If you work with a mixture of images and text, the Hewlett-Packard, both of the Mitsubishi models, and the Viewsonic PF795 are all worthy candidates. If you're price-sensitive but still want a strong performer that's easy to configure, take a look at Samsung's SyncMaster 900 IFT. And although the Mitsubishi Diamond Pro 900u is expensive, you just can't beat its performance, features, and out-of-the-box Mac compatibility.—JEFF PITTELKAU

### 19-Inch Flat-Screen CRT Displays Compared

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Mouse Rating</th>
<th>List Price</th>
<th>Contact</th>
<th>Dot Pitch (mm)</th>
<th>Maximum Resolution</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewlett-Packard</td>
<td>P910</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1/2</td>
<td>$737</td>
<td>800/792-0900 <a href="http://www.hp.com">www.hp.com</a></td>
<td>0.24-0.25</td>
<td>1,600 x 1,200</td>
<td>Excellent image quality and intuitive on-screen menus; first-year on-site service; expensive.</td>
</tr>
<tr>
<td>Hitachi</td>
<td>CM771</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1/2</td>
<td>$479</td>
<td>800/488-2244 <a href="http://www.hitachidisplays.com">www.hitachidisplays.com</a></td>
<td>0.21-0.22</td>
<td>1,600 x 1,200</td>
<td>Low cost; the lowest-performing model in our round-up; confusing controls.</td>
</tr>
<tr>
<td>Mitsubishi</td>
<td>Diamond Plus 91</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1</td>
<td>$479</td>
<td>800/843-2515 <a href="http://www.mitsubishi-display.com">www.mitsubishi-display.com</a></td>
<td>0.25-0.27</td>
<td>1,600 x 1,200</td>
<td>Excellent image quality and reasonably intuitive on-screen controls.</td>
</tr>
<tr>
<td>Mitsubishi</td>
<td>Diamond Pro 900u</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1</td>
<td>$599</td>
<td>800/843-2515 <a href="http://www.mitsubishi-display.com">www.mitsubishi-display.com</a></td>
<td>0.25-0.27</td>
<td>1,600 x 1,200</td>
<td>Excellent image quality and reasonably intuitive on-screen controls; dual upstream USB connections.</td>
</tr>
<tr>
<td>NEC</td>
<td>FE950</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1</td>
<td>$499</td>
<td>800/284-4484 <a href="http://www.nectech.com">www.nectech.com</a></td>
<td>0.25-0.27</td>
<td>1,792 x 1,344</td>
<td>Only fair image quality but very intuitive controls.</td>
</tr>
<tr>
<td>Princeton</td>
<td>AGF900</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1/2</td>
<td>$539</td>
<td>800/747-6249 <a href="http://www.princetongraphics.com">www.princetongraphics.com</a></td>
<td>0.25-0.27</td>
<td>1,600 x 1,200</td>
<td>Very good image quality; reasonably intuitive controls.</td>
</tr>
<tr>
<td>Samsung</td>
<td>SyncMaster 900 IFT</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1/2</td>
<td>$499</td>
<td>800/637-1337 <a href="http://www.samsungmonitor.com">www.samsungmonitor.com</a></td>
<td>0.2</td>
<td>1,600 x 1,200</td>
<td>Very good image quality and on-screen controls.</td>
</tr>
<tr>
<td>Sony</td>
<td>Multiscan E400</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1/2</td>
<td>$479</td>
<td>888/315-7669 <a href="http://www.ita.sel.sony.com">www.ita.sel.sony.com</a></td>
<td>0.24-0.25</td>
<td>1,800 x 1,440</td>
<td>Very good image quality but confusing DisplayMouse control.</td>
</tr>
<tr>
<td>Sony</td>
<td>Multiscan E400</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1/2</td>
<td>$599</td>
<td>888/315-7669 <a href="http://www.ita.sel.sony.com">www.ita.sel.sony.com</a></td>
<td>0.24-0.25</td>
<td>1,800 x 1,440</td>
<td>Very good image quality but confusing DisplayMouse control; supports higher refresh rates than E400.</td>
</tr>
<tr>
<td>Viewsonic</td>
<td>PF795</td>
<td><img src="https://www.macworld.com/2000/08/images/mouse-rating.png" alt="" /> 1/2</td>
<td>$625</td>
<td>800/888-8583 <a href="http://www.viewsonic.com">www.viewsonic.com</a></td>
<td>0.25-0.27</td>
<td>1,920 x 1,440</td>
<td>Excellent image quality but less-than-intuitive controls.</td>
</tr>
</tbody>
</table>
You are a master of code.

A genius. An artist.

But that project you just got was due yesterday.
NEW MACROMEDIA DREAMWEAVER ULTRADEV* lets you create database-driven Web applications faster than ever before. It also allows you to create ASP, JavaServer Pages™ and CFML applications in a single design environment. So whether you love working directly with source code, or prefer to work visually, cut the time it takes to create employee directories, product catalogs, database search pages, and more. Artist, genius, speed demon—that's you.

macromedia.com/ultradev

macromedia® what the web can be.
**iMovie**

FREE, FRIENDLY DV-EDITING SOFTWARE

WANT TO TEST THE WATERS of digital-video (DV) production? Need to create simple videos for business presentations or personal Web sites? Apple has a program for you, and it's free. iMovie is the video-editing software that Apple bundles with the iMac DV and iMac DV Special Edition, which contain FireWire ports that can connect to DV-format camcorders. The combination of FireWire and iMovie makes it easy and downright fun to bring high-quality digital video into the Mac, edit it, then record it back to tape.

Initially, the only way to get iMovie was to buy one of the iMac DV models. But reports soon surfaced that iMovie also ran on other Macs, including blue-and-white G3s as well as G4s—all of which have FireWire ports. Owners of these Macs begged Apple to bundle iMovie with the Mac OS or at least sell it separately. Apple responded to the ruckus by making iMovie free for the downloading. Was Apple's generosity inspired in part by Microsoft, which has announced plans to include an iMovie-like program with its forthcoming Windows Millennium Edition? Who cares? What counts is that iMovie is blissfully simple, surprisingly capable, and absolutely free.

**Big Download, Bigger Exaggeration**

iMovie 1.0.2 weighs in at nearly 20MB. If you want to avoid the lengthy download, you can order an iMovie CD-ROM for $20; it includes tutorial footage the downloadable version lacks. That footage aside, the downloadable iMovie is identical to the version bundled with the iMac DV.

iMovie's system requirements call for a Power Mac G4 or FireWire-equipped PowerBook running Mac OS 9.0.4 and QuickTime 4.1 or later. Actually, iMovie also runs beautifully on blue-and-white Power Mac G3s and under Mac OS 8.6. I tried iMovie on an older (Revision B) iMac and it worked fine, although its installer crashed when the iMac's screen resolution was set to 640 by 480 pixels (the installer didn't have a problem at higher resolutions). Many users have even reported running iMovie on beige Power Macs containing G3 upgrade cards and third-party FireWire cards.

Camcorder compatibility is another story, however. One of the beauties of FireWire is that it enables device control—iMovie controls your DV camcorder as you press the on-screen play, rewind, and stop buttons. But this works only if you're using an iMovie-compatible camcorder or video deck (see Apple's list of iMovie-compatible hardware at www.apple.com/imovie/). Stray from this group and you risk problems such as an inability to record a completed project back to tape.

**No Manual Needed**

iMovie's online help is great, but you probably won't refer to it often—iMovie is that easy to use. (For some insights into the program's subtleties, see "iHome-Movie Magic," April 2000.)

iMovie divides the screen into several regions (see "On the Set"). A monitor region displays video from a FireWire-connected camcorder and shows a preview of your epic. To its right is the shelf, which holds movie clips as well as still images (iMovie imports PICT, JPEG, GIF, Windows BMP, and Photoshop image formats).

Below the shelf are four buttons. Depending on the button you click, a tool palette slides out that enables you to add visual transitions between scenes, create titles that can be superimposed over a scene or over black, import music from audio CDs, or add sound effects from iMovie's small library of effects.

Across the bottom of the screen is iMovie's timeline-like clip viewer, where you do most of your editing. To add a freshly captured scene to a movie, drag it from the shelf into the clip viewer. To add a transition between two scenes, drag the transition icon to the clip viewer, and the two scenes separate to make room for it. It's all so straightforward that you'll be making movies in minutes.

When you've finished, you can record your movie back to digital videotape via FireWire, with iMovie controlling the camcorder. You can also export to a standalone QuickTime movie that you can post on a Web site, include in a PowerPoint presentation, or burn to a CD.

Although iMovie excels at simple editing, it falls flat at more advanced tasks. Its audio features are weak—you can't separate the audio and video of a scene so you can cut away to a second shot while the first shot's audio continues to play. Nor can you precisely adjust volume levels so that, say, background music fades slightly when narration begins. iMovie also lacks the range of effects found in programs such as Adobe Premiere and Apple's Final Cut Pro—you can't pan across a still image, composite one video clip within another, or create slow-motion effects.

**Macworld's Buying Advice**

iMovie's lack of glitzy special effects isn't significant, given the program's intended audience and applications. But its weak audio features do make many common video-production techniques cumbersome or downright impossible. In the end, though, criticizing iMovie for these shortcomings is like criticizing the toy surprise inside a box of Cracker Jack. iMovie is splendid software, and it's free. Go download it now.—Jim Heid

**Rating:**

**Pros:** Extremely easy to use; runs on wide range of Macs.

**Cons:** Limited audio and effects features.


**List Price:** Free (CD-ROM version, $20).

**On the Set**

iMovie's clean, easy-to-use interface boasts all the features you need to make digital videos.
The Quantum® Snap Server is the ideal solution for upgrading your network storage. It offers the perfect combination of quick and easy installation at prices far below what you’d pay for a traditional server. And while the Snap Server works like a Mac and fully supports AppleTalk and Macintosh TCP/IP networks, it is the only network-attached server that is fully compatible in all computing environments, including NT, Windows 2000, NetWare, Linux and Unix. So now you can seamlessly integrate both the creative and business communities on one server. The Snap Server is also pre-configured, so you really just plug it in and turn it on – with no network downtime. In fact, it’s so hassle-free it installs in less than 5 minutes!

Call 1-888-343-SNAP, or visit www.snapserver.com for more information.
InDesign 1.5

MAJOR UPGRADE FOR PROMISING PAGE-LAYOUT PROGRAM

WHEN ADOBE FIRST SHIPPED InDesign 1.0, the page-layout program felt premature—as if the company needed to get something out the door but had only a square table with three legs. Sure, it was usable, but at what cost in the time and energy of users? Fortunately, Adobe mobilized its forces, stayed focused, and took advantage of InDesign’s modular structure to release version 1.5 only six months later, solving many of the first version’s most glaring errors and omissions. InDesign 1.5 is a table with four legs now, though it still wobbles something fierce every now and again.

Amazing Turnaround
Adobe paid attention to users and reviewers when it came to fixing some of the most glaring deficiencies of InDesign 1.0 (see Reviews, December 1999). Version 1.5 improves on the crippled path-editing tools—you can now select and modify more than one point at a time on a path (or even points on different paths). And InDesign 1.5 boasts text-on-a-path features that not only match QuarkXPress’s but far exceed those in Adobe Illustrator.

Adobe has also slightly improved InDesign’s frustrating text-runaround features. Instead of relying solely on physical frames for controlling text wrap, InDesign 1.5 can recognize embedded paths and alpha channels in bitmapped images. Unfortunately, InDesign is still brain-dead when it comes to EPS files created in Illustrator or FreeHand: the only way to run text around the shapes of such graphics is to either create a frame based on an image preview or drag the images into InDesign. The latter solution is less than ideal, as it transforms your single image into a collection of objects.

InDesign 1.5 can also use the alpha channel or path information to create a clipping path for a placed graphic. However, unlike QuarkXPress, InDesign makes you convert clipping paths into frames (boxes), so it’s still infuriatingly easy to move an image while leaving its clipping path behind. Adobe needs to rethink its entire concept for working with frames and clipping paths in InDesign.

Other new features include an eyedropper for sampling and applying colors, vertical justification for text frames, and new control characters that indent text or send it to new positions. Adobe has also resolved one of version 1.0’s most glaring deficiencies: whereas InDesign formerly required a separate (and expensive) program to trap files, the new version’s impressive native trapping feature can trap to its own objects as well as to placed raster graphics (though not to placed EPS images).

Still MIA
Despite all these new features, InDesign needs many more before we’ll consider it a killer app. It still lacks long-document features such as table-of-contents generation, indexing, and style and page-number synchronization between documents. You can’t yet combine spot and process colors, as you can in QuarkXPress. PageMaker users who switch to InDesign won’t find a Story Editor feature. And unbelievably, InDesign still has two separate keyboard shortcuts for accessing the Grabber Hand: the option key when you’re inside a text block, and the spacebar when you’re not.

You should ignore Adobe’s minimum hardware requirements; most users report that they need a G3 or a G4 with at least 128MB of RAM to use InDesign with any degree of efficiency. In addition, because the program opens so many files as part of its plug-in architecture, some users have had to upgrade to Mac OS 9 to avoid error messages warning them that they have too many files open. Finally, watch how your Mac OS RAM usage expands while InDesign is running—an increase from 40MB to 70MB is not uncommon.

Even when your system meets these requirements, InDesign can run surprisingly slowly. Just a few graphics on the page can slow down screen redraw; you may find that even a text-only chapter gets terribly bogged down. And InDesign can take forever to spool a short document to a laser printer.

Upgrade Revolt
One of the most interesting aspects of InDesign 1.5 isn’t a feature or a performance enhancement, but its upgrade policy. When Adobe first announced an upgrade price of $99, existing users had a quick and loud reaction. Adobe backed down and offered the upgrade free to anyone who had paid full price for InDesign 1.0; for everyone else, it changed the upgrade price to a much fairer $30. Within a week after Adobe posted the new upgrade policy, the revolt was over. (InDesign 1.5 is not backward-compatible, so if one person in a workgroup decides to upgrade, everyone else should follow suit.)

Macworld’s Buying Advice
It’s astonishing that Adobe managed to release such a significant upgrade in such a short time. Added to InDesign’s already superb typography, master-page innovations, native export to PDF, multiple levels of undo, and familiar Adobe interface, the new features make version 1.5 completely suitable for short or single-page documents. We never felt comfortable recommending InDesign 1.0 to desktop-publishing pros, but with this new version InDesign finally begins to merit comparison with QuarkXPress.

—DAVID BLATHER AND SANDIE COHEN

RATING: ★★★★★
CONS: Onerous hardware requirements; slow performance; no long-document features

Palettes in the Midst
InDesign 1.5’s redesigned interface lets you center text vertically and place it along the outside edge of the frame.

RATING: ★★★★★
PROS: Improved path manipulation and text-on-a-path features; native trapping; innovative typography options
CONS: Onerous hardware requirements; slow performance; no long-document features
You think the Internet is safe. Think again...

NetBarrier and VirusBarrier. The ultimate Internet security solution for Macintosh.

All Macs connected to the Internet (dialup, DSL, cable-modem) are exposed to hackers and viruses. Whether you are a home user or a corporate user, your data interests them. That's why you need a security solution that only NetBarrier and VirusBarrier can provide.

Licences available
5, 10, 20+

See us at Macworld NYC Booth #655

www.intego.com
1-877-9-INTEGO

Macworld
MacNN
Macworld
Intego
CDW
ClubMac
DEPOT
MacWard
Outpost.com
www.intego.com

800-509-4239 800-258-2622 800-622-3381 800-221-8180 800-217-9492 800-255-6227 800-436-0606 877-688-7678

Mac and the Mac logo are trademarks of Apple Computer, Inc., registered in the U.S. and other countries. Outpost.com™ is a trademark of Cybernet Outpost, Inc. All other trademarks belong to their respective owners. Illustration: Kim Gary ©1999 Antilla Stock Images.
500MHz G3 Upgrade Cards

TOP-OF-THE-G3-LINE PROCESSOR UPGRADES

APPLE HAS MOVED ON—from beige to blue to the latest graphite- and-white G4 systems—but you and your older Power Mac G3 may not be prepared to follow. If a new Power Mac G4, or even a G4 processor upgrade for your beige or blue-and-white Power Mac G3, would bust your budget, consider a less-expensive G3 processor upgrade for your beige or blue-and-white Power Mac G3, would bust their backsides.

The Sonnet Encore G3 and XLRS's Mach Carrier G3 install in the Zero Insertion Force (ZIF) sockets of the desktop and minitower beige Power Mac G3, all-in-one G3, and blue-and-white Power Mac G3. Although we received XLRS's 500MHz G3 processor bundled with the CarrierZIF Upgrade Adapter, you can get the processor-only Mach Speed G3z for $50 less.

Installation is a simple affair with all four cards. The Newer, PowerLogix, and XLRS upgrades come with some kind of driver and control panel for configuring their backside-cache speed. The Sonnet upgrade doesn't require additional software, but you also can't configure it. After installing the software for those upgrades that require it, you simply swap the old processor for the new one. Newer's and Sonnet's manuals offer the clearest instructions for installing the card.

There's very little real-world difference between these upgrades. Each of the four accelerators runs at 500MHz and carries a 1MB backside cache, so it's not surprising that they all yielded similar results. The Newer upgrade produced the best scores, with the PowerLogix and XLRS cards close on its heels. The Sonnet accelerator consistently lagged behind the other three. All four significantly outperformed a 350MHz blue-and-white Power Mac G3.

Those who wish to overclock the processors will find the difference between upgrades most apparent. XLRS provides extensive charts for setting jumpers and switches to increase processor speed. The PowerLogix card sports a dial for this purpose but offers fewer settings. Newer provides no information for overclocking its upgrades via the four DIP switches, while Sonnet actually prevents you from changing the processor speed.

Macworld's Buying Advice

Given its relatively low price and slightly better performance, we favor Newer Technology's Maxpower G3-G3. The PowerLogix PowerForce G3 performs nearly as well but is a bit more expensive. If XLRS offered its highly configurable 500MHz Mach Carrier G3 (or Mach Speed G3x) upgrade at a lower price, it would be worth a look. The Sonnet Encore G3, although it's the easiest to install and the least expensive, is our last pick due to its slow speed and lack of software and hardware configuration options.—CHRISTOPHER BREEN

Behind Our Tests

We tested each upgrade card in a Power Macintosh G3/350 with Mac OS 9, 128MB of RAM, a default system disk cache of 4MB, and virtual memory disabled. We set displays to 768x1280 and 24-bit color. We performed Photoshop tests with a 50MB file; we set Photoshop's memory partition to 80MB and Photoshop History to Minimum. We tested MP3 encoding with an audio-CD track that was 9 minutes and 29 seconds in length and converted it using a default setting of 128 Kbps in SoundJam 2.2. We tested Quake III at a resolution of 640 by 480 pixels, with graphics set to Normal. 

Reviews

Encore G3


Mach Carrier G3


Maxpower G3-G3


PowerForce G3


UPGRADES GIVE G3S A SPEED BOOST

Best results in red. Reference systems in italics. Speedmark 2.0 scores are relative to those of a 350MHz iMac, which is assigned a score of 100. Adobe Photoshop results are in seconds. SoundJam results are in minutes:seconds. Quake III results are in frames per second.

Macworld Lab Test

SPEEDMARK 2.0  |
QUAKE III  |
PHOTOSHOP 5.5  |
SOUNDJAM  |

Newer Technology Maxpower G3-G3 — 142 | 33.2 | 30.9 | 28.2 | 2.32
PowerLogix PowerForce G3 — 139 | 33.0 | 32.3 | 31.5 | 2.33
Sonnet Technologies Encore G3 — 138 | 32.0 | 33.6 | 33.4 | 2.32
XLRS Mach Carrier G3 — 138 | 32.2 | 33.2 | 31.9 | 2.32
Apple Power Macintosh G3/350 — 138 | 31.3 | 36.7 | 35.9 | 2.31

Longer bars are better. Shorter bars are better.

We tested each upgrade card in a Power Macintosh G3/350 with Mac OS 9, 128MB of RAM, a default system disk cache of 4MB, and virtual memory disabled. We set displays to 768x1280 and 24-bit color. We performed Photoshop tests with a 50MB file; we set Photoshop's memory partition to 80MB and Photoshop History to Minimum. We tested MP3 encoding with an audio-CD track that was 9 minutes and 29 seconds in length and converted it using a default setting of 128 Kbps in SoundJam 2.2. We tested Quake III at a resolution of 640 by 480 pixels, with graphics set to Normal. SpeedMark is a suite of common tasks (see www.macworld.com/speedmark).—Macworld Lab testing supervised by Ulyssis Bravo
Color is fun.

Color makes everything better. Color is cool. And color is what Minolta-QMS laser printers do better than anyone else. No other laser printer comes close to our color-matching technologies. Not to mention our full color duplex printing at up to 2400 dpi and up to speeds of 12 ppm in color and 24 ppm in monochrome. Minolta-QMS color laser printers.

We out-color the competition. To learn more, visit us at www.qms.com or call 1-800-523-2696.
Animation Master Millennium

INEXPENSIVE 3-D CHARACTER ANIMATOR

Modeling and animating organic creatures and objects is a difficult task no matter what program you use, but Animation Master Millennium makes it easier by providing 3-D tools that do more than just rotate logos and shapes. The latest incarnation of Hash's venerable 3-D modeling, animation, and rendering tool offers a powerful combination of features and options traditionally found only in more-expensive programs.

Use the Patch

Animation Master models are made up of patches, a major advance in 3-D technology. Models defined with patches take up less memory and disk space than traditional polygon-based models, and you can scale and deform them more easily because equations describe the curves rather than just a series of straight lines between vertices.

Modeling in Animation Master closely resembles drawing in Adobe Illustrator or Macromedia FreeHand, making it easier for artists to handle the transition to the third dimension. To create a patch, you click on a series of points in the 3-D space; the program then draws a spline curve through those points. Animation Master offers standard lathe and extrusion tools, but you can also join splines by dragging a control point on top of another point and pressing a button; three or four points in an enclosed shape make up a patch. The flexibility of patch modeling makes small tweaks—or even adding limbs—much simpler tasks in Animation Master than in many other modelers.

One disadvantage of the patch system is that you won't find enormous libraries of models in the Animation Master format. You can import DXF-format models from other programs, but this may require so much additional work that you'll find it faster to build models from scratch in Animation Master.

Bones! Action! Render!

As its name implies, Animation Master excels at creating not only organic shapes but also ones you can animate. Once you've created a model, you can define animations as reusable actions. Each action has its own timeline, with keyframes that store changes from the original model's position and structure. To create both muscular and skeletal movement, you can either move the model's control points or use linked bone structures. The CD-ROM includes a model of a standard human skeleton for creating bone structures.

You can apply skeletal and muscular actions to other models, and the pose feature makes it easy to reuse actions. When you define a pose, that definition stores the modifications to the model elements. Attach a pose to a model during animation, and a slider bar lets you control how much of the pose to apply at that particular time.

A second level of animation takes place in the Choreography window, where you position models in relation to each other and then apply and combine actions and poses. To make a character walk across a surface, you create a model, define a walking action that moves the legs in relation to the body, insert the model into the Choreography window along with any scenery you want, define a path for the character to follow, and apply the action to the model. An animation of a man walking across a field might consist of a model, a path drawn in the Choreography window, and a walking action. One of Animation Master's strengths is its ability to combine building blocks of objects and simple actions to create complex creatures. With a few mouse clicks, you can make a walking and talking character by combining two actions in a choreographed setting. The actions are separate, so you can stop the walking action at any point but still have the lips in motion.

Another nice touch is the ability to add sound to the animation timeline. Because Animation Master lets you synchronize action and audio, you don't need a digital video editor to add sound to movies rendered in Animation Master, nor do you have to make several renderings to synchronize a prerecorded sound. Scrubbing the timeline in Animation Master works just as in a video-editing program, defining how sound and image are synchronized. With the Dope Sheet feature, you type in text to match the audio track, and Animation Master breaks the words into phonemes—an invaluable aid for the lip-syncing process.

We did run into a couple of annoyances. You must have the cross-platform CD-ROM in the drive each time the program starts up. Also, the user interface needs polishing—it's very tricky to control docking of floating palettes, we found unselected control points small and difficult to see, and the program has subtly different methods for drawing the splines for models and those for animation paths.

Macworld's Buying Advice

Animation Master Millennium's wealth of features makes it robust but adds to its complexity: you'll need artistic talent and ample learning time to turn your office into the next Disney or Pixar studio. If your goal is to use animated 3-D characters to tell a story, though, Animation Master makes the task about as easy and affordable as it gets.—DARRELL PLANT

RATING: •••• PROS: Powerful; inexpensive; can build and reuse libraries of animations.
1200 dents and 800 scratches.
Make that 1200 dents and 798 scratches.

A beat-up negative impresses no one. Fortunately, the Super Coolscan® 2000 film scanner uses Digital ICE™ technology to automatically remove scratches and other surface defects. And of course there are superior Nikkor optics for great image quality, Nikon's Color Management System that ensures color matching, hot swappable film adapters, and auto-feed. This isn't just a scanner. This is one mean machine. 1-800-NIKON-UX.
Broadband Internet Routers

HARDWARE ROUTERS SPEED UP AND NETWORK YOUR HOME COMPUTERS

With cable and DSL Internet connections becoming less expensive and more widely available, users are ditching dial-up modems and second phone lines in favor of these high-bandwidth DSL alternatives. Until recently, connecting multiple computers to such hardware meant paying higher monthly ISP fees. Enter broadband routers: these devices let multiple computers (PCs or Macs) share a single cable or DSL Internet connection, and can network your home computers too.

Macworld Lab tested six broadband routers ranging from $149 to $399: the Hawking Technologies PN9225, Linksys EtherFast, Macsense XRouter and XRouter Pro, Netgear RT311, and MaxGate UGate-3000. The routers present varying degrees of setup difficulty, but all of them will have your computers networked and online in no time.

Configuration Considerations

All the routers except the Netgear RT311 offer simple Web-based configuration. (The Netgear unit requires that you download a Telnet application and use its command-line interface; the company says the RT311 should allow Web-based configuration by the time you read this.) You can configure the routers over the Web using any browser-equipped computer—running the Mac OS, Windows, Unix, or Linux—on your home network.

We tested the routers over a DSL connection with a static IP address and found the Linksys EtherFast and MaxGate UGate-3000 easiest to set up, requiring only a few minutes to install the hardware, connect our Macs to the router, and get online. The hardest to configure was the Hawking PN9225, which requires you to first configure your Mac with the IP information from your ISP, then hook up the router and configure it. With the other routers, you simply set the configuration in the TCP/IP control panel to Configure Using DHCP Server. Your Mac configures itself to use the router, and you then set up the router with your Web browser.

If you have a static IP address from your ISP and you want to run a Web or file server (such as Mac Personal Web Sharing), you can configure one or more machines on your network with a static IP address from the router. You then configure the router to allow only certain Internet traffic access to those machines. If you have a dynamic IP address, consider the UGate-3000: it includes a year of free Dynamic DNS service.

One difference among these routers is their Ethernet connection. The Hawking and Netgear units require a hub but will work at 10 or 100 Mbps, so they can connect to a network of either speed.

The Linksys EtherFast (top) and the Macsense XRouter Pro.

The Linksys EtherFast and Macsense XRouter Pro have built-in four-port 10/100 switches; the UGate-3000 sports a built-in four-port 10/100 hub. The Macsense XRouter offers only four 10BaseT ports—which is fine for sharing an Internet connection but could make for slow transfers of large files between locally networked machines.

Macworld’s Buying Advice

You can find inexpensive software routers (for example, Sustainable Sofiworks’ $89 IPNetRouter; see Reviews, January 2000). However, they require that you dedicate one machine to running the software, and they won’t speed up your network. If you want a faster network and a shared Internet connection, the Linksys EtherFast and Macsense XRouter Pro are your best choices.—BRETT LARSON

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Mouse Rating</th>
<th>Company’s Estimated Price</th>
<th>Contact</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawking Technologies</td>
<td>PN9225</td>
<td>3 ½ / 5</td>
<td>$149</td>
<td>888/662-8828  <a href="http://www.hawkingtech.com">www.hawkingtech.com</a></td>
<td>Small footprint and inexpensive, but difficult setup.</td>
</tr>
<tr>
<td>Linksys</td>
<td>EtherFast</td>
<td>4 ½ / 5</td>
<td>$199</td>
<td>800/546-5797  <a href="http://www.linksys.com">www.linksys.com</a></td>
<td>Easy setup and good price.</td>
</tr>
<tr>
<td>Macsense</td>
<td>XRouter</td>
<td>3 / 5</td>
<td>$200</td>
<td>800/642-8860  <a href="http://www.macsense.com">www.macsense.com</a></td>
<td>Easy setup but slow file transfers.</td>
</tr>
<tr>
<td>MaxGate</td>
<td>UGate-3000</td>
<td>3 / 5</td>
<td>$399</td>
<td>800/284-8985  <a href="http://www.maxgate.net">www.maxgate.net</a></td>
<td>Simple setup but a bit pricey.</td>
</tr>
<tr>
<td>Netgear</td>
<td>RT311</td>
<td>3 / 5</td>
<td>$199</td>
<td>888/638-4127  <a href="http://www.netgear.com">www.netgear.com</a></td>
<td>Easy to add to existing network, but command-line configuration interface is confusing.</td>
</tr>
</tbody>
</table>
THE LACIE POCKETDRIVE™ Measuring just 3.5" x 5.75" x 1" and weighing a mere 12.5 oz., it's the hard drive equipped with both USB and FireWire™ connections, and available in either 6 or 18 gigabytes of portable storage.
America Online 5.0

MAC UPGRADE'S MINOR TWEAKS OFFER MIXED BAG

With its ubiquitous TV commercials and the free software that arrives unbidden in your mailbox, America Online has always promised one thing: simplicity. Install the software, log on to AOL, and soon you're firing off e-mail like an old pro. Knock the service all you want, but for the 2 million-plus Mac users who subscribe to AOL, that simplicity is a big draw.

With AOL 5.0, the latest version of the ISP's software for the Mac, simplicity is still a factor. Indeed, the most impressive additions in AOL 5.0 are tweaks that make it easier to navigate the growing online community. But the upgrade focuses on the additional services—from a personal calendar to a digital photo album—that make AOL an online destination. And all too often, simplicity gets lost in the shuffle.

No Mac Makeover

The latest version offers few major changes; the high-profile additions, such as My Calendar, My Places, and You've Got Pictures, have already appeared in AOL's Windows software or on the company's Web site. And although the new Mac-only features are nice, they're hardly stuff that will change the way you use AOL.

Still, some of the changes in AOL 5.0 are quite useful. Mac users can now attach files to their e-mail messages by dragging and dropping them into the Attachments window (now AOL just needs to master the art of making attached files consistently readable); the new Download Manager simplifies locating files; and the You've Got Pictures feature lets you drop off film for development at a participating retailer and have the prints e-mailed back. Also, you can now create up to seven screen names and switch between them easily without logging off.

The problem is, many of these convenient features don't go far enough. For instance, My Places lets you pick five links to include on your Welcome screen. Unfortunately, you can only choose AOL channels; you can't program in a favorite URL or a frequently visited Web site.

The search button in AOL's main tool bar scours AOL features and the Internet, but produces vague results. When we typed in "Macintosh," for example, we got four AOL categories and a host of Web pages. But the top ten results included an IBM press release for ViaVoice and a home page for a Mac repair service in Oregon—not exactly useful.

My Calendar, My Nightmare

Other new AOL 5.0 features need more than a little refinement. My Calendar stands out as one of the biggest misfires. AOL touts it as an online organizer that lets members track appointments and special events online. A search feature lets users add local concerts, shows, and sporting events to My Calendar—a nice idea, but the calendar features of PDAs and other online services are much less frustrating to use. Look for San Francisco events, for example, and you'll get only a listing of venues, not the actual events they're offering. This is a time-consuming way to search, and you get few listings for outlying cities.

Adding events is almost as maddening. For instance, My Calendar lets you mark when your favorite TV shows air, but entering just one episode of a program took us five clicks. If you want weekly reminders for the show, that's an extra click. That may seem inconsequen-

tial, but as AOL's service is already known for sluggishness, My Calendar can turn into a huge time sink.

Apart from drag-and-drop capability, the Mac-specific features failed to excite us. Mac users can now view animated GIF files and listen to embedded sounds in e-mail from other Mac-using AOL members—not exactly a cutting-edge feature. New speech-synthesis, file-storage, and sorting features are equally bland.

Downloading the AOL 5.0 upgrade takes some time—28 minutes to nearly 2 hours, depending on the speed of your modem. Installation on a hard disk via CD-ROM is much faster, but the bottom line is that upgrading to AOL 5.0 may not be worth the effort.

Macworld's Buying Advice

There's not much in AOL 5.0 to impress Mac subscribers. Most of the new features either don't go far enough or sacrifice simplicity for useless bells and whistles. AOL users who are happy with version 3.0 or 4.0 have little reason to upgrade, and Mac users new to AOL should be aware that the service's famed ease of use gets lost amid the clutter of version 5.0.

—Philip Michaels

RATING: **½  PROS: Adds convenient new features; brings feature parity with Windows version.  CONS: No major new features; My Calendar is cumbersome; Mac-specific tools are unexciting.  COMPANY: America Online (800/827-6364, www.aol.com).  LIST PRICE: Free (monthly service fee varies; unlimited use is $21.95 per month).
Hit the road with the latest evolution in portable digital audio players from the rebel leader of the music revolution. Whether your passion is alternative, hip-hop or the fringes of spoken word, Rio delivers a listening experience way beyond mainstream electronics.
Now Up-to-Date & Contact 3.9

RESURRECTED PIM IS STILL A WINNER

Back in the mid-1990s, NOW Software's Now Contact and Now Up-to-Date had bested the majority of their PIM counterparts in features and user loyalty. Suddenly, those programs became unwitting passengers on the product-acquisition roller coaster: Qualcomm bought Now Software and then immediately lost interest in the products it had acquired. As a result, the QuickContact and QuickDay features, which provided contact and schedule information in the menu bar, broke in Mac OS 8.5 and never got fixed. Worse, Palm Pilot users were left with the executables Now Synchronize (see Reviews, August 1997). With the release of Now Up-to-Date & Contact 3.9 by new owner Power On Software, the ride has come full circle—the products aren't substantially different, but Power On has updated them to work with today's Mac OS and to support Palm devices.

Longtime users will be pleased to see that QuickContact and QuickDay (actually rewritten in version 3.8) now work with Mac OS 8.5 and later versions. For the most part they work well; from the menu bar, you can access or add frequently used contact information and the day's appointments and events. QuickContact falls short in telephone dialing features, however—it can't use the internal modems in iMacs or G3 or G4 tower machines. Power On has promised to address this problem in a future release.

The main applications remain virtually unchanged from version 3.8; Power On has yet to update the programs to the current Mac look-and-feel. In some areas they show their age—for example, listings of long-dead e-mail programs appear in Contact's preferences. The networking features are fortunately still robust: you can share calendars and contact files with other users through a central server, and changes you make to your client files go automatically to the server and to other users' files. Power On now includes the contact and calendar servers with the base product, along with Now Web Publisher, which lets you publish calendar files on the Web.

The sole new feature in version 3.9 is synchronization with Palm OS devices, and it's a winner. We tested the new conduits with an old Palm Pilot Professional, a Palm IIIxe, and a Handspring Visor Deluxe and found that they did an excellent job of synchronizing data. The Handspring was especially quick at HotSyncing, thanks to its USB cradle. Now Up-to-Date & Contact sometimes contains data that doesn't translate directly to the Palm, but Power On provides intelligent workarounds.

Macworld's Buying Advice
If you've stuck with your old versions of Now Up-to-Date and Now Contact because they were the best (or only) multiuser PIMs, you can breathe a sigh of relief. Back from the brink of doom, the package works well with modern Macs and is once again in active development. Palm synchronization finally works correctly, to the joy of handheld users; if you use a Palm OS device, version 3.9 is a must-have upgrade. If you're still using one of the Now Software versions, it makes sense to upgrade and regain full functionality with newer versions of the Mac OS. But if you've already upgraded to 3.8 and you don't use a handheld, wait for version 4.0.—Tom Negrino

FaxElite 5.0

RELIABLE NETWORKED FAXING

Fax Elite 5.0 includes client and server components. You must buy one server pack and then pick a client pack for as many users as you need. The single-user version doesn't require the server pack. You choose one Mac with a fax modem to host the server—you don't have to dedicate it to the task. The server can also be a client.) We set up both the server and the clients quickly and easily, and sent our first test fax just minutes after installation.

The client software consists of the fax printer driver, which appears in the Chooser, and three applications: FaxStatus displays the server's fax queue and lets you change and delete queued items; FaxViewer lets you view, print, and delete faxes; and FastFax lets you send quickie text faxes. FaxElite lacks OCR (optical character recognition) capability, but you can export received faxes as TIFFs, which any OCR product can read.

FaxElite uses the familiar method of holding down certain keys to print documents to fax rather than to a printer. From the printing dialog box, you can add cover pages, control the fax's resolution, add attachments, and preview the fax before sending.

Installed on a 604e-based Umax clone that was also running AppleShare IP and other server software, FaxElite's server software performed very well. Faxes spoofed smoothly from the clients to the server, where they queued up for sending. Because FaxElite renders outgoing faxes on the server, all the fonts in the document must be in the server's System Folder, or you'll get unpredictable font

FaxElite 5.0 includes client and server components. You must buy one server pack and then pick a client pack for as many users as you need. The single-user version doesn't require the server pack. You choose one Mac with a fax modem to host the server—you don't have to dedicate it to the task. The server can also be a client.) We set up both the server and the clients quickly and easily, and sent our first test fax just minutes after installation.

The client software consists of the fax printer driver, which appears in the Chooser, and three applications: FaxStatus displays the server's fax queue and lets you change and delete queued items; FaxViewer lets you view, print, and delete faxes; and FastFax lets you send quickie text faxes. FaxElite lacks OCR (optical character recognition) capability, but you can export received faxes as TIFFs, which any OCR product can read.

FaxElite uses the familiar method of holding down certain keys to print documents to fax rather than to a printer. From the printing dialog box, you can add cover pages, control the fax's resolution, add attachments, and preview the fax before sending.

Installed on a 604e-based Umax clone that was also running AppleShare IP and other server software, FaxElite's server software performed very well. Faxes spoofed smoothly from the clients to the server, where they queued up for sending. Because FaxElite renders outgoing faxes on the server, all the fonts in the document must be in the server's System Folder, or you'll get unpredictable font
Facile Facsimiles FaxElite 5.0's fax dialog box exemplifies the program's clean, uncluttered interface.

substitution. An incoming fax triggers the server to notify the fax administrator, who checks the fax and forwards it to the correct recipient over the network. Alternatively, you can have the server automatically archive or print incoming faxes for distribution by sneaker-net. Network faxing requires AppleTalk over Ethernet; Glenwarne says a future version will add TCP/IP networking.

FaxElite comes with plug-ins that allow automated faxing through several database programs, including FileMaker Pro. And FaxElite's extensive AppleScript support makes it easy to create AppleScript droplets, onto which you drag and drop documents for delivery to the people you fax most often.

This is such a well-thought-out product that coming up against its shortcomings is a bit jarring. For example, you can't annotate received faxes, there's no Windows client, FaxElite won't accept a phone calling card for billing, and the program logs outgoing faxes but not incoming ones. Most annoying is the lack of smart dialing, which drops the area code for local numbers in your fax phone book.

Macworld's Buying Advice

For companies that want to enable users to share a fax modem, FaxElite 5.0 is the only Mac product still in active development. The program isn't inexpensive, but its cost is much more justifiable than the expense of equipping users with dedicated modems and phone lines. If you want networked faxing from the Mac, FaxElite is worth a look.—TOM NEGRINO

RATING: PROS: Networked faxing; good AppleScript and database support. CONS: No fax annotation, smart dialing, or Windows client; mediocre fax logging. COMPANY: Glenwarne Limited (sales@faxelite.com; www.faxelite.com). LIST PRICE: Single-user version, $90; server pack, $59; multiuser client packs, $129 for 3 users to $1,699 for 50 users.

---

**News and Stock Tickers**

**INTELLINEWS AND MACTICKER BRING NEWS AND STOCK QUOTES TO YOUR DESKTOP**

The idea of relying on a daily newspaper to bring you the day's events seems almost quaint, particularly when you can access up-to-the-minute information via the Internet. The hitch is that gathering a wide range of information from the Internet, bouncing from one Web site to the next, takes time. But thanks to two new products from Aladdin Systems, your bouncing days may be over.

IntelliNews 2.0.1 and MacTicker 1.6.2 bring information to your Web-connected Mac. As its name implies, IntelliNews focuses on news—including technical, financial, world, U.S., science, health, entertainment, sports, and Mac-related stories, along with weather information and stock quotes. MacTicker skips the news but provides far more comprehensive stock information than IntelliNews and also tracks mutual funds and indexes.

Both IntelliNews and MacTicker let you control the frequency of updates (you can also refresh data manually with the push of a button). Although IntelliNews refreshes headlines no more than every 15 minutes, you can set it to refresh stock information every 15 seconds and sports scores every minute. You can configure MacTicker to update stock prices and indexes every minute and mutual fund information every 15 minutes. In both programs, the sources used generally delay stock quotes 15 to 20 minutes.

IntelliNews' friendly interface offers a rectangular window containing buttons that lead to headlines, sports scores, weather information, a user-configurable list of stocks, and an index of Mac-related Web sites (known as stations). You can also add your own stations to the list. When you double-click on a headline, IntelliNews launches your default browser and displays the Web page containing the story. Double-clicking on one of the stations brings its headlines into a window within IntelliNews.

As useful as IntelliNews is, it's missing a search function. IntelliNews would also benefit from a sort feature that filtered news by source, for example, or configured the Sports window to display only baseball information.

Similarly, although MacTicker is a fine source of nearly current financial market information—providing details on the day's opening price, lows and highs (both daily and 52-week), and earnings and dividends shares—it lacks a portfolio feature where you can enter information such as your stock's purchase price and the number of shares you own. Otherwise, MacTicker is well laid out, displaying financial information in easy-to-read boxes and a scrolling ticker.

**Macworld's Buying Advice**

Although both IntelliNews 2.0.1 and MacTicker 1.6.2 provide information you could find free on the Web, those resources won't deliver it in a neat package right to your desktop. If you're a news junkie or dedicated follower of finance, IntelliNews and MacTicker may be just the ticket for you.—CHRISTOPHER BREEN

---

**IntelliNews 2.0.1**


**MacTicker 1.6.2**

FTP Client Pro 3.0

FILE-TRANSFER TOOL SYNCHRONIZES OVER THE INTERNET

A

ALMOST NOBODY SIMPLY TRANSFERS files between computers in the same building anymore—today’s users move files over the Internet, between computers that may not even be located in the same country. File Transfer Protocol is a platform-independent method for copying files around the world, but its quirky behavior makes it tedious to use for such routine chores as uploading Web-site content or updating files. The latest release of Vicomsoft’s FTP Client Pro, which has always had an elegant interface, adds features such as file synchronization to make these chores painless.

FTP Client Pro 3.02 offers a Finder-like view of files on remote systems, with drag-and-drop support for both downloading and uploading. You can customize the view to display the particular attributes that interest you—file name, type, size, date changed, and so on—and set up remote and local file-system views side by side for easy comparison. The utility uses suffix mapping and its Smart Translation feature, which examines the contents of files during downloading, to automate file-transfer conversions; it supports Windows, mainframe, AS/400, and many other proprietary server types. If a transfer gets interrupted midstream, the program can pick up where it left off once it reestablishes a connection.

New in this release is a sophisticated synchronization feature that lets you copy changed files from a local directory to a remote one and vice versa. The synchronization process properly avoids expanding compressed files, and it copies modification dates from the most current system rather than setting them to the current date, features other file-synchronization utilities lack. It also takes into account time differences with the remote location and can operate in a two-pass mode to propagate changes in one directory to the other.

A Persistent Download option makes the utility keep trying to download a file from a busy server while you do other work in the foreground. The 3.02 release also supports a number of new server types and offers improved compatibility with existing servers. Other enhancements include a streamlined interface, audio alerts for completed and failed downloads, support for MacBinary III, direct URL parsing, and the ability to make FTP Client Pro your browser’s preferred FTP download tool.

Macworld’s Buying Advice
FTP Client Pro 3.02’s slick interface and handy new features make it a must-have utility for anyone moving files over the Internet. Even if all Vicomsoft had done with the new release was add a few features, FTP Client Pro would be at the top of its class. But the company made one other change sure to please users: it cut the price by almost half.

|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|=|
Upgrade to new Toast™ 4 Deluxe

and burn music, multimedia and data CDs. It opens a world of possibilities far beyond the software that came with your CD-Recorder. Now with new PhotoRelay™ software you can view, sort and organize your photos, illustrations, scanned images, movies, sounds, and fonts in customized media catalogs.

You can also pull MP3 files from the Internet, as well as favorites from LPs and cassettes, to create your own compilation CDs. New CD Spin Doctor™ software removes hisses, pops and clicks from old recordings—your music is reborn in stunning digital quality. Get new Toast 4 Deluxe and satisfy all your burning desires.

Available from your retailer or contact us at: www.adaptec.com/toastsw5 or 1-800-442-7274.

Satisfy All Your

Burning Desires.

Delivering the promise of a digital world.™

©2000 Adaptec, Inc. All rights reserved. Adaptec, the Adaptec logo, Toast, CD Spin Doctor, and PhotoRelay are trademarks of Adaptec, Inc., which may be registered in some jurisdictions. All other trademarks and service marks are owned by their respective owners. Our software is designed to work in conjunction with material in which you own the copyright or have permission to copy from the copyright owner.
USB Web Cameras
VIDEO AND STILL IMAGES ON THE CHEAP

ADDITION A VIDEO CAMERA TO your USB Mac for Internet videoconferencing and quick image snapping is quite easy—and with the USB interface's cross-platform compatibility, you have more Mac video cameras to choose from than ever. Macworld Lab looked at two recent contenders, 3Com's HomeConnect USB and iRez's Kritter USB. Both offer the painless setup we've come to expect from USB devices, but they're quite different when it comes to image quality.

Initial setup is simple: just install the included drivers (or download them, in the case of the HomeConnect) and capture software. Restart your Mac, plug in your USB camera, and you're ready to start filming.

Once the cameras were set up, we noticed qualitative differences. The Kritter's video was superior to the HomeConnect's—smooth, with no dropped frames—but the image was dark, like a bad videotape copy. However, changing its settings to capture smooth video at various levels, from 16-bit grayscale to millions of colors, was easy.

The HomeConnect excelled in overall image quality, but the prerelease Mac software we downloaded from 3Com's Web site (the camera comes with Windows software only) was buggy, and we had a devil of a time making movies with it. Although we tried many of the included compression settings, the video always looked jerky and suffered from dropped frames. If you're willing to buy different video-capture or video-conferencing software and download just the HomeConnect's drivers, you'll get better video and still images. We had good results using the HomeConnect in conjunction with the $199 Sorenson Broadcaster, the $100 ClearPhonePPC, the $15 BTV 3.2.6, and the $149 SiteCam 5.0. (The Kritter is also compatible with all of these packages, but they don't yield better output than the camera's own software.)

NetTen 1.4
MAIL SERVER DELIVERS UNIX POWER

Tenon InterSystems specializes in wrapping friendly Mac interfaces around powerful Unix applications. With NetTen 1.4, Tenon seeks to provide an industrial-strength, standards-based mail server for the Mac. NetTen incorporates widely used Unix applications—PostOffice for mail and BIND for DNS—into a single Mac program that hides the Unix environment from the administrator. The result is a unique combination of features and flexibility—and a management experience that the Macintosh faithful may find slightly uncomfortable.

NetTen is easy to install, taking less than 5 minutes, and has simple hardware demands (a Power Mac with 15MB of RAM and 50MB of disk space). Configuring the mail and DNS services is fairly straightforward, with NetTen's Web interface allowing remote administration from any browser-equipped computer. The management pages could use a more polished interface, and they require too many mouseclicks, though the Web forms do offer the benefit of hypertext links to topics in the online documentation. Administrators who really appreciate the bare-bones approach can perform much of the mail administration via e-mail, bypassing the Web interface entirely.

NetTen performed solidly during testing, providing reliable SMTP, POP, IMAP versions 4, and DNS services to Mac and Windows clients. The server supports multiple mail domains, and you can configure each account to receive mail for multiple addresses. Users can manage their own mail accounts via the Web, and administrators can limit mailbox size to avoid overflowing in-boxes. To thwart spammers, NetTen offers relay restrictions, source-address filtering, content filtering, and dynamic checks against the Mail Abuse Prevention System's list of known spammers.

For all its Unix power, NetTen is still missing a few relatively minor features. It doesn't provide any LDAP access to its mail directory or autoconfiguration of mail clients—features Qualcomm's $249 Eudora Internet Mail Server offers. NetTen's DNS doesn't support Dynamic DNS registration or service locator records, and it has no way to view or force an update of a secondary zone. It also lacks the DNS analysis tools and WebStar plug-ins found in Men and Mice's QuickDNS Pro.

Macworld's Buying Advice Administrators looking for sophisticated spam blocking, account aliasing, and DNS services will find NetTen 1.4 a reasonable value. Those looking for just a mail server—and a 100 percent Mac experience—might consider the less-expensive Eudora Internet Mail Server.

The HomeConnect's still-image quality was significantly better than the Kritter's, even when the camera was set to capture and display 640 by 480 pixels. And even after we made several adjustments to the Kritter, its images still didn't look as sharp. It also tended to warp images at the corners, giving them a fish-eye appearance.

Macworld's Buying Advice If you need to make quick movies for sending to friends and family by e-mail, the Kritter USB is an acceptable choice. If full-motion video is not a major issue, the HomeConnect USB offers better still-image quality.—BRETT LARSON

HomeConnect USB
RATING: + PROS: Great still-image quality. CONS: Mac software must be downloaded and is buggy; requires other cam software for better performance. COMPANY: 3Com (800/638-3266; www.3com.com). LIST PRICE: $190.

Kritter USB

Hold the Spam NetTen 1.4's sophisticated filters stop spam from reaching users.

Hold the Spam NetTen 1.4's sophisticated filters stop spam from reaching users.

Hold the Spam NetTen 1.4's sophisticated filters stop spam from reaching users.
Thank God everything's not powered by Voodoo5.

A superb design and publishing solution that combines unprecedented 3D realism with blistering QuickDraw performance and support for all major Mac API's—the Voodoo5—truly is the most powerful graphics accelerator ever built for the Macintosh. See for yourself @ www.3dfx.com.

Available for Macintosh and PC.

3dfx

50 POWERFUL, IT'S KIND OF RIDICULOUS.

Find 3dfx software at www.3dfxworld.com (partners)
**EndNote 4.0**

**SOLID UPDATE TO RESEARCH TOOL**

EndNote users who worried about the fate of their favorite bibliography manager when Niles Software was acquired last year can rest easy. ISI ResearchSoft has released EndNote 4.0 with a host of new features that make for a solid, if pricey, upgrade.

The roster of changes includes several welcome additions to the Library window. You can specify which fields to display, adjust column widths by dragging, and click on any column heading to sort the references on that field. The Library window also includes a collapsible preview panel that lets you see how references will appear in the final bibliography (see "In Style"). Finally, this version at last grants our oft-repeated wish for a horizontal scroll bar.

ISI has also beefed up EndNote's search functions. For example, you can save and reload complex search criteria and restrict searches to the first author listed. EndNote 4.0 retains its predecessor's ability to query Z39.50-compliant databases over the Internet or institutional intranets, but it also ships with connection files for more databases (217 in all).

Whenever you add references to a library, EndNote 4.0 saves the authors, keywords, and journals in term lists. As you enter text into a field, EndNote scans the appropriate term list for a unique matching entry and fills in the rest of the text for you. This feature saves keystrokes and minimizes errors when you have to reenter references manually.

EndNote's new Style Manager window makes it easier to add new bibliographic styles or edit existing ones, and you can specify which styles you want to appear in the Style menu. We also appreciate EndNote's new formatting options—for example, you can specify font and style settings for individual authors. Visible symbols now represent formatting characters, including tabs and carriage returns, so you can specify precisely how you want the bibliography to appear in your document. EndNote 4.0 also supports hanging indents in bibliography layouts. (We did run into a snag when we imported two of our old definitions, however.)

**Macworld's Buying Advice**

It's gratifying to see ISI continue to improve EndNote's interface and add to its feature set, but the $100 upgrade price ($80 for the downloadable version) is a bit steep. By comparison, a fully functional version of Research Software Design's Papyrus 8.0, which lacks some of EndNote's bells and whistles, costs only $89 (see Review, April 2000). Upgrade cost aside, however, EndNote 4.0 is a solid update to an already excellent research tool.—Franklin Tessler

---

**Ferazel's Wand**

**ENGAGING RUN-AND-JUMP ADVENTURE**

Anyone who's tried to take an eight-year-old to the movies in the last couple of years knows that few films at the local octoplex are both appropriate for younger viewers and entertaining for adults. One can say the same of computer games: those targeting teens and adults often overflow with violence and devilish compelxity, while diversions designed for children are often too saccharine for mature tastes. Ferazel's Wand, a side-scrolling run-and-jump adventure from Ambrosia Software, strikes a pleasing compromise that should make players of all ages happy.

You control Ferazel, the last of the free Habnabits, on a quest to destroy the evil Manditraki race, led by Queen Xichra. To defeat this insectoid horde you must leap, clamber, and fight your way through 23 levels of landscape. Along the way you'll battle a host of enemies, including poisonous spiders, evil goblins, and spine-flinging armadillos. In the lower levels your main weapon is a fireball spell; you pick up more exotic weapons as you progress.

Veteran gamers will see a striking similarity to such classics as Broderbund's Prince of Persia and Delta Tao's Dark Castle—especially if they've encountered Prince of Persia's spike pits and Dark Castle's venomous bats. One difference is that Ferazel's Wand doesn't require the split-second timing that those earlier games demand. When propelling Ferazel from a ledge to a nearby vertical wall, for example, your fingers don't get tangled up in the effort to issue several keyboard commands in perfect succession. The game is very forgiving when it comes to executing commands.

But Ferazel's Wand is no walk in the park. Although the first few levels are relatively easy, things get tricky a third of the way into the game—particularly when environmental conditions such as high winds and slippery ice demand more precise control of your character. (Don't worry, it's not too tricky for younger kids or even clumsy adults.) Adding to the challenge, you can save your game only in certain locations. These appear often enough to keep you from quitting in frustration, but infrequently enough to require careful planning of your moves.

Those accustomed to the lush graphics of many modern Mac games may find that Ferazel's Wand looks a bit cartoonish. Its graphics style has both good and bad points: although older users will wonder if they're playing a little kids' game, the absence of gruesome detail may convince adults to let their children play it.

**Macworld's Buying Advice**

Ferazel's Wand is a fun adventure that harkens back to some of the finest Mac games. What it lacks in graphical refinement it more than makes up for in compelling and challenging game play.—Christopher Brien

---

**In Style** EndNote 4.0's preview panel displays formatted references based on the currently selected bibliographic style.

**PROS:**
- Customizable Library window; autocompletion of entries; preview panel.
- Expensive upgrade.


**LIST PRICE:** $299.

**RATING:**
- PROS: Challenging and well-balanced game play; controls are not too finicky.
- CONS: Somewhat cartoonish graphics.

**COMPANY:** Ambrosia Software (800/231-1816, www.ambrosiasw.com).

**LIST PRICE:** $30.
Oh well, at least you can control your fonts.

So many things are out of your control in this world... even your personal space. If you’re feeling crushed by your surroundings, just practice this simple technique:

Breathe in. Imagine a world where your fonts are organized. Where you’re able to quickly preview fonts, print out sample pages, and make sure your workgroup has access to the same fonts. A place where your system runs faster and crashes less. Breathe out.

Still feeling pressured? Get new Suitcase 9, the font management solution from Extensis. It will take you to a peaceful valley of orderly fonts... in a world that’s out of control.

Suitcase 9 includes three free connections to Suitcase Server, so small workgroups can immediately coordinate their fonts.

NEW! Extensis Suitcase 9
www.extensis.com/ca 800.796.9798

© 2000 Creativepro.com, Inc. All rights reserved. Extensis and the Extensis logo are trademarks of Creativepro.com, Inc. Suitcase is a trademark of Symantec Corporation. All other trademarks are the property of their respective owners.
Driver
You are the Wheelman™

You are the difference between the Big House and a Big House in Malibu.

You are the fastest driver in the entire criminal community.

San Francisco
Film your own classic 70's car chase using incredible Director-Mode.

Los Angeles

Miami
Getaway through real pedestrians, traffic signals, traffic... and cops!

New York
No tracks. Just sprawling urban downtowns from NY to San Fran.

“A High Speed Thrill Ride!”
Newsweek

MacSoft
www.wizardworks.com/macosf
The Game Room

Now It’s Our Turn

FOUR WAYS WE CAN ENSURE THAT GREAT GAMES KEEP COMING TO THE MAC

by Christopher Breen

We Breens are slow to boil. When crossed, we tend to lightly simmer—sending up a single errant bubble that only hints at the greater heat within. But there are times when we, like the famed Popeye clan before us, have taken all we can stand and we can’t stand no more. In these rare moments, nothing short of a flak jacket, dental shield, and garland of garlic draped casually around the neck provides protection from our wrath—which may help explain the following:

I was at the home of an acquaintance who shares my enthusiasm for computer gaming. We were hovering over his G4, and as usual, I was listening to his latest diatribe. You see, he’s a loquacious sort and was just beginning the second movement of a fairly fruity rant regarding Apple, game developers, and what he considered their less-than-wholehearted support for Mac gaming. When I could get a word in edgewise, I explained that I’d certainly done my part by addressing these issues in this column—Apple could offer Macs with more-robust 3-D hardware acceleration, bundle games with new Macs, help developers defray the cost of promoting games by entering into co-marketing agreements, and seed upcoming hardware to game developers so they’d have the opportunity to test their products with Apple’s latest and greatest gear. And PC game developers eyeing the Mac market should be interested to know that Mac users want games that (a) include all the features found in the PC version, (b) support and reflect the Mac’s interface, and (c) don’t suck. But that didn’t seem to be enough for him.

“Well, you’re not getting through to them,” he railed. “They just don’t [expletive deleted] get it!”

Then he did something that turned up the Breen burner from Warm to Broil.

As he issued this verdict, he pulled out a CD-R plainly marked with these words in blue, Sharpie fine point: Unreal Tournament. He turned and stopped in mid—“So, howsabout we go online and kick some...” when he noticed that my face had changed from its usual cheery-pink Irish hue to a full, hearty burgundy. “You pompous ass!” I screamed.

“Wha...?”

“You have the nerve to slam Apple and game developers about ‘not getting it’ and then blithely shove a pirated game into your Mac?! You hypocrite!”

“Hey, what’s the big deal? So I pirate a few games. You should see all the games [name withheld to protect a PC pal of ours] has!”

If my brain hadn’t shut down at that point in order to avoid bursting from its casing, I might have suggested that we, as Mac gamers, are in a different situation from our pal Name Withheld. For PC game developers, creating games for Windows boxes is a necessity, but making or licensing games for the Mac is a choice—these folks don’t need us. Apple and PC game developers can walk on water and raise the dead, and it won’t mean squat if we, the Mac gamers, don’t make our own effort to turn the Mac into a game-friendly platform as well.

Now that I’ve calmed down, I’d like to gently offer Four Ways We Can Make a Difference.

Way One: Pungle Up

The primary reason they don’t port their games to the Mac, PC game developers say, is that Mac games don’t sell in numbers vast enough to justify the cost. Therefore our first mission is to increase the number of units sold by paying for the games we play. When we play games that we have no intention of purchasing, we give PC game developers one more reason to say “Nah, I don’t think so” when the subject of licensing their best stuff for the Mac comes up around the watercooler.

I’m not about to climb on a soapbox and issue a stern lecture on the evils of piracy. I don’t know a single person in the computer business who hasn’t, at one time or another, used a piece of software they didn’t pay for—and that includes yours truly. This Way has nothing to do with piracy being wrong...
or evil, and everything to do with piracy being counterproductive and short-sighted. It comes down to this: if we don’t pay for more games today, we may not have new games tomorrow.

But Mac game piracy won’t go away just because some Pollyanna in Macworld says it should, so let’s strive for a compromise. If you happen to be running a less-than-kosher copy of a game that you enjoy, buy a copy of the real thing. If the game stinks, trash it and move on with only a mildly cloudy conscience. (Note: to avoid risking your immortal soul for a lousy game, download the game demo. The demo usually gives you a clear idea of whether a game is worth its price.)

And because games aren’t cheap, let’s consider this: if you can’t afford to buy a game—and by that I mean you receive an allowance of $7.49 a week, and out of that meager sum you buy your clothes and food and pay off the school bully—try to get the game by dropping broad hints around your birthday and any convenient holiday.

Way Two: Buy Right
Although not commonly found, some games ship with the Mac and PC versions on the same disc. These hybrid discs can be identified by a box that boasts both Mac and Windows compatibility. In large stores that sell lots of PC software and very little Mac software, these games are invariably found in the PC games section. When you purchase such a game, that sale is chalked up as a PC sale rather than a Mac sale.

As I mentioned, the number of Mac units sold makes a difference. In order for the accounting to more clearly reflect that a hybrid game was purchased by a Mac user, buy games from a Mac-only dealer whenever possible. If that’s impossible, try online and catalog sources that cater to Mac users.

Way Three: Spread the Word
There is a finite number of us—meaning Mac gamers, not pontificating pundits—in the world, and even if each and every one of us buys a copy of our favorite game from a Mac dealer, the resulting sales figures are going to pale in comparison with those for a game that sells only fair to middlin’ on the PC. In order for us to get more and better games, we must create more Mac gamers.

If the drug and tobacco cultures have taught us anything, it’s that the “first one’s free” strategy is an effective way to introduce a potential customer to your product. For us this means finding someone—let’s call that person Our Next Victim—who’s open to the idea of gaming. Offer to install the demo of a game you think that person will enjoy on his or her Mac. Try to copy the demo from a CD or across a network rather than downloading it—you’re not going to impress Our Next Victim by tying up his or her dial-up connection for eight hours to download a massive demo. Show off the highlights of the game for a minute or two, and then let Our Next Victim give it a whirl. Start with a game that can be easily grasped and that offers a measure of success right away. Traditional and arcade games are a good place to start, particularly for older players. And avoid games that will offend Our Next Victim—your grandmother is unlikely to fall in love with the guts-scattering goodness that is Quake III Arena and Unreal Tournament on the first go-round.

Way Four: Make Your Wishes Known
Keep your eyes open for cool PC games that you’d like to see on the Mac. I check in with my PC pals to see what they’re playing and flip through PC gaming magazines to find out what’s hot. If I see a game that looks like it might fit nicely on the Mac, I’ll drop a note to the game developer and politely suggest that I and many of my Mac buddies would buy several dozen copies of the game if only it were available in Mac-flavored form. Lob a message into one of the comp.sys .mac.games newsgroups to see what other Mac players have heard about particular PC games, and if there seems to be a positive consensus about a game, suggest banding together as a group to petition a company for a Mac port.

A Word Before I Leave
Ultimately, the success or failure of any product—whether it’s gas-guzzling sport utility vehicles that tip over in a gentle breeze or another Robert Urich miniseries—depends on whether enough customers are willing to lay down enough dough to obtain their heart’s desire. Mac games are no different. If we want more and better games for our Macs, it’s time we put our money—and our best evangelical efforts—where our mouths are.

Contributing Editor CHRISTOPHER BREEN has been writing about the Mac and technology since the latter days of the Reagan administration.
Whether you drive a desktop Mac (even a trusty old 68K machine running System 7), pound a PowerBook, or pack a Palm®, you need Now Up-to-Date & Contact, the best choice in contact management and calendaring.

No other product allows you to keep track of your contacts and schedule so easily. With its ability to recognize common phrases and automatically enter items on your calendar, you will spend less time on data entry. Built-in email tracking; word processing with mail merge; label and envelope generators with postal bar codes; and alarms to remind you of key events make this an essential product for anyone who needs to save time and stay organized. A built-in TCP/IP server allows you to add users and share group data, while keeping personal information private. Designed for the Internet, Now Up-to-Date & Contact offers a unique web plug-in architecture that will have you soaring through cyberspace.

Need a map or an e-mail address for someone? Click the blazingly fast search engine to find the contact and let the software do the rest! It is no wonder that Now Up-to-Date & Contact is the #1 best-selling Macintosh PIM on the planet.

Phone: 800-344-9160 • 614-413-4000 • Fax: 614-413-4100 • http://www.poweronsoftware.com

Copyright ©1999 by Power On Software, Inc. All rights reserved. Now Up-to-Date and Now Contact are registered trademarks of Power On Software, Inc. Macintosh is a registered trademark and Finder is a trademark of Apple Computer, Inc. Palm Computing is a registered trademark and Palm® is a trademark of Palm Computing, Inc., 3Com Corporation, or its subsidiaries. All other trademarks acknowledged.
The world's largest computer makers buy our memory direct.

[Genius.]

Buy your memory direct from one of the largest memory manufacturers in the world. Performance, reliability, selection & factory direct savings — Crucial Technology, a division of Micron.

Crucial is your source for Macintosh memory.
Receive a 10% discount for ordering online. You can't get this quality for a lower price, anywhere.

Upgrades for popular Macintosh models such as:
iMac, Power Mac G3, iBook and Power Mac G4.

64 MB $53.99
As low as...

Crucial prices reflect an automatic 10% discount for ordering online. Prices are subject to change. ©2000 Micron Semiconductor Products, Inc. All rights reserved. Crucial Technology and the Crucial logo are trademarks of Micron Semiconductor Technology, Inc. and Micron is a registered trademark of Micron Technology, Inc. All other brands or trademarks are the property of their respective owners. Crucial Technology is a Division of Micron Semiconductor Products, Inc. Phone 208-363-5500. Fax 208-363-5501. Email crucial.sales@micron.com. Crucial Technology is not responsible for omissions or errors in typology or photography.

Online discounts for over 42,000 upgrades at:

www.crucial.com
or call toll-free 1-888-363-3082
Power = Crucial RAM

Illustration by Jerome Denis

The Memory Experts™
BY CHRISTOPHER BREEN

Will Napster change the way we buy—or don't buy—music forever?

steal this song

TONIGHT’S THE NIGHT. After months of indecision you’ve decided to offer your hand in matrimony to that special someone. You’ve purchased the ring and chosen the ideal spot to pop the question—the only remaining detail is selecting the perfect song to accompany your proposal. After scanning your record collection for Chad and Jeremy’s The Ark—“Painted Dayglow Smile” is “your song”—you remember you loaned the record to your brother-in-law last week. What to do?

Illustration by Joyce Hesselberth
How Napster Works: The Pirate’s Toolbox

NAPSTER, the popular file-sharing service for swapping MP3s online, operates with the help of a centralized server that maintains a database of all the MP3 files that users with Napster clients make available to other Napster users. Here’s how it works:

1. Long John Silver installs a copy of a Napster client—Macster—is one such for Macintosh, although Napster is working on a Mac client as we go to press—and establishes a free account with Napster.
2. Although Macster doesn’t currently support this capability, a PC-packing Long John can place MP3 files he’s willing to share with others in a particular folder. When John logs on to the Napster server, the server software adds a list of these files to its database.
3. When John initiates a search—based on song title or artist—Napster’s server scans the database and returns a list of computers where a song can be found.
4. Once John picks a computer to download the song from, a network link is established between his computer and the one that contains the song he’s after, and the song is copied from the remote computer to John’s hard drive.
5. With the MP3 file secure on John’s hard drive, he can then play it with an MP3 player such as SoundJam MP, Audion, or QuickTime.
6. If John wishes to take his tunes with him when he travels, he can download them to a portable MP3 player such as the Rio 500, or convert the files into AIFF files and then turn them into audio CDs with the help of a CD-R writer.

Simply fire up your Mac, launch a copy of a program called Macster, type Chad and Jeremy into the Artist search field, and cross your fingers. Sure enough, you discover that “Painted Dayglow Smile” is available for download from three different computers. With a double-click, the song is delivered to your Mac in a matter of minutes—at no cost and just in time for its strains to be heard as your beloved crosses the threshold.

As romantic as this scenario seems, there’s one minor catch: your actions may be illegal—illegal enough, in fact, that if the recording industry has its way, Internet services such as Napster (www.napster.com) that allow people to swap songs online could be shut down in short order. (See the sidebar “The Long Arm of the (Copyright) Law” for an analysis of the legal issues involved.)

This seemingly innocent act of trading music online has sparked a remarkable controversy that has pitted fans against bands, artists against the recording industry, and the recording industry against an Internet start-up. Yet if this trend continues, it’s likely to change the way artists and their representatives make money and how you lay your hands on everything from music to software to movies.

The Way We Were
Most people still get their hands on music the old-fashioned way—by trooping down to their local retailer and buying it. Web-savvy folks might purchase CDs online, but it’s fundamentally the same concept—paying for the right to use tangible media. But a number of factors are conspiring to change this model.

Means to an End
The first, and most notorious, factor is programs such as Napster and Gnutella (http://gnutella.wego.com)—programs that allow you to download MP3 files from other people’s hard drives without paying a penny to the artist or entertainment industry. (See the illustration “Serving It Up” to see how it all works.) With a Napster client such as Macster (or the Mac-compatible Furi client for Gnutella) and a broadband Internet connection, Mac users can download an album’s worth of MP3 files in less than an hour. This leads us to the second factor: high-speed Internet access.

Fast Enough for You
Downloading a file of a few megabytes used to take hours. With broadband connections such as DSL and cable modems—featuring download rates more than ten times faster than those of 56-Kbps modems—becoming more commonplace, however, you can now download megabyte media files in just minutes.

Cut Down to Size
But even with high-speed Internet access, the trend to download large digital media files would be stymied without file compression. MP3, the most widespread audio-compression technology today (see “MP3 to Go,” February 2000), allows you to compact a 3-minute, 31MB audio file into a 3MB song while maintaining a high level of quality.

Holding On
Although the recording industry would likely be loath to admit it, its reluctance to embrace online access to the material it controls plays a significant part in this digital drama. Even though most people would agree that artists and their representatives should be compensated for their work, many feel, for example, that there has to be a better way to obtain one song than paying as much as $18 to purchase an entire album on CD—prices which, according to the FTC, are artificially inflated. Were media more easily obtained online—and at a lower price—people might be more motivated to pay for content instead of pirating it.

While the ways, means, and motive are in place, they have
The Long Arm of the (Copyright) Law

THE WEB-SITE NOTICES GO SOMETHING LIKE THIS: "We respect copyright law and expect our users to do the same. You agree you will not use our service to infringe intellectual property rights of others." The chance that the average Web user knows whether she's infringing someone's copyright, however, is another story—it's a complex balancing act, especially when a site leads her directly to copyrighted work to download.

What Is Copyright, Anyway? The federal Copyright Act is the primary copyright law in the United States. Under most circumstances, copyright owners—the musicians or songwriters who created something or the record companies and music publishers that bought the rights from them—may prevent others from copying, distributing, and displaying or performing (playing) their work for the public. (See "Stay on the Right Side of Copyright Laws" elsewhere in this issue.)

What does this mean to you? When you download music or offer your MP3 files for others to copy over the Internet (through Napster, for example), you're copying and distributing songs (owned by the writers or music publishers) and sound recordings (owned by the record companies)—that's two copyrighted works for each recording. If you don't have permission from the true copyright owners, you're probably breaking the law. If they want to come after you, start counting your money—legal fees and damages could cost you more than $150,000. (Most penalties are civil and not criminal, so there's not much fear of being thrown in jail.)

Watch Your Step In general, you'll be safe downloading from a site that owns the music—such as a record company's or musicians' site that offers only their own recordings—or buying from big online retailers such as Amazon and CDNow. When sites or services such as Napster offer other artists' music, be wary.

Although sharing music with friends is considered to be personal use and is legal, sharing it with the public through big-file swapping sites means you're probably infringing copyright. If you draw attention to yourself by sharing thousands of files, copyright owners may come after you. You leave digital fingerprints on the Internet, namely IP and e-mail addresses, and your actions can be traced. But so far, the representatives of copyright holders, such as the RIAA, have targeted the people who make the tools that let you swap MP3s, rather than the people who use those tools.

Fair Game There are a few legal routes for online service providers such as search engines and portal sites to take. Most avoid prosecution from copyright infringement under the provisions of the Digital Millennium Copyright Act of 1998 (DMCA).

Online service providers are allowed, by this law, to refer or link users to copyrighted work or simply store it for users (such as hosting Web sites with MP3 files), among other things—as long as they meet certain conditions. They can do so—and this is critical—without fear of copyright infringement.

The DMCA generally defines online service providers as those who provide online services or Internet access. But to protect themselves from lawsuits, they have to follow rules such as terminating accounts of subscribers who are repeat copyright infringers.

Avoid Temptation Those who enjoy the challenge of coming up with new technology to get around online copyright protections should be careful. The DMCA prohibits anyone, including service providers, from interfering with the technology used to identify or protect copyrighted works (digital watermarks, for example).

What does this mean for Napster and similar technologies that may come later? Their future is uncertain, but if people continue developing technologies and learn to work with copyright owners, the Internet will offer more quality music that costs much less than traditional CDs. Now that's innovation. —Susan P. Butler

Is It Legal? Most of the music available via Napster is illegally posted. But some bands (such as Phish, used in this example) allow fans to record their concerts and trade those recordings freely. This still doesn't make their albums fair game, however. Here's a quick look at what can be legal and illegal in a single Master search.

<table>
<thead>
<tr>
<th>Search Results for phish</th>
<th>Size</th>
<th>Bit Rate</th>
<th>Length</th>
<th>User</th>
<th>Live Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phish (Live) - FreeBird.mp3</td>
<td>3.5 MB</td>
<td>128 kbps</td>
<td>3:50 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - (Long Day) 09 - Decaying Around The Room.mp3</td>
<td>3.6 MB</td>
<td>128 kbps</td>
<td>3:55 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - (Slip Stitch and Pass) 00 - Hello My Baby.mp3</td>
<td>1.2 MB</td>
<td>128 kbps</td>
<td>1:24 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - 02 - You Enjoy Myself.mp3</td>
<td>1.2 MB</td>
<td>128 kbps</td>
<td>1:24 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - 05 Here Comes.mp3</td>
<td>12 MB</td>
<td>128 kbps</td>
<td>1:11 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - 1997-08-11 - set 1 (03) Water In The Sky.mp3</td>
<td>4.7 MB</td>
<td>128 kbps</td>
<td>4:01 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - Bouncing Round The Room.mp3</td>
<td>3.7 MB</td>
<td>128 kbps</td>
<td>4:01 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - Brian and Robert (Live) 08-9-98.mp3</td>
<td>3.5 MB</td>
<td>128 kbps</td>
<td>4:51 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - Cities (Bootleg).mp3</td>
<td>9.5 MB</td>
<td>128 kbps</td>
<td>4:51 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - Down with Disease.mp3</td>
<td>3.5 MB</td>
<td>128 kbps</td>
<td>4:51 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
<tr>
<td>Phish - Farikhana - Heavy Things.mp3</td>
<td>6.9 MB</td>
<td>256 kbps</td>
<td>5:06 minutes</td>
<td>1</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Live-album track (not legal to download)
Live-concert track (legal to download)
"Bootleg" track (legal to download)
Studio-album track (not legal to download)
LARS ULRICH, DRUMMER FOR METALLICA, IS AGAINST NAPSTER
(See www.macworld.com/2000/05/12/metallica.html for the complete interview.)

Q. What made you file suit against Napster? A. This Napster thing came completely out of nowhere. We were recording a song for the Mission: Impossible 2 soundtrack, and we got word that there were five or six versions, works in progress, playing on radio stations—and we weren't even finished with it. We found out our song was being traded on Napster, and we had to put our foot down. The Internet in general is not the issue; the issue is who dictates what goes on with your work.

Q. Do you think the Internet is a realistic way for new bands to get known? A. There's only so much attention each band could get on the Internet. The role of a record company is to promote and publicize one band over another.

Q. In your suit, you've asked for huge financial compensation from Napster. Has Napster really had any effect on your bottom line? A. We've sold about a thousand gazillion records and we're glad that we're set for life. The stuff that's being lost on the Internet, it's pocket change—it's meaningless. But where is it going to be in five years? This is something that could really be out of control.

We're paying more money to our lawyer—$500 an hour—than we're losing on the Internet. If people think this is about greed, then they should think again.

Q. What do you think of the bands—Limp Bizkit, the Offspring, Public Enemy—that have come out in favor of Napster? A. If they're saying, "Napster's my friend," I think they're shortsighted and they're ignorant to the big, big picture. I little to do with the furor surrounding this subject. We know the technology works, but what we haven't agreed on is whether using it is legal or morally justifiable—and if there's some middle ground that will satisfy everyone involved.

Whipping Post
Currently, Napster Inc., based in San Mateo, California, is the lightning rod for this controversy. Although an outfit called MP3.com was the first to be taken to court for allegedly storing MP3 files illegally on its servers, Napster has generated the bulk of the press. Here's why:

It's in the Way That You Use It As we stated, Napster created software that allowed people with a Napster client program—Maester is one of the most popular for the Mac—to download MP3s from another person's hard drive. (See the sidebar "How Napster Works: The Pirate's Toolbox" for more information.) You do this by launching the program, signing up for a free account, searching for an artist or song title by name—then downloading files that match your search. PC users can designate a folder on their drive for MP3 files they want to share—they just drop the MP3s into the folder and identify the location of the folder on the hard drive. The Mac software currently available doesn't allow users to share their files—although Napster says it's working on Mac software that will let you share files as well as play MP3s from within the program.

When someone shares files on his or her drive, the Napster client sends a list of those files to Napster's central server. That list is incorporated into a huge database of song titles and artists—no actual MP3 files are stored on the server, just a directory of the MP3 files that Napster users are offering for download.

You Can't Always Get What You Want
This process may sound innocent enough, but Napster's popularity has put a few thorns under the saddles of two groups—those who maintain computer networks at colleges and universities and representatives of the music industry.
CHUCK D, FRONT MAN FOR PUBLIC ENEMY, SUPPORTS NAPSTER
(See www.macworld.com/2000/05/12/chuckd.html for the complete interview.)

Q. Tell me why you support Napster. A. Napster’s the radio of the 21st century. I just think it develops a whole new paradigm, and there’s no legitimate proof it cuts into the traditional market for music. The industry has always prided itself on driving on the enthusiasm of the audience. Now they’re having to fight against the enthusiasm of the audience.

Q. What do you think of Metallica and the other big acts that have filed suit against Napster? A. Metallica shouldn’t be getting into that lawyer or accountant mentality. I think most of the people who download Metallica music online are fans who are also buying their music in the stores.

Q. How is free music on the Web going to change the music business? A. You’re going to see the global distribution of music, which is something the music industry promised but never could deliver. I think you’re going to see people selling music for a lot cheaper—and not a certain set price for music. Downloadable music is the biggest musical phenomenon since the Beatles, and the music industry is slow to come to grips with that. You have more music on the outside of the industry than on the inside, so fans will find a lot more music. There will be more money in the pot than ever before and there will be millions of hands in it. Artists are going to have to work a lot harder and not expect things to fall in their laps. Fat and happy rock ‘n’ rollers are only a select few who are supported by the four major labels, and the power of those four hands will be diluted by the power of a lot more hands.

Q. Do you have any problem with a company like Napster making money off your music and not giving you a cut? A. I don’t have any problem with that. I’ve signed with major labels and I haven’t had any control over the money. At least this way, I know I can take advantage of the exposure.

Q. If everyone’s giving your music away, how are you going to survive as an artist? A. There’s a multibillion-dollar market for rap around the planet. I set up five major concert tours on the Web in the last two years. The day of the lazy artist is over, and I know how to make out. I have five studios. I have interests, so this all works out for me.

Campus Life Napster is extremely popular among people who tend to listen to lots of music and have access to high-bandwidth network connections—namely, college students. Because a large number of these students use Napster and transfer huge files back and forth across the Internet via campus networks, these networks can become clogged by an activity that some school administration officials maintain is recreational—and therefore unnecessary. For this reason, Napster has been banned on some college campuses.

Battle of the Bands Unlike files on MP3 Web sites such as the Internet Underground Music Archive (www.iuma.com), which carries files from artists who want their music downloaded, the majority of files found via Napster are pirated—commercial songs that have been posted in violation of copyright laws.

While some artists, such as Limp Bizkit, the Offspring, Public Enemy’s Chuck D (see our interview with Chuck D elsewhere in this feature), and many independent bands, support having their music freely distributed, others—and the music industry at large—don’t. For example, Metallica filed suit against Yale and Indiana University, in addition to Napster, alleging copyright infringement and racketeering. Once Yale and Indiana University banned Napster, the institutions were dropped from the lawsuit. (See our interview with Metallica’s Lars Ulrich.)

The members of Metallica were concerned enough about the alleged music piracy that they tracked down more than 300,000 users who had posted or copied their music, and provided those names to Napster along with the demand that Napster discontinue these users’ accounts.

The Recording Industry Association of America (RIAA) (www.riaa.com), an industry group that represents major record labels, also filed suit against Napster. As we went to press, a judge had decided not to dismiss the lawsuit against Napster, leaving open the possibility of a trial.

Although Napster claims it has no control over the files that users make available—the software displays a request that you post only legal MP3 files when you first install the client—the
Metallica and RIAA suits maintain that because Napster retains a database of those MP3 files found on computers running Napster clients, the company knows that audio files are being pirated and is facilitating that piracy. Naturally, Napster disagrees.

Who Are You? How does this affect you? It might put Napster out of business, and if you’re a devoted Napster user, this is certainly sad news. But Metallica’s actions could bring the controversy closer to home. The fact that Metallica was able to obtain the screen names of these users should concern those who post and download files on Napster. Should the recording industry wish to get personal and go after individuals—and you engage in this kind of file trading—it’s possible that you’ll be taken to task for your actions.

It’s All Too Much Napster isn’t the RIAAs only target. MP3.com offers a service called My.MP3.com that allows you to listen to any music you own over the Internet from any computer. To register as the owner of a particular audio CD, you simply sign on to MP3.com and insert the CD in your computer’s CD-ROM or DVD-ROM drive. The RIAA sued MP3.com, and in April, a U.S. District Court judge ruled that MP3.com violated copyright law with this action. At press time, MP3.com had removed all songs owned by the five largest record distributors in the United States.

Regardless of how specific legal issues are resolved—or whether Napster will have ceased to exist by the time you read these words—the battle over sharing files on the Internet has just begun. Though Napster and My.MP3.com, with their centralized servers, may be vulnerable to prosecution, those seeking to shut down Internet file sharing are likely to have a harder time targeting peer-to-peer technologies such as Gnutella.

The Direct Route Unlike Napster, Gnutella allows users to share files between individual computers without going through a central server. Instead, when a Gnutella user performs a search, the Gnutella software, rather than querying a database held on a central server, directly polls computers on a Gnutella network and returns a list of accessible files. Users then select the files they want, initiate a download request, and the files are transferred directly from one computer to another.

With no company hosting a central server, groups like the RIAA will have to target users who offer pirated music or software, rather than a specific company that facilitates that piracy. Obviously there are far too many people sharing these kinds of files to sue them all, but the RIAA may choose to make an example of large-scale pirates.

It Takes All Kinds . . . of Media Particularly troublesome to the entertainment and software industries is that unlike Napster, Gnutella also supports a variety of media formats, meaning that people can transfer not only music files but also video, pictures, and software. Users with enough bandwidth, patience, and hard-drive space will be able to download the latest feature films and copies of Microsoft Office—without paying for them.

Fixing a Hole

While prosecution of those who pirate copyrighted material may be a short-term solution, preventive measures may make Internet file sharing irrelevant. Specifically, the music industry is looking at ways to protect media—both online and in physical form—so that it cannot be copied.

DVD Is Not Free A company called Macrovision (www.macrovision.com), for example, has created a copy-protection scheme for DVD-Video—if you try to copy a DVD to VHS tape or a computer’s hard drive, the video signal is scrambled, making the video unwatchable. This comes after the discovery that DeCCS, a utility originally intended to allow Linux users to view DVD movies, was being used to copy movies onto hard drives.

Such schemes, however, wouldn’t work without some cooperation among entertainment and technology companies, and that cooperation came in the form of the Secure Digital Music Initiative—a coordinated effort by the entertainment and technology industries to copy-protect media. But the plan doesn’t stop with just CDs, DVDs, and other digital recording media. Companies are working on ways to protect online media from being pirated as well.

Controlled Distribution Liquid Audio (www.liquidaudio.com) has created its own system for controlling online distribution of music. A song encoded with the company’s Liquifier Pro software is encrypted in a scheme for DVD-video—if you try to copy a DVD to VHS tape or a computer’s hard drive, the video signal is scrambled, making the video unwatchable. This comes after the discovery that DeCCS, a utility originally intended to allow Linux users to view DVD movies, was being used to copy movies onto hard drives.

Such schemes, however, wouldn’t work without some cooperation among entertainment and technology companies, and that cooperation came in the form of the Secure Digital Music Initiative—a coordinated effort by the entertainment and technology industries to copy-protect media. But the plan doesn’t stop with just CDs, DVDs, and other digital recording media. Companies are working on ways to protect online media from being pirated as well.

In-Store Appearance This isn’t to say that the music industry is relying only on copy protection. There’s already a move to plant music kiosks in record stores—places where you can burn music files onto your own CDs or download MP3 files to portable players such as Diamond Multimedia’s (www.riohome.com) Rio 500. While this makes buying exactly the music you want easier, it doesn’t address the fact that it’s far more convenient to download music and media from the Web than to hop in your car to visit the local record mart. Napster and Gnutella have demonstrated that there’s a huge demand for online access to media; it’s now up to the recording industry to determine how to provide this kind of service while still making a profit. (Some record labels have announced plans to make albums and singles available for purchase and download online, at least on a trial basis.)

The Last Word

Where will this all lead? Moving copyrighted files across the Internet is both easy to do and easy to get away with—but it won’t be for long. Though the RIAA and Metallica aren’t likely to start getting people who download an MP3 or two tossed into the pockey, they will take steps other than prosecution to protect their rights and work. This means that stricter copy-protection schemes will be introduced in the near future. Yet this too is a short-term solution; though copy-protection measures will surely reduce piracy, savvy people will find a way to skirt them. With this in mind, the entertainment industry must eventually how to the realities of this new wired world, shift its current distribution model, and seek alternative means of compensation—with actions such as advertising on online distribution centers, offering “bonus” material that can be purchased only online, and streaming “pay to play” content on demand.

When not engaged in journalistic pursuits, Contributing Editor CHRISTOPHER BREEN is a musician in the San Francisco Bay Area.
Give your Mac a multimedia transplant

ATI XCLAIM VR 128

The ultimate multimedia, graphics and TV-Tuner upgrade

One powerful upgrade – many multimedia features:

• Watch TV on your MAC
• True color 32-bit 3D graphics for incredible gaming action or 3D applications
• Capture motion video and still images from any camcorder or VCR
• Output to TV or videotape
• Play full screen flicker-free video

ATI is the number one graphics supplier to Apple Computer Inc.

Add XCLAIM VR 128, to give a complete multimedia transplant to any MAC with a PCI slot

For more information on ATI's full line of MAC graphics accelerators go to www.ati.com

Visit ati.com
MAKE  SOME  NOISE

Turn Your Mac into a Recording Studio
(WITHOUT GOING BROKE)

You're finishing up a song and tapping your feet as volume meters dance in tempo with the beat. Reaching over to the mixing console, you tweak the volume levels of the piano track. That's better. You rewind your multitrack recording deck, press the record button, and add a few chords from an '80s-vintage analog synthesizer. Nice. Now there's just one more thing: you patch in a reverb-effects unit to give the vocal that rich concert-hall sound. Perfect. You're ready to burn a CD and encode your efforts as MP3 files to post on the Web.

Think you're in the control room of a million-dollar recording studio? No—you're sitting in front of your trusty Mac.

The volume meters and mixing console are on screen, and you're turning knobs and pressing buttons with your mouse. The multitrack deck and vintage synthesizer are actually pieces of software, and so is the reverb-effects unit. In fact, aside from a music keyboard, a special musical interface, and a pair of speakers, everything in this setup is a piece of software. Welcome to the virtual recording studio.

Outfitting even a modest studio used to mean spending thousands of dollars for recording decks, effects processors, music synthesizers, and other hardware devices. But thanks to the fast processor in the Power Mac G3 and G4, these days the Mac itself can handle most of what once required dedicated hardware. With

BY JIM HEID
The Ins and Outs of Desktop Audio

The MIDI controller (A)—usually a pianolike keyboard, but guitar, wind, and drum controllers also exist—transmits and receives note data through MIDI I/O jacks, connected to the MIDI interface (B). This connects to your Mac (C), usually via the USB port (see “Music in the Key of USB,” March 2000). You can attach the MIDI controller's audio output to the audio input of a mixer (D), which allows you to turn multiple audio inputs (vocals, MIDI, instruments) into one or two outputs. To hear and record what you are creating, connect the mixer back to the Mac's mike jack and the Mac's speaker jack to one of the mixer's inputs. Then connect the mixer to speakers, a stereo system, or a pair of monitors designed for close-range audio work (E).

Sequencers offer huge advantages over conventional tape recording, starting with undo features no razor blade can approach. You also have instantaneous access to any point in a recording—no rewind or fast-forward delays.

Best of all, sequencers provide nondestructive processing: they don't permanently apply your edits and effects to the audio tracks you've recorded unless that's what you want. Nondestructive editing gives you infinite freedom to experiment with sounds and effects, and it's made possible by the speed of today's computers.

Sound Off But a sequencer is nothing without sounds. With software synthesizers, the Mac can mimic anything from a vintage analog synthesizer to a grand piano to a cello. You generally play a software synth using an external music keyboard plugged into the Mac via some variety of MIDI (Musical Instrument Digital Interface) hardware device for connecting electronic musical instruments to each other and to computers (see the illustration “The Ins and Outs of Desktop Audio”). Do you have to own a MIDI keyboard? No, you can create music by entering notes manually in a sequencer program. But it isn't exactly efficient—more akin to typing a letter via hunt-and-peck with the mouse and the Mac's Key Caps instead of simply using your keyboard.

Some software synthesizers are designed for creating dance and rhythm loops—repeating series of bass and drum lines. These programs can help you create infectious dance grooves that would make even Alan Greenspan get up and shake that thing.

Software synths are a great way to expand your studio's sound palette. They cost hundreds or even thousands of dollars less than hardware synthesizers, and if you have a PowerBook or an iBook, they're a lot more portable.

Cause and Effect Once you have your sounds, effects plug-ins let you add audio effects such as auditorium-like reverberation. These software effects are comparable in quality to those of dedicated effects hardware, which can be much more expensive. Effects plug-ins work within your sequencer program, and—as I'll explain shortly—several different plug-in formats exist. Your choice of a sequencer may very well depend on the plug-ins you want to use.

All You Need Is... Handling huge audio files, generating real-time effects, and simultaneously communicating with external MIDI gear demands a fast computer with a fast hard drive and plenty of RAM. Still, you don't have to break (or even rob) the bank to set up a desktop recording studio.

Power Inside An iMac will take you a long way, and even an elderly 604-based Power Mac will run the sequencers I tested. But if you're planning to use software synthesizers and real-time effects plug-ins, you'll want a G3 or better with at least 128MB of memory. That's because software synths can gobble up 50MB or more of RAM when you have lots of sounds installed. I used a 400MHz blue-and-white G3 with 128MB of RAM for my testing.

I also used Mac OS 8.6 because Apple was still tweaking Mac OS 9 to address some audio-related issues. The company was resolving these problems as I finished this article, but they underscore two important points: first, verify compatibility with your Mac model and system software before buying any audio software;
second, avoid updating the system software until you're sure your audio tools will run with the latest Mac OS.

Also, if my experience was any indication, getting a system to work properly can be a challenge. You'll download update patches frequently as vendors release bug fixes. You'll also become pals with the Mac's Extension Manager control panel, because audio programs can bicker with one another and with other software. This is the bleeding edge, and hemorrhages happen.

Room to Grow You'll also need plenty of hard drive space, because CD-quality stereo files gobble about 10MB per minute. The hard drives that ship in today's iMacs and G4s are big and fast enough to record and play back several simultaneous audio tracks. But the more tracks you want to play at a time, the faster the hard drive you need. That's because each track is stored as a separate file, and playing back software. This is the bleeding edge, and hemorrhages happen.

Radio Radio All Power Macs are capable of stereo recording and playback, so to actually hear your efforts, all you need is a set of amplified speakers or some headphones. But for recording, an inexpensive mixer—a device that takes multiple audio inputs and merges them into one or two audio outputs—will greatly streamline your audio connections by providing multiple jacks into which you can plug microphones and instruments (see "The Ins and Outs of Desktop Audio"). You can also invest in third-party hardware that improves on the Mac's built-in sound circuitry (see the sidebar "Beyond Miniplugs: Audio Hardware Options").

Savvy Sequencers I tested three popular audio/MIDI sequencers: Emagic's $799 Logic Audio Platinum 4.1, Mark of the Unicorn's $795 Digital Performer 2.0, and Steinberg's $799 Cubase VST/24 4.1. (For more information on all the software I tested, see the table "Magical Musical Software."). There's a fourth powerhouse sequencer—Opcode Systems' $100 Studio Vision Pro—but its future remains hazy as Opcode rides out a rough transition to new ownership, and its customers meanwhile endure poor technical support and a dearth of upgrades. Studio Vision Pro is a fine program, but I won't recommend it until the company's future comes into sharper focus. (If you're new to music on the Mac, check out Christopher Breen's roundup of inexpensive sequencers, such as Steinberg's Cubasis and Mark of the Unicorn's Freestyle, at www.macworld.com/sequencers.html.)

Which sequencer is best? Forests fall and battles rage over that question. The easy answer: they're all awesome. But because all three have very similar features and include some effects plug-ins, I based my choice on how the sequencer works. Digital Performer's elegant look-and-feel makes it my favorite; Mark of the Unicorn has sweated the design details to create a program that looks beautiful and is a pleasure to use (see "Auditioning Sequencers"). Even Digital Performer's manuals and online help are superior—by contrast, Cubase doesn't come with any printed material other than a "Getting Started" manual.

Plug Me In The third-party effects plug-ins and software synthesizers you want to run may influence your choice of a sequencer. Cubase, Logic Audio, and Studio Vision Pro support VST (Virtual Studio Technology), a standard developed by Steinberg. Digital Performer doesn't support VST; instead, it provides its own standard, called MAS (MOTU Audio System).

Third-party VST plug-ins outnumber MAS plug-ins, but most major developers now support both standards, and many also support the plug-in formats high-end audio hardware such as Digital's Pro Tools use. What's more, two available MAS plug-ins let you run VST plug-ins within Digital Performer: AudioEase's $30 VST Wrapper for MAS 1.01 and Cycling74's $74 Pluggo 2.0.8.

My experience with both was mixed—I was able to run many VST effects within Digital Performer, but VST software synthesizers sometimes misbehaved or required workarounds.

Bottom line: don't count on a VST adapter, particularly for software synthesizers. Even though Digital Performer's design and interface are superior, you may prefer Logic Audio or Cubase if your projects demand a VST-format plug-in.

[Diagram of audio software interfaces]
Plucky Plug-Ins
Effects plug-ins, which tap into a sequencer to modify the sound of the audio tracks you record or import, are usually sold in bundles of about four to six effects. You'll now find software equivalents for all mainstream hardware effects devices, including reverb for adding room reverberation; compressors and limiters, which add punch to vocal tracks; equalizers for boosting or lowering certain frequencies; and flangers and phase shifters, used to add rich, swirling textures to instrumental tracks.

Smooth Sounds
You can also find offbeat plug-ins that don't necessarily have parallels in the hardware world.

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Rating</th>
<th>Price</th>
<th>Contact</th>
<th>Free Trial</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emagic</td>
<td>Logic Audio Platinum 4.1</td>
<td>★★★</td>
<td>$799</td>
<td>530/477-1501, <a href="http://www.emagic.de">www.emagic.de</a></td>
<td>0</td>
<td>Powerful but difficult to learn; very good bundled effects.</td>
</tr>
<tr>
<td>Mark of the Unicorn</td>
<td>Digital Performer 2.7</td>
<td>★★★½</td>
<td>$795</td>
<td>617/569-2760, <a href="http://www.motu.com">www.motu.com</a></td>
<td>0</td>
<td>Best mix of power and ease of use; doesn't support VST plug-ins.</td>
</tr>
<tr>
<td>Steinberg</td>
<td>Cubase VST/24 4.1</td>
<td>★★★</td>
<td>$799</td>
<td>818/678-9100, <a href="http://www.steinberg.net">www.steinberg.net</a></td>
<td>0</td>
<td>Powerful but cumbersome; best VST compatibility; no printed manuals.</td>
</tr>
<tr>
<td>BitHeadz</td>
<td>Unity DS-1 2.0</td>
<td>★★½</td>
<td>$449</td>
<td>831/465-9898, <a href="http://www.bitheadz.com">www.bitheadz.com</a></td>
<td>0</td>
<td>Ambitious software sampler with many expansion sounds available.</td>
</tr>
<tr>
<td>Retro AS-1 2.0.1</td>
<td></td>
<td></td>
<td>$259</td>
<td></td>
<td>0</td>
<td>Powerful analog synth simulator; tested version was finicky.</td>
</tr>
<tr>
<td>Koblo</td>
<td>Stella9000 2.5</td>
<td>★★★</td>
<td>$189*</td>
<td>(45) 87 30 14 30; <a href="http://www.koblo.com">www.koblo.com</a></td>
<td>0</td>
<td>Rich sounds; extremely flexible design; cool and simple user interface.</td>
</tr>
<tr>
<td>Steinberg</td>
<td>Model-E 1.0</td>
<td>★★★</td>
<td>$199</td>
<td>818/678-5100, <a href="http://www.steinberg.net">www.steinberg.net</a></td>
<td>0</td>
<td>Rich retro sounds and a great interface; supports VST plug-ins only.</td>
</tr>
<tr>
<td>Pro-Five</td>
<td>1.0</td>
<td>★★★</td>
<td>$199**</td>
<td>818/678-5100, <a href="http://www.steinberg.net">www.steinberg.net</a></td>
<td>0</td>
<td>Amazing re-creation of the vintage Prophet 5 analog synth; supports VST plug-ins only.</td>
</tr>
<tr>
<td>ReBirth</td>
<td>RB-338 2.0.1</td>
<td>★★★★</td>
<td>$199***</td>
<td>818/678-5100, <a href="http://www.steinberg.net">www.steinberg.net</a></td>
<td>0</td>
<td>Best bass-and-drum rhythm machine; works with all major sequencers.</td>
</tr>
</tbody>
</table>

Effects Plug-Ins

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Rating</th>
<th>Price</th>
<th>Contact</th>
<th>Free Trial</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arboretum</td>
<td>Ionizer 1.3</td>
<td>★★★</td>
<td>$495</td>
<td>800/700-7390, <a href="http://www.arboretum.com">www.arboretum.com</a></td>
<td>0</td>
<td>Excellent noise reduction and equalization.</td>
</tr>
<tr>
<td>AudioEase</td>
<td>Rocket Science Bundle 1.0.2</td>
<td>★½</td>
<td>$199</td>
<td>(31) 20 24 33 600, <a href="http://www.audoease.com">www.audoease.com</a></td>
<td>0</td>
<td>Three fun, offbeat plug-ins; for MAS only.</td>
</tr>
<tr>
<td>VST Wrapper for MAS 1.01</td>
<td>VST Wrapper for MAS 1.01</td>
<td>★★</td>
<td>$30</td>
<td></td>
<td>0</td>
<td>Economical way to run VST plug-ins under MAS, but Pluggo gives better results.</td>
</tr>
<tr>
<td>Cycling74</td>
<td>Pluggo 2.0.8</td>
<td>★★★</td>
<td>$74</td>
<td>415/621-5743, <a href="http://www.cycling74.com">www.cycling74.com</a></td>
<td>0</td>
<td>A winner with 74 great plug-ins; can run VST plug-ins under MAS.</td>
</tr>
<tr>
<td>DUY Research</td>
<td>DUY Everpack 1.2</td>
<td>★½</td>
<td>$499</td>
<td>(34) 932 174 510, <a href="http://www.duy.com">www.duy.com</a></td>
<td>0</td>
<td>High-quality reverb; tube simulator adds warmth, especially to vocals.</td>
</tr>
<tr>
<td>TCWorks</td>
<td>TCINative Bundle 2.0</td>
<td>★½</td>
<td>$499</td>
<td>925/873-1828, <a href="http://www.tcwworks.de">www.tcwworks.de</a></td>
<td>0</td>
<td>Superb reverb; equalization, compression, and more.</td>
</tr>
<tr>
<td>Waves</td>
<td>Native Power Pack II</td>
<td>★★½</td>
<td>$500</td>
<td></td>
<td>0</td>
<td>Warm, analog-like equalization and compression; MaxxBass adds bass emphasis.</td>
</tr>
<tr>
<td>Waves</td>
<td>Pro-FX Plus</td>
<td>★★½</td>
<td>$450</td>
<td></td>
<td>0</td>
<td>Turns solo vocals into multipart harmonies, adds rich chorusing effects, and more.</td>
</tr>
</tbody>
</table>

• = yes, 0 = no. *Also available as part of the $460 Studio9000 bundle, which includes several additional software synths. ** Also available from the developer, Native Instruments.

***Also available from the developer, Propellerhead Software (www.propellerhead.com), for $179.
there's the amazing Pluggo, which creates everything from reverb to robotic speech. Its low price belies its quality and usefulness—it's got something for just about any project, and its ability to run VST plug-ins within Digital Performer (albeit imperfectly) is a bonus.

As I've previously mentioned, all the sequencers come with some plug-ins that provide basic reverb, compression, and other sound-processing functions. But in terms of audio quality, these bundled plug-ins fall short of the third-party effects I tested. If you're after the best possible sound quality, check out the $499 TC Native Bundle 2.0, from TCWorks, or the $299 Native Power Pack, from Waves. I'm partial to the TC Native Bundle's interface, but both products provide superb reverb effects.

Snappy Synthesizers
If you're like most musicians, you're always on the prowl for new sounds—and software synthesizers deliver them. Instead of paying $1,000 or more for additional keyboards or sound modules (sound-producing circuitry you can attach to MIDI keyboards), for a few hundred dollars you can get a more flexible instrument. Once you've installed a software synthesizer, its name appears in your sequencer alongside your actual MIDI instruments, and you play it using the keys on your MIDI keyboard (see "MIDI Magic"). When everything is purring, it's easy to forget that some of your instruments are actually just programs running on a Mac.

Dramatic Pause Alas, everything doesn't always purr. A software synthesizer can bring an otherwise fast Mac to its knees. One potential problem is latency—noticeable delays between when you press a key and when you actually hear its note. Generating high-quality sounds in real time is a processor-intensive job requiring almost as many calculations as Bill Gates's home-improvement spreadsheet. Slower, pre-G3 Macs are particularly vulnerable to latency, but even a G3 can suffer from it if you're running effects plug-ins at the same time (or are otherwise over-taxing the system).

And just as system extensions can bicker, software synthesizers (generally running as plug-ins within sequencers) can also conflict with one another or with other plug-ins, requiring you to pull one or more plug-ins from the sequencer's plug-ins folder until your sequencer runs smoothly.

Old-time Sound
I loved every software synthesizer I tested, so picking winners wasn't easy. But Koblo's S189 Stella9000 2.5, which combines rich retro sounds with an easy-to-use interface, is hard to beat. Visit Koblo's site to download the free Vibra1000; it does only one note at a time (no chords), but gives you an idea of what a good synthesizer has to offer.

Dance to the Music
If dance music is your specialty, check out Propellerhead Software's $199 ReBirth RB-338 2.0.1. Distributed by Steinberg, ReBirth faithfully re-creates the sounds of Roland's revered but long-discontinued TR-303 Bass Line bass synthesizer and TR-808 Rhythm Composer drum machine (see "Boot Up and Get Down"). ReBirth is great for creating addictive dance beats that you can trigger from a sequencer or export to audio files for importing into a sampler or sequencer.

Sample Me
Another noteworthy program is BitHeadz' S449 Unity DS-1 2.0. Technically speaking, this is a software sampler (that is, rather than synthesizing sound, it plays back recorded samples). You can expand its palette by sampling your own sounds or buying sample libraries such as BitHeadz' $199 Black & Whites, which adds dozens of great piano and electric-piano samples (see Reviews, July 2000). BitHeadz also makes a software synthesizer, the $259 Retro AS-1 2.0.1.

During my testing, BitHeadz released major updates to Unity DS-1 and Retro AS-1—alas, both had problems. I had trouble getting them to run reliably, particularly with Digital Performer, and if the message headers on the BitHeadz e-mail discussion list are any indication, I'm not alone. If you're interested in these very promising programs, you might want to download the trial versions to see if they behave with your system.
BEYOND MINIPLUGS
AUDIO HARDWARE OPTIONS

EVEN THOUGH THE MAC’S BUILT-IN AUDIO CIRCUITRY
sounds great, for audio professionals it falls short. For starters, it’s
limited to a maximum sampling rate of 44.1kHz and a sampling
resolution of 16 bits. (Sampling rate refers to how many digital
“snapshots” of a sound a device takes per second; generally, the
higher the sampling rate, the better the ability to capture high-
frequency sounds. Sampling resolution refers to how many bits
describe each sample—more bits per sample result in a more accurate representation of the original sound.)

The 44.1kHz, 16-bit standard for compact discs sounds excellent. But
to get the very best quality, pro-level audio gear typically uses a sampling
rate of at least 48kHz and a sam­
pling resolution of 24 bits.

Another limitation of the Mac
is that it lacks digital audio inputs and outputs. To get your final
efforts out of a Mac and onto
digital audiotape (DAT) for sub­sequent mastering—the final
process of preparing audio tracks
for mass duplication—you’ll need
to connect your Mac’s speaker jack
to the DAT recorder’s audio-input
jacks. This forces your music through
additional digital-to-analog and analog­
to-digital conversions, which introduce very small
(but perceptible) amounts of distortion. To prevent this
derogation, it’s always better to keep an audio signal in the dig­
ital domain when transferring it between devices.

The Hardware Way Although audio hardware that over­
comes these limitations has been available for years, it has tended
to be expensive. No longer. I tested two sub-$1,000 products: the
$995 Digi 001, from Digidesign (800/333-2137, www.dig001 .com), and the $849 SoloEX, from SeaSound (415/485-3900,
www.seasound.com). Both offer pro-quality sound, have multiple
audio inputs (eliminating the need for an external mixer), and act
as MIDI interfaces.

Each of these products consists of a PCI expansion card that
provides higher-quality audio circuitry than the Mac’s, and an
external box for connecting music keyboards, microphones, and
other noisemaking devices. (PCI-only digital sound cards cost less,
but you’ll lose most of the connections you’d get with the exter­
nal box.) Both provide digital inputs and outputs in the form
of S/PDIF (Sony/Philips Digital Interface Format) connectors, common on DAT recorders and
other digital gear.

Both also include software. The Digi 001 comes with Pro Tools LE, a
scaled-down version of the Pro Tools software that accompa­
nies Digidesign’s high-end com­
puter audio gear. Like the sequencers I tested, Pro Tools LE
provides MIDI and digital audio
recording, playback, and editing.
The SoloEX includes Steinberg’s Cubasis, a “lite” version of Cubase
VST that doesn’t support effects plug­
ins or software synthesizers. You’ll prob­
ably want to invest in one of the
sequencers reviewed here if you’re going
this route.

The Digi 001 and SoloEX are terrific prod­
ucts, packing features that not long ago cost a
lot more. The SoloEX has the edge, though, because its hard­
ware is more flexible, providing inputs for musical instruments
such as electric guitars and basses. (To use these with the Digi 001,
you must connect a separate preamplifier.) The SoloEX’s
breakout box is also packed with knobs for adjusting levels, and it
sports a large volume meter. By comparison, the Digi 001’s box is
much more spartan.

Macworld’s Buying Advice
All these products are good, pro-strength
tools. My top picks are Mark of the Uni­
corn’s Digital Performer, a powerful, easy­to-use sequencer; TC | Works’ TC | Native
Bundle and Waves’ Native Power Pack for
great mainstream effects; Cycling74’s Plug­
go for unique effects and great value; and
the Stella9000 and ReBirth RB-338 soft­
ware synthesizers from Koblo and Prop­
ellerhead, respectively.

So what’s ahead for desktop audio? More capabilities, for starters. As processor
speeds continue to climb, look for increas­
ingly versatile software synthesizers and
effects plug-ins. BitHeadz has already
added support for the G4’s Velocity Engine
to boost to 128 the number of simultaneous
voices in its Retro AS-1 and Unity DS-1.

Also look for the Internet to play a
larger role in music production. Rocket
Network (www.rocketnetwork.com) is set­
ing up Internet recording studios—virtual
studios where musicians can collaborate
remotely. No, you won’t jam in real time
with musicians worldwide. Rather, Rocket
Network’s servers keep track of a project’s
MIDI sequences and audio files; when you
sign in to a virtual studio, your copy of the
project updates to the latest version. The
Cubase VST and Logic Audio sequencers
already support the service.

The best thing about the new gener­
ation of audio software is that it’s for
everybody. If you’re a newbie, these tools
can open new doors to creative expres­
sion, making it possible to realize the
music you hear in your head—or at least
have fun trying. And professional musi­
cians and audio engineers will love these
ecological alternatives to expensive stu­
dio gear—and studio time. m

Contributing Editor JIM HEID (www.heidite.com)
grew up in his father’s recording studio. He’s been
using and writing about Mac sound tools since the first
MacRecorder appeared in 1985 and has produced
audio for CDs, CD-ROMs, FM radio, and the Web.
Get away from the office this summer without missing a beat.

With VST's line of portable USB, FireWire* (IEEE 1394) and laptop peripherals, you can get away from the office this summer without missing a beat.

VST's portable USB products, such as the CD-RW Drive and the Tri-Media Reader, provide a convenient way for you to easily backup and transfer your data. If you're looking for a faster storage solution, VST's FireWire Hard Drives and Zip Drives are perfect for quick data transfer and even storing digital video files. Or, for the best of both worlds, the VST USB/FireWire Combo Hard Drives provide the versatility you need to keep you on the go.

Apple PowerBook users can increase productivity without sacrificing mobility with VST's line of Expansion Bay storage devices and power peripherals. With such products as the Zip and SuperDisk® Drive to the Auto Adapter and Dual Battery Charger, keeping up to speed while on the road is a breeze.

So for all of your portable computing needs stop by www.vsttech.com to learn more about these and other exciting products designed with your mobility, productivity and convenience in mind.

Stop by booth #841 at MacWorld, NY to enter for your chance to win a FireWire peripheral!

www.vsttech.com

Iomega, the Iomega logo, Zip, and The Capacity To Do More, are trademarks of Iomega Corporation. All other trademarks are property of other respective holders. Iomega patents protected by patent applications pending in the US and other countries. Apple, Macintosh, the Mac OS logo, PowerBook, and iBook are registered trademarks of Apple Computer, Inc. SuperDisk is a trademark of Imation Corporation.
Travel freely between the Mac and Windows worlds with our cross-platform guide.

GONE ARE THE DARK DAYS when Windows’ forays into Mac territory seemed unstoppable. Apple has reclaimed its strongholds and attracted new populations, but the sheer prevalence of Windows-based PCs means you’ll probably need to cross the border occasionally. An important client may require Windows files, or Dad, a longtime PC user, may not be able to open the e-mail you send him. It could be that the software you need doesn’t run on Macs, so you have to emulate a PC. And when emulation isn’t enough and you must buy a PC, you can at least save money and desk space by sharing your Mac peripherals with the other system.

THIS GUIDE GIVES YOU the essential tools and strategies to thrive in today’s cross-platform world. For the products we examine in depth, you’ll find contact information in the table “Cross-Platform Travel Kit,” while quick mentions of related products include price and contact details.

by ADAM C. ENGST

Photographs by NOLA LOPEZ
Convert That File

The report is due tomorrow, and you need the text from Bob in the branch office. But when Bob, who has Windows, sends the report as an e-mail attachment, you realize you’re facing a long night. The file has a blank icon, double-clicking on it does nothing, and none of your programs recognize the format. When you send back the attachment, Bob says he can open and read it, so the problem isn’t file corruption. How can you bridge this inability to communicate before your deadline hits?

Not Your Type One communication gap between platforms is caused by differences in how the operating systems identify file types and originating applications. Windows files require three- or four-character extensions at the end of file names to provide this information—for example, .doc for Microsoft Word documents. (For more information, see the sidebar “File Typecasting.”)

All programs involved in transferring files between Macs and PCs rely on an extension-mapping database that says, for instance, any Mac file of type TEXT should have a .txt extension in Windows. You can simplify the process by adding the appropriate file-name extensions yourself (see the File Exchange control panel for a list).

If you need to share a large number of files that lack extensions and your transfer utility won’t add them, check out Miramar Systems’ $20 AKA utility. Despite its clumsy port from Windows, AKA batch-processes entire folders full of files at once, adding extensions and replacing any characters that are illegal in Windows names (such as question marks and commas).

Cross-Platform Applications The simplest approach to bridging the language gap between Macs and Windows is to stick with major applications from companies that produce cross-platform versions of their software. Microsoft, Adobe, Quark, and Macromedia all use the same file formats for the Mac and Windows versions of most of their products.

These cross-platform applications handle files from the other platform best when the versions are roughly comparable. For example, try to open an Adobe PageMaker 5 for Windows file in PageMaker 6 for Mac, and you’re out of luck. But you can usually open a Microsoft Word 98 for Windows file in Word 98 for Mac. Fonts may cause cross-platform problems, but that’s a separate issue. (For more on font differences, see the online sidebar “Font of Wisdom” at www.macworld.com/2000/08/features.)

Employ a Translator When you can’t use a cross-platform application, rely instead on translators. Most productivity applications, including AppleWorks and Nisus Writer, can both save and open documents in a variety of common formats. If you want to send your accountant an AppleWorks spreadsheet, use Save As within AppleWorks and choose a format your accountant can likely open, such as Microsoft Excel 4.0. Just beware that this lowest-common-denominator approach may not retain some version-specific features of your documents.

If you need to convert files for Windows users frequently, or if the translators built into your application don’t cut the mustard, get a copy of DataViz’s MacLinkPlus Deluxe 11 ($100), which offers bidirectional translation of a wide variety of file formats. The Document Converter feature is ideal when you need to convert a batch of files simultaneously. It often does a better job than built-in translators with some specialized features, such as styles in word processing documents.

Generic Formats Sometimes full cross-platform

File Typecasting

To gain a better understanding of why you may run into file conversion problems across platforms, take a look at the different ways the Mac and Windows operating systems identify file types and originating applications.

Windows files need three-letter extensions at the end of file names to identify both the file type and the originating application. The .doc extension tells the Windows OS that the file is a Microsoft Word document.

The Mac interface buries the file type and creator information in the file as two four-letter codes. The type code identifies the expenses file as TEXT. The creator code links it to an application—in this case, Microsoft Word.
operability isn't a requirement. For example, when you're designing a company's business cards, your clients don't need to open your Adobe Illustrator or Macromedia Freehand files and manipulate them—they want only to see what the design looks like. In cases such as this, try formats most applications can view regardless of platform.

Everyone with a Web browser can view GIF and JPEG images, and most programs can save in or export these formats. When you need higher resolutions than GIFs and JPEGs can provide, Adobe Acrobat's Portable Document Format (PDF) is a good choice. A PDF file preserves the typefaces, graphics, and layout of the original file. Anyone on a Mac or a PC can view or print out (but not modify) PDF files with the free Acrobat Reader.

There are several ways to create PDF files. Some applications have built-in PDF export. Adobe also provides a Web-based PDF converter (http://cpdf1.adobe.com) that allows three free conversions. James Walker's $20 shareware PrintToPDF printer driver (www.jwalker.com/pages/pdf.html) handles less-complex documents. For the full range of creation and modification features, you'll need the $249 Adobe Acrobat package (www.adobe.com/productsacrobat, 888/724-4508). The package includes Distiller, Capture, and Catalog, in addition to Acrobat.

Transfer That File

After converting files, the next task is to get them across the platform border. There are a variety of ways to move files around the office and the world, and which one makes the most sense depends on your individual situation.

Follow our examples and see which option best matches your needs.

Use the Internet You're a freelance writer, churning out articles for any magazine that will pay. You could send your work on disks, but that's slow, and overnight delivery gets expensive. The best approach for individuals working on their own is to transfer files via the Internet, mostly through e-mail. (FTP is another inexpensive solution for transferring files over the Internet, but many people don't know how to use it effectively, and storing confidential files on a public FTP server can be problematic.)

Although you may find sending and receiving e-mail attachments a frustrating experience, you can eliminate most cross-platform problems by following these rules:

- Make sure that file names sport the appropriate Windows extensions.
- Encode attachments using the AppleDouble (also called MIME) format. If that doesn't work, switch to Base64, then to UUencode. If the recipient uses America Online, stick with Base64. Attachment format settings are in your e-mail program's outgoing message windows or Preferences menu.

  - When attachments from Windows users get mangled in transmission, ask the sender to try the MIME format, then UUencode.
  - To send multiple files, compress them in a single archive. If you create StuffIt archives, the Mac standard, make sure your recipient has the free Aladdin Expander for Windows (www.aladdinsys.com, 831/761-6200). You can also create Zip archives, the standard in Windows, using Aladdin's $20 shareware DropZip or Tom Brown's $15 shareware ZipIt (www.maczipit.com).
  - Download a free copy of Aladdin's StuffIt Expander to decode whatever compression or encoding format you receive. If you find even StuffIt Expander failing you on a regular basis, DataViz's MacLink Plus may be a better option.

Stick with Disks The Internet might be everywhere, but sometimes only disks will do. For example, your desktop publishing files may be so large that they'd take hours to transmit to a client for approval or to a service bureau for printing, so sending them on disk is your best option. Here, too, cross-platform problems can crop up.

Mac users can read and write data on disks formatted for Windows, so sending Mac files on Windows-formatted Zip and Jaz disks, SyQuest cartridges, and Orb disks is relatively trouble-free. However, recordable CDs can cause problems, even when you set them up in the cross-platform ISO 9660 format. Use file names longer than the creaky DOS standard of eight letters, then a dot, then three letters, and the CD-burning process may truncate those names and end up breaking links between files on the CD-R. If you've got the popular Toast app from Adaptec ($89, www.adaptec.com, 800/442-7274), you can preserve your file names by choosing Allow Macintosh Names from the Settings menu.

A few people are turning to DVD-RAM disks
### Cross-Platform Travel Kit

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Mouse Rating</th>
<th>List Price</th>
<th>Contact</th>
<th>OS Support</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NETWORKING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple Computer</td>
<td>AppleShare IP 6.3.1—Windows file sharing (10 clients)</td>
<td>★★★½</td>
<td>$510</td>
<td>408/996-1010</td>
<td>Mac</td>
</tr>
<tr>
<td></td>
<td>Windows NT 4.0 Server Services for Macintosh (5 clients)</td>
<td>★★★★</td>
<td>$809</td>
<td>425/882-8080</td>
<td>Windows NT</td>
</tr>
<tr>
<td>Miramar Systems</td>
<td>PC MacLAN for Windows 95/98 7.2 (1 user)</td>
<td>★★★½</td>
<td>$199</td>
<td>800/862-2526</td>
<td>Windows 95/98</td>
</tr>
<tr>
<td></td>
<td>PC MacLAN for Windows NT/2000 8.0 (1 user)</td>
<td>★★★½</td>
<td>$199</td>
<td>800/862-2526</td>
<td>Windows NT/2000</td>
</tr>
<tr>
<td>Thunby Software Systems</td>
<td>Dave 2.5.1 (1 user)</td>
<td>★★★½</td>
<td>$149</td>
<td>817/478-5070</td>
<td>Mac</td>
</tr>
<tr>
<td></td>
<td>TSSTalk for Windows 95/98 1.0 (1 user)</td>
<td>★★★½</td>
<td>$149</td>
<td>817/478-5070</td>
<td>Windows 95/98</td>
</tr>
<tr>
<td></td>
<td>TSSTalk for Windows NT 1.0 (1 user)</td>
<td>★★★½</td>
<td>$169</td>
<td>817/478-5070</td>
<td>Windows NT</td>
</tr>
<tr>
<td><strong>REMOTE CONTROL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT&amp;T Research Laboratories Cambridge</td>
<td>VNC 3.3.3</td>
<td>★★★★</td>
<td>Free</td>
<td>44 1223 340000</td>
<td>Mac, Windows 95/98/NT/2000</td>
</tr>
<tr>
<td><strong>FILE CONVERSION UTILITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DataViz</td>
<td>Conversions Plus 5.0 (1 user)</td>
<td>★★★★</td>
<td>$100</td>
<td>203/268-0030</td>
<td>Windows 95/98/NT/2000</td>
</tr>
<tr>
<td></td>
<td>MacLink Plus Deluxe 11</td>
<td>★★★★</td>
<td>$100</td>
<td>203/268-0030</td>
<td>Windows 95/98/NT/2000</td>
</tr>
<tr>
<td>Miramar Systems</td>
<td>AKA 1.0</td>
<td>★★★½</td>
<td>$20</td>
<td>800/862-2526</td>
<td>Mac</td>
</tr>
<tr>
<td><strong>DISK UTILITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple Computer</td>
<td>File Exchange (in Mac OS 9)</td>
<td>N/A**</td>
<td>N/A**</td>
<td>408/996-1010</td>
<td>Mac</td>
</tr>
<tr>
<td>Mediafour</td>
<td>MacDrive 2000</td>
<td>★★★½</td>
<td>$60</td>
<td>515/225-7409</td>
<td>Windows 95/98/NT/2000</td>
</tr>
<tr>
<td><strong>PC EMULATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connectix</td>
<td>Virtual PC 3.0 with Windows 98</td>
<td>★★★★</td>
<td>$179</td>
<td>650/571-5100</td>
<td>Windows 98</td>
</tr>
<tr>
<td></td>
<td>Virtual PC 3.0 with Windows 2000</td>
<td>★★★½</td>
<td>$329</td>
<td>650/571-5100</td>
<td>Windows 2000</td>
</tr>
<tr>
<td>FWB</td>
<td>SoftWindows 98 5.1 with Windows 98</td>
<td>★★★½</td>
<td>$159</td>
<td>415/345-4300</td>
<td>Windows 98</td>
</tr>
</tbody>
</table>

* First word refers to server, second to client. * N/A = not applicable. Editors' Choice appears in red.

for the heftiest jobs. Just make sure to format DVD-ROM disks using the cross-platform Universal Disk Format to reduce compatibility issues.

When PC users need to read and write to your Macintosh-formatted disks, tell them about MacDrive 2000, from Mediafour, or MacOpener 2000, from DataViz. Both cost $60, handle almost any type of Macintosh disk, and map Macintosh file types and creators to Windows file-name extensions on-the-fly, so the extensions disappear when you view the disks on a Mac again. MacDrive gets our nod because it supports copying Mac disks, extracting Mac files from MacBinary and BinHex encoded files, creating MacBinary files, and viewing the contents of Mac files' resource forks.

**Lone Mac in a PC Network** You land a great job with a Windows-based company that agrees to let you use your beloved Mac. Or maybe your company
<table>
<thead>
<tr>
<th>Lets Macs</th>
<th>Lets Windows</th>
<th>Access Macs</th>
<th>Access Windows</th>
<th>Volumes/Printers</th>
<th>Maintains Resource Forks</th>
</tr>
</thead>
<tbody>
<tr>
<td>No/No</td>
<td>Yes/No</td>
<td>No</td>
<td>Yes/No</td>
<td>No</td>
<td>No/No</td>
</tr>
<tr>
<td>Yes/Yes</td>
<td>No/No</td>
<td>Yes</td>
<td>Yes/No</td>
<td>Yes</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Yes/Yes</td>
<td>No/No</td>
<td>Yes</td>
<td>Yes/No</td>
<td>Yes</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Yes/Yes</td>
<td>Yes/Yes</td>
<td>Yes/No*</td>
<td>Yes/No</td>
<td>Yes/No*</td>
<td>Yes/No*</td>
</tr>
<tr>
<td>Yes/Yes</td>
<td>Yes/Yes</td>
<td>No/Yes*</td>
<td>No/Yes</td>
<td>No/Yes*</td>
<td>No/Yes*</td>
</tr>
<tr>
<td>No/No</td>
<td>Yes/Yes</td>
<td>No</td>
<td>Yes/No</td>
<td>No</td>
<td>No/No</td>
</tr>
<tr>
<td>No/No</td>
<td>Yes/Yes</td>
<td>Yes</td>
<td>Yes/No</td>
<td>No</td>
<td>No/No</td>
</tr>
<tr>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
</tr>
<tr>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
</tr>
<tr>
<td>N/A**</td>
<td>N/A**</td>
<td>Yes</td>
<td>N/A**</td>
<td>Yes</td>
<td>N/A**</td>
</tr>
<tr>
<td>N/A**</td>
<td>N/A**</td>
<td>Yes</td>
<td>N/A**</td>
<td>Yes</td>
<td>N/A**</td>
</tr>
<tr>
<td>N/A**</td>
<td>N/A**</td>
<td>Yes</td>
<td>N/A**</td>
<td>Yes</td>
<td>N/A**</td>
</tr>
<tr>
<td>N/A**</td>
<td>N/A**</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No/No</td>
</tr>
<tr>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
</tr>
<tr>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
<td>N/A**</td>
</tr>
</tbody>
</table>

converts from Mac to Windows, with only your Mac left. You must share files with your Windows coworkers, and in most modern workplaces that means an Ethernet network. The trick is creating a setup that lets your Mac talk with all those PCs.

Two options make the most sense when you have one or two Macs hiding in a Windows-based network: the Services for Macintosh functions that come with Microsoft’s Windows NT 4.0 Server ($809) and Windows 2000 Server ($999), and Dave 2.5.1 ($149), from Thursby Software Systems.

Choosing between these options is simple. If you already have Windows NT 4.0 Server or Windows 2000 Server running on your network, you can easily activate Services for Macintosh, which provides AppleShare services over AppleTalk or, for better performance, TCP/IP. For installation instructions, see the online sidebar “Install Services for the Macintosh” at www.macworld.com/2000/08/features.

But when that’s not feasible, Dave is your best bet. This stealth solution lets a Mac masquerade as a PC network client, and it doesn’t require putting more software on the server, so it’s less likely to alienate potentially Mac-hostile network administrators.

Once you’ve installed Dave on a Mac (you don’t need to make changes on any PC), the Macintosh can see shared resources on PCs, including folders and printers. You can create desktop printers for PC PostScript printers, make aliases to shared PC folders, and generally work with PC resources as though a Mac were hosting them. In addition, you can use the Dave Sharing control panel to give PC users access to shared folders and printers on your Mac. The main negatives are that you must access PC resources through the Dave client in the Chooser rather than through the Network Browser (see the screen shot “Dave in the Chooser”), and the PC terminology and protocols can prove confusing.

Both Dave and Services for Macintosh allow you to copy Macintosh files with resource forks, such as applications and fonts, to a PC and back again with no data loss.

**Lone PC in a Mac Network**  You may find yourself in the opposite situation, where you need to integrate a PC in an otherwise all-Mac office. Both Dave and Windows 2000 Server enable file sharing (as an internal FTP server would), but you don’t have to outfit multiple Macs with Dave or install and administer a dedicated Windows 2000 server for such minimal needs. Instead, look to the $149 TSSTalk 1.0, from Thursby Software Systems; the $199 PC MacLAN 7.2 or 8.0, from Miramar Systems; the $250 AppleShare IP 6.3.1, from Apple; or the $159 Timbuktu Pro 2000, from Netopia.

TSSTalk (previously known as COPSTalk)
offers the most basic way to share files and printers with Macs, since it lets a Windows machine use Network Neighborhood to connect to your existing AppleShare servers and printers. Moreover, it doesn’t allow Macs to access the PC running TSSTalk. To avoid sluggish behavior when you’re browsing the AppleTalk zone, map shared folders to drive letters. Some caveats: at press time TSSTalk isn’t compatible with Norton AntiVirus, and the program comes with a sparse extension-mapping database.

PC MacLAN 7.2 (Windows 95/98) and 8.0 (Windows NT/2000) are basically Dave in reverse. Enabling a PC to act as an AppleTalk network client, they also include their own file and printer server that allows networked Macs to access files on the PC and its printers. PC MacLAN’s directory listings are more readable than TSSTalk’s and AppleShare IPs.

PC MacLAN’s file server essentially ignores the built-in Windows interfaces for creating users and sharing folders. Its interface fits better into the mindset of most Macintosh users. Since its file server is a full-fledged AppleTalk-based AppleShare server, shared folders appear in the Mac’s Network Browser. Thanks to its file and print server, PC MacLAN has significantly more power than both TSSTalk versions for only $30 to $50 more.

AppleShare IP starts at around $500, so it’s probably overkill if all you need is file sharing with a lone PC on a Macintosh network. But when you already have AppleShare IP or need enough of its full set of services (a print server and servers for FTP, the Web, and Internet e-mail) to warrant the purchase, you’ll find setting up file access for a Windows PC simple—just check the Enable Windows File Sharing (SMB) check box in the Windows tab when configuring file sharing, and make sure you have a shared folder and a user who can access that folder.

Netopia’s Timbuktu Pro (which includes Timbuktu Pro 5.2 for the Mac and Timbuktu Pro 2000 for Windows) is primarily known as remote-control software—it lets you view and operate the PC in a window on your Mac—but it also sports speedy file-transfer capabilities. On the minus side, Timbuktu Pro doesn’t offer printer sharing of any sort. Thanks to a clumsy interface for transferring files (see the screen shot “Timbuktu Pro File Transfer Window”), Timbuktu Pro makes sense only if you need remote control and don’t care much about printer sharing.

With the exception of PC MacLAN’s file server, when you transfer files from a Mac to a PC, all four of these products copy only the Mac files’ data fork, which stores the guts of most documents. That’s seldom an issue with documents, but the process can actually destroy applications, along with other files that rely on their resource forks, such as fonts.

Run Windows on Your Mac

Sometimes you run into a cross-platform problem when you need to access capabilities that are unique to one platform or the other. For example, imagine you’re in the construction business and you need to run a particular Windows-only program for making project estimates. Everything else in your office is Mac-based—how can you add this single application to your workflow inexpensively?

You can choose one of several paths. Compatibility cards, which graft most of the guts of a PC into your Mac, were once an option, but rumor has it that the last remaining vendor, OrangeMicro, has recently discontinued them. Software emulators, a less powerful alternative, use your Mac’s memory and hard drive to simulate Windows so you can run Windows applications. Or you can buy a cheap PC, stuff it in a closet, and use remote-control software to direct it from your Mac.

Fake It Good Evaluating PC emulation programs is tricky, since they’re most likely used with custom software that serves a specific task, and custom programs often act flaky even on real PCs. That said, here are our overall impressions of and insights into which programs work most smoothly on the Mac. (See the benchmark, “Testing the Boundaries,” for performance numbers.)

We give the nod to Connectix’s Virtual PC 3.0 ($179 with Windows 98 and a whopping $329 with Windows 2000), which offers the tightest integration with Mac OS. You can share Macintosh folders with the PC environment by dragging them to a Folders button on the Virtual PC window border, and in a unique and elegant twist, you can also copy files back
and forth with a simple drag-and-drop move. Copying and pasting works transparently between Windows and Mac OS as well. Notable in the latest release of Virtual PC is support for a number of USB devices within Windows 98. And in the most recent minor update (3.0.3), Connectix added support for the Velocity Engine in the G4 chip, which might improve performance in certain situations.

Another software emulator, FWB's $159 SoftWindows 98, offers most of the same folder-sharing and copy-and-paste Macintosh integration features. You can also easily copy images from the Windows environment to the Mac. In our testing, SoftWindows continually encouraged switching the monitor to 256 colors and proved somewhat clunkier to configure and use.

For serious use of any software emulator, we recommend a fast G3- or G4-based Mac with at least 96MB of physical RAM and 600MB of free hard-disk space.

**Puppet PCs** If your Mac lacks the oomph to emulate Windows at a reasonable speed, or your custom program simply doesn't run well in an emulator, you can couple an inexpensive PC with remote-control software, such as Netopia's Timbuktu Pro or VNC, from AT&T Research Laboratories Cambridge. This combination lets you view the PC in a window on your Macintosh (see “Control Windows from Afar”). Even if you don’t share hardware between the machines (see “Sharing Hardware,” elsewhere in this feature), you’ll still need a separate PC monitor, keyboard, and mouse—just in case. For example, if your PC runs into trouble, you might need to run ScanDisk on it before the remote-control software can take over. However, you can use cheap devices and stash the PC itself out of the way.

Netopia constantly improves Timbuktu Pro, for years the premier cross-platform remote-control software. You can transfer files back and forth, move the contents of the Clipboard between computers, and save the remote desktop as a PICT file or actions on the remote desktop as a QuickTime movie.

On the downside, the jerky remote-control performance can make even a hopped-up PC feel slightly sluggish. Display quirks aren’t uncommon, though few make the PC screen unreadable.

The free VNC fails to match up to Timbuktu Pro in many ways. It’s more complex to configure, offers just remote-control and observation features (no file-transfer, chat, intercom, or screen-capture capabilities), and the Macintosh version seems like a perennial beta release. However, it’s usable and free.

For yet another take on running Windows applications from afar, check out Java-based Personable.com (www.personable.com). Pay a monthly fee, and you can access a virtual Windows 2000 desktop within Internet Explorer 4.0 and higher. The available programs are limited, and system performance may take a hit over a slower Internet connection. But if Personable.com polishes its service and offers more applications, it might become a useful way to avoid buying either a PC or emulation software.
Sharing Hardware

You can share quite a bit of hardware between Macs and Windows computers these days, either swapping devices from one machine to another or connecting devices to multiple computers simultaneously via switch boxes.

Printers You’ve got a perfectly good LaserWriter for your Mac—why bother buying a new printer just for a PC? Very little about a printer is platform-specific, other than its interface—how it connects to the computer—and the driver it requires. Most high-end laser printers rely on PostScript (and therefore work with standard drivers included in both Mac and Windows) and are accessible via Ethernet.

Sharing inexpensive ink-jet printers presents more of a challenge, since they generally require custom drivers and connect via serial (old-style Macintosh), parallel (old-style PC), or USB ports—or some combination thereof. To find Mac drivers for PC-based printers, check out Infowave's PowerPrint products (www.infowave.com, 800/463-6928). Most products that share files between Macs and PCs on a network (including Dave, PC MacLAN, and TSSTalk) also share PostScript printers. Infowave offers PowerPrint for Networks, which comes with a small hardware print server. For low-end printers on computers not connected to a network, spend around $50 on cables and a switch box from a company such as Belkin (www.belkin.com, 800/223-5546), and your Mac and PC can access the same device. Some printers with both a serial port for the Mac and a parallel port for the PC can detect incoming print jobs on both without a switch box.

Monitors When you don’t need to look at the PC often, consider sharing a single monitor between it and your Mac to save money and a lot of desk space. As long as the monitor is multisync—that is, it can operate at a variety of resolutions—this should be easy. If you bought your Mac in the last several years, you may need an adapter for the two-row 15-pin connector some older monitors use. You can often get an adapter free from the monitor manufacturer if you call and request one. Most monitors today, along with current Macs, use a three-row, 15-pin, VGA-style connector—standard issue in the PC world.

You’ll also need a monitor switch box, such as Dr. Bott’s $139 MoniSwitch USB (www.drbott.com, 503/452-8101). It’s more expensive than simple serial or USB switch boxes, but it lets two computers share a keyboard and mouse.

Keyboard and Mouse With Apple’s adoption of USB in place of ADB for input devices, sharing keyboards and pointing devices has become easier, and it’s a great way to avoid cluttering your desk, plus you can use your favorite Macintosh trackball. Most devices should work at a basic level in both directions, but using devices designed for Windows systems is a little trickier. For more information, see the online sidebar “Cross-Platform Input Devices” at www.macworld.com/2000/08/features.

Modems and Serial Devices As long as you're sharing devices to save money, why not share an external modem or Palm cradle too? To share either of these devices, you’ll need appropriate serial cables for the Mac and the PC, plus a cheap switch box to eliminate annoying cable swapping. For modem sharing, you may also need drivers on the PC side or modem scripts on the Mac side—visit the modem manufacturer’s tech-support site for details.

The situation is more confusing for other serial devices. Unlike Palm Computing’s cradles for Palm handhelds, most PC devices don’t have Macintosh versions of their software, even if you can connect a serial cable to them. When in doubt, contact the manufacturer for compatibility information.

The Last Word Thanks to Apple’s robust health, Mac users no longer have to fear the wholesale invasion of Windows systems. Ever-improving software and standard cross-platform hardware and file formats such as USB and HTML make communication between the two platforms easier than ever. The iron curtain between Macs and Windows has opened.

ADAM C. ENGST is the publisher of the e-mail newsletter TidBits and coauthor of the cross-platform translation dictionary Crossing Platforms: A Macintosh/Windows Phrasebook (O'Reilly & Associates, 1999).
Speed and functionality are built into the recipe of every Belkin USB hub product, along with portability. Our high-speed USB devices deliver up to 12 Mbps and allow virtually limitless Plug-and-Play connectivity. Available in both, Mac and PC formatting, our modular BusStations™, and mobile Pocket Hubs come in colors and configurations to match your personality and hardware demands. You want a Tangerine BusStation™ with eight USB ports and two serial ports...we've got it! How about a blueberry pocket hub with four USB ports...no problem! And these are just a taste of the extensive Mac products available from Belkin. Go ahead. Soup up your Macintosh, Belkin guarantees to satisfy your hunger.

Mac Products & Accessories From Belkin. Soup Not Included!

www.belkinusb.com

©2000 Belkin Components. All rights reserved. All trademarks of respective manufacturers listed.

Circle 63 on card or go to www.macworld.com/getinfo
It's about speed and agility. Simply add a Sonnet processor upgrade card to your Power Macintosh or PowerBook and leave the competition in your wake. Whenever speed is a factor, more people depend on Sonnet. You should too. For more information, call us at 1-949-261-2800 or visit our website at:

www.sonnettechnologies.com

Visit us at MacWorld New York
July 19-21, Booth # 1707
Internet Explorer 5 Shortcuts

by Ted Landau

By definition, surfing the Web means never staying in one place for very long. The people behind Microsoft’s Internet Explorer (IE) 5 clearly recognize that if you’re not jumping from one page to the next, you’re racing from one end of the page to the other. That’s why IE 5 comes packed with an assortment of ways to make your Web navigation faster and more convenient.

Getting Around
Want to go directly to the bottom of a long Web page? Just press the # key and the down-arrow key, and you’re there. If the page doesn’t have a “back to the top” link, # and the up arrow take you right back.

For the ultimate in page navigation, press # and then click and hold down your mouse button. The cursor icon will turn into a hand. Now, as you move the mouse, the page goes up, down, or from side to side in sync with the cursor.

To move backward or forward through previously visited pages, press # in combination with the left- or right-arrow key. (Or you can use delete and shift-delete; they work the same way.) If you have several windows open, use IE 5’s Cycle Through Windows command—#-tilde (~) is the shortcut—to bring the window you want to the front.

Climbing the Web Ladder
Suppose you have a long URL (such as www.macgizmo.com/support/faqs/problems/refunds.html) in IE’s Address box. The information you need isn’t on this page, so you decide to move up a few levels in the Web site’s hierarchy (to, say, www.macgizmo.com/support) in the hope that this page will contain a link to what you’re seeking. With IE 5, you can quickly jump to a higher level without ever touching your mouse.

First, if it isn’t already selected, press option-tab to highlight the URL in the Address box, and then press the right-arrow key once to bring your cursor to the end of the URL. Now, while holding down the control key, press the left arrow. Each time you do this, you’ll highlight another segment of the URL. When you’ve highlighted the portion you want to eradicate, press delete. Finally, press return and you’ll be whisked to the selected page.

If you’re willing to use your mouse, there’s an even better alternative: press # and click on the title text in the header of any IE window. The result is similar to what happens when you do this with Finder windows—you’ll get a pop-up menu that lists all the URLs for hierarchical levels back to the home page (see “Move On Up”). Select a URL from the list to go directly to that page.

continues
SECRETS

96 August 2000

Move On Up Go directly to a higher level of a Web address by using Internet Explorer's Address bar pop-up menu.

Looking for Links?
Trying to find a particular link on a page filled with them? No problem. Just click anywhere on the page and start pressing the tab key, and IE will cycle through every link on the page. If a Web page consists of a form filled with text boxes, you can use option-tab to jump from box to box. The browser's Keyboard Accessibility Preferences setting lets you toggle between functions that use the tab key and those that use option-tab. (For the scoop on another new option in IE's Preferences, see “Make a New Resolution.”)

Toolbar Tricks
You can keep a collection of your most frequently visited sites in IE's Favorites bar, located just below the Address bar. To add a site to the list, locate any text (on any Web page) that contains the desired link and drag the text to the Favorites bar. To add the current URL in the Address box, drag the @ symbol to the left of the address. To rearrange the order of the links, just drag a URL where you want it to go. To delete an item, control-click on it and select Delete from the contextual menu that appears.

The venerable Button bar (which displays icons or text links for actions such as Back, Forward, and Print) now lets you arrange and delete items. You can also add items here by selecting Customize Toolbars from the View menu.

If IE's Toolbars are taking up too much of your screen, you can hide them by selecting Collapse Toolbars from the View menu. With the Toolbars collapsed, you can still enter a URL in the Address box: simply press ⌘-L, and the box will reappear; press escape, and it's gone again.

Internet Explorer as Psychic
Start typing a URL in IE 5's Address box. As you type, the program generates a menu displaying Web addresses that match what you have typed thus far, updated with each new letter you add. At any point, you can slide your cursor down the menu and select a URL; there's no need to finish typing it. (Internet Explorer 4.5 has a similar feature, but it just gives you its single best guess rather than a menu of them.) If for some reason this feature doesn't work, make sure you haven't disabled Address AutoComplete in Preferences.

Easier Pickings
Suppose you want to save just a paragraph of text from a Web page—for example, a single news item on a crowded page. With previous versions of Internet Explorer, your only options were to save the entire page or to copy and paste the selection. With IE 5, you can highlight the portion of text you want and drag it to the Finder's desktop. Faster and more convenient than copying and pasting, this method also saves the original formatting (font, style, size, and color). You can even drag a selection directly into another application such as AppleWorks to use in a document of your own.

Contributing Editor TED LANDAU uses Internet Explorer 5 to navigate his MacFixIt Web site (www.macfixit.com).

Make a New Resolution

The fonts and size section of Internet Explorer 5's Preferences dialog box contains another new feature that Mac users will appreciate. Figuring out exactly what the Resolution option does and why it's useful can be a bit tricky, though, so here's the scoop.

Many Web designers use FONT FACE tags to assign text size on a relative scale, indicated by numbers 1 through 7, with 3 being the default. Previous versions of IE for the Mac had a default of 12-point type, which meant that text specified by the designer as FONT FACE=3 showed up in the user's browser as 12-point type by default. However, because the Windows browser default has been 16 point, Web-page type that looks fine on Windows displays may appear too small on Mac screens.

The default size for the Macintosh version of IE 5 is now also 16 point. You may like the larger default; if not, go to the Size pop-up menu in Preferences to change it. If you go back to the 12-point default but occasionally want to increase the type size of a Web page, you can do so without altering the Size setting in Preferences: just press ⌘-plus (+) for larger type or ⌘-minus (-) for smaller type.

For the best text appearance overall, Microsoft recommends setting Internet Explorer's Resolution option to match the resolution of your display. Most monitors today stray from the Mac's traditional 72 dpi—resolutions in the 80s are now common. Use the Resolution setting's Other option to determine which resolution you should use; changing to the recommended setting should make the text size display as the Web designer intended. The setting will mainly affect text to which the designer has assigned an absolute rather than a relative font size.
ViewSonic® will improve your image with...

PerfectFlat® Technology

Big screen, PerfectFlat technology, outstanding color and a ton of bandwidth – the new PF815 has it all. The screen is a big 22" (20.0" viewable) and utilizes ViewSonic's PerfectFlat technology for edge-to-edge precise images and minimal glare. A flicker-free maximum resolution of 1,920 x 1,440, refreshing at 75Hz and a wide video input bandwidth of 300MHz, delivers a sharp and crisp image even at very high resolutions. A super-fine 0.25-0.27mm variable aperture grille pitch provides high contrast for ultimate image clarity and outstanding color saturation. OnView® controls including advanced color purity adjustment for all four corners of the screen gives you even, color performance, making the PF815 the ideal choice for pre-press, imaging, animation, desktop publishing and graphic design.

At ViewSonic, we offer the #1 best selling monitors and flat panel displays in the USA*. Buy with confidence from the company that's won over 600 industry awards. Our warranty covers 3 years parts and labor. Plus 24-hour customer service, 7 days a week. An Express Exchange® service option is also available.

The Visual Technology Company™

For more information on the company that's won over 600 industry awards, visit our website at: www.ViewSonic.com/pf815

*800-888-8583 • Specifications subject to change without notice • Copyright© 2000 ViewSonic Corporation • Corporate names and trademarks stated herein are the property of their respective companies. "ViewSonic, ViewSonic at United States" #1 best selling flat panel display and the leading non-captive monitor brand by Stanford Resources, Inc. (Flat Panel Monitor, Q3 '99 and Monitor Q3 '98.)
Get the monkeys off your back!

We know how it is: you've got deadlines. But every time you get the creative flow going, wham! Someone needs something. The sales rep in Sedona needs a logo, the CEO needs a two-year-old PowerPoint™ presentation, and your distributor in London wants a catalog of photos by the end of the day. It's enough to drive you bananas.

It could take hours to find those files. But with Portfolio 5 – the award winning digital asset manager from Extensis – it takes minutes. It's easy to create a catalog of the most popular files — logos, ads, presentations, audio, movies and much more. Then everyone can easily get the files they need themselves — no matter where they're located, even over the internet. So get Portfolio 5 — because it's a jungle out there!
Tips, Tricks, and Shortcuts

by Lon Poole

People complain that AirPort can't connect with America Online, but Paul Lorah of Lansdale, Pennsylvania, found an easy workaround. Simply get an ordinary dial-up PPP account with an ISP in your area, and connect your AirPort via this account. Set up AOL to connect through your ISP using TCP/IP instead of dialing an AOL access phone number. Offset the cost of the ISP account by signing up for AOL's Bring Your Own Access plan (AOL keyword BYOA), which costs only $9.95, $12 a month less than the regular plan. Using TCP/IP and BYOA also lets you get to AOL through a DSL or cable modem connected to an AirPort base station or your computer.

Speedier Disk Images

Q. I like the idea of using self-mounting disk images in place of floppy disks and installation CDs (Quick Tips, April 2000), but how can I make them skip the time-consuming checksum verification process, which checks for a corrupt disk image?

A. If you're confident that your disk image isn't corrupt, skipping the verification process is a good idea; there are a couple of ways to do it. First, there's the free method: Turn off the Disk Copy utility's Verify Checksum option, or turn on the Except DiskScripts/DiskSets option (Edit: Preferences). Then, instead of double-clicking a self-mounting disk-image file to mount it, drag it to the Disk Copy application's icon—it will skip the verification process.

This approach has drawbacks. It takes extra time to open Disk Copy and still more time to quit it manually (unless you're willing to leave it open and occupying RAM). Moreover, this trick doesn't work with the combination of Disk Copy 6.3.X and the type of self-mounting disk images that display a licensing agreement before mounting the disk image. Most Apple-distributed images are of this type.

For the fastest mounting, there's a second method: create self-mounting disk images using the $30 ShrinkWrap program from Aladdin Systems (www.aladdinsys.com). ShrinkWrap's self-mounting disk images skip checksum verification. The program can also convert existing Disk Copy files into ShrinkWrap files, which skip the licensing agreement and verification steps.

View Help Pages in Your Browser

TIP The benefits of opening Mac OS help pages in your Web browser instead of in the usual Apple Help Viewer program are no secret (they're revealed in Secrets, March 2000).

But if you already have a page open in Help Viewer (which you access from the Finder's Help menu), you have to retrace your steps painstakingly from the starting help page to get to exactly the same page in your browser. The AppleScript shown in "Get Help from Your Browser" alleviates the tedium.

To make the script available from a menu while you're using the Help Viewer program, install the OSA Menu software from the CD Extras folder on the Mac OS installation CD. Then enter the script in the Script Editor program. When you save the script, set the Format option to Compiled Script and put the file in a folder called Help Viewer Scripts (create this if necessary) inside the Scripts folder within the System Folder.

NEIL MAYHEW
Calgary, Alberta, Canada

If you don't want to install OSA Menu, you can put the script in the Apple menu instead. In this case, save the script (in Script Editor's Save dialog box) with the Format option set to Classic Applet or Application and the Never Show Start-up Screen option turned on.

Finally, put the script file in the Apple Menu Items folder.—L.P.

iMovie Audio-Track Swapping

TIP Although Apple's iMovie software doesn't allow you to replace one clip's audio track with another's (as noted in "Home-Movie Magic," April 2000), you can accomplish this by turning the replacement audio track into an AIFF sound file and importing it into continu...
Better Blends in Illustrator 8

To see the spine, either switch to Artwork mode (⌘-Y) or click the center of the blend with the Direct Selection tool. Then select the Convert Direction Point tool and drag out a direction point control handle at each end of the spine (B). Move these control handles along the spine to adjust its rate of change (C). This is similar to how you would control blend speed in a gradient mesh.

If you impose extreme acceleration or deceleration on the blend, you can prevent visible banding by increasing the number of blend steps in the Blend Options dialog box (choose Object: Blend Options).

You can vary the blend's acceleration and deceleration even more by adding intermediate anchor points along the spine with the Add Anchor Point tool (D). These points divide the blend into segments you can control individually by dragging their direction-point control handles. However, the intermediate points don't provide control over the position of particular blend steps. For example, a point added between the spine endpoints does not designate the location of the halfway step in the blend progression.

iMovie. With the help of QuickTime Pro, it's easy. To replace the audio in Clip 1 with the audio from Clip 2, do the following:
1. In iMovie, put Clip 2 in the Clip Viewer at the bottom of the screen.
2. Choose File: Export Movie. In the Export Movie dialog box, set the Export To option to QuickTime and set the Format option to produce the sound quality you want. For best quality, choose the CD-ROM Movie, Large setting or choose Expert and make audio settings for no compression, 44.1kHz, 16-bit stereo. Select the lowest image settings, since you won't be using the video portion of the movie. This will reduce the file size and speed up exporting.
3. Open the exported movie in QuickTime Player and choose File: Export. (You'll see this menu command only if you've upgraded to QuickTime Pro.) In the dialog box that appears, set the Export option to Sound To AIFF and set the Use option to the sound quality you want. Save the file. (You can now put the QuickTime movie in the Trash to recover the disk space it used.)
4. In iMovie, choose File: Import File, select the newly created AIFF sound file, and click Import. This places the AIFF clip in iMovie's music track.
5. Drag Clip 1 to the Clip Viewer. Click the audio viewer tab and mute Clip 1's audio track. Finally, drag the AIFF clip directly below Clip 1. You will now hear the audio from Clip 2 when you view Clip 1.

You can move AIFF clips to any position on the music track (a wonderful way to provide audio for still images), copy and paste them, and crop them, all independent of the video. You can create an echo effect by turning a clip's audio track into an AIFF sound file and importing this file to a position offset a few frames from the original clip. In this case, don't mute the original clip.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. He is a coauthor, with John Rizzo, of The Little Network Book (Peachpit Press, 1999).

All shareware and freeware mentioned in Quick Tips is available from the Macworld Online software library (www.macdownload.com).

We pay $25 to $100 for tips selected for publication that discuss how to use Macs, peripherals, or software. Please include your full name and address, so that we can send you your payment. Send questions or tips to quicktips@macworld.com or to Macworld Quick Tips, 301 Howard St., 16th Fl., San Francisco, CA 94105. All published submissions become the sole property of Macworld. Due to the high volume of mail received, we cannot provide personal responses.
Make the Most of FreeHand 9

LET FREEHAND'S NEW FEATURES SAVE YOU TIME AND TROUBLE

by Olav Martin Kvern

Because of its sophisticated and powerful illustration tools, people commonly lump Macromedia FreeHand in with other professional drawing programs. But while the majority of FreeHand users are professional illustrators, the program’s scope far surpasses that of a conventional drawing package. With its tools for page layout, Web graphics, and animation, FreeHand is difficult to pigeonhole.

Version 9 expands the application’s abilities even more, offering new features for each of FreeHand’s personalities (see Reviews, July 2000). Some of these additions are eye-catching and take the program in a new direction; others offer solid enhancements to everyday tools and promise to transform FreeHand from a workhorse to a racehorse.

Here’s a look at the most impressive additions to FreeHand 9 and some tips on putting them to work for you.

Perspective Grids

One of the most notable new features in FreeHand 9 is the perspective grid. For years, graphic designers have needed a way to get simple 3-D graphics into their drawing programs. For example, you may want to create a realistic depiction of a room or show what your flat design will look like wrapped around a product box. Before FreeHand 9, you had to either turn to complicated 3-D rendering programs, such as KPT Bryce, or manually redraw the graphics—a tedious and time-consuming chore. And time is exactly what most designers don’t have.

FreeHand’s new perspective grids give you the power to create and edit simple 3-D effects without breaking the bank or missing your deadline. Like traditional perspective drawing, FreeHand’s perspective grids rely on the concept of vanishing point—the place where, due to quirks of visual perception, receding parallel lines meet. FreeHand simulates this illusion of distance by creating vertical and horizontal grids whose grid lines likewise converge on a single, editable vanishing point.

When creating a new perspective grid, you can select up to three vanishing points depending on the effect you want to produce. A grid with a single vanishing point contains only a horizontal and a vertical plane receding into the distance. Select a second vanishing point to add an additional wall, producing the illusion that you are staring at the corner of a building. The third vanishing point appears at the top of the grid, turning the building into a pyramid. You can adjust each plane’s perspective by dragging the grid’s vanishing point or outer edges—even extending them onto the pasteboard.

Once you’ve defined the grid, you can use the Perspective tool to snap single or grouped objects to its planes. FreeHand adjusts the images, shrinking or expanding them as you move them around the grid. And since the objects remain editable, you can always detach them from the perspective and return to the original graphic. (For instructions on using FreeHand’s improved perspective grids, see the sidebar “Putting FreeHand in Perspective”).

A document can have multiple perspective grids, although you can only view one at a time. You can also hide the grids completely when you need to work on unrelated areas of the page.

FreeHand’s perspective grids do have several limitations. For one, you can’t...
PUTTING FREEHAND IN PERSPECTIVE

Imagine that you've used FreeHand to create a package design for one of your clients—a somewhat eccentric vaudeville performer who is branching out into a new line of medical products. You've sent out the package for printing when the client asks for a perspective rendering he can use in advertising materials. Thanks to FreeHand 9, with a few quick clicks of the new Perspective tool you can convert the client's existing flat FreeHand artwork into a reasonably good 3-D drawing.

1. In your FreeHand document, arrange the artwork you want to convert to 3-D. Group individual elements on each panel so you have a single image for each side of the package. This keeps your designs intact when you move them to the perspective grid.

2. To set up your perspective grid, open the Define Grids dialog box from the Perspective Grid submenu under the View menu. For a simple box rendering showing only a front and side panel, choose two vanishing points. Set the Grid Cell Size field to a value that's an even divisor of the package's width or height—this makes aligning the objects on the perspective grid much easier.

3. Next, display the perspective grid by choosing Show from the Perspective Grid submenu. If the perspective isn't right, you can adjust the grids by clicking and dragging the vanishing points—or the horizon—out onto the pasteboard.

4. With the perspective grid in place, you can apply the perspective to your graphics. Use the Perspective tool (A) to select the front panel of the box. While holding down your mouse button, press the right-arrow key. This snaps the front panel of the box onto the right "wall" of the perspective grid (the plane of the grid extending from the vanishing point on the right). Likewise, pressing the left- or up-arrow key projects the object onto the left "wall" or "ceiling" plane.

Tip: Sometimes objects attached to the grid appear backward—to reflect an object you've attached to a grid, select the object with the Perspective tool and then press the spacebar.

5. Repeat this process for the side panel of the box. To snap the two panels together, use the Perspective tool to move the objects to the intersection of the left and right grids. As you drag, FreeHand adjusts the perspective distortion of the object.

To adjust the angle of a grid without dislodging its contents, hold down the shift key as you drag the grid into a new position.

Tip: To release an object from the distortion applied by the perspective grid, select the object and choose Remove Perspective from the Perspective Grid submenu of the View menu. To release the object from the confines of the grid while maintaining its distortion, select Release With Perspective.
attach an imported image to the perspective grid. This is a problem if you need to use a client's bitmapped logo in your design. To get around this problem, trace the images using FreeHand 9's improved Autotrace tool, which now incorporates a magic-wand tool for selecting continuous areas of color. Then attach the resulting paths to the perspective grid.

Attaching an object pasted inside a clipping path also can be a headache. To add perspective to these objects without permanently losing their paths, you must first remove them from their paths by choosing Cut Contents from the Edit menu; then apply them to the perspective grid. Once the object has the correct perspective, you can use the Release With Perspective command (located in the Perspective Grid submenu under the View menu) to detach the object from the perspective grid while retaining the illusion of perspective. You can then paste the object back into its original path.

The perspective grid has no effect on tiled fills, custom fills, or PostScript fills. If your artwork uses these types, you’ll have to come up with another solution for 3-D rendering.

Live Envelopes
Like the perspective grid, FreeHand's live envelope feature aims to make manipulating images a quick and easy process. An envelope is a method of distorting an object (or a group of objects) so it appears that you've bent or stretched the plane on which it rests. This creates an effect similar to a fun-house mirror. When applying an envelope, FreeHand creates an envelope grid—a kind of bounding box you can manipulate using standard points and control handles. As you stretch and distort the grid, the shape of the underlying object changes as well. (For tips on using the envelopes tool, see the sidebar “Pushing the Envelope.”)

The envelope feature itself isn't the big news in FreeHand 9; previous releases of the program included a primitive version. The main difference is that now envelopes are live, and you can manipulate them directly within the workspace. In previous versions, applying an envelope changed the shape of the original path. This meant that the only way to adjust the original object was to start over or undo all of the envelope.

PUSHING THE ENVELOPE

YOUR CLIENT ASKS YOU TO CREATE SOME GRAPHICS SHOWING HIS NAME PRINTED on ribbons. This project isn't as simple as it first seems. When you're simulating the appearance of text on fabric, you can't count on having a flat plane. Fabric stretches, bends, and wrinkles—and so must the text. It's a perfect job for FreeHand's improved Envelope feature.

1 First create the basic design of your ribbon. Make sure the design has enough points that you can reshape it later. To distribute new points evenly around the object, open the Xtras menu and select Add Points from the Distort submenu. If you add other details to your ribbon, group the paths before applying the envelope.

2 Open the Envelope Toolbar (found under Toolbars in the Window menu). Select your ribbon and choose the Rectangle envelope from the list of envelope presets on the Envelope Toolbar's pop-up menu (A). Click on the Create button (B) to apply the envelope. This applies a distortion grid over the ribbon. To view the grid, click on the Show Map button (C).

3 Before you begin reshaping the ribbon, add additional points, as you did in Step 1. This time, you're adding the points to the envelope. For precise control, make sure the envelope has the same number of points as the original object. You can now edit the envelope as you would any other path.

One interesting feature of FreeHand's envelopes is that you can turn them inside out by dragging one edge over or beyond the other, creating the illusion that you've twisted or folded the object.

4 When you're done, click on the Save As Preset button in the Envelope Toolbar and name the new effect “Ribbon.” You'll see the envelope at the top of the Envelope Preset pop-up menu.

DOCTOR HELIOTROPE T. VIPER

5 Position a text block above the ribbon. Select your new envelope from the Envelope Preset pop-up menu and click Apply. The text appears to curve around the ribbon.
The key to working with symbols in FreeHand is the Symbols palette, located in the Panels submenu of the Window menu (see the screenshot "Slim Down"). Creating a new symbol is as easy as dragging the object into the list area of the Symbols palette and dropping it. Then, to insert an instance of the symbol into your document, drag it out of the Symbols palette and drop it on the page. You can transform an instance just as you would any other object—moving, rotating, skewing, or reflecting it. These changes affect only the selected instance. You can also break the link between an instance and its symbol completely, converting the instance to a normal FreeHand object.

To update a symbol—and all of the instances based on it—simply drag a new object over the original item in the Symbols palette. You can even share your symbols with other designers or transfer them to another FreeHand document, by exporting them into a symbol library. To do this, choose Export from the Symbols palette's pop-up menu.

**Page Tool**

In addition to utilizing its illustration tools, many designers also rely on FreeHand as a page-layout program—especially for short jobs such as brochures. Unlike other drawing programs—Adobe Illustrator, for example—FreeHand can create documents containing more than one page, and you can give the pages in a single document any size and orientation. The only real limit is the size of the pasteboard—a healthy 222 by 222 inches.

In the past, it was hard to ensure that your pages ended up in the correct order and location when you arranged them in the Document Inspector's tiny Page Preview window. The introduction of the Page tool changes all that. This tool allows you to move, flip, and rotate pages directly, rather than dragging a tiny thumbnail around in the Document Inspector. You can also use the Page tool to add, duplicate, remove, and resize pages quickly.

When you select a page with the Page tool, handles appear around the edges of the page, allowing you to manipulate it like any other object. To resize a page, for example, simply drag one of the corner handles. Or if you want to delete the page altogether, select the page and press the delete key.

To arrange multiple pages on the pasteboard, choose Fit All from the View menu. FreeHand zooms out to a view that displays all of the pages in the publication. This makes it very easy to position pages relative to each other. For greater accuracy in positioning pages on FreeHand's pasteboard, you can activate the Snap To Grid feature (in the View menu), which forces the page to snap to increments of the document grid. (To view the grid, choose Show from the Grid submenu of the View menu; to edit the spacing of the grid, choose Edit.) This makes it much easier to leave an exact distance between pages—which you sometimes need when you're printing imposed pages.

**Final Word**

FreeHand 9 is a different program for every user. Part of its strength lies in its diverse feature set. But whether you use FreeHand for creating Web animations or designing vacation brochures, chances are you'll find a tool in version 9 that can save you both time and trouble. You can download a trial version of FreeHand 9 from Macromedia's Web site (www.macromedia.com).
Stay on the Right Side of Copyright Laws

KNOW WHETHER IT'S LEGAL TO USE ARTWORK SOMEONE ELSE CREATED

by Susan P. Butler

Let's face it: we can't all compose beautiful music, draw stunning illustrations, and make professional movies. Yet you may want to put together a project that includes these art forms and more—for instance, a Web site that plays music in the background, contains eye-catching GIFs on each page, and plays Flash animations on your navigation buttons. Rather than doing all of the artwork yourself, you may need to use someone else's creations to bring your project to fruition. The question is, How can you use the work legally and fairly?

Besides playing fair with the artist and the copyright owner by not stealing what belongs to them, you also want to avoid the stiff penalties imposed for breaking copyright laws. You could get hit up for as much as $150,000 each time you copy, distribute (give away or sell), or display or perform publicly someone else's copyrighted work; this includes showing it on your Web site. The copyright owner may be able to collect from money you earn for the next 20 years.

Avoid the guilt, the civil liability, and the criminal penalties by finding out if a copyright protects a work. If so, then clear the rights (obtain permission) to use it. Here are some pointers on making sure you stay within the law.

Make a Detailed Plan

The first step in using someone else's work is to decide exactly how you want to use it. This will help you decide whether you need to clear the copyright and will also give you answers to typical copyright-owner questions.

First of all, how do you intend to use the work? For example, do you want to play an entire song over your movie's ending credits, or use just the chorus in a small scene?

If you're creating a Web site, do you want to link to another site? Although you probably have the right to link to a home page without permission, lawsuits are currently pending regarding the right to link to a page within another Web site ("deep linking"), bypassing the site's home-page advertisements. Also, you may or may not have the right to pull another site's copyrighted content into a frame on your own site, making it appear to be yours, without permission. The law isn't clear on these issues yet.

Here are some other questions that will prepare you for the process of using someone else's work: How do you plan to distribute the copyrighted work? Will you use it on the Internet? Will you make CD-ROMs, CDs, DATs, MP3 files, videos, or DVDs that include the work? In what countries will you make these media available? For how long do you intend to use the work?

Do You Need Permission?

It's always safest to ask for permission before you make someone else's work a part of your own production. However, if a work isn't protected by copyright, you have the right to use it without asking.

Public Domain

Copyright protects work for only a certain period of time. After that period expires, the work goes into the public domain, and anyone may use it without permission and without paying royalties or fees.

Figuring out the length of protection in the United States can be tricky. Federal copyright law has changed over the years. It used to require owners to register and provide notice of copyright;
Is Macworld Breaking the Law?

As a professional courtesy, however, we got permission from copyright owner Epic Records and musician Steve Vai to use the image. We also credit the artist, Aaron Brown. Although this isn't legally necessary, it's the right thing to do.

Copyright law gives four general guidelines determining what constitutes fair use. First, if you’re using a work for noncommercial purposes, it may qualify because you’re not trying to profit from the creations of others. For instance, using a work for criticism, comment, news reporting, teaching, scholarship, or research purposes is often fair use, as it tends to foster freedom of speech.

The second guideline is that the less creative and original a work is, the more likely it is that you can use it without permission. (For detailed examples of what qualifies as original and creative work, see “Put Your Work under Lock and Key,” Create, July 2000.)

Third, you may be able to use just a portion of a work, rather than the entire thing, without permission; this is often considered fair use (while copying an entire work usually isn’t). Contrary to popular belief, there is no set number of musical notes you may copy without permission: if you can name that tune in five notes because they make up most of the chorus to a famous song—and therefore form a substantial part of that song—you might end up the target of a lawsuit that could drag on for five long years.

Finally, it’s illegal to use a work if doing so will affect its value or the owner’s potential market for that work (see the sidebar “Is Macworld Breaking the Law?”). Basically, it’s unfair to compete with someone by using his or her own work. For instance, it wouldn’t be fair for a nonprofit organization to sell CDs as a fund-raiser without

otherwise the work would fall into the public domain. These rules still apply to certain works created before 1978.

In the United States, copyright law protects works created on or after January 1, 1978, for the life of the author (creator), plus 70 years. For works created before that date, the duration of protection depends on such things as the date of creation, when the work was first published, whether it was registered, and if copies of it included a copyright notice.

As a general rule and based on my interpretation of copyright laws, I don’t presume that anything is in the public domain in the United States unless it was created and sold to the American public before 1904. The U.S. Copyright Office’s Web site (www.loc.gov/copyright) has additional information.

Never assume that just because a work is in the public domain in one country, it’s in the public domain everywhere—copyright-protection periods vary from country to country. In fact, some nations protect photographic works, sound recordings, and movies in a different manner than the United States protects them. For instance, the famous 1902 silent film Le voyage dans la lune (A Trip to the Moon), by Georges Méliès, is still protected in France.

**Fair Use**

Even if a work is protected by copyright, you may still be able to use it without permission—if the way you use it qualifies legally as fair use.

**Is Macworld Breaking the Law?**

**Breaking the Law?** (For detailed examples of what qualifies as original and creative work, see “Put Your Work under Lock and Key,” Create, July 2000.)

Third, you may be able to use just a portion of a work, rather than the entire thing, without permission; this is often considered fair use (while copying an entire work usually isn’t). Contrary to popular belief, there is no set number of musical notes you may copy without permission: if you can name that tune in five notes because they make up most of the chorus to a famous song—and therefore form a substantial part of that song—you might end up the target of a lawsuit that could drag on for five long years.

Finally, it’s illegal to use a work if doing so will affect its value or the owner’s potential market for that work (see the sidebar “Is Macworld Breaking the Law?”). Basically, it’s unfair to compete with someone by using his or her own work. For instance, it wouldn’t be fair for a nonprofit organization to sell CDs as a fund-raiser without

**This Illustration** from a music-CD cover is original enough to copyright. Therefore, does reproducing it in Macworld and distributing it all over the world constitute copyright infringement? Or is it fair use?

Let’s consider the four fair-use guidelines detailed in the article. Although the CD cover image is more creative than a simple drawing and we’re showing the entire work rather than a small corner of it, we’re using it for teaching purposes. And, most important in this situation, we’re not interfering with its value or restricting the copyright owner’s market. I think it’s fair use.

As a professional courtesy, however, we got permission from copyright owner Epic Records and musician Steve Vai to use the image. We also credit the artist, Aaron Brown. Although this isn’t legally necessary, it’s the right thing to do.
licensure of the sound recording. Recording studios and record distributors rarely own these rights. Also contact the music publisher or songwriter for permission.

For rights to use video and film, contact the company whose name appears after the copyright symbol on the packaging or in the credits. The Directors Guild of America's Web site can help you, too.

---

**Copyright Sources**

<table>
<thead>
<tr>
<th>Type of Work</th>
<th>What You Need</th>
<th>Whom to Contact</th>
<th>Web Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical license to record songs</td>
<td>Harry Fox Agency</td>
<td></td>
<td><a href="http://www.harryfox.com">www.harryfox.com</a></td>
</tr>
<tr>
<td>Permission to use a sound recording for any purpose; permission to use album cover artwork</td>
<td>The music publisher</td>
<td></td>
<td>Varies</td>
</tr>
<tr>
<td>List of record companies (labels)</td>
<td>Billboard's International Buyer's Guide</td>
<td></td>
<td><a href="http://www.billboard.com/Store">www.billboard.com/Store</a></td>
</tr>
<tr>
<td>Video and film</td>
<td>Help in finding film studios and entertainment organizations</td>
<td>Directors Guild of America</td>
<td><a href="http://www.dga.org">www.dga.org</a></td>
</tr>
<tr>
<td>Books and magazines</td>
<td>Rights to copy or distribute</td>
<td>The book or magazine publisher</td>
<td>Varies</td>
</tr>
<tr>
<td>Fine art and photographic works</td>
<td>Rights to copy or distribute</td>
<td>The photographer or artist</td>
<td>Varies</td>
</tr>
<tr>
<td>All media</td>
<td>Basic copyright information for the United States</td>
<td>U.S. Copyright Office</td>
<td><a href="http://www.loc.gov/copyright">www.loc.gov/copyright</a></td>
</tr>
<tr>
<td></td>
<td>Basic International copyright information</td>
<td>World Intellectual Property Organization</td>
<td><a href="http://www.wipo.org">www.wipo.org</a></td>
</tr>
</tbody>
</table>

---

**THE INTERNET** is a great source for finding copyright owners. This table will help you figure out whom you need to contact and how to locate them on the Web.

Here are a few pointers for specific cases.

If you need permission to use sound recordings, such as a particular recorded version of a song, contact the record companies (also called record labels) because they normally own all or part of the sound-recording rights. Recording studios and record distributors rarely own these rights. Also contact the music publisher or songwriter for permission.

For rights to use video and film, contact the company whose name appears after the copyright symbol on the packaging or in the credits. The Directors Guild of America’s Web site can help you, too.

---

**The Final Judgment**

If you think that copyright protects a work you want to use, and you don’t want to risk making a mistake about fair use or aren’t sure if the work falls into the public domain, then ask the copyright owner for permission (or simply notify the owner and pay a royalty or fee if the law permits). All too often, when a court ends up deciding the question of which parties have the right to use a work, you’ll pay tons of money for litigation.

To stay on the safe side, check with a copyright lawyer before using anything without permission. If you’re using material that’s copyrighted outside the United States, make sure the attorney is experienced in international transactions. The money you spend up front for legal advice could save you money, time, and emotional distress down the line.

**Susan P. Butler** is a new-media and entertainment attorney in Northern California. She writes a monthly legal column for ZDNet’s Small Business Channel and is currently completing The E-business Legal Kit for Dummies (IDG Books Worldwide), due out this fall.
Unleash the Power of Your Message

Attend the leading event delivering Web and print publishing solutions.

Take advantage of educational opportunities that address the new reality of dynamic publishing. More than 110 sessions cover topics like:

- Web Development
- Interface and Transactional Design
- Asset Management
- Digital Imaging
- Streaming Media
- Workflow Automation
- XML/PDF
- E-Books
- Connectivity
- E-Commerce
- On-Demand Printing
- E-Commerce
- On-Demand Printing

Get an up-close introduction to both new and proven products that will enable you to design and build media, communicate and get results.

- See cutting-edge products from 350+ exhibitors.
- Maximize the impact of your message on the Web and in print.
- Extend your cross-media capabilities.

To register, go to
www.seyboldseminars.com
or call toll-free 888-886-8895;
international 781-433-1508.

Your priority code is: CHMG
Create a Barrier-Free Web Site

OPENING SITES TO THE VISUALLY IMPAIRED WILL BENEFIT EVERYONE

by Jim Heid

For people with visual impairments, the Internet has the potential to broaden horizons and open doors to independence. Using new surfing technology, they can read newspapers and magazines without waiting days—or weeks—for Braille or audio versions and without depending on volunteer reading services. They can shop for music, groceries, and airline tickets. They can learn, bank, work, or just surf.

That's the Internet's potential. The reality is that many Web sites are cumbersome or impossible for blind users to navigate. Banner advertisements, multi-column layouts, poorly phrased hyperlinks, and unlabeled graphics can turn an elegant-looking site into a navigational nightmare.

Here's a look at the issues and the answers behind Internet accessibility. This article focuses mainly on the needs of users with severe visual impairments, because your design choices impact their experience most. For an overview of other accessibility issues, see the online sidebar, "Designing for Users with Other Impairments," at www.macworld.com/2000/08/create/access.html.

Growing Awareness

Fortunately, the need to improve Internet accessibility, not only for the blind but also for everyone with disabilities, is receiving a lot of attention, thanks in part to lawmakers. As part of an amendment to the Rehabilitation Act of 1973, the U.S. government recently passed regulations requiring that federal Web sites be accessible to people with disabilities by the end of the year. Meanwhile, the National Federation of the Blind has filed suit against America Online, charging that its system is inaccessible.

But addressing the needs of disabled users isn't just a good cause—it's also good business. Consider this: an estimated 10 percent of Americans have a physical disability, and a 1998 federal study concluded that consumers with disabilities control more than $175 billion in discretionary income. Open your site to this group, and you'll not only expand your audience—you may also win some extremely loyal customers.

Adding accessibility features will also help you prepare for the coming stampede of Web-enabled devices. Web-capable handheld computers, such as the Palm VII, are already available, and soon you'll be surfing from devices as diverse as cell phones and car dashboards. All of these devices lack the large displays needed to show off the fancy graphics and complicated layouts on today's sites. By making your site navigable without graphics, you benefit sighted and blind customers alike.

The Sound of a Site


Screen readers help visually impaired users navigate a site by interpreting HTML tags, particularly those dealing with hyperlinks, Web forms, and graphics. Take the following HTML code, for example:

```
<font><b><address><area><h5><table><t被列入超过该所有数</t被列入超过该所有数</address></table></address></h5></area></b></font>
```

www.macworld.com August 2000 109
CREATE WEB


Instead of reading out the entire link, the screen reader simply says, “Link: go to home page.” Blind users can then press the tab key to jump from one link to the next. To get an idea of what a blind person might experience on both an accessible and a not-so-accessible site, see the sidebar “The Sound of Surfing.”

Easy Ways to Improve Accessibility

Does making your site accessible mean eliminating glitzy graphics, rollovers, multimedia, Java applets, and all the other eye candy that spices up (and sometimes clutters) today’s sites? Absolutely not. Indeed, sighted users won’t even notice most accessibility tricks.

The following tips are easy to implement, even on existing sites—and many also improve the surfing experience for sighted users.

Describe Your Graphics

It’s no news flash that graphics dominate today’s sites. What with buttons, logos, and artwork, a single page can include a dozen or more images—many of them essential for navigation. By default, when a screen reader encounters one of these graphics, it reads out the file name, often an unhelpful—if not downright incomprehensible—string of letters such as Top2_rev.gif.

You can tell screen readers to ignore these file names and provide valuable context for your graphics. Use the `<image>` tag’s `alt` attribute to give a brief description of the images—for example, "XYZ Corporation Logo" for a company logo or "Link to the home page for a graphical button.

Smooth Talker

The Web site for WGBH in Boston does it right—no surprise, given that WGBH is headquarters for the National Center for Accessible Media.

The first thing a Jaws user hears is “Page contains 39 links”—less overwhelming than The New York Times on the Web’s 131 links. From there we hear “Link: D vertical bar. Link: text version and access instructions. Graphic: This week.” (Thanks to an `alt` attribute, Jaws doesn’t read the whole file name.) “Link: site map. . . .”

You’ll notice that the text links at the very top of the page (A) enable a blind user to jump quickly to a text-only version of the site and get instructions about the site’s structure and accessibility features. The `d` link (B) leads to a page containing a description of the home page graphics—how many there are, what they look like, and so on—making the site a bit more inclusive.

THE SOUND OF SURFING

LISTENING TO WEB SITES THROUGH A SCREEN READER SUCH AS JAWS IS THE BEST WAY TO APPRECIATE THE CHALLENGES AND ISSUES THAT LIE BEHIND WEB SITE ACCESSIBILITY. HERE’S A SAMPLING OF WHAT YOU’D HEAR ON A VISIT TO THE HIGH-TRAFFIC WEB SITES FOR THE NEW YORK TIMES (WWW.NYTIMES.COM) AND PUBLIC BROADCASTING GIANT WGBH (WWW.WGBH.ORG).

Hard Times at the Times

The New York Times on the Web immediately gets off on the wrong foot. The ad graphic in the upper left corner (A) has no alt text, so Jaws reads its link aloud—and because sites serve most ads dynamically from databases, these links are incomprehensible. In this instance, the Jaws surfing experience begins as follows: “Page has 131 links. Link: graphic list one-dash-side-dot-gif slash six-six-hundred-ninety-six-d-six....” This numerical gibberish continues for several more seconds. Simply adding `alt="Advertisement"` to the `image` tag would have eliminated that agony.

Things improve only slightly from here. The site’s designers also fail to specify alt text for the left-hand image map (B), so Jaws reads the links thus: “Image map link slash index. Image map link front slash index. Image map link day slash world. Image map link day slash national.” And on and on.

Finally, the links for each of the main front-page articles (C) read simply “Go to article.” A blind user surfing from link to link won’t know which article each link designates.

Smooth Talker

The Web site for WGBH in Boston does it right—no surprise, given that WGBH is headquarters for the National Center for Accessible Media.

The first thing a Jaws user hears is “Page contains 39 links”—less overwhelming than The New York Times on the Web’s 131 links. From there we hear “Link: D vertical bar. Link: text version and access instructions. Graphic: This week.” (Thanks to an `alt` attribute, Jaws doesn’t read the whole file name.) “Link: site map. . . .”

You’ll notice that the text links at the very top of the page (A) enable a blind user to jump quickly to a text-only version of the site and get instructions about the site’s structure and accessibility features. The `d` link (B) leads to a page containing a description of the home page graphics—how many there are, what they look like, and so on—making the site a bit more inclusive.
Concise, meaningful alt text is one of the most important accessibility features you can add. It will also improve your site for the many sighted Web users who speed up surfing by setting their browsers to skip images.

**Label Your Image Maps** Image maps are common navigation devices that divide a single image into several different links. There are two types of image maps: server-side maps, which rely on software that runs on the Web server to interpret where a user clicked, and client-side maps, which use HTML tags to denote each of the map’s clickable hot spots directly within the Web page. Some screen readers can only interpret client-side maps.

In addition to providing client-side maps, it’s essential that you use the alt attribute to create an informative text description for each clickable region—especially those used for navigation. Far too many sites—including Yahoo, Amazon, and The New York Times on the Web—forget this step, rendering their maps almost useless to a visually impaired user.

**Write Meaningful Links** Before reciting all the text on a page, some screen readers recite just the hyperlinks, enabling a user to jump elsewhere without having to listen to every word. But if you use the all-too-common *click here* for your hyperlinks, the user hears just “click here, click here, click here.” The solution is to write meaningful links that provide some context, such as *Learn about our products*. Read aloud your pages’ hyperlinks as a test. Is the site still navigable?

**Provide Text-Based Navigation** If you use image maps or graphics for navigation, also provide a text-based navigation scheme, such as a row of links at the top or bottom of each Web page. Place a vertical bar (|) between links to set them apart. This helps some screen readers distinguish them.

A text-based site map, also a great idea, enables sighted and blind users alike to jump quickly to sections of interest.

**Accessing Forms**

Web forms, a prerequisite for almost every online shopping site, present their own accessibility issues because they rely on additional user-interface elements, such as text boxes for typed information, pop-up menus for choosing options, and Submit buttons for sending the form’s contents. The way you create and position these elements greatly influences how well a screen reader can interpret them.

**Label Form Elements Properly** To help visually impaired users navigate your forms, you need to provide a text label for every form element. For example, instead of just leaving four empty fields for a user’s address, specify which part of the address to enter in each box. And always position the labels either directly above or directly to the left of the elements they describe. This way screen readers can state additional information about the element—for example, “edit: street address.”

If you use an image for your form’s Submit button, don’t forget to specify alt text. Otherwise, a screen reader will read the image as “button”—and if the page has multiple buttons, a blind user won’t know which one does what.

**Put the Most Likely Choice First** When creating pop-up menus for navigation or for choosing values such as a country, consider creating a hierarchy, with the most likely choice as the default value and others below it in descending order of likelihood. This decreases the amount of scrolling users must do to get to the desired option.

**Designing Your Site**

You may want to use the following techniques when starting a new site or redesigning an existing one. The design choices you make at this phase have a huge impact on your site’s accessibility—and on its adaptability for other types of browsing devices, such as mobile phones.

**Simplify Tables** Most designers use HTML tables to position items on a Web page. As a result, text doesn’t always read logically across the screen. Jaws is smart enough to deconstruct tables properly, but most screen readers aren’t—yielding nonsensical results.

If you use tables for layout—and let’s face it, they remain the most browser-compatible layout technique—avoid nesting them. Also consider providing nontabular versions of the most important pages on your site. A simplified layout speeds up your site for everybody.

**Don’t Count on Flash** Blind users can’t access multimedia elements, such as Flash movies. Therefore, if you use Flash for navigation or to present content, you’ll need to provide a non-Flash version of your site to make it accessible.

---

**ACCESSIBILITY BOOKMARKS**

ON THESE WEBSITES, YOU CAN LEARN more about accessibility issues, techniques, and tools.

- [www.w3.org/wai](http://www.w3.org/wai) The World Wide Web Consortium’s Web Accessibility Initiative is the horse’s mouth for all Internet issues related to accessibility.
- [www.cast.org](http://www.cast.org) The Center for Applied Special Technology (CAST) is a great resource for Web developers. CAST’s Bobby is a Web-based tool that will analyze any page and report on its accessibility.
- [www.ibm.com/able](http://www.ibm.com/able) IBM’s Web Accessibility Checklist is a succinct guide to accessibility techniques.
- [www.webable.com](http://www.webable.com) WebAble contains a database of hundreds of accessibility resources.

**Test Your Sites**

Those without vision impairments might have difficulty pinpointing accessibility trouble spots. You can use the free trial versions of both Jaws and OutSpoken, available from the companies’ Web sites, to check your designs for accessibility. The trial versions are fully functional but work for only 20 to 40 minutes before requiring a restart. You can test Jaws, the most popular screen reader, on a Mac using Connectix’s (800/950-5880, www.connectix.com) $179 Virtual PC 3.0.

If you’ve added accessibility features to your site, post a notice on the Usenet newsgroup alt.comp.blind-users. Invite its members to visit your site and provide feedback. You can also submit your Web site to [www.cast.org/bobby](http://www.cast.org/bobby), which tests it and sends a report on its accessibility.

As more stores and services move onto the Web, accessibility will become an increasingly heated issue. A little preparation and forethought now could save you serious headaches later and win you valuable new customers.

---

A *Macworld* contributing editor since 1984, Jim Heid (www.heidsite.com) writes and lectures about all aspects of Web development. He thanks Tom Wlodkowski of the WGBH National Center for Accessible Media for his insights.
## Index to Advertisers

Interact with the companies whose products and services are advertised in Macworld.

<table>
<thead>
<tr>
<th>ADVERTISER</th>
<th>INTERACT</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3DFX Interactive</td>
<td><a href="http://www.3dfx.com">www.3dfx.com</a></td>
<td>59</td>
</tr>
<tr>
<td>Access Macworld</td>
<td></td>
<td>118</td>
</tr>
<tr>
<td>ACD Systems</td>
<td><a href="http://www.acdsystems.com/mw">www.acdsystems.com/mw</a></td>
<td>11</td>
</tr>
<tr>
<td>Adaptec</td>
<td><a href="http://www.adaptec.com/mac">www.adaptec.com/mac</a></td>
<td>57</td>
</tr>
<tr>
<td>Adobe</td>
<td><a href="http://www.adobe.com">www.adobe.com</a></td>
<td>36-37</td>
</tr>
<tr>
<td>AEC Software</td>
<td><a href="http://www.aecsoft.com">www.aecsoft.com</a></td>
<td>8</td>
</tr>
<tr>
<td>ALSOFT</td>
<td>800-257-6381</td>
<td>12</td>
</tr>
<tr>
<td>American Power Conversion</td>
<td>888-289-APCC</td>
<td>16-17</td>
</tr>
<tr>
<td>Anthro</td>
<td><a href="http://www.anthro.com">www.anthro.com</a></td>
<td>10</td>
</tr>
<tr>
<td>APS Tecnologies</td>
<td>800-285-0638</td>
<td>146-147</td>
</tr>
<tr>
<td>ATI Technologies Inc.</td>
<td><a href="http://www.ati.com">www.ati.com</a></td>
<td>75</td>
</tr>
<tr>
<td>Belkin Components</td>
<td><a href="http://www.belkin.com">www.belkin.com</a></td>
<td>93</td>
</tr>
<tr>
<td>Canon</td>
<td><a href="http://www.ccsi.canon.com">www.ccsi.canon.com</a></td>
<td>IFC,1</td>
</tr>
<tr>
<td>CDW Computer Centers, Inc.</td>
<td>800-509-4239</td>
<td>144-145</td>
</tr>
<tr>
<td>Creativepro.com</td>
<td><a href="http://www.creativepro.com">www.creativepro.com</a></td>
<td>61</td>
</tr>
<tr>
<td>Creativepro.com</td>
<td><a href="http://www.creativepro.com">www.creativepro.com</a></td>
<td>98</td>
</tr>
<tr>
<td>Crucial Technology</td>
<td><a href="http://www.crucial.com">www.crucial.com</a></td>
<td>66-67</td>
</tr>
<tr>
<td>Diamond Multimedia</td>
<td><a href="http://www.riohome.com">www.riohome.com</a></td>
<td>53</td>
</tr>
<tr>
<td>Diehl Graphsoft</td>
<td><a href="http://www.diehlgraphsoft.com">www.diehlgraphsoft.com</a></td>
<td>26</td>
</tr>
<tr>
<td>Hire Knowledge</td>
<td><a href="http://www.hireknowledge.com">www.hireknowledge.com</a></td>
<td>18</td>
</tr>
<tr>
<td>Intego</td>
<td><a href="http://www.intego.com">www.intego.com</a></td>
<td>45</td>
</tr>
<tr>
<td>J&amp;R Computer World</td>
<td>800-221-8180</td>
<td>149</td>
</tr>
<tr>
<td>Kensington</td>
<td><a href="http://www.kensington.com">www.kensington.com</a></td>
<td>BC</td>
</tr>
<tr>
<td>La Cie</td>
<td><a href="http://www.lacie.com">www.lacie.com</a></td>
<td>51</td>
</tr>
<tr>
<td>Mac Zones</td>
<td><a href="http://www.maczone.com">www.maczone.com</a></td>
<td>136-143</td>
</tr>
<tr>
<td>MacMall</td>
<td>800-222-2808</td>
<td>128-135</td>
</tr>
<tr>
<td>Macromedia</td>
<td><a href="http://www.macromedia.com/">www.macromedia.com/</a></td>
<td>28-29</td>
</tr>
<tr>
<td>Macromedia</td>
<td>macromedia.com/ultradev</td>
<td>40-41</td>
</tr>
<tr>
<td>MacSoft</td>
<td><a href="http://www.gtstore.com">www.gtstore.com</a></td>
<td>62</td>
</tr>
<tr>
<td>MacWarehouse</td>
<td>800-434-3036</td>
<td>119-127</td>
</tr>
<tr>
<td>Macworld Expo</td>
<td><a href="http://www.macworldexpo.com">www.macworldexpo.com</a></td>
<td>114-117</td>
</tr>
<tr>
<td>MegaHaus</td>
<td>800-786-1184</td>
<td>148</td>
</tr>
<tr>
<td>MicroMat</td>
<td>800-829-6227</td>
<td>30</td>
</tr>
<tr>
<td>Microsoft</td>
<td><a href="http://www.microsoft.com/mac">www.microsoft.com/mac</a></td>
<td>14-15</td>
</tr>
<tr>
<td>Microsoft</td>
<td><a href="http://www.microsoft.com/mac">www.microsoft.com/mac</a></td>
<td>24,25</td>
</tr>
<tr>
<td>Minolta/QMS</td>
<td><a href="http://www.qms.com">www.qms.com</a></td>
<td>47</td>
</tr>
<tr>
<td>Nikon Electronic Imaging</td>
<td><a href="http://www.nikonusa.com">www.nikonusa.com</a></td>
<td>49</td>
</tr>
<tr>
<td>Olympus America</td>
<td><a href="http://www.olympus.com">www.olympus.com</a></td>
<td>13</td>
</tr>
<tr>
<td>Orange Micro</td>
<td>714-779-2772</td>
<td>20</td>
</tr>
<tr>
<td>PowerOn</td>
<td><a href="http://www.poweronsoftware.com">www.poweronsoftware.com</a></td>
<td>65</td>
</tr>
<tr>
<td>Quantum</td>
<td><a href="http://www.snapserver.com">www.snapserver.com</a></td>
<td>43</td>
</tr>
<tr>
<td>Seybold SF</td>
<td><a href="http://www.seyboldseminars.com">www.seyboldseminars.com</a></td>
<td>108</td>
</tr>
<tr>
<td>Sonnet Technologies</td>
<td>800-786-6260</td>
<td>95</td>
</tr>
<tr>
<td>Sony CRT</td>
<td><a href="http://www.sony.com/obessed">www.sony.com/obessed</a></td>
<td>22-23</td>
</tr>
<tr>
<td>SPSS INC.</td>
<td><a href="http://www.spss.com">www.spss.com</a></td>
<td>35</td>
</tr>
<tr>
<td>Techworks</td>
<td>800-434-4032</td>
<td>21</td>
</tr>
<tr>
<td>Toyota</td>
<td><a href="http://www.toyota.com">www.toyota.com</a></td>
<td>9</td>
</tr>
<tr>
<td>Viewsonic</td>
<td>800-888-8583</td>
<td>97</td>
</tr>
<tr>
<td>Virtual Ink Corp.</td>
<td><a href="http://www.mimio.com">www.mimio.com</a></td>
<td>4-5</td>
</tr>
<tr>
<td>VST Technologies Inc.</td>
<td><a href="http://www.vsttech.com">www.vsttech.com</a></td>
<td>83</td>
</tr>
<tr>
<td>XANTE Corporation</td>
<td><a href="http://www.xante.com">www.xante.com</a></td>
<td>IBC</td>
</tr>
<tr>
<td>Xerox OPB</td>
<td><a href="http://www.xerox.com">www.xerox.com</a></td>
<td>6-7</td>
</tr>
</tbody>
</table>
## ACCESSORIES

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>144-145</td>
<td>CDW Computer Centers, Inc.</td>
<td>2</td>
</tr>
<tr>
<td>149</td>
<td>J&amp;R Computer World</td>
<td>56</td>
</tr>
<tr>
<td>136-143</td>
<td>Mac Zones</td>
<td>71</td>
</tr>
<tr>
<td>128-135</td>
<td>MacMall/Creative Computers</td>
<td>131</td>
</tr>
<tr>
<td>119-127</td>
<td>MacWarehouse</td>
<td>18</td>
</tr>
<tr>
<td>148</td>
<td>MegaHaus</td>
<td>107</td>
</tr>
</tbody>
</table>

## HARDWARE

### BUSINESS

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-17</td>
<td>American Power Conversion</td>
<td>72</td>
</tr>
</tbody>
</table>

### COMPUTER SYSTEMS

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>128-135</td>
<td>MacMall/Creative Computers</td>
<td>131</td>
</tr>
<tr>
<td>83</td>
<td>VST Technologies Inc.</td>
<td>73</td>
</tr>
</tbody>
</table>

### HARD DISK STORAGE

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>146-147</td>
<td>APS Technologies</td>
<td>62</td>
</tr>
<tr>
<td>51</td>
<td>La Cie</td>
<td></td>
</tr>
</tbody>
</table>

### MISCELLANEOUS

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-17</td>
<td>American Power Conversion</td>
<td>72</td>
</tr>
<tr>
<td>93</td>
<td>Belkin Components</td>
<td>63</td>
</tr>
<tr>
<td>66-67</td>
<td>Crucial Technology</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Diamond Multimedia</td>
<td></td>
</tr>
</tbody>
</table>

### BC

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>TechWorks</td>
<td>129</td>
</tr>
</tbody>
</table>

### MONITORS/GRAPHICS BOARDS

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>3DFX Interactive</td>
<td>25</td>
</tr>
<tr>
<td>57</td>
<td>Adaptec</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>ATI Technologies Inc.</td>
<td>113</td>
</tr>
<tr>
<td>20</td>
<td>Orange Micro</td>
<td>60</td>
</tr>
<tr>
<td>95</td>
<td>Sonnet Technologies</td>
<td>132</td>
</tr>
<tr>
<td>22-23</td>
<td>Sony CRT</td>
<td></td>
</tr>
<tr>
<td>97</td>
<td>Viewsonic</td>
<td></td>
</tr>
</tbody>
</table>

### NETWORKING PRODUCTS

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>Quantum</td>
<td></td>
</tr>
</tbody>
</table>

### PRINTERS

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1F, 1</td>
<td>Canon</td>
<td>23</td>
</tr>
<tr>
<td>47</td>
<td>Minolta/QMS</td>
<td>104</td>
</tr>
<tr>
<td>4-5</td>
<td>Virtual Ink Corp.</td>
<td>43</td>
</tr>
<tr>
<td>1BC</td>
<td>XANTÉ Corporation</td>
<td>112</td>
</tr>
<tr>
<td>6-7</td>
<td>Xerox QPB</td>
<td>31</td>
</tr>
</tbody>
</table>

### SCANNERS & DIGITAL CAMERAS

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>Nikon Electronic Imaging</td>
<td>59</td>
</tr>
<tr>
<td>13</td>
<td>Olympus America</td>
<td>126</td>
</tr>
</tbody>
</table>

## MAIL ORDER

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>146-147</td>
<td>APS Technologies</td>
<td>62</td>
</tr>
</tbody>
</table>

## SERVICES

### INTERNET PRODUCTS/SERVICES

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>Creativepro.com</td>
<td>14</td>
</tr>
<tr>
<td>98</td>
<td>Creativepro.com</td>
<td>14</td>
</tr>
<tr>
<td>45</td>
<td>Intego</td>
<td>85</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Hire Knowledge</td>
<td>97</td>
</tr>
</tbody>
</table>

### TRADESHOW/CONFERENCES

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>108</td>
<td>Seybold SF</td>
<td></td>
</tr>
<tr>
<td>118</td>
<td>Access Macworld</td>
<td></td>
</tr>
<tr>
<td>114-117</td>
<td>Macworld Expo</td>
<td>111</td>
</tr>
</tbody>
</table>

## SOFTWARE

### BUSINESS/PRODUCTIVITY

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>ACD Systems</td>
<td>30</td>
</tr>
<tr>
<td>8</td>
<td>AEC Software</td>
<td>83</td>
</tr>
<tr>
<td>26</td>
<td>Diehl Graphsoft</td>
<td>46</td>
</tr>
<tr>
<td>14-15</td>
<td>Microsoft</td>
<td></td>
</tr>
<tr>
<td>24,25</td>
<td>Microsoft</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>PowerOn</td>
<td>118</td>
</tr>
<tr>
<td>35</td>
<td>SPSS INC.</td>
<td>49</td>
</tr>
</tbody>
</table>

### ENTERTAINMENT

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>MacSoft</td>
<td>29</td>
</tr>
</tbody>
</table>

### GRAPHICS/DTP

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>36-37</td>
<td>Adobe</td>
<td></td>
</tr>
<tr>
<td>28-29</td>
<td>Macromedia</td>
<td>36</td>
</tr>
<tr>
<td>40-41</td>
<td>Macromedia</td>
<td>36</td>
</tr>
</tbody>
</table>

### MULTIMEDIA

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>28-29</td>
<td>Macromedia</td>
<td>36</td>
</tr>
<tr>
<td>40-41</td>
<td>Macromedia</td>
<td>36</td>
</tr>
</tbody>
</table>

### UTILITIES

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>ADVERTISER</th>
<th>GET-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>ALSOFT</td>
<td>140</td>
</tr>
<tr>
<td>30</td>
<td>MicroMat</td>
<td>67</td>
</tr>
</tbody>
</table>
Get in touch with your creativity at MACWORLD Conference & Expo

Let loose with Mac color, audio, images, streaming media, desktop video, cinematic DV, Internet/Web, gaming, QuickTime interactivity and more. Use your Mac to fulfill your wildest creative impulses. If you can dream it, think it, imagine it, you can do it with a Mac. Experience MACWORLD Conference & Expo/New York and let yourself go.

- Over 400 exhibitors
- Choose from more than 100 conference sessions and workshops
- See the newest generation of Macs
- Hear about OS X
- Discover new Internet technology products
- Participate in MacBeginnings
- Meet Mac technical experts and innovative creators
- View the winners of the Webby Awards and the Digital Art Competition
- Compete in the National Macintosh Gaming Championships
- and a whole lot more!
Technology professionals and users look ahead to the summer’s largest selection of Mac products and solutions.

Visit the newest additions to MACWORLD Conference & Expo
- The Music & Audio Special Interest Area — first time in New York
- Assistive Technology District — solutions to meet the special needs of individuals with physical disabilities and challenges
- Brand New! MacBeginnings — especially created for new Mac users and first-time attendees — these high energy, informative sessions will provide the resources needed to get you up to speed
- More than 30 first-time exhibiting companies

Best Buys, Best Values
- Big, big savings right on the Macworld Conference & Expo floor
- East Coast’s largest selection of Mac technology solutions
- Latest hardware, software, peripherals and services
- Try before you buy, hands-on demos
- Take your purchases home with you!

www.macworldexpo.com
1-800-645-EXPO

Test-Drive Powerful Leading-edge Technology in:
- FireWire™
- Universal Serial Bus (USB)
- Streaming Media
- Digitized Music
- Desktop Video
- Internet/Web Solutions

Circle 111 on card or go to www.macworld.com/getinfo
Master your Mac and the Internet

More than 60 MACWORLD User Conference sessions enhance your use of the Mac and the internet to unleash your creativity and let yourself go! Learn new software, develop new skills, experience powerful new tools. For professional developers, MACWORLD/Pro provides more than 40 advanced sessions on networking, streaming media, programming, and technology.

MACWORLD/User Sessions
- Mobile musician
- Small office/home office
- Wireless classroom
- Apple DV editing
- MIDI demystified
- Filemaker and the Web
- Mysteries of the System Folder

MACWORLD/Pro
- Cinematic DV
- Multi-user Mac
- Firewalls
- DSL
- VPN
- Advance QuickTime preparation
- QuickTime interactivity

Let yourself go: MACWORLD Conference & Expo Ahead

Move ahead to the most cutting edge technology available to consumers and professionals alike; ahead to the Internet, to streaming media and desktop audio and video; ahead to unlimited creativity; ahead to OS X; ahead to the future...only at MACWORLD Conference & Expo. Let yourself go!

www.macworldexpo.com
1-800-645-EXPO

Flagship Sponsors

Owned and Managed by

Macworld MacCentral Macworld.com
MacBuy.com MacWEEK.com

macGAMING.com

Indulge yourself at MACWORLD Conference & Expo Special Interest Environments

- Assistive Technology District
- Consumer Showcase
- Developer Central
- Education District
- Music and Audio
- National Macintosh Gaming Championships
- Net Innovators
- QuickTime Multimedia Studio
- Sci-Tech
- Small Business Solutions

Circle 111 on card or go to www.macworld.com/getinfo
Early Discount Registration Form
MACWORLD Conference & Expo/New York 2000

Jacob K. Javits Convention Center, New York City

1. Customer Information

Fill out the form completely. Incomplete forms will be returned unprocessed. Please use one form per person; make photocopies for additional people.

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name</td>
<td>M.I.</td>
</tr>
<tr>
<td>Last Name</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td></td>
</tr>
<tr>
<td>Street Address (Please Indicate Apt., Suite or Mail Stop)</td>
<td></td>
</tr>
<tr>
<td>P.O. Box</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td></td>
</tr>
<tr>
<td>State/Province</td>
<td></td>
</tr>
<tr>
<td>Zip Code/Postal Code</td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td></td>
</tr>
<tr>
<td>Telephone</td>
<td></td>
</tr>
<tr>
<td>Extension</td>
<td></td>
</tr>
<tr>
<td>Fax</td>
<td></td>
</tr>
<tr>
<td>Email Address</td>
<td></td>
</tr>
</tbody>
</table>

2. Registration Package Selection & Fees

Pre-Conference Workshops: July 18, 2000, Conference Programs & Workshops: July 18-21, 2000, Exposition: July 19-21, 2000. All Conference Sessions, Keynote Address and Vision Thing Live are on a first-come, first-served basis with the exception of the Pre-Conference Workshops. (Note: check your Workshop selection code)

- **Early Discount Registration Form**
  - MACWORLD Conference & Expo/New York 2000
  - Pre-Conference Workshops: July 18, 2000, Conference Programs & Workshops: July 18-21, 2000, Exposition: July 19-21, 2000. All Conference Sessions, Keynote Address and Vision Thing Live are on a first-come, first-served basis with the exception of the Pre-Conference Workshops.
  - (Note: check your Workshop selection code)

<table>
<thead>
<tr>
<th>Package 1: Super Pass</th>
<th>$1,195</th>
<th>$1,295</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package 2: MACWORLD/Pro Conference</td>
<td>$845</td>
<td>$985</td>
</tr>
<tr>
<td>Package 3: MACWORLD User I</td>
<td>$195</td>
<td>$245</td>
</tr>
<tr>
<td>Package 4: MACWORLD User II</td>
<td>$545</td>
<td>$595</td>
</tr>
<tr>
<td>Package 5: Workshop ONLY</td>
<td>$395</td>
<td>$445</td>
</tr>
<tr>
<td>Package 6: Exhibits ONLY (July 19-21)</td>
<td>$10</td>
<td>$25</td>
</tr>
</tbody>
</table>

3. Attending Profile (Must be filled out to process your registration)

For what purpose are you purchasing/evaluating products and services?
- [ ] For My Company/Department
- [ ] For Myself as a Consultant/Senior Proprietor
- [ ] For Myself as a Consumer

What is your industry?
- [ ] Aerospace
- [ ] Art/Architecture/Construction/Process Industries
- [ ] Arts & Entertainment
- [ ] Banking/Finance/Insurance/Reinsurance
- [ ] Chemical/Pharmaceutical/Health
- [ ] Consulting
- [ ] Education: K-12
- [ ] Education: Higher Ed
- [ ] Education: Other
- [ ] Engineering/R&D
- [ ] Engineering/Construction
- [ ] Engineering/Computer Science
- [ ] Government/Military
- [ ] Health/Medical Services

What is your job function?
- [ ] Independent Software Vendor
- [ ] Legal Services
- [ ] Manufacturing (Computer Industry)
- [ ] Manufacturing (Non-computer Industry)
- [ ] Marketing/Sales/PR/Communications
- [ ] Multimeda
- [ ] Non-profit Organization
- [ ] Printing/Publishing
- [ ] Publication/Publication
- [ ] Public Sector
- [ ] Real Estate
- [ ] Retail
- [ ] System Integrator
- [ ] Transportation/Utilities
- [ ] Website Administration/Development
- [ ] Other

What is the size of your organization?
- [ ] Under 50
- [ ] 50-99
- [ ] 100-499
- [ ] 500-999
- [ ] 1000 & Over

Which personal computer do you use?
- [ ] Apple Macintosh
- [ ] IBM Laptop/Notebook
- [ ] Other

- [ ] What is your role in making purchases?
  - [ ] Final Decision Maker
  - [ ] Recommend Product or Vendor
  - [ ] Develop Specifications
  - [ ] No Role

4. Payment Information

Payment must accompany form for registration to be complete. Don't pay for this event twice! You will be charged for all registrations received and will not be refunded for duplicate registrations. Please use one method of registration only. All prices include 8.25% New York sales tax. All Registration fees are non-refundable and credits are not transferable. A $20 fee will be charged for all returned checks.

- [ ] Check enclosed (make check payable to MACWORLD Conference & Expo)
- [ ] Master Card
- [ ] Visa
- [ ] American Express

- [ ] Amount $____

5. Special Discounts for Educators & Students!

Register online with this Priority Code to get a FREE Expo Only Pass compliments of Mac Publishing in conjunction with MACWORLD Conference & Expo.

- [ ] Pre-Conference Workshop Key
- [ ] Tuesday, July 18: 12:00 pm - 7:00 pm
- [ ] Please refer to pages 6-8 for complete descriptions.

- [ ] WA: Practical Introduction to Mac Networking
- [ ] WB: Desktop Publishing: The Big Picture
- [ ] WC: Managing Shared Macintosh Computers with Apple Macintosh Manager
- [ ] WD: The QuickTime Professionals Workshop
- [ ] WE: How to be a Mac Power User
- [ ] WF: Getting Started with Applescript
- [ ] WG: JavaScript and Dynamic HTML Wizardry
- [ ] WH: RealAudio & MP3 on the Mac: The State of the Art Macintosh Audio
- [ ] WI: The Filmmaker Workshop
- [ ] WJ: Mac Efficiency 101
- [ ] WK: Streaming Video Production Workshop
- [ ] WL: Final Cut Pro
- [ ] WM: Current Macintosh Administration Strategies
- [ ] WN: Getting Started with Multimedia
- [ ] WP: Working with PDF

- [ ] Workshops are subject to change, please visit the Web at www.macworldexpo.com for the most up-to-date information.

6. Easy Ways to Register:

Use ONE of the following methods to register for MACWORLD Conference & Expo/New York 2000.

- [ ] Web: www.macworldexpo.com
- [ ] Mail To: MACWORLD Conference & Expo/New York, P.O. Box 3321, Boston, MA 02241-3321. Through 6/19/00 ONLY.
- [ ] Fax To: 606-654-1676. Faxced registration forms must include credit card information. Through 6/19/00 ONLY.

- [ ] Special Discounts for Educators & Students!
- [ ] Go to www.macworldexpo.com for complete details.

- [ ] Please check here if you have any special needs that require attention.

- [ ] Workshops, speakers, conference sessions are subject to change, please visit www.macworldexpo.com for the most up-to-date information.
Access Macworld
Get a backstage pass to all that’s happening at Macworld Expo and the Mac marketplace! LIVE from the Mac Publishing booth at Macworld Expo, Access Macworld will provide continuous programming all three days of the show. Produced by the editors of Macworld magazine, with contributions from the editors of Macworld.com, MacCentral.com, MacWEEK.com, and MacGaming.com.

Enter to Win FREE Prizes!
The Access Macworld Product Showcase is your chance to win exciting Mac products. Simply fill out a card available at the Access Macworld booth and return at designated times during the day for the drawing! You can enter to win valuable prizes every day of the show!

Access Macworld will also feature:
- MacWEEK “Best of Show” winners—Our editors select the best that Expo has to offer.
- “e-Living: Your World on the Web”—E-commerce, online finance, community, entertainment, and more!
- Gaming Central: The Mac gaming world’s brightest minds discuss the coolest games for the Mac.
- Pundits Panel: Watch leading experts debate on such hot topics as MP3, Digital Video, and Online Privacy.

Don’t settle for a simple ticket to the show—you need Access Macworld to give you the inside story on what’s happening behind the scenes . . .

Access Macworld—Get In!

Brought to you by

Macworld MacWEEK.com
MacCentral.com MacBUY.com
macGAMING.com

Enter to Win FREE Prizes!
The Access Macworld Product Showcase is your chance to win exciting Mac products. Simply fill out a card available at the Access Macworld booth and return at designated times during the day for the drawing! You can enter to win valuable prizes every day of the show!

Access Macworld will also feature:
- MacWEEK “Best of Show” winners—Our editors select the best that Expo has to offer.
- “e-Living: Your World on the Web”—E-commerce, online finance, community, entertainment, and more!
- Gaming Central: The Mac gaming world’s brightest minds discuss the coolest games for the Mac.
- Pundits Panel: Watch leading experts debate on such hot topics as MP3, Digital Video, and Online Privacy.

Don’t settle for a simple ticket to the show—you need Access Macworld to give you the inside story on what’s happening behind the scenes . . .

Access Macworld—Get In!

Brought to you by

Macworld MacWEEK.com
MacCentral.com MacBUY.com
macGAMING.com
**Free! 64MB RAM UPGRADE!**

on all Power Mac G4s, PowerBooks, iBooks and iMac DVs!

*Some rebate; termination fee required. Does not apply to reconditioned models.

**Up to 500MHz!**

**Apple Power Mac G4s**

As low as $1599!

Item #CPU1574

- Up to 500MHz
- Up to 288MB SDRAM
- Up to 27.068 HD
- DVD-ROM or DVD-RAM Drive
- Three FireWire® Ports
- Zip Drive (on CPU1575 and CPU1576 only)
- SX 9,0 Modem

Free memory offer does not apply.

**Apple PowerBook G3s**

As low as $2499!

Item #CPU1589

- Up to 128MB SDRAM
- Up to 12.068 HD
- SX 6 modem
- 14.1" Active-Matrix Display

Free memory offer does not apply.

**Apple iBook Special Edition**

Only $1799!

Item #CPU1579

- 366MHz PowerPC G3
- 64MB SDRAM
- 6.0GB Ultra ATA/66 HD
- 24X max. variable CD-ROM
- SX 6 modem
- 12.1" Active-Matrix Display

Free memory offer does not apply.

**EPSON Stylus 740 Printer**

Only $999!

Item #AP1193

- 350MHz G3
- 64MB SDRAM
- 6.0GB HD
- SX 6 modem
- 13.0" display

Free memory offer does not apply.

**SONY MAVICA FD-95 DIGITAL CAMERA**

Only $999.95!

Item #NP6616

- 2.1 megapixel resolution
- 10X Optical/20x digital zoom
- SteadyShot® Image Stabilization
- SX Quick Access Floppy Disk Drive

Free memory offer does not apply.

**SONY IMAC 350MHz**

Only $899!

Item #CPU1492

- 350MHz G3
- 64MB SDRAM
- 6.0GB HD
- SX 6 modem
- 15" color monitor (13.8" viewable)

Many other reconditioned Apple systems available. See page 8 for details.

**EPSON STYLUS COLOR 740i**

Only $129.95!

Item #PR15063

- Mac serial and USB compatible
- 1440 x 720 dpi resolution
- 60ips black - 60ips color
- Super-small ink droplets for amazing detail

Price before manufacturer's mail-in rebate is $179.95. $50 rebate offer is available on product orders where at least one product totals $75 or more. Payment is based on a 48-month lease term. Subject to change without notice. Call for complete details.

**FREE 64MB RAM UPGRADE!**

APPLE IMAC DV Special Edition • 400MHz G3 • 10.068 HD
- 1.6GB SDRAM • DVD-ROM • SX 6 modem
- Blueberry: #CPU1543
- Grape: #CPU1544
- Tangerine: #CPU1545
- Strawberry: #CPU1546

Items #CPU1497 $499!

**APPLE IMAC DV SPECIAL EDITION**

- 400MHz G3
- 64MB SDRAM
- SX 6 modem
- 128MB SDRAm • 13.068 HD • SX 6 max. variable CD-ROM • SX 6 modem

Price before rebate is $1299.95. Additional $50 mail-in rebate from MacWAREHOUSE with purchase of Mac. Order now while supplies last!
Buy any Power Mac G4

- Nikon • Adobe • Apple • Quark • Kodak • Iomega • PowerUser • Canon

6' USB Cables
Only $11.99 ea.
DCAS98: Blueberry
DCAS99: Tangerine
DCAS90: Strawberry
DCAS92: Grape
DCAS93: Lime

Jaz 1GB External Refurbished* Drive
Cartridge sold separately. *Refurbished by ref. to meet original factory specifications. While Supplies Last.

GL1 Digital Video Camera
Only $2499.95!
Item #11223
- 20X Optical Zoom
- 100X Digital Zoom
- FireWire input/output • 3 CCD image sensors

QuarkXPress 4.1
Update! Trade-up for only $299.95!
Item #11001
Precise layout tools and control over every aspect of your document!

Kodak DC290 Zoom Digital Camera
New Low Price!
Was $899.95: Now only $799.95!
Item #11305
- 3.3 megapixels in Ultra Mode • 5X optical/2X digital zoom lens
- USB and serial cables included • 2” color LCD

Apple 17" Studio Display
Only $499!
Item #001064
- 17” Diagonally-CRT (16” viewable image size)
- 1800 x 1200 @ 60Hz

Apple 15" LCD Studio Display
Only $1299!
Item #001095
- 15" viewable screen
- 1024 x 768 max. resolution
- Wide viewing angle • Tilt and swivel height adjustable base

Apple 22" Cinema Display
Only $3999!
Item #121000
- 22" viewable screen
- 1600 x 1200 pixels • 16.7 million colors
- Displays full screen DVD movies

— More Speed Than Megahertz Alone! —

The speed secret is in the processing — 128-bit chunks, instead of 64 or 32-bit chunks. No wonder a G4 can perform many tasks at twice the speed of a Pentium III processor**

*Based on Apple internal benchmark tests.

DCA5919: Blueberry
DCA5920: Tangerine
DCA5921: Strawberry
DCA5922: Grape
DCA5923: Lime

Jaz 1GB Cartridge only
$99.95 each, item #001077

IJSB • s
Jaz 1GB External Refurbished* Drive
Cartridge sold separately. *Refurbished by ref. to meet original factory specifications. While Supplies Last.

QuarkXPress 4.1 Full Version, ask for item #71400, only $729.95
*For PageMaker owners. Serial number required at time of purchase.

Kodak Free 64MB RAM Upgrade AFTER MacWarehouse $100 mail-in rebate. Price before rebate is $129.95. Installation free of $129.95 required. Visit www.warehouse.com/industriewarehouse for mail-in rebate coupon or call us at 1-800-390-0706 to request one. Offer not valid on purchase of reconditioned Power Macs. MicroWarehouse reserves the right to terminate this offer at any time. Offer expires 7/15/2000.

PAGE 2 OF 9

We accept these major credit cards:

Our sales representatives are ready to take your order 24 hours a day, 7 days a week. We accept most major credit cards. We offer overnight delivery to most areas for in-stock items ordered weekdays up to 12:00 midnight (EST) or 11:00 pm (EST) if ordered via warehouse.com. CT, IL, NJ and OH residents, please add applicable sales tax. Shipping and handling charges apply

Please contact one of our sales representatives or visit the Customer Service section of our web site at warehouse.com, to review our 30-day defective product return policy. Certain products must be returned directly to their manufacturers.

MicroWarehouse makes no product warranty, either expressed or implied, including without limitation, any warranty of merchantability or fitness for a particular purpose.

Copyright© 2000 MicroWarehouse, Inc. All rights reserved. All product names and images throughout this advertisement are trademarks or registered trademarks of their respective holders.
Apple Power Mac G4

The Gigaflop is Here!
The Power Mac G4 runs at over a gigaflop—a billion floating-point operations per second!...and is twice as fast running Photoshop than a Pentium III 600MHz processor-based PC!*

*Based on Apple internal benchmarks.

As low as $1599!

Business Lease for $47/mo.!

Up to 500MHz PowerPC G4 processor
1MB Backside Level 2 Cache
Up to 256MB PC100 SDRAM (exp. to 1.56B)

Up to 27.0-GB Ultra ATA/66 HD

ATI Rage 128 Pro graphics card with 16MB of graphics memory installed in an AGP 2X slot

Three FireWire ports
Two USB ports

• DVD-ROM (CPU1574, CPU1575) or DVD-RAM (CPU1576) drives—both with video playback
• Built-in 100MB Zip drive (CPU1575, CPU1576)
• 56K V.90 modem (CPU1574, CPU1575)
• Built-in 10/100 Base-T Ethernet
• Support for optional Airport wireless networking

Power Mac G4 Memory
128MB PC100 SDRAM
Only $249.95 each

Power Mac G4/400MHz
400MHz G4 processor/64MB SDRAM/10.0G Ultra ATA/66 HD/DVD-ROM/56K modem
Item #CPU1574

Power Mac G4/450MHz
450MHz G4 processor/128MB SDRAM/20.0GB Ultra ATA/66 HD/DVD-ROM/56K modem/Zip Drive
Item #CPU1575

Power Mac G4/500MHz
500MHz G4 processor/256MB SDRAM/27.0GB Ultra ATA/66 HD/DVD-RAM/Zip Drive
Item #CPU1576

Call today to see how you can qualify. Lease terms are subject to change.

$1599!

Business Lease for $47/mo.!

1-800-725-1450 ★ www.warehouse.com/md

ORDER TOLL-FREE 24 HOURS A DAY, 7 DAYS A WEEK! ★ CANADA ORDERS CALL: 1-800-603-5139

In-stock items, call weekdays by midnight (E), or order online weekdays by 11pm (E).

PAGE 3 OF 9

Source for Mac Systems and Products—since 1987!

Your #1 Source for Mac Systems and Products—since 1987!

MacWAREHOUSE EXPRESS DELIVERY OVERNIGHT!
EPSON Stylus

Cooler, Sleeker iMacs - Mixed

1 Apple iMac
350MHz Blueberry
Only $999!

2 Apple iMac DV
400MHz
Only $1299!

EMC: 2 USB Multiport Hub
Includes all features of the 350MHz Model - PLUS -
- 400MHz Processor
- Slot-loading DVD drive
- Movie-making software
- Two FireWire® ports
- 10.0GB Ultra ATA/66 Hard Drive

FREE* with any purchase from
MacWAREHOUSE
Item #AAA0742

Includes ALL the GREAT Features of the 350MHz Model - PLUS -
- 400MHz Processor
- Slot-loading DVD drive
- Movie-making software
- Two FireWire® ports
- 10.0GB Ultra ATA/66 Hard Drive

Myst
Challenge your puzzle-solving skills in the Island world that is Myst!

FREE with any purchase from
MacWAREHOUSE
Item #AAA0742

- Challenge your puzzle-solving skills in the Island world that is Myst!
- $3.95 shipping and handling applies. Shipped in promotional packaging. Hurry! Offer good while supplies last.
- Value based on MacWAREHOUSE pricing as of this magazine printing.
3 different ways! Free! EPSON Stylus 740 Printer

after rebates, when purchased with an iMac Ask for Item #AAP1133

3 Apple iMac DV Special Edition

Only $1499!

- 400MHz PowerPC G3 processor
- 128MB of SDRAM (exp. to 512MB)
- ATi Rage 128 VR 2D/3D graphics accelerator
- 1.3GHz Ultra ATA/66 hard drive
- Slot-loading DVD-ROM drive
- Built-in 56K V.90 modem
- 15" color display (13.8" viewable)
- 512K Backside Level 2 Cache
- Harman Kardon Odyssey Audio System
- 10/100 BASE-T Ethernet
- Dual FireWire ports
- Two 12Mbps USB ports
- Support for AirPort wireless networking (antenna built-in, AirPort card optional)
- Pre-installed iMovie software

•Free 64MB RAM Upgrade AFTER MacWAREHOUSE $100 mail-in rebate. Before rebates: $129.95. Installation fee of $39.95 required. Visit www.macwarehouse.com/site/macwarehouse for mail-in rebate coupon or call us at 1-800-390-0706 to request one. Free printer offer not valid with any discounted Mac. Offer good while supplies last.

MacWAREHOUSE special offer!

Epson Stylus 740 Printer and iMac must appear on the same invoice. Includes coupons available at www.macwarehouse.com/epson or call us at 1-800-239-0706 to request. Free printer offer not valid with any discounted Mac. Offer good while supplies last.

Is the #AAP1133 item number. Ask for Item AAP1133 and INS104L Instal fee required.

MacWAREHOUSE special offer!

EPSON STYLUS COLOR 740PRINTER

+ Blueberry cover standard
+ 1440 x 720 dpi with smaller ink droplets • 8ppm: 36K, 5ppm: clr
+ USB/Mac serial compatible

Only $129.95 after 50 rebate


Adobe LiveMotion

Only $289.95!

- Create professional web graphics and animations

PAGE 5 OF 9
Palm VII Connected Organizer with Free Serial Kit

Features Web Clipping to retrieve stock quotes, and other Internet information.

Internet access requires activation and a monthly PalmNet service fee. Service provided by 3Com. See coverage maps for 260 Metropolitan areas at www.palm.net.

Olympus D-360L

• 2x digital zoom • 8MB Smartmedia card included
• 1.3 Megapixel • 1.8" Ultra-bright color LCD

SupraExpress V.90

56K Modem

• 230Kbps throughput
• Voice/modem ID

Olympus 21" Monitor

SONY G500 21" MONITOR

• 21" screen (19.8" viewable image size)
• 24 aperture grille
• 2048 x 1536@75Hz with adapter

Only $1179.95!

Item #MON1041

Zip Storage Tower when you buy any Zip Disk 10-pack!

New Low Price! $89.99!

Item #BD3616

100MB Zip Disk Gray (10-pack)

BN3616 ................................ $175.80

IOmega Zip Disks FREE

100MB Zip Disk Color (10-pack)
BN2655 ................................ $90.95

TDK Allspeed CD-Rs

Only $85.00 each, in 100-pack spindles

TDK Allspeed CD-Rs

Only $85.00 each, in 100-pack spindles

56K* V.90 FaxModem

Only $99.99!

Ask for item #OM2482

TDM U.S. Robotics

FaxModem

Ink cartridges for Epson Stylus Color 740/740i/760/660/1160

4-pack 1 FREE

As low as $18.99 each, in 4-pack FREE

Ask for item #PR13844

Prevents computer disasters
• Speeds recovery from emergencies

Norton Utilities 5.0

Upgrade only $49.95*

Item #UJI11546

• Prevents computer disasters
• Speeds recovery from emergencies

Dear customers,

The grand opening of our new store is this week, and we're offering a special discount on the Apple PowerBook G3. Come by and see why it's the top choice for Mac users.

Best, [Your Name]
500MHz PowerBook G3s!

- Up to 500MHz PowerPC G3 processor
- Up to 128MB PC100 SDRAM (expandable up to 512MB)
- DVD-ROM drive
- Up to 12.0GB Ultra ATA/66 hard drive
- 56K V.90 modem
- 1MB Backside Level 2 Cache

PowerBook G3/400MHZ processor
- 64MB SDRAM • 6.0GB Ultra ATA/66 hard drive • DVD-ROM • 2 FireWire® ports
- Item #CPU188I $2499

Business Lease for $75/mo.1

PowerBook G3/500MHZ processor
- 128MB SDRAM • 12.0GB Ultra ATA/66 HD • DVD-ROM • 2 FireWire® ports
- Item #CPU188I $3499

Business Lease for $102/mo.1

FREE 64MB RAM UPGRADE!


PowerBook G3 Memory
- New PC100 100MHz memory upgrades for 400MHz and 500MHz G3’s
- 128MB PowerBook
  - Item #BND1065 $249.95 each

PowerBook G3 PC100 MEMORY

PowerBook G3 PC100 Memory

PowerBook G3 PC100 MEMORY

PowerBook G3 PC100 Memory

PowerBook G3 PC100 Memory

AirPort Card & Station
- Transmits up to 150 feet
- Speeds up to 11MB per second
- AirPort for iBook, only
- Item #DEC4142 $99

Airport FastEther 10/100 Adapter
- 10 times the bandwidth of 10Base-T Ethernet.
- Auto-negotiate to achieve maximum speed or backward compatibility with older devices.
- FastEther TX 10/100 PCI Ethernet Card 5-Pack, only $219.99, item #DEC3195.

FireWire 2 Go
- Add FireWire to your PowerBook G3!
- Item #DR4350 $119

120MB USB SuperDisk Drive

120MB SuperDisk Media 10-pack, only $99.99 (only $9.99 ea.), item #BD329.

Targus Universal Notebook & Printer Case

Special Edition iBook
- 366MHz PowerPC G3 processor
- 64MB SDRAM • 56K modem
- 6.0GB Ultra ATA/66 hard drive
- 24x max. variable CD-ROM
- Integrated AGP Mobility 2D/3D
- Item #CPU1579 $1799

FREE Cool graphite color!

SPECIAL EDITION iBook

PowerBook G3 Battery
- Item #ACC3728 $139.95

- Lithium-Ion

Farallon FastEther 10/100 Adapter
- 10 times the bandwidth of 10Base-T Ethernet.
- Auto-negotiate to achieve maximum speed or backward compatibility with older devices.
- FastEther TX 10/100 PCI Ethernet Card 5-Pack, only $219.99, item #DEC3195.

PowerBook G3 Battery
- Item #ACC3728 $139.95

- Lithium-Ion

- ACC3728 (fits new 1999/2000 models), only $139.95

- ACC3278 (fits 1998 models) shown, only $199.95


1-800-725-1450 ★ www.warehouse.com/md

ORDER TOLL-FREE 24 HOURS A DAY, 7 DAYS A WEEK! CANADA ORDERS CALL: 1-800-803-5139

MacWAREHOUSE EXPRESS DELIVERY OVERNIGHT!

Your #1 Source for Mac Systems and Products—since 1987!

*Call by midnight (6) or order online weekdays by 11 am (6). Call by midnight (6) or order online weekdays by 11 am (6).
NEW! Adobe Illustrator 9.0

Adobe • 3Com • Global Village • Maxell • Mitsubishi • Iomega • Microtek

Olympus C-2020 Digital Camera

New Low Price!

Was $999.95, Now only $99.95!

2.1 Megapixel • 3X optical zoom • 1600 x 1200 ppi resolution

QuickTime movie mode (up to 60 seconds)

Olympus PS20 Stylus Photo Printer, ask for item #PR1474, only $99.99

64MB SmartMedia Cards

Only $159.99!

Digital item for digital cameras • Compatible with even digital cameras with SmartMedia slot

Microtek ScanMaker 4

Only $399.95!

36-bit color • 600 x 1200 dpi

Snaptrans template included in box!

PowerUser 12X 80Min CD-Recordables

Only 59¢ ea.

(in 50-pack, only 55¢ each)

Palm IIIc Connected Organizer

FREE Serial Kit Included!

Only $449!

FREE* Jaz 2.0GB Cartridge

With purchase of 2 pack, item JAZ20G2

Apple 350MHz iMac

Only $899!

360MHz PowerPC 633 processor

64MB SDRAM (64MB max.)

3GB Ultra ATA/66 HD

24X max. variable CD-ROM

56K modem

15" color monitor (13.9" viewable)

10/100 Base-T Ethernet

Two USB ports

NEW! Apple iMac 400MHz

Only $1149!

640MHz PowerPC 601 processor

32MB SDRAM (64MB max.)

4GB Ultra ATA/66 HD

24X max. variable CD-ROM

56K modem

15" color monitor (13.9" viewable)

Two USB ports

Microtek F-100 42" Monitor

Only 399.95!

42" diagonal CRT screen

500MHz PowerPC 601 processor

256MB SDRAM (256MB max.)

32X max. variable CD-ROM

56K modem

15" color monitor (13.9" viewable)

10/100 Base-T Ethernet

Two USB ports

Apple iMac DV Special Edition

Only $1299!

Graphite only

Apple iMac DV

Only $1299!

Graphite only

MITSUBISHI	

Only 637.95!

1600 x 1200 @ 75Hz

25 aperture grilles

Manufacturer’s 3-year warranty

VIEWSONIC P810 21" MONITOR

Only $809.95!

21" monitor (20" viewable image size)

1800 x 1440 @ 75Hz

25mm dot pitch

MacSense XRouten Cable/DSL Internet Sharing Hub

Only $194.99!

Supports Mac, PC and UNIX

Free Memory Offer does not apply.
NEW VERSION! Adobe Illustrator 9.0
Upgrade only $149.95!

- Unlimited transparency capabilities
- Live object and layer effects
- Comprehensive layer management
- Superb integration with other Adobe programs

Illustrator 9.0 Full Version
Item #GRA332
$389.95

Adobe Photoshop 5.5
Upgrade for $149.95!

- Full-featured vector-based drawing software
- Excellent image editing tools

Photoshop 5.5 Full Version
Full Version
Item #UPG1049
$179.99

Adobe Photoshop LE
Item #GRA2851
$99

NEW! Adobe InDesign 1.5
InDesign Full Version
Item #GRA3307
$689.95

Only $99!

COMPACT FLASH CARDS
- Digital film for storing pictures
- Compatible with all digital cameras

8MB Storage Card
Only $29.95!
Item #MT7648

32MB Storage Card
Only $79.95!
Item #MT8875

ONLY $12.95

IBM VIAVOICE MILLENNIUM EDITION
- Powerful speech recognition software
- Understands simple, natural, continuous speech
- Easy installation means you'll be up and running in no time!

Only $74.95!
Item #BUS1393

Get a FREE Gift when you order online!
Every time you order from our full line of Mac products on the Web, you can get a FREE Gift. Choose from Myst CD, Hot Door Transparency and more!

ONLY $9.95 shipping and handling applies.
Order online today!

PAGE 9 OF 9
iBook. Stunning style designed to go where you go!

Now the iBook gives you more choices than ever. With twice the memory, twice the memory expandability, and nearly twice the hard disk capacity, there's even more to love about the iBook.

Outrageous performance.
- 300MHz PowerPC G3 processor
- 512K level 2 cache on processor
- 64MB of SDRAM; supports 320MB
- 6GB IDE hard disk drive
- Built-in 24X CD-ROM drive

Connectivity.
- One 12-Mbps (USB) port
- Built-in 10/100BASE-T Ethernet
- Built-in 56K modem
- Optional AirPort wireless networking

Advanced battery technology.
- Li-Ion battery with 6 hours of charge

Great graphics and video features.
- ATI RAGE Mobility graphics controller w/2X AGP for incredible 2D/3D performance
- 12.1" built-in TFT SVGA active-matrix display

Input controls.
- Solid-state Apple trackpad for precise cursor control; supports tap, double-tap and drag

Compact size/Cool software.
- 6.6 pounds
- Mac OS 9

300MHz iBook starting at $1594
#56184 Blueberry
#56183 Tangerine

New iBook Special Edition!

It could only be the next generation of iBook—the computer that set a new standard for notebooks. For those who want a little more, there's the iBook Special Edition. It includes all the great features of the regular iBook models and it comes with 366MHz of processing power in a very stylish Graphite color.

Blazing speed, dazzling design, and fast, easy access to the Internet have made the iBook incredibly popular.

Open up the iBook Special Edition and you'll enjoy the brilliance of a 12.1" TFT active-matrix color display. It's driven by a PowerPC G3 processor that runs at a whopping 366MHz. With 64MB of built-in memory, a 6GB hard drive, a built-in CD-ROM drive and a high-performance ATI RAGE Mobility graphics accelerator. There's even more to love about the iBook Special Edition Graphite iBook

only $1,794 #56176
With the PowerPC G3 processor running at up to 500MHz and built-in FireWire®, the new PowerBook G3 gives you the performance and portability you need. It is an ideal choice for creative professionals, educators, and anyone else who needs performance to go.

**Processor and Memory**
- 400 or 500MHz PowerPC G3 processor—fastest performance ever in a notebook!
- 66MHz system bus
- 1MB backside Level 2 Cache; 160 or 200MHz dedicated 64-bit backside bus
- Integrated floating point unit and 64K on-chip Level 1 cache (32K for data and 32K for instruction)
- 64MB or 128MB RAM; 2 SODIMM slots support up to 512MB RAM

**Storage**
- Internal 6 or 12GB IDE hard drive
- DVD-ROM drive with DVD video playback
- Hot-swappable expansion bay supports CD-ROM, DVD, Zip, SuperDisk or hard drive

**Expansion & Networking Ports**
- 2 USB ports, 2 FireWire Ports, power adapter port
- Built-in 10/100BASE-T Ethernet
- RJ-11 modem port, 4Mbps Infrared (IrDA) port
- Support for a Zoom Video PC card
- PC Card Slot for one Type I or Type II card

**Graphics, Video & Sound**
- 14.1 inch (diagonal) display features built-in TFT XGA active matrix display, supporting millions of colors at 1024 x 768 resolution
- 8MB SDRAM video memory for millions of colors on external displays up to 21"
- 2D/3D graphics, through integrated ATI RAGE Mobility 128 video controller
- S-Video port
- 16-bit CD quality stereo input/output
- 24-bit video output port
- Two built-in stereo speakers
- Internal omnidirectional microphone

**Portability**
- Kensington cable lock slot and keyboard lock
- Includes one Lithium-Ion battery for up to 5 hours of normal use; supports two batteries for as much as 10 hours of use (depending on configuration and usage)

**PowerBook**
- Only 5.9 lbs., nearly 2 lbs. lighter than previous models!

**Order Any Time! Open 24 Hours! Order Today by 10pm EST—Get it Tomorrow by 10:30am!**

**PowerBooks**

**The New PowerBook G3 gives you the performance you need!**
Great Add-ons!

**Stylus Color 900 Printer**
- Only $149.99
- #7401
- Price reflects $50 mail-in rebate. Factory refurbished. One year warranty.

**UMAX Astra 2200 USB & SCSI Scanner**
- Only $149.99
- #49245
- After $30 mf. mail-in rebate w/CPU purchase. Reg. price is $179.99.

**Digital Camcorders**
- Starting at $679.99!
- Call for details!

**Yellow Dog Linux Champion Server Pre-Installed**
- Only $279.99
- #70688
- Call for details!

**30GB FireWire Hard Drive**
- Only $399.99
- #8804
- Call for details!

MacMall EXCLUSIVE!

Up to 128MB RAM FREE!

<table>
<thead>
<tr>
<th>If Product Price is Between</th>
<th>FREE RAM*</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1201-1800</td>
<td>64MB</td>
</tr>
<tr>
<td>$1801+</td>
<td>128MB</td>
</tr>
</tbody>
</table>

*Memory is subject to a $20 professional installation fee. Sales tax and shipping do not qualify as part of product price total. Valid only on regular in stock items—special order and clearance items do not apply. Not valid with any other offer. All offers are subject to change. MacMall Exclusive Offer only applies to items advertised in this catalog. Sorry, free Apple/HP memory promotion cannot be combined. Sorry, teas do not qualify for this promotion.

Uptop128MB RAM FREE!

No Rebate Hassles!

MacMall Exclusive!

**MacMall Super Bundle**

Complete your system and save on these name brand peripherals when you purchase any new Mac. Supplies are limited so order now!

- Epson Stylus 740 Printer (factory refurb.)
- Agfa Snapscan 1212UB Scanner
- Micro Connector USB 4-Port Hub
- Norton AntiVirus
- USB Printer Cable
- PhotoDisc Starter Kit
- IntelliNews

Hurry and order yours today!

all for only $189.99* #74058

*Bundle offer valid only w/CPU purchase. Your cost is $235.99 - $55.00 Epson mail-in rebate = $180.99. Availability may affect actual bundle items. We reserve the right to substitute like items. Please call Account Executive for updated information.

Protect Your Investment

Get a NEW AppleCare Service Plan with your G4! Ask your MacMall Account Representative for order #53348.

MacMall Exclusive!

Get a NEW AppleCare Service Plan with your G4! Ask your MacMall Account Representative for order #53348.
Buckle up—the Power Mac G4 is here! It features the revolutionary PowerPC G4 processor with Velocity Engine, which crunches multimedia data at blazing-fast speeds. The Velocity Engine uses true independent vector processing—a technology originally developed for use in scientific supercomputers. The G4 was developed for creative professionals who use computers as the pivotal tool of their trade.

Outrageous power
- PowerPC G4 processor running at 400, 450, or 500MHz
- Velocity Engine vector processing unit
- Full 128-bit internal memory data paths
- Powerful new floating point unit
- Data stream prefetching operations supporting four simultaneous 32-bit data streams
- 1MB of backside level 2 cache running at half the processor speed
- 100MHz system bus
- 64, 128 or 256MB RAM
- Supports up to 1.5GB of high performance PC100 SDRAM
- 10, 20 or 27GB Ultra ATA hard disk
- DVD-ROM drive or DVD-RAM drive
- 100MB Zip drive (some configurations)
- Built-in 10/100BASE-T Ethernet networking; optional Gigabit Ethernet

Advanced capabilities
- Three 400Mbps FireWire ports
- Two USB ports—up to 127 devices at once
- Optional AirPort wireless networking card
- Two additional internal drive bays
- Three 64-bit PCI slots
- Now enhanced for Adobe Photoshop
- Includes Mac OS 9

Great graphics and video features
- ATI RAGE 128 Graphics Accelerator with 16MB of SGRAM graphics memory
- Hardware acceleration of graphics and video
- Advanced integrated triangle setup engine
- Single-pass multi-texturing design

Order Any Item in 4 Easy Steps
1. Go to www.macmall.com
2. Click on "Shopping Cart"
3. Enter part # in "Catalog Express"
4. Click on "Proceed to Checkout"

macmall.com 1-800-217-9492

G4's

Unbeatable G4!
Up to 500MHz!

The New Apple® Power Mac G4—Better and Faster than Ever!

For our full line of
USB2.0
peripherals, call us or visit macmall.com

New Power Mac G4
starting at $1,594

Call for even lower price!
Looking for a Server?
See the NEW G4 Server Series at macmall.com.
Introducing iMovie software. Now you can make your own movies!

The iMovie software is pre-installed on all DV iMacs and allows you to rearrange scenes, cut out boring parts, cut and paste text and graphics and add sound and music! All you need to do is connect your camcorder to your iMac's built-in FireWire port and launch the iMovie software!

Want to play movies or even make some of your own?

An iMac DV model is your personal theatre for viewing DVD movies. It's also your personal movie studio! Simply connect your favorite DV camcorder to the FireWire port and use Apple's groundbreaking iMovie software to create your own digital movies. And iMac DV models include built-in video mirroring for making presentations!

Apple® iMac DV Special Edition

For those who want a little more, there's the iMac DV Special Edition. It includes all the great features of the iMac DV models and it comes in a see-through graphite color. Plus, it has twice the standard RAM and a larger hard drive than the iMac DV models.

iMac DV Special Edition Graphite

only $1,494

Own this iMac DV Special Edition for as low as $42/month with the NEW MacMall EZ Payment Plan!

Apple® iMac DV Models

Want to play movies or even make some of your own?

An iMac DV model is your personal theatre for viewing DVD movies. It's also your personal movie studio! Simply connect your favorite DV camcorder to the FireWire port and use Apple's groundbreaking iMovie software to create your own digital movies. And iMac DV models include built-in video mirroring for making presentations!

All models come with:
- 400MHz Processor
- 64MB RAM
- 10GB HD
- 56K Modem
- 10/100BASE-T

Choose from these flavors:
- #52493 Blueberry
- #52496 Grape
- #52494 Tangerine
- #52498 Strawberry
- #52501 Lime

iMac DV Models

only $1,294

Own one of these iMac DVs for as low as $36/month with the NEW MacMall EZ Payment Plan!

Canon Ultura Mini DV Camcorder

only $949.95

400MHz Apple® iMac DV Models

Want to play movies or even make some of your own?

An iMac DV model is your personal theatre for viewing DVD movies. It's also your personal movie studio! Simply connect your favorite DV camcorder to the FireWire port and use Apple's groundbreaking iMovie software to create your own digital movies. And iMac DV models include built-in video mirroring for making presentations!

All models come with:
- 400MHz Processor
- 64MB RAM
- 10GB HD
- 56K Modem
- 10/100BASE-T

Choose from these flavors:
- #52493 Blueberry
- #52496 Grape
- #52494 Tangerine
- #52498 Strawberry
- #52501 Lime

iMac DV Models

only $1,294

Own one of these iMac DVs for as low as $36/month with the NEW MacMall EZ Payment Plan!

Canon Ultura Mini DV Camcorder

only $949.95

400MHz Apple® iMac DV Models

Want to play movies or even make some of your own?

An iMac DV model is your personal theatre for viewing DVD movies. It's also your personal movie studio! Simply connect your favorite DV camcorder to the FireWire port and use Apple's groundbreaking iMovie software to create your own digital movies. And iMac DV models include built-in video mirroring for making presentations!

All models come with:
- 400MHz Processor
- 64MB RAM
- 10GB HD
- 56K Modem
- 10/100BASE-T

Choose from these flavors:
- #52493 Blueberry
- #52496 Grape
- #52494 Tangerine
- #52498 Strawberry
- #52501 Lime

iMac DV Models

only $1,294

Own one of these iMac DVs for as low as $36/month with the NEW MacMall EZ Payment Plan!

Canon Ultura Mini DV Camcorder

only $949.95

400MHz Apple® iMac DV Models

Want to play movies or even make some of your own?

An iMac DV model is your personal theatre for viewing DVD movies. It's also your personal movie studio! Simply connect your favorite DV camcorder to the FireWire port and use Apple's groundbreaking iMovie software to create your own digital movies. And iMac DV models include built-in video mirroring for making presentations!

All models come with:
- 400MHz Processor
- 64MB RAM
- 10GB HD
- 56K Modem
- 10/100BASE-T

Choose from these flavors:
- #52493 Blueberry
- #52496 Grape
- #52494 Tangerine
- #52498 Strawberry
- #52501 Lime

iMac DV Models

only $1,294

Own one of these iMac DVs for as low as $36/month with the NEW MacMall EZ Payment Plan!

Canon Ultura Mini DV Camcorder

only $949.95

400MHz Apple® iMac DV Models

Want to play movies or even make some of your own?

An iMac DV model is your personal theatre for viewing DVD movies. It's also your personal movie studio! Simply connect your favorite DV camcorder to the FireWire port and use Apple's groundbreaking iMovie software to create your own digital movies. And iMac DV models include built-in video mirroring for making presentations!

All models come with:
- 400MHz Processor
- 64MB RAM
- 10GB HD
- 56K Modem
- 10/100BASE-T

Choose from these flavors:
- #52493 Blueberry
- #52496 Grape
- #52494 Tangerine
- #52498 Strawberry
- #52501 Lime

iMac DV Models

only $1,294

Own one of these iMac DVs for as low as $36/month with the NEW MacMall EZ Payment Plan!

Canon Ultura Mini DV Camcorder

only $949.95

400MHz Apple® iMac DV Models

Want to play movies or even make some of your own?

An iMac DV model is your personal theatre for viewing DVD movies. It's also your personal movie studio! Simply connect your favorite DV camcorder to the FireWire port and use Apple's groundbreaking iMovie software to create your own digital movies. And iMac DV models include built-in video mirroring for making presentations!

All models come with:
- 400MHz Processor
- 64MB RAM
- 10GB HD
- 56K Modem
- 10/100BASE-T

Choose from these flavors:
- #52493 Blueberry
- #52496 Grape
- #52494 Tangerine
- #52498 Strawberry
- #52501 Lime

iMac DV Models

only $1,294

Own one of these iMac DVs for as low as $36/month with the NEW MacMall EZ Payment Plan!
New Apple® iMacs
Starting at $999!

Now up to 400MHz with FireWire, Digital Video and Stereo Sound!

For home, school and the office, the most popular computer in the world—the Apple iMac®.

The translucent, incredibly easy to use iMac is cause for celebration. With speeds up to 400MHz, the iMac is the best choice for playing games, listening to music and searching the Web with Apple’s Sherlock 2. And with iMac DV models, not only can you watch movies, you can finally make your own.

Processor and Memory
- 350 or 400MHz Power PC G3 Processor
- 512K backside level 2 cache on processor module
- 100MHz system bus
- 64 or 128MB of PC100 SDRAM; two SO-DIMM slots support up to 512MB
- 64-bit memory bus

Storage
- Internal 6, 10 or 13GB Ultra ATA hard disk drive
- Internal 24X (maximum) slot-loading CD-ROM drive or DVD-ROM Drive (DVD is in DV models only)

Communications
- Built-in 56K V.90 modem
- Built-in 10/100BASE-T Ethernet
- AirPort wireless networking slot for optional AirPort card; runs at 11Mbps with 150 foot maximum range

Connectivity
- Two high speed Universal Serial Bus (USB) ports (12 Mbps), which support USB devices such as keyboard, mouse, printer, storage devices, and USB hubs
- Two 6-pin FireWire ports running at up to 400Mbps (DV models only)

Multimedia capabilities
- Built-in 15" shadow mask CRT (13.8-inch diagonal viewable image size), 28mm dot pitch
- Three crisp resolutions: 640 X 480 pixels at 117Hz; 800 X 600 pixels at 95Hz; 1024 X 768 pixels at 75Hz
- ATI RAGE 128 VR accelerated 2D/3D graphics controller with 8MB video memory and AGP 2X support
- 24-bit true color at all resolutions for displaying millions of colors
- Refresh rate of up to 117Hz

Outstanding Audio Features
- Integrated high-performance Odyssey audio system from Harman Kardon
- Built-in microphone for speech recognition and audio recording
- And much more!

Software Deals!

RAM Doubler 9
Mac OS 9 compatible!
only $9.99
with CPU purchase, Reg. price $44.99, #54716

Norton AntiVirus
only $29.99
with CPU purchase, Reg. price $64.99, #58320

Communications
- Built-in 56K V.90 modem
- Built-in 10/100BASE-T Ethernet
- AirPort wireless networking slot for optional AirPort card; runs at 11Mbps with 150 foot maximum range

Connectivity
- Two high speed Universal Serial Bus (USB) ports (12 Mbps), which support USB devices such as keyboard, mouse, printer, storage devices, and USB hubs
- Two 6-pin FireWire ports running at up to 400Mbps (DV models only)

Multimedia capabilities
- Built-in 15" shadow mask CRT (13.8-inch diagonal viewable image size), 28mm dot pitch
- Three crisp resolutions: 640 X 480 pixels at 117Hz; 800 X 600 pixels at 95Hz; 1024 X 768 pixels at 75Hz
- ATI RAGE 128 VR accelerated 2D/3D graphics controller with 8MB video memory and AGP 2X support
- 24-bit true color at all resolutions for displaying millions of colors
- Refresh rate of up to 117Hz

Outstanding Audio Features
- Integrated high-performance Odyssey audio system from Harman Kardon
- Built-in microphone for speech recognition and audio recording
- And much more!

350MHz iMac
$999
only #52492 (Cherry only)
64MB RAM, 6GB Hard Drive, 24X CD-ROM Drive, 56K Modem

Order Any Time! Open 24 Hours! Order Today by 10pm EST—Get it Tomorrow by 10:30am!
macmall.com 1-800-217-9492
AOL Keyword: MacMall
Mention your Priority Code: #ZMWD083

Order Any Item in 4 Easy Steps
1. Go to www.macmall.com
2. Click on "Shopping Cart"
3. Enter part # in "Catalog Express"
4. Click on "Proceed to Checkout"
Blowout Pricing on Mac Software Titles!

**NetBarrier**
Protect you Mac against all threats from the Internet including hacker, vandals and data theft!
*Only $56.99*
#58267

**Ablex Accounting 3.1**
Simple, powerful accounting!
*$149.99*
#35443

**Illustrator 9.0**
The standard in vector graphics creation software just got better!
*Upgrade for only $139.49*
#58038 Illustrator 9.0 Full Version

**Stuffit Deluxe 5.5**
Open virtually all compressed files on the Internet. Send files faster!
*$47.99*  
#35443

**Virex6.0**
Protect your Mac from every virus source—even viruses hidden in e-mail!
*$39.89*
#812640

**Illustrator 9.0**
The standard in vector graphics creation software just got better!
*Upgrade for only $139.49*
#58038 Illustrator 9.0 Full Version

**MacMail Exclusive!**

**SoundJam MP/Virtual Game Station Bundle**
Run MP3 and PlayStation games right on your Mac!
*$59.89*
#61232

**Flash 4 FreeHand 9 Studio Upgrade**
FreeHand 9—The Professional Illustration and Layout Solution for Print & Web!
Flash 4—Produce high-impact sites with ease and reliability.
*Upgrade only $184.99*  
#56668 Flash 4 FreeHand 9 Studio Full Version
#48028 FreeHand 9 Upgrade
#48060 FreeHand 9 Full Version
#46851 Flash 4 Upgrade
#46860 Flash 4 Full Version

**Dreamweaver UltraDev**
Develop ASP, JSP and CFML Web applications in one visual environment.  
*special offer only $299.99*  
#59233

**Cosmopolitan Virtual Makeover**
It's the most exciting new way to experiment with your own look! Change your hair color and more.
*$21.99*
#15926

**RealPlayer 7 Plus**
Lets you experience the best audio and video on the Internet!
*$24.99*  
#81389

**The Complete National Geographic: 110 Years**
The ultimate resource and reference tool too!
*$99.99*  
#57843

**Inside the SAT/PSAT/ACT**
Step-by-step program that helps you increase your scores.
*$34.99*  
#52110

**MacMail Software & Accessories Buyers Guide!**
Call For Yours Today!  
1-888-425-MALL
Visit Our Online Catalog at software.macmall.com
Order Any Item in 4 Easy Steps
1. Go to www.macmall.com
2. Click on "Shopping Cart"
3. Enter part in "Catalog Express"
4. Click on "Proceed to Checkout"

The best prices on USB and FireWire peripherals for the iMac™, iBook™, PowerBook G3, Power Mac G3 and G4!

- **Stylus® Color 740i Printer**
  - The awesome inkjet in iMac and iBook Custom Colors
  - $79.99

- **Stylus® Color 900 Printer**
  - New!
  - $149.99

- **Lexmark Optra M410 Laser Printer**
  - 12ppm
  - PostScript L3
  - $669

- **4 Port USB Hub**
  - Provides instant expandability that is as simple as plugging in a USB connector!
  - $24.99

- **Sub Subwoofer for iMac DV**
  - Handles low frequencies between 42Hz and 200Hz
  - $99.99

- **Coolpix 990 Digital Camera**
  - 3.34 Megapixel CCD
  - 3X Zoom-Nikkor lens, plus 4X digital zoom
  - USB interface
  - One year warranty
  - $979.99

- **Zip 100 USB Drive Blowout!**
  - It’s small, sleek and portable.
  - Hot swappable USB
  - PC/Mac Compatible
  - $249.99

- **Que! 4x4x8 CD-RW Drive**
  - The revolutionary USB interface CD-RW drive allows iMac users to easily record, erase and rewrite CD's again and again at 4X Write and 4X Rewrite speeds.
  - Includes a FREE Carrying Case!
  - $299.99

- **Agfa SnapScan 1212UB Blueberry Scanner**
  - 600 x 1200dpi
  - 36-bit color
  - USB connectivity
  - $129.99

- **Perfection 636U Scanner**
  - 600 x 1200dpi
  - 36-bit color
  - USB connectivity
  - $129.99

- **SuperDisk Drive!**
  - Twice as fast! Reads & writes both 120MB SuperDisk diskettes and standard HD 8.5” diskettes.
  - $129.99

Great peripheral deals for your serial and SCSI Macs!

- **Astra 220S Scanner**
  - 600 x 1200dpi
  - 36-bit color
  - SCSI interface
  - $59.99

- **Epson Stylus Color 3000 Printer**
  - Present full-bleed 13" x 19" designs at 1440 x 720dpi
  - Includes Adobe PostScript L2
  - Optional internal Ethernet, Mac & PC
  - $899

- **La Cie External 12x4x32 SCSI CD-RW Drive!**
  - Create your own music or data CDs.
  - 12X record speed
  - 2MB data buffer
  - $419.99

- **Iomega® Jaz® 1GB Drive and Cartridge**
  - Faster than many hard drives
  - 10 ms. seek time
  - $99.99

Order Any Time! Open 24 Hours! Order Today by 10pm EST—Get it Tomorrow by 10:30am!

macmall.com 1-800-217-9492
AOL Keyword: MacMall
Mention your Priority Code: #ZMWD083
Delivers incredible digital image quality! **Nikon.**

Coolpix 990 Digital Camera

**ONLY $999**

Revolutionary interface boosts read and write speeds!

**ONLY $399**

GPS 8X4X32X

External FireWire CD-RW

SEE the difference

DV makes!

Canon GL1 Digital Camcorder

Special G4 plug-in makes Photoshop run faster!

AppleCare Protection Plan

ONLY $248

Power Mac

Upgrade from to 3 years of Apple-certified service, both parts and labor

ONLINE... Includes Apple Display coverage when purchased with a Power Mac G4 on the same invoice

Apple Cinema

Display sold separately.

The key to dramatic DV!

Desktop digital movie studio — and much more!

It's a movie studio, graphics workstation and power user's dream machine, all rolled into one. Focus your creative energy on the final result, not on what to do while the screen redraws. The Power Mac G4, with its Altivec Velocity Engine, easily plows through Final Cut Pro digital video effects, Photoshop filters, 3D graphics rendering, anything you can throw at it.

Processor

Hard Drive

RAM Std/Max

Backside Cache

Optical Drive

Modem

Zip

Item #

ONLY* Lease*

G4/400Mhz

10.6GB Ultra ATA-66

64MB/128MB

1.0MB at 200MHz

DVD-ROM (read only)

56K Int.

—

#116013

$1594.98

$55

G4/450Mhz

20.0GB Ultra ATA-66

128MB/256MB

1.0MB at 225MHz

DVD-ROM (read only)

56K Int.

Yes

#116014

$2494.98

$88

G4/500Mhz

27.0GB Ultra ATA-66

256MB/512MB

1.0MB at 250MHz

DVD-ROM (read/ write)

—

Yes

#116015

$3494.98

$123

*Business Lease: 36-month, tax-mo rked value lease based on approved credit. Other leasing options available. Leases require a minimum order of $1,000. Call 1-800-611-9751 for details. FREE 128MB memory with any G4 purchase on same invoice. FREE MacTicker with any G4 purchase on same invoice. $4.99 shipping and handling applies. Offers subject to change. While supplies last.

Credit cards are not charged until the order is shipped. Most products ship the same day ( barring system failure, etc.). Shipping options include Ground, Second Day and Overnight delivery. Freight is based on average product weight. Handling extra. Insurance available. Special orders may require special shipping and handling charges. Call for international shipping rates. Prices and product availability subject to change without notice. Specials and promotions may be limited to stock on hand. Not responsible for typographical errors. All products sold by Multiple Zones International (MZI) are third-party products and are subject to the warranties & representations of the applicable manufacturers, including but not limited to Y2K compliance. Accordingly, MZI makes no representation or warranty with respect to Y2K compliance of product sold. (C)2000 Multiple Zones International Inc. All rights reserved. Unauthorized duplication is a violation of applicable laws. Apple, the Apple logo, Macintosh® and PowerBook® are registered trademarks of the Apple Computer Inc. ©2000 Multiple Zones International Inc. All rights reserved. Unauthorized duplication is a violation of applicable laws. Apple, the Apple logo, Macintosh® and PowerBook® are registered trademarks of the Apple Computer Inc.
Apple Cinema Display

A revolutionary display for a revolutionary video experience!

See more, do more, scroll less.
The Apple Cinema Display's all-digital technology delivers eye-friendly, distortion-free images in a 11" by 17" area — room enough for two full pages AND all your tool palettes.

No image-shrinking black bars.
Now you can watch DVD movies in a letterbox format that fills the entire screen from edge to edge.

Big screen, small footprint.
As big as its screen is, the Cinema Display actually lets you see — and use — more of your desktop than ever.

Incredible prices and quality in genuine Apple displays!

Our #1 best selling Apple monitor!
Apple 17" Studio Display (16 variable)

See accurate color for the lifetime of the display!
Apple 21" Studio Display with ColorSync Graphite (17.8 variable)

Ultimate price on the ultimate flat-screen!
Apple 15" Flat-Panel Studio Display

*Offer good through 7/1/99

#116067 $3999.97

Note: Compatible only with Power Mac G4, sold separately.

Supplies and availability of Cinema Display subject to change without notice.

FREE! or FREE!

FREE MEMORY!
128MB MEMORY UPGRADE

G4/400MHz $116048
G4/450MHz $116049
G4/500MHz $116050

Altec Lansing PowerCube USB 3-piece Speaker Set

Ultimate price on the ultimate flat-screen!
Apple 15" Flat-Panel Studio Display

*With purchase of G4 on the same invoice, while supplies last. Offer subject to change.

Source Code MWO80
Order by Phone 1.800.436.0606

Corporate bids welcome!
Fax to 1-888-239-2591

A NASDAQ® COMPANY Ticket Symbol: MZON

Final Cut Pro 1.2 combines professional editing, compositing and special effects capabilities in one program!

Only $999.98
#114895

Professional Web authoring and site management!

Save big with Web and print publishing collections!

Adobe Publishing Collection:
- Photoshop
- Illustrator
- GoLive
- LiveMotion

Adobe Web Collection:
- Photoshop
- Illustrator
- PageMaker Plus - Acrobat

The first Internet security solution for the Mac!

Corporate bids welcome!
Fax to 1-888-239-2591

A NASDAQ® COMPANY Ticket Symbol: MZON
Apple® iBook™

Your #1 traveling companion. Now with twice the memory, hard drive capacity and expandability of the original, the new iBooks give you even more reasons to be crazy about the iMac to go.

Very backpackable. Most notebooks might give you pause for concern before putting one in your backpack. But the iBook comes rucksack-ready with a tough, polycarbonate case and latch-free closing mechanism. Just toss it in there and go! Or carry it by its handle, conveniently tucked away in its hinge.

The well-rounded traveler. Besides its curved corners and easy-grip, rubberized accents, the iBook comes well-stocked with 64MB of RAM (expandable to 256MB), 60GB hard drive, G3 processor, AT/RT Rage Mobility graphics card, modem and great software.

Choose Your iBook!

Apple iBook
300 MHz PowerPC G3
6.0 GB Capacity
64 MB Memory
12.1 TFT Display
CD ROM Drive
56K Modem
USB Built-in

#116100 iBook - Blueberry .................. $1594.98
#116111 iBook - Tangerine .................. $1594.98

Apple iBook SE
366 MHz PowerPC G3
6.0 GB Capacity
64 MB Memory
12.1 TFT Display
CD ROM Drive
56K Modem
USB Built-in

#116010 iBook SE - Blueberry ............... $1794.98
#116011 iBook SE - Tangerine ............... $1794.98

Play music over the Web!

Credit cards are not charged until the order is shipped. Most products ship the same day ( barring system failure, etc.). Shipping options include Ground, 2nd Day and Overnight delivery. Freight is based on average product weight. Handling costs and insurance available. Special orders may require special shipping and handling charges. Call for international shipping rates. Prices and product availability subject to change without notice. Specials and promotions may be limited to stock on hand. Not responsible for typographical errors. All products sold by Multiple Zones International Inc. are third party products and are subject to warranties and representations of the applicable manufacturers, excluding but not limited to Y2K compliance. Multiple Zones International Inc. All rights reserved. Unauthorized duplication is a violation of applicable laws. Apple, the Apple logo, Macintosh and PowerBook are registered trademarks of the Apple Computer, Inc.
I

Newly designed glacier blue with silver flat screen

~

~

Sony A200 17” Flat-screen Display

Newly designed glacier blue with silver flat screen

Excellent price & performance!

Microtek V6UPL USB/Parallel legal size 600x1200 scanner

Scan slides and up to legal-sized documents!

Our Best Selling Mac Modem!

Global Village Teleport 56K V.90 Fax/Modem

Robust mobile printer!

HP DeskJet 960C Portable Printer Includes USB to Parallel Adapter and Cable.

Unbelievable quality at an incredible price!

HP Color DeskJet 985C Printer

1200x1200 dpi – 10ppm!

HP 2100M Printer

NEW!

Epson Stylus 875DC Printer

$50 REBATE!

Rich, detailed color printing!

Epson Stylus 900G with NEW Graphite Cover

High performance and brilliant output!

Epson Stylus 900G

Pro-quality scans made perfectly easy

Epson 838U Perfect Image USB Scanner

$50 REBATE!

Now Up-to-Date and Contact New Version 3.9

Norton Utilities 5.0

SAVE $50!

Norton Utilities 5.0

Corporate bids welcome!

Fax to 1-888-239-2591

A NASDAQ COMPANY Ticker Symbol: MZON

Source Code MW080

Order by Phone
1.800.436.0606
Create your own digital movie projects. Make your own summer vacation travelogue, music video, video greeting cards - whatever your creativity directs you to do - and complete them with titles, effects, graphics and more.

The freedom to play "What if?" with video.
Cut and paste text and graphics, add sound and music, and even snip out the less exciting parts - leaving the original tape untouched.

Top Sellers to Film Your Video
Combine video and stills via FireWire connectivity!

Capture beautiful video and digital still images!

Sony
SONY
Sony DCR TRV/11
Digital Camcorder
ONLY $1249.99
#112586

SONY
Sony DCR TRV900
Digital Handycam Camcorder
ONLY $2299.99
#113184

SONY
Sony DCR TRV900
Digital Handycam Camcorder
ONLY $2299.99
#113184

AppleCare Protection Plan
1. Upgrade from 90-day phone support to 3 years
2. TechTool Deluxe diagnostic software included to fix most problems - $69 Value!
3. Exclusive access to AppleCare Web support site
4. A total of 3 years of Apple-certified iMac service, both parts and labor
5. VALUE... 3 years of protection for only $148.99

Credit cards are not charged until the order is shipped. Most products ship the same day (Barring system failure, etc.). Shipping options include Ground, 2nd Day and Overnight delivery. Freight is based for average product weight. Handling extra, Insurance available. Special orders may require special shipping and handling charges. Call for international shipping rates. Prices and product availability subject to change without notice. Specials and promotions may be limited to stock on hand. Not responsible for typographical errors. All products sold by Multiple Zones International, Inc. are third party products and are sold subject to warranties & representations of the applicable manufactures, including but not limited to Y2K compliance. Accordingly, MJ makes no representation or warranty with respect to Y2K compliance of product sold. ©2000 Multiple Zones International Inc. All rights reserved. Unauthorized duplication is a violation of applicable laws. Apple, the Apple logo, iMac, iBook, PowerBook and PowerPC are registered trademarks of the Apple Computer, Inc.

applecare protection plan
1. upgrade from 90-day phone support to 3 years
2. techtool deluxe diagnostic software included to fix most problems - $69 value!
3. exclusive access to applecare web support site
4. a total of 3 years of apple-certified imac service, both parts and labor
5. value... 3 years of protection for only $148.99

Credit cards are not charged until the order is shipped. Most products ship the same day (barring system failure, etc.). Shipping options include Ground, 2nd Day and Overnight delivery. Freight is based for average product weight. Handling extra, Insurance available. Special orders may require special shipping and handling charges. Call for international shipping rates. Prices and product availability subject to change without notice. Specials and promotions may be limited to stock on hand. Not responsible for typographical errors. All products sold by Multiple Zones International, Inc. are third party products and are sold subject to warranties & representations of the applicable manufacturers, including but not limited to Y2K compliance. Accordingly, MJ makes no representation or warranty with respect to Y2K compliance of product sold. ©2000 Multiple Zones International Inc. All rights reserved. Unauthorized duplication is a violation of applicable laws. Apple, the Apple logo, iMac, iBook, PowerBook and PowerPC are registered trademarks of the Apple Computer, Inc.
summer hit movie!

FREE!
Scanner!

$129.99
Originally!

AGFA SnapScan 1212U USB Scanner

*With select iMac or iBook purchase, except iMac/350. While supplies last. Offer subject to change.

FREE!

iSub!

$100 Value!

Harman
Kardon
iSub

The world's coolest subwoofer!
Enhances the gaming, music, and DVD movie experience by adding deep rich tones. Feel the difference!

*With purchase of an iMac, on same invoice. While supplies last. Offer subject to change.

Freedom to Roam!

$294.99
Value!

AirPort Base Station
• Surf the Net or network wirelessly®
• Up to 150' range lets you and the iBook roam around the home or classroom
#115920 AirPort Card ............ $99.98

*Requires the AirPort Card, Base Station and a computer that is AirPort Card ready.

Storage & Creativity

Special Buy!

250MB of removable storage!
Imation USB Zip 250 Drive

Add a floppy drive to your iMac!
VST USB Floppy Drive – Tangerine

New colors!
Graphite 4x5" USB Tablet with Pen and Cordless Mouse

MAC ZONE EXCLUSIVE!

SAVE OVER '124!

Aladdin Systems StuffIt Deluxe 5.5 and FlashBack PLUS DataViz
MacLinkPlus Deluxe 11.0!

BONUS Buy!

SAVE '10!

Connectix Virtual Game Station with Mac iBook GamePad

Input & Output

The trackball iMac users have been waiting for!
Kessington
Orbit Trackball – iMac Blueberry Blue

Pro-quality scans made perfectly easy!
Epson B36U Perfection USB Scanner

#1 selling iMac printer!
Epson Stylus 740 Color Inkjet Printer

USB Tools

Trouble-free USB connections!
Belkin 4-port Stackable USB Hub with Click-on Flavors

Connect your serial printer or joystick to your iMac!
Keyspan USB Twin Serial Adapter

Games

The Sims 2000
Madden NFL 2000
Rainbow Six
Baldur's Gate
Age of Empires
Tomb Raider III
The Big Kahuna
SimCity 3000
Myth: The Total Codex 1.0
Descent 3
Total Annihilation Gold
Railroad Tycoon II
ChessMaster 6000
Quake II
Unreal Tournament
Bagdom 3D for the Family
Sid Meiers Alpha Centauri

Corporate bids welcome!
Fax to 1-888-239-2591

Order by Phone
1.800.436.0606

Order Online Today
Zones.com

Source Code
MW080

New Version for Mac!
NEW Version
for Mac!

SAVE $20!

Special Edition for the iMac & iBook
#65534
$99.95

SAVE $30!

Internet Explorer 5.0
with any Mac Zone purchase.
Ask for #114042

Top Games!

NEW!

Virtual PC 3.0
With Windows 2000
#68368
$299

NEW!

Order by Phone
1.800.436.0606

Order Online Today
Zones.com

Source Code
MW080
**FREE!**
AirPort Card

$100 VALUE!

AirPort Card

*With purchase of PowerBook on same invoice. Base Station required for wireless functionality, sold separately. While supplies last.

**FREE!**
SoftWindows

$150 VALUE!

**With purchase of PowerBook or Power Mac on same invoice. While supplies last.

Apple PowerBook

Get more freedom with mobile digital video!
Publish high-quality video more easily, more affordably and with more creative opportunities. The G3 processors, 400 MBytes FireWire ports, ample hard drive space and large, crisp displays provide enough built-in muscle to whip through compositing tasks, special effects and transitions. Use Final Cut Pro to move entire scenes around as if they were post-it notes on a board.
If the whole edit doesn’t work for you, just transfer the original, untouched footage and start again.
Get the results you want when and where you want.

Choose Your PowerBook!

Apple PowerBook 400

Now with double the cache and a DVD drive!

- 400 MHz PowerPC G3
- 6.0 GB Capacity
- 64 MB Memory
- 14.1” TFT Display
- DVD ROM Drive
- 56K Modem
- USB and FireWire Ports

FREE! AirPort Card

FREE! SoftWindows

Starting At

$2494.98

Apple PowerBook 500

The maximum portable horsepower available!

- 500 MHz PowerPC G3
- 12.0 GB Capacity
- 128 MB Memory
- 14.1” TFT Display
- DVD ROM Drive
- 56K Modem
- USB and FireWire Ports

FREE! AirPort Card

FREE! SoftWindows

ONLY

$2494.98

#116008

Lease for only $99.99/month.

FREE! AirPort Card with any PowerBook purchase on same invoice. Offers subject to change. While supplies last. *Business Lease: 36-month, fair-market value lease based on approved credit. Other leasing options available. Leases require a minimum order of $1000. Call 1-800-611-9751 for details.

Reads SuperDisks and floppies!

VST SuperDisk Drive for PowerBook G3

ONLY

$199.95

#119627

The ease and convenience of a floppy drive!

VST Zip 100 Drive for PowerBook G3

ONLY

$59.95

#126120

The #1 scheduler & contact manager for the Mac!

NEW VERSION!

Microsoft Word H-O-M-Einvestment

Now Up-to-Date & Contact

ONLY

$84.99

#112770

Fits in your pocket!

USB and FireWire Ports

MacSense

4-Port USB Mini Hub

ONLY

$29.99

#114563

Compartmentalized expandable notebook case!

Notebook Case

Originally priced at $59.99!

SAVE $30!

Authorized Catalog Reseller

MacZone

the next generation of

macZones

Explore FREE ways

Visit our NEW Apple e-Store! Check out complete PowerBook system specifications online at zones.com.

Professional video production in a box!
Final Cut Pro 1.2

Blazing fast and self-powered!

VST FireWire 4.0GB Ext. Drive

Compartmentalized expandable notebook case!

MacZone

247 days away!

Camera sold separately.
Credit cards are not charged until the order is shipped. Most products ship the same day (business system failures, etc.). Shipping options include Ground, 2nd Day and Overnight delivery. Freight is based on average product weight. Handling extra, insurance optional. Special orders may require special shipping and handling charges. Call for international shipping rates. Prices and product availability subject to change without notice. Specials and promotions may be limited to stock on hand. Not responsible for typographical errors. All products sold by MacZone International, Inc. are third party products and are subject to the warranties & representations of the applicable manufacturers, including but not limited to 120-day return policy. Accordingly, MCI makes no representation or warranty with respect to Y2K compliance of product sold. ©2000 MacZone International, Inc. All rights reserved. Unauthorized duplication is a violation of applicable laws. Apple® the Apple logo, Macintosh® and PowerBook® are registered trademarks of the Apple Computer, Inc. All rights reserved.
to new frontiers!

**NEW VERSION!**

Mac Zone Exclusive!

**FREE** with your purchase of Mac OS 9.0.4!

**FREE! Internet Explorer 5.0 with any Mac Zone purchase.**
Ask for #114042

### Get High-Quality Output

- **Vibrant 42-bit color!** Fujifilm UMAX Astra M30 Scanner

### Save on Storage

- **Easy to use!** Iomega Zip 100 Portable USB Drive

### Build a Reliable Network

- **Lifetime warranty!** Asante 8-Port 10/100 Hub

### Maximize Your Power

- **Increase your processing speed!** Sonnet Crescendo G4/PCI 400MHz Upgrade Card – 1MB of backside cache

### Meet iTools

**FREE E-mail**
Get your own Mac.com e-mail address. Create an auto-reply message and forward your e-mail to another e-mail address.

**FREE KidSafe**
Give your kids access to over 55,000 educator-approved sites while you control access to services such as chat rooms, e-mail and online games.

**FREE HomePage**
Build your own personal Web site in three easy steps. Apple will host your Web site, so it's always there for the world to see.

### Corporate bids welcome!
Fax to 1-888-239-2591

Source Code MW080

Order by Phone
1.800.436.0606

Order Online Today
zones.com

Circle 71 on card or go to www.macworld.com/getinfo

---

*Shipping and handling fees apply. While supplies last!*
Take a walk on the creative side

Looking for a way to express your business’ creativity? Look no further. Your CDW account manager will work with you to build the perfect outlet for your creativity. We offer lifetime toll-free technical support and same day shipping so the only thing that will put a damper on your creative side is writer’s block. Call your CDW account manager today and bring your wildest creations to life.

Digital enhancements

Apple® iMac™ DV

• 400MHz PowerPC™ G3 processor
• 15” display, 13.8” viewable image size
• 512KB backside Level 2 cache
• 64MB SDRAM
• 10GB hard drive
• 4X Max DVD-ROM drive
• 56Kbps (V.90) modem
• 10/100BASE-T Ethernet

Blueberry  CDW 190108
Strawberry  CDW 190120
Tangerine  CDW 190110
Grape  CDW 190114
Lime  CDW 190123

$1494

iMac DV Graphite

Special features include:
• 400MHz PowerPC G3 processor
• 128MB SDRAM
• 13GB hard drive
• Two FireWire® ports

$1294

Authorized Reseller

FireWire® is a registered trademark of Apple Computer Corp.
Apple® Power Macintosh G4 Series
• Up to 500MHz PowerPC G4 processor
• 1MB backside Level 2 cache
• 100MHz system bus
• DVD-ROM drive
• 56Kbps (V.90) modem

Starting at $1594
CDW 208133

Apple® iBook Graphite
• 366MHz PowerPC G3 processor
• 512MB RAM
• 6GB hard drive
• 24X Max CD-ROM drive
• 56Kbps (V.90) modem
• 10/100 Ethernet
• 12.1" active-matrix display

$1794
CDW 208120

Apple iBook
Tangerine $1594 CDW 208118
Blueberry $1594 CDW 208106

NEC MultiSync FE100 monitor
• 17" truly flat monitor,
• 16" viewable image size
• 0.25mm AG dot pitch

$289.90
CDW 187171

Macromedia Dreamweaver UltraDev
Rapidly develop ASP, JSP and CFML Web applications in one visual environment. Next, preview live data while you design and maintain total control over source code with Roundtrip™ HTML and Roundtrip™ Server Markup. Then, easily add server-side logic, navigation and interactivity.

Upgrade $279.94
Full version $549.15
CDW 214701

Mac OS 9.0.4
Mac OS 9.0.4 Update provides additional FireWire® and USB support, enhances networking and power management, and improves audio, video and graphics functionality.

$97.54
CDW 220798

Adobe Illustrator V9.0 upgrade
With Adobe® Illustrator® V9.0 software, you can easily transform your ideas into dazzling graphics for use on the Web, in print, and in dynamic media using flexible, vector-based tools.

$145.89
CDW 210968

LaCie PocketDrive
• IEEE-1394/USB external hard drive
6GB $399 CDW 206056
18GB $749 CDW 206060

Harman Multimedia iSub
6" subwoofer for iMac
• 20 Watt powered subwoofer for the iMac
• Produces stereo-quality sound for music, movies and gaming experiences
• USB interface

$99.00
CDW 211570

Adobe Illustrator V9.0 upgrade
With Adobe® Illustrator® V9.0 software, you can easily transform your ideas into dazzling graphics for use on the Web, in print, and in dynamic media using flexible, vector-based tools.

$145.89
CDW 210968

CDW® Computing Solutions
Built for Business™
www.cdw.com
800-509-4239

All pricing subject to change. For all prices and products, CDW® reserves the right to make adjustments due to changing market conditions, product discontinuation, manufacturer price changes or typographical errors in advertisements. All products sold by CDW are third party products and are subject to the warranties and representations of the applicable manufacturers. Please refer to www.cdw.com for additional terms and conditions.
APS CD-RW 12x4x32 SCSI
- Fastest max. record speed ever
- 32x read speed faster than most CD-ROMs
- Ultimate CD drive for content playback, distribution, backup

APS Tech proudly offers our fastest CD-RW drive ever. With 12x max. record speed, you can burn a full disc in only six minutes and send your projects out quicker. Ships with Toast for Mac, Easy CD Creator for PC, and Direct CD for PC to get you going right away.

APS CD-RW 8x4x24 FireWire
- Speedy CD-RW drive with convenient IEEE 1394 interface
- Hot-swappable, great for sharing among workstations

\[
\text{Take away the hassle of device IDs and terminators, and add unprecedented speed, ease-of-use and compatibility. What have you got?} \text{ FireWire. The APS CD-RW 8x4x24 FireWire enables you to burn CDs faster than you ever imagined, not to mention an amazing buffer size of 4MB to minimize overhead. If you want to burn CDs with your new FireWire-based computer, order the APS FireWire CD-RW today.}
\]

Drive faster

$649.95
APS Pro2

APS 45GB FireWire Hard Drive
- Easiest connections ever – hot-swappable, no terminator or device ID
- Ideal for personal video storage and editing, large-scale imaging/graphics

$499.95
APS Pro

APS DVD-RAM
- Rewritable DVD discs with 5.2GB of storage for backup, archiving or digital video storage
- Reads virtually any CD at up to 20X speed

$499.95
APS Pro

APS ST 73GB Ultra160 LVD SCSI
- 7200 rpm LVD drives offer you fastest reliability and performance
- 73GB for your most data-intensive creations

$1,499.95

APS 73GB LVD
- Internal Configuration

APS Ultra2 Wide / Ultra160 LVD SCSI Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>RPM</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS ST 9GB Ultra160 LVD</td>
<td>7200</td>
<td>329.95</td>
</tr>
<tr>
<td>APS 13.1GB Ultra160 LVD</td>
<td>10000</td>
<td>439.95</td>
</tr>
<tr>
<td>APS ST 1.1GB Ultra160 LVD</td>
<td>10000</td>
<td>439.95</td>
</tr>
<tr>
<td>APS ST 18GB Ultra160 LVD</td>
<td>7200</td>
<td>399.95</td>
</tr>
<tr>
<td>APS ST 36GB Ultra160 LVD</td>
<td>10000</td>
<td>499.95</td>
</tr>
<tr>
<td>APS ST 50GB Ultra2 Wide LVD</td>
<td>7200</td>
<td>969.95</td>
</tr>
<tr>
<td>APS ST 73GB Ultra160 LVD</td>
<td>10000</td>
<td>1,569.95</td>
</tr>
</tbody>
</table>

Drives listed above carry a five-year warranty.

APS ST 18GB Ultra SCSI
- Sixth-generation Barracuda mechanism
- Perfect for design/publishing with an ultra-low price

$449.95
APS Pro

APS Ultra SCSI Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>RPM</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS ST 9GB</td>
<td>7200</td>
<td>$269.95</td>
</tr>
<tr>
<td>APS ST 18GB</td>
<td>7200</td>
<td>$469.95</td>
</tr>
</tbody>
</table>

Drives listed above carry a five-year warranty.

APS IDE Ultra ATA/66 Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>RPM</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS IDE 10GB</td>
<td>5400</td>
<td>$119.95</td>
</tr>
<tr>
<td>APS IDE 20GB</td>
<td>5400</td>
<td>149.95</td>
</tr>
<tr>
<td>APS IDE 45GB</td>
<td>7200</td>
<td>389.95</td>
</tr>
<tr>
<td>APS IDE 75GB</td>
<td>7200</td>
<td>599.95</td>
</tr>
</tbody>
</table>

Drives listed above carry a one-year warranty.

CLOSEOUT SALE

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS CD-RW 4x4x16 SCSI External</td>
<td>$199.95</td>
</tr>
<tr>
<td>APS Q 8GB Internal 5400 rpm IDE refurb</td>
<td>99.95</td>
</tr>
<tr>
<td>APS CD-RW 6x6x16 SCSI Ext. Pro refurb</td>
<td>199.95</td>
</tr>
<tr>
<td>APS I 9GB SCSI Ext. Pro 7200 rpm</td>
<td>259.95</td>
</tr>
<tr>
<td>ZIP 230 Parallel Port Ext.</td>
<td>69.95</td>
</tr>
<tr>
<td>LaCie 6GB USB Hard Drive Ext EKO</td>
<td>159.95</td>
</tr>
</tbody>
</table>

For more information, visit us at: www.apstech.com
APS HyperDAT® IV LVD

• Longer tape, higher density vault DDS-4 into corporate network backup
• 20GB native capacity, 2-3 MB/s transfers

New DDS-4 technology has increased capacity by 67% over DDS-3 and cut your backup time in half. And the HyperDAT IV can read and write to your DDS-3 and even DDS-2 tapes, so migration is easy. Also comes with a limited three-year warranty.

$1,149.95

APS Pro2 case with Retrospect software for Mac and PC

Zoom into focus

Canon ZR10 Digital Video Camcorder

• FireWire/IEEE 1394 DV terminal
• Analog line-in for making copies, preserving originals
• 10X optical zoom lens, 200X digital zoom

$899.95

Digital Video Camcorders

Model | Price
--- | ---
Canon XL1 | CALL
Canon GL1 | CALL
Canon Optura Pi | CALL
Canon ZR10 | $899.95

Nikon Coolpix 800

• 8MB CompactFlash™ stores 200 images
• 2x optical zoom zeroes in on the action

$599.95

Digital Cameras

Model | Price
--- | ---
Sony Digital CyberShot DSC-S30 | $499.95
Sony Digital CyberShot DSC-S50 | 599.95
Sony Digital CyberShot DSC-S70 | 799.95
Olympus C-2020 Zoom | 699.95
Olympus C-3000 Zoom | 999.95
Olympus C-2500L | 1,499.95
Nikon Coolpix 800 | 599.95
Nikon Coolpix 990 | 999.95
EPSON PhotoPC 600 | 599.95
EPSON PhotoPC 750z | 499.95

Sony Multiscan SDM-N50

15" (viewable) LCD Display

• Incredible 1/2" thin screen, under six pounds
• Best of Show winner, COMDEX '99

$1,499.95

Call 800 - 374- 5681

Corporate Sales (800) 395 - 5671 • International (503) 844 - 4600
5am - 10pm, Monday - Friday, 8am - 6pm Saturday - Sunday, Pacific Time

Circle 62 on card or go to www.macworld.com/getinfo
### USB Hard Drive
- **20.4GB** $199
  - Also available in 6, 8, 13 GB
  - For Mac or PC!

### USB CDRW Drive
- **4x4x32 USB**
- **Ext. $279**
  - For Mac or PC!

### YAMAHA Drive Kit
- **8x4x24 $249**
- W/mastering soft. & 1 disk
  - Int. (VC880424000I) $289 Ext. (VC880424000X)

### CDRW Drive Kit
- **ULTRA ATA 446**
- **5.25GB** $105
  - CD Rewriteable

### Tape Drive
- **SoniPro 20-40GB $949**
  - Ultra Wide SCSI
  - Ext. $1119
  - Int. (STD11000A4) (STD11000AM)

### G3 UPGRADES
- **Intel 400MHz Power Mac**
  - New 800MHz PowerPC G3
  - New 1GHz PowerPC G3

### CD ROM
- **Ultra ATA 446**
- **5.25GB** $105
  - CD Rewriteable

### Video
- **Ultra Wide SCSI**
- **300MB**

### Hard Drive
- **Quantum**
- **9.2GB $339**
  - Ultra Wide SCSI
  - Ext. $469
  - Int. (STD92040W) (STD92040X)

### 2 Gig Jazz Drive
- **iomega**
- **2GB Jazz Drive $315**
  - 2GB disks
  - $85 each

### Sound Accessories
- **Flat Panel Speakers and Subwoofer System**
- Get the ultimate sound from your computer with our full line of hot new (LSX516) S79 speakers, headphones & microphones.

### RAID
- **Controller boards for Hot Swap**, 2-4 hard drives
- **SCSI 446**

### CD Recorder
- **Quantum DLT**
- **DLT Cleaning Tape** $40

### Optical Media
- **CD Rewritable**
  - **4x4x32 USB**
  - **Ext. $279**

### Backup Tape
- **2.5" IDE LAPTOP**
  - **QUANTUM DLT**
  - **8mm**

### FIREWIRE
- **USB PCI Board**
  - **PCI Board Kit**

### ZIP, JAZZ & OPTICAL
- **Zip**
  - **Zip 2MB**

### Backup Tape
- **2.5" IDE**
  - **8mm**

### Secure Ordering
- **Daily Specials**
- **Drive Store on the Web**

---

**BEST BUY AWARD WINNER!**

We've been making deals and satisfying customers for more than 13 years!

Here's this month's hot features. Check out more at www.megahaus.com/mac
Apple® Instant Loan — See below for details. Other products sold at J&R may be purchased on an Apple® Instant Loan program following the purchase of an Apple® Computer.

Apple® iBook™ G3 Computers!

Apple® iBook™
Special Edition Notebook Computers
1.17 GHz PowerPC® G3 processor
6 GB hard drive/256 MB RAM
AU VRAK • 70MB. Memory Card or Zip drive
$1599.99* or Only $37.51/month
or Only $58.63/month

Apple® iBook™
with SuperDrive
6 GB hard drive/256 MB RAM
AU VRAK • 70MB. Memory Card or Zip drive
$1799.99* or Only $42.21/month
or Only $62.04/month

* 67 payments of $25.51 (APP M7712LVAI or APP M7713LVAI) or $42.21 (APP M7714LVAI or APP M7715LVAI), 15.80% Annual Percentage Rate subject to increase or decrease.
Payments deferred for the first 120 days subject to interest of $54.63 (APP M7712LVAI or APP M7713LVAI) or $50.66 (APP M7714LVAI or APP M7715LVAI) and a loan origination fee of $54.63 (APP M7712LVAI or APP M7713LVAI) or $50.66 (APP M7714LVAI or APP M7715LVAI) charged on day 91. No prepayment penalty. Subject to approval of credit. Based on Estimated Retail Price of $1499.99 (APP M7712LVAI or APP M7713LVAI) or $1799.99 (APP M7714LVAI or APP M7715LVAI).

Apple® Power Mac™ G4 64/10GB/DVD MiniTower
600MHz PowerPC® G4 processor 64MB SDRAM • 10GB hard drive • 256x256x256 color display • 3 USB ports • 3 FireWire ports
$2499.99 or Only $58.63/month
or Only $82.04/month

1GHz PowerPC® G4 processor w/ Velocity Engine™ • 256MB RAM • 10GB hard drive • 256x256x256 color display • 3 USB ports • 3 FireWire ports
$3499.99 or Only $82.04/month

Apple® Power Mac™ G4 256/768GB/DVD/Zip
1200GB hard drive • 768MB RAM • 256x256x256 color display • 3 USB ports • 3 FireWire ports
$4699.99 or Only $98.56/month

Apple® Power Mac™ G4 A1164 3.5GHz PowerPC® G4 processor w/ Velocity Engine™ • 256MB RAM • 10GB hard drive • 256x256x256 color display • 3 USB ports • 3 FireWire ports
$5999.99 or Only $155.96/month

Apple® Power Mac™ A1161 3.5GHz PowerPC® G4 processor w/ Velocity Engine™ • 256MB RAM • 10GB hard drive • 256x256x256 color display • 3 USB ports • 3 FireWire ports
$6799.99 or Only $178.99/month

Apple® Power Mac™ G4 800 A1186 1GHz PowerPC® G4 processor w/ Velocity Engine™ • 512MB RAM • 10GB hard drive • 256x256x256 color display • 3 USB ports • 3 FireWire ports
$4999.99 or Only $135.30/month

J&R CORPORATE SALES BUSINESS LEASING: No Money Down, No Payments for 30 Days!

Call J&R Corporate Sales for details at 1-800-221-3191 or 1-212-238-9080

J&R CORPORATE SALES
www.jandr.com
AOL keyword: J&R

Order Code: MW008

All Major Credit Cards Accepted
Overnight Delivery Available!

To Order Toll Free and Receive a Free Catalogue
800-221-8180
24 Hours, 7 Days, Anywhere In the USA
PARK ROW • NEW YORK • NY • 10038
FAX: 1-800-232-4432

Order from www.jandr.com

Circle 56 on card or go to www.macworld.com/getinfo
THE #1 MACINTOSH RESOURCE

Get super savings on a subscription, plus a FREE CD-ROM.

Incisive Product Reviews
Lab-based Performance Tests
Tips, Tricks & Tutorials
Technical Solutions
Coverage of Emerging Technology
And much more!

Macworld is the best way to stay on top of today's fast-changing Macintosh technology. And here's your chance to save big on a subscription, plus get the exclusive Macworld Clip Art CD-ROM containing an extensive collection of images, digital stock photos, and more — FREE with your paid order.

To get it all, go to http://subscribe.macworld.com
Welcome to the Developer Showcase

Macworld magazine offers this Developer Showcase advertising section to keep you, our valued reader, apprised of some of the hottest products available for your Mac. Due to the unparalleled popularity of Apple computer systems like the iMac, PowerBook G3 and PowerMac G4, more than ever before developers are releasing new Mac-compatible software and hardware products. Be sure to check this section each month where you’ll find a wide variety of innovative solutions that will make your Macintosh experience even more pleasurable! Contact Niki Stranz or Carol Johnstone at: (800) 597-1594

IF YOU’RE CHEWING UP HOURS SEARCHING FOR STOCK IMAGES ON THE WEB

Grab This

RANDOM EYE image grabber

THE FASTEST, SIMPLEST WAY TO SEARCH FOR IMAGES ON THE WEB

www.randomeye.com

Check out image grabber (free download) and wonder how you ever lived without it.
Protect Your PDA Investment

RhinoSkin offers the most protective line of hardcases, including the Aluminum Molded Hardcase (left) and Titanium Slider Hardcases for the Palm III and Palm V.

The Shock Suit Sportcase, with its EVA foam construction and two-piece detachable clip, offers a unique combination of protection and convenience.

RhinoSkin's line of RhinoPaks, including the RhinoPak 1100, offer a water-resistant outer Cordura layer, along with inner padding and designated storage for credit/business cards, cash, and receipts.

Draw looks in the boardroom, out in the field, and everywhere in between!

RhinoSkin, Inc.
970 W. Broadway #495
Jackson, WY 83001-9475

www.rhinoskin.com/mac

Our two-port MiniView™ USB allows two computers to share a monitor and four USB devices. Combine two PCs, two Macs or one of each! The MiniView™ USB is complimented with IOGEAR's patented Video Signal Enhancement technology, which provides ultra-high resolution. Use it with your mouse, keyboard, scanner... anything with USB!

Visit our website for more exciting connectivity products.

www.iogear.com/macworld
**Lind Air/Auto Power Adapters for PowerBooks**

- Design Excellence!
- Safety Certified!
- Rugged!

**Simply the Right Choice!**

Lind Electronics, Inc.
6414 Cambridge St.
Minneapolis, MN 55426

To order:
Call: 800-897-8994
or order online at:
www.lindelectronics.com

---

**Can uConnect™ to your iMac?**

UNIVERSAL Mac & PC connectors

uConnect

ALL IN ONE
3 uConnects + extra USB port

(877) 381-1400
www.momentumus.com

---

**What did you sell today?**

- **Easy Flow Pens**
  - Date: 12/04/00
  - Time: 08:42pm
  - Units sold: 57
  - Units purchased: 350
  - Items in stock: 231
  - Shrinkage: 0
  - Store profit: $26.85
  - Auto reorder 10/07/01

- **Tape Dispensers**
  - Date: 12/04/00
  - Time: 08:32pm
  - Units sold: 63
  - Units purchase: 120
  - Items in stock: 82
  - Shrinkage: 3
  - Store profit:

POS•IM software gives you the power to succeed by providing you with:

- Inventory management
- Shrinkage control
- Customer tracking
- Enhanced margins

---

**$197 Laptop Word-Processor**

Weighs 2 Pounds. Up to 500 hours on 3 AA’s.
Text easily uploads directly into your open application on nearly any computer (Mac or PC)

---

**Type on This!**

www.smartinput.com • 1-800-366-8323

See why more than 3,500 retailers use POS•IM.
Call 800.409.7678, or visit http://www.ensign.com.
Add three 400Mbps FireWire ports and two USB ports to your Beige PowerBookG3 instantly.

- Transform your legacy Beige into a DV Mac.
- Works with SONY, Canon, Panasonic and JVC DVCAM.
- Works with FireWireHD Cable Power is available for Logic and VST portable drives (C83/Pismo).
- Low price US$179.00 and 5-year warranty.

C83 I Pismo/ C832PB - SCS solution for your favorite SCSI device and PowerBookG3(Pismo).
- Works with 10MB/S (C83/Pismo) and 40MB/sec (C832PB).
- Works with MacOS9.0, MacOS9.0 and MacOS8.
- Supports Sleep-Wakeup function.
- Comes with High-Density 68-pin cable and High-Density 50-pin cable (C83/Pismo).
- Low price US$219.00 (C83/Pismo), US$270.00 (C832PB) and 5-year warranty.

URL http://www.ratocsystems.com
e-mail int-support@rexpccard.co.jp

KEYBOARDS ------ and a whole lot more!!

Visit us at Macworld Expo Booth 875
Visit us at www.adessoinc.com

RATOC Systems, International
1933 O'Toole Avenue Suite A109 San Jose, CA 95131
Phone: 408-965-9409 FAX: 408-965-9402

Visit us at www.adessoinc.com

ADESCO Input Specialists

- SCAN ANYWHERE
- WEIGHS ONLY 1 LB.
- INCLUDES SOFTWARE
- RECHARGEABLE BATTERY

Visit us at Macworld Expo Booth 875
Visit us at www.adessoinc.com

Scan - LE

TRUFORM™

USB Hub - 2.0
Our goal is to increase customers' efficiency and profitability.

For a Trial Version visit us at: www.getmyob.com or call 1-800-322-6962 (MYOB)

---

BookEndz® Docking Stations for PowerBook's

Convert your PowerBook to a desktop system (or back) in seconds!

- Models for 2000 and 1999 PowerBook's
- No more file synchronization problems
- Attach your peripherals once
- Dock or undock in 2 seconds
- No more damaged connectors
- Supports all rear ports
- No assembly required
- Eliminates cable confusion
- Lighted power/docked indicator
- Insert or remove PC cards while docked
- Adds only 3" to rear of PB while docked
- Eliminates the need for a separate desktop computer
- Will not interfere w/ IR port, security slot, or media bays

www.pilot-tech.com

Pilot Technologies, Inc., Minneapolis MN
Tel: (952) 828-6002  Fax: (952) 828-6806
Email: info@pilot-tech.com
We welcome Reseller & Distributor inquiries

BookEndz is a registered trademark of Pilot Technologies, Inc. All other trademarks are the property of their respective owners.

Strat-O-Matic is bringing you baseball to your Mac... like nobody else!

This dynamite game is based upon the most realistic and statistically accurate baseball board game ever created -- The Strat-O-Matic Baseball Board Game. Here's your chance to replay some of the best seasons in baseball history. Every season since 1901 is available for purchase. Plus, you can play by yourself, against friends, or in a non-network league.

With Strat-O-Matic's new baseball game for Mac computers is compatible with 7.5 - 9 operating systems.

- Fantastic box scores and game stories
- Complete ability to manage your favorite team or to draft up fantasy teams
- Autoplay -- play through an entire season, or any portion of it automatically
- Manage just one team or manage them all
- Automated drafting and trading abilities
- An incredible statistical package
- An encyclopedic which stores your season replays
- And of course the magical 1989 season

1-800-645-3455 or (516) 671-6566
Ask for Dept. 5X

Internet: http://www.strat-o-matic.com
Ask for Dept. 5X

Strat-O-Matic Game Company, 42 Railroad Ave., Glen Head, NY 11545
What every RAD tool wants to be when it grows up

Omnis Studio is the most powerful and flexible RAD tool available for the Mac.

Omnis Studio allows you to develop on your favorite platform and deploy your solution wherever your customer needs it: Mac, Win 95/98/NT or Linux. In addition, you can call your data from Oracle, DB2, Informix, Sybase or a number of other ODBC compliant databases. Omnis Studio means you can develop where you want, deploy where you want, data store where you want.

Omnis Studio is also a powerful tool for deploying data driven solutions to the web (internet or intranet) without using Java or HTML and in a fraction of the time it might otherwise take.

Continuously being updated to reflect your needs and the latest OSs available, including OSX, and costing just $149 for the complete product, there's never been a better time to take advantage of all the functionality that Omnis Studio has to offer. Make the mature choice: call us today on 1-800 34 OMNIS or check it out on www.omnis.net.

OMNIS
www.omnis.net

Meet the future of programming

- Open source runtime
- Full access to the Mac toolbox
- PPC/68K compiles
- Access to shared libraries

www.stazsoftware.com · 800.348.2623
The ultimate styling tool for Internet, Print and Video.

You just won't believe your eyes!
The new TypeStyler is a powerhouse of spectacular special effects, yet retains the friendly ease of use that made the original TypeStyler so popular.

TypeStyler is the graphic designer's backroom secret weapon. Create dazzling web graphics, headlines, ads, signs, posters, video titles and more in minutes, instead of hours!

TypeStyler is a complete stand-alone design, layout, and effects program yet also works seamlessly with Photoshop, Illustrator, GoLive, XPess, PageMaker, InDesign, FreeHand, FireWorks, and more.

- Includes style and shape libraries, design templates & 110 of the world's coolest fonts.
- Always editable - text, shape & style - makes changes & design reuse a snap.
- Unlimited text shaping -- circles, arcs, distortions -- any shape you can imagine.
- Integrated path editing tools to create virtually any logo or custom design.
- Create buttons, banners, image maps and awesomely flashy links for the Web.
- Expert vs Photoshop layers, Illustrator, GIF, PICT with alpha, EPS, & more.

To order, call 906-863-7798 or visit us at: www.typestyler.com

Check Color Trapping on Your Epson Color Printer

PowerRIP 2000
Shows Illustrator 8.0 Overprinting

Other PostScript RIPs
Don't Show Illustrator 8.0 Overprinting

PowerRIP 2000™
• See your color traps with the ability to combine separations
• Save time and money—make your own color corrected pre-press proofs
• Control spot color output
• Includes 1200 ICC profiles for Epson and PressProof papers
• Includes SWOP, FOGRA, Toyo and Japan S profiles
• Accepts user defined ICCs
• Network printing for all clients on your network
• Drives all Epson inkjet printers
• A true prepress PostScript RIP

Available at MacWarehouse or directly through iProof Systems
321-254-4401  •  Fax 321-254-6899  •  www.iproofsystems.com

ONADIME COMPOSER
Revolutionary multimedia: responsive, realtime visual programming.
Macworld NY July 2000
www.onadime.com

Every color painted by music: live, CDs, MP3s, tapes

Something Wicked This Way Comes...

The Future of 3D Animation is Here!
CINEMA 4D XL Version 6
Fully Integrated 3D Modeling, Animation, Rendering

Download a Free Demo Version Today and You Could Win a Full Version!
www.maxoncomputer.com
CONVERT YOUR IDE DRIVE TO AN EXTERNAL FIREWIRE® DRIVE FOR LESS

Digital video production is the hottest thing to hit the personal computer, but storing data-intensive DV files can burn up hard drive space. With the Pyro FireWire®/1394 Drive kit, convert any IDE hard drive to an external FireWire® drive simply by installing it into the enclosure. Plug and Play, Hot Swappable, Stackable, and Chainable FireWire® storage at a price that won't incinerate your wallet. Also available with Pyro 1394 PCI host card for non-FireWire® enabled G3's.

Available at: J&R, Mac Connection, Macwarehouse, CDW...and more!

Cerritos, CA 800.888.5244
www.ads-tech.com

Introducing ECLIPSE from BELLSTOR, the first simple high-performance storage solution. Featuring the highspeed FireWire interface, the BellStor Eclipse is available in Hard Disk, Tape and CD-RW models.

• Data transfer rates up to 400 Mbps
• Simple Plug & Play installation
• Hot-Pluggable
• Auto-configuring
• No device ID's or termination

www.bellstor.com • (800) 800-1513
PRODUCT INDEX

Category                              Page No.
Business Operations                    159
  Bar Code                              159
  Inventory Management                   159
ISP                                    160-161
  Web Hosting                           160
USB                                    161-163
  Education/Entertainment                163-164
  Discount Software                     164
Peripheral Products                    164-165
  Cables                                164
  CD Rom                                164
  Digital Media                         164
  Magnetic Media                        164
  Printing Supplies                     165
Digital Advertising Coordinator:      
  Alan Anzalone... 415.243.3511
  Production@macworld.com

Category                              Page No.
Systems & Peripherals                  165-172
  Memory & Upgrades                     165-173
  Services                              165-175
  Data Recovery                         165-175
  Digital Production                    165-175
  Printing                              165-175
  Repair                                165-175
Classifieds                            175

Account Manager:                      
  Carol Johnstone......... 415.243.3691
  carol_johnstone@macworld.com

Account Manager:                      
  Niki Stranz..... 415.243.3664
  niki_stranz@macworld.com

Assistant and Classifieds Rep:         
  Franck Zamora..... 415.243.3628
  f_zamora@macworld.com

POINT OF SALE • INVENTORY CONTROL

Software & Hardware for:
  • Retail/Wholesale
  • Mail Order
  • Internet Commerce
  • Rentals
  • Service/Repair
  • Manufacturing
  • FileMaker Tools
  • Now iMac compatible
  • Fully Integrated Accounting
  • Multi-Site Polling • Cross Platform
  • Barcode Readers • Receipt Printers
  • Cash Drawers • Mag Stripe
  • Ribbons/Paper/Labels
  • Credit Card Authorization
  • Deposit Software

www.posdirect.com
(800) 622-7670 • sales@posdirect.com
(618) 985-8237 vox • (618) 985-3014 fax

Macworld.com
No one knows the Mac world like
Macworld
online

Want to Print
Bar Code
Labels?

maclabel.com

Call Us Toll Free 800-345-4220
Broadsed Selection of Bar Code Products in the Industry
  • Technically superior products
  • Direct from the manufacturer
  • Toll free technical and pre-sale support
  • 24-hour turnaround on repairs
  • Free UPS Basic shipping in U.S.
  • 30-day money back guarantee

www.BarCodeHQ.com
for a complete catalog and bar code primer

or visit our website of www.BarCodeHQ.com

Bar Code Solutions
UPC/EAN/ISBN
Code 39
Code 128
Interleaved 2 of 5
POSTNET/FIM
And more!

Visit us online at:
www.bearrock.com

Bear Rock Offers:
Free Expert Consultation,
Lifetime Technical Support
and Satisfaction Guaranteed on ALL Bar Coding products!

FREE Handbook
"Bar Code Basics"
A User's Guide to Bar Coding

Call Today for a FREE Consultation!
800 232-7625
Intl: (530) 672-0244 Fax: (530) 672-1103

160 on card or www.macworld.com/getinfo
We got Websites.

The #1 experts in Windows® 2000 and UNIX hosting.

Everyday more companies around the world trust their Websites to Interland. Interland is a true Web solutions provider offering everything from site design and hosting to secure e-commerce solutions and advanced application services. With your first call, you’ll see the Interland difference when you are assigned your own personal Account Manager who will help you decide on the solution that’s right for your business. PC Magazine and Windows NT magazine rated Interland #1. Call today and find out why.

starting at

$19.95

Hosting solutions include:

@ 150MB of Website storage
@ 10 GB Transfer
@ Unlimited e-mail accounts for your Website (POP3, SMTP, aliases, auto responders, and forwarding)
@ 30-day unconditional money-back guarantee
@ Toll-free 24/7 technical support
@ Browser-based control of your Website and e-mail
@ Browser-based statistics and reporting tool
@ Windows® NT and UNIX Web servers
@ Database support for MS Access, MS SQL 6.5/7.0, mSQL, FoxPro, and more
@ Active Server Pages, PHP, Cold Fusion®, Microsoft® FrontPage®, Microsoft® Office 2000, Microsoft® Commerce Server, SSL Security, PGP encryption, CGI-bin and more
@ Dedicated Web server solutions available
@ Aggressive Reseller Program

Best support and pricing in the industry.

Call Today 800.845.0684 www.interland.com • 404.586.9999 • sales@interland.com

©2000 Interland, Inc. All Rights Reserved. *Excludes set-up fee.

Circle 10 on card or www.macworld.com/getinfo
When things get rough, a good host thinks of everything.

Trust NetNation to keep your Web presence afloat.
Macally is proud to bring you the latest USB and FireWire peripherals for Mac users. Our full line of products are specifically designed for your Mac to improve your productivity. Please visit our website to see what Macally has to offer for all your peripheral needs. We work hard to provide you with the best peripherals for your Mac.

Call us for dealers near you 1-800-644-1132 or visit us at: www.macally.com

All trademark or registered trademarks are the property of their respective owners.
Add High Speed FireWire to your Mac, PC or Laptop

Keyspan FireWire Cards
- PCI: Add 3 FireWire ports to your Mac or PC ($89)
- CardBus: Add FireWire to Your Laptop ($139)
- Works with Sony, Canon and other DV camcorders
- Includes QuickTime Pro & FireWire Cable

USB Twin Serial Adapter
- Add 2 Mac serial ports to your USB Mac ($79)
- Use with tablets, modems, cameras & many printers
- Two ports for the price of the single port solutions!

USB PDA Adapter
- Connect Palm organizers to your USB Mac or Win98 PC ($39)
- USB remote control for PowerPoint, DVD, CD, & MP3 software players ($79)

USB - Parallel Printer Adapter ($39)
- USB 4-Port Hub ($39)
- 2-Port PCI USB Card ($39)

www.keyspan.com
(510) 222-0131

STUDENTS!
Save up to 75% OFF popular software!

ACADEMIC DISCOUNTS on CREATIVE DIGITAL TOOLS

THOUSANDS OF TITLES AVAILABLE!
FREE CATALOG!
Serving students & schools since 1990
1-800-874-9001
JourneyEd.com

PRICING & INFORMATION:
www.creationengine.com
800.431.8773

153 on card or www.macworld.com/getinfo
174 on card or www.macworld.com/getinfo

www.musitek.com
www.smartcore.com

Macworld
Discount Software Education/Entertainment
**Savings for Students & Teachers**

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash 4</td>
<td>$99</td>
</tr>
<tr>
<td>Dreamweaver 3 Studio</td>
<td>$149</td>
</tr>
<tr>
<td>CodeWarrior Pro R5</td>
<td>$119</td>
</tr>
<tr>
<td>Final Draft 5.0</td>
<td>$149</td>
</tr>
</tbody>
</table>

**ACADEMIC DISCOUNTS**

**Super Savings for Students, Teachers, & Schools!**

Just a Click Away Everyday Low Prices!

Macromedia Internet Studio
Dreamweaver 3 & Fireworks 3
Now low price $144

New release: Lightwave 6
The latest from Noviski is only $789
now shipping at a special low price!

- Teckla C.
  College Student (Soon to be Teacher)

Monthly Specials
Macromedia
Flash 9.0 and Flash 4 “Bundle”
now just... $144

**ACADEMIC SUPERSTORE**

**FREE TECHNICAL SUPPORT!!!**

Available to everyone, customer or not.
FIREFIRE PRODUCTS
At Blazing Discounts
A Complete Line of FireWire
1394 Products At Great Prices!

PCI UPGRADE CARDS
• Orange Micro
• Raicce
• Digital Origin
• Pinnacle
• ADS
• PowerLogic

CDR/CDRW DRIVES
• ClubMac
• QPS
• LaCie
• Sony

PRINTERS
• Epson

SCANNERS
• Epson

HARD DRIVES
• ClubMac
• VST
• LaCie
• Fujitsu

CAMCORDERS
• Canon

Visit Us At
1394FireStation.com

SHOPPER
Are you a student or a teacher? Great discounts on this page!

Learn AppleScript

biomorph
interactive desk

catalog 888-302-DESK

Visit Us At
1394FireStation.com

MacMart
Systems & Peripherals
LIFETIME MEMORY WARRANTY
PC100 SDRAM 64 MB ... 128 MB $49 ... $89
PC100 SDRAM 256 MB ... 512 MB $189 ... $249
SD-DIMMS 64 MB ... 128 MB LP $49 ... $89
SD-DIMMS 256 MB ... 512 MB LP $195 ... $249
72 PIN SDIMMS 32 MB ... 64MB $75 ... $120
168 PIN SDIMMS 32MB ... 64MB $65 ... $125

GUARANTEED LOW PRICES
On Over 10,000 New Mac Products
www.macmart.com

POWERMACS
G4/400 64 MEG - 10GB-DVD-56K $1499
G4/450 128-20GB-DVD-ZIP-56K $2345
G4/500 256-27GB-DVD-RAM-ZIP $3249

SYSTEM BUNDLE SPECIALS
G4/400 64-10GB-DVD-56K Tomerza Zip & SCSI Card 
$1625
G4/400 128-20GB-DVD-56K $1799

POWERBOOKS
G4/400 26GB-DVD-56K $2775
Zip, SCSI Card, Adobe Photoshop 5.5
G4/400 128-20GB-DVD-56K-ZIP $2949

REFURBISHED SYSTEMS
G3/400/406 512MB - 16GB-DVD-56K - $1399
Powerbook G3/333-32-6GB-56K $1299
Powerbook G4/450/1GB-16-13GB-CM $1299
Powerbook G4/500/2GB-16-13GB-CM $1299

SPECIALS & SECURE ONLINE ORDERING
www.MACMART.com

Aeron Chair
800-883-9697
www.sittingmachine.com

Visit Us At
1394FireStation.com

60 on card or www.macworld.com/getinfo

161 on card or www.macworld.com/getinfo

Order Toll Free in the USA
1-800-600-2708

11500 Erwin St. Suite 4022 • Van Nuys, CA. 91411

SHAPER
Are you a student or a teacher? Great discounts on this page!

Learn AppleScript

biomorph
interactive desk

catalog 888-302-DESK

Visit Us At
1394FireStation.com

167 on card or www.macworld.com/getinfo

163 on card or www.macworld.com/getinfo
LaCie CDR/CDRW Blowout!
External, Includes Toast Software, SCSI Cable and Manuals!
2x2x6 CDR: $119
4x2x6 CDR: $149
2x2x6x CDRW: $189
4x2x8x CDRW: $219
Only $499!

Norton Version 6.0 Only
AntiVirus
$29

Parts, Parts, Parts!
PowerMac Logic Boards Start @ Only $29!
PowerBook Logic Boards Start @ Only $49!
PowerBook Color LCD Screens Start @ Only $99!
PowerMac Power Supplies Start @ Only $79!

We Stock PARTS! If we don’t have it, we can source it for you. Just call or email to
sales@macresq.com

Resellers: Call For Discounts!
www.MacResQ.com, 925-689-9488
Toll Free 1-888-447-3728

Mac of All Trades takes the fear out of buying and selling used equipment.

Refurbished and tested
Mac-savy advisors

Best Prices
800.304.4639
Direct : 404.355.5144
Cust. Service : 404.355.5668
Fax : 404.355.5461
500 Bishop Street, Suite E3
Atlanta, Georgia 30318
macofalltrades.com

Not online? No problem! Call (888) 466-2271

Call for Specials! (CPU plus 13/14 monitor, kb/m) 1 gig Internal HD 7200 RPM $699

Not online? No problem! Call (888) 466-2271

Mac of All Trades is your complete used Mac Resource!
WE BUY MACS & MAC STUFF (318) 424-9791
WE STOCK MAC PARTS!
1-800-227-3971
FAX (318) 424-9771 • Technical Support (318) 424-7937
Customer Service (318) 424-9791 • Purchasing/Information (318) 424-9791
1200 Marshall Street • Shreveport, Louisiana 71101

FLOPPY DRIVE BLOWOUT!
NEW 1.44 SuperDrives
STARTING AT $29!

HP Deskjet 890
ONLY $249
PowerJet 5300cs
• Supports ext. video
• 24MB RAM
• 750 Hard Drive
• 100-MHz 603e
• Dual-scan color
• Refurbished
SEE OUR WWW SITE FOR OUR INTERNET SPECIAL!
MacintoshLC580
Internet Ready! $249
• 33-MHz MC68LC040
• 8MB of RAM
• 800MB Hard Drive
• 28.8 Motorola Modem
$299 with internal 4XCD
Color LaserWriter 12/600PS
• 600-dpi
• 12 ppm
• Color Photograde
• LocalTalk, Ethernet
• Mac, DOS, Unix or Windows
• Toner included
NEW! Refurbished...
PowerMac 6100
Bundle
• Includes 13” Monitor
• 24 MB RAM
• 250 MB Hard Drive
• 2X CD
ONLy $249
FREE ClarisWorks 3.0!
Macally Extended Keyboard
PowerComputing 17” Monitor
ONLY $169!
Voxcon 14” and 15” Monitors
NEW! AS LOW AS $99!

System Bundles SALE!

PRINTERS
MAYER LOGIC LOGIC BOARD
MONITORS
NUBUSB ADAPTERS
Apple 11x17 Color Inkjet Printer NEW, #9500...
O$249. G3 logic board, No Processor, No ROM...
$999.
HP Deskjet 890 CM, NEW...
O$249.
7200/90 logic board, refurbished...
$179.
Apple StyleWriter 1200, refurbished...
O$199.
Apple StyleWriter 1500, factory refurbished...
$329.
Apple StyleWriter 2400, refurbished...
O$399.
LC logic board, refurbished...
$499.
LaserWriter Lint, refurbished w/ Toner...
O$199.
Mac LCII logic board, refurbished, exchange...
$149.
LaserWriter Lf 465MB RAM, refurbished...
O$549. Performa 630, No Processor, refurbished...
$79.
LaserWriter Lf 465MB RAM, refurbished...
O$549. Performa 630, No Processor, refurbished...
$79.
Texas Instruments Micro Laser Pro NEW...
$499.
5000 logic board, exchange...
$549.

Laser Toners Cartridges Sold Separately
Quadra 950 logic board, refurbished...
O$499.

ClarisWorks 4 Internet Edition
NEW!
NEW!
$39!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
NEW!
Check Out Our Complete Inventory Online

**SuperMac S900**
Build it YOUR way!

**SuperMac G600**
16/16/16 GCD

---

**Apple G4-** $1489
**Iomega** Software Specials
**SquirtXoress 4** $649
**1.0GB Jaz** $75
**4GJ/266 DT/MT-SCSW**
**toppy! Ser** $989
**G4/4fl()I450**
**1500MHZ** $1489

**Apple MacOS**
**7.6/8/8.1/8.5**
**19** $69/59/69/89
**100MB Zip** $10
**Act V2 .8/Acrobat V3/V4** $129/$99/$189

**Syquest Anti-Virus 5/SAM V4**
**Apple Utilities**
**$49/29**
**JAlJZIP, Hard DR. & CDR**
**44 MB/88M B** $25/35

**Claris EMailer/ORAW/Ca len dar Maker** $69 ea.
**BryceJ0/4/30 Suites** $99/125/379
**4DDM811GB/2G8/3G8** $99/$159/$189

---

**Corel DRAW 9/ WordPerfect V3.5** $329/$75
**Manager Software Speclals**
**M.D. Cart.*UMAX Powerloo**
**3oooDirector V5/Studio/6/Studio** $199/389/489/589
**128/23DMB** $8/12
**OeBabe lizer V3/ Da nt z Retrospec t 4.1** $199/99

---

**Extensis MaskPro2/PortFolio** $199/109
**Extensis Preflight Pro/ PhotoGraphics** $269/99

---

**640/650MB** $29/$34
**Extensis PhotoToo3/0XTool4** $129/129

---

**Epson 5000 Color Printer**
**2.6/4.6GB** $149/$189

---

**Final Cut Pro/flightChek/Upg.** $949/$355/85
**Color Proof ~**

---

**Flash 4/ Free hand 8/ DreamWeaver2** $249 ea.
**Jaz ext. Dr. 1GB/2GB** $199/$339

---

**Media Cre anerPro4/0u**
**a**
**arkXpress4** $389/649
**JAZ+ZIP $289**

---

**Microsoft Offlce4.2.1/97Pro .** $149/$199

---

**OMeget, Antivirus Bundl e $79 both Tape Ext . Drive ~:~:~:~MB**

---

**PDFX BatchMaker $199/299**
**PainterJ/41515.5/ fro ni Page $69/99/149/229/99
**SDT2000/400015000** $199/$499/$999

---

**SONY650MB11.3GB**
**Persuasion V3N4 PowerPoln198** $99/189/189

---

**Premiere LE/V3/V4/Pholo01ux** $89!189/289/25
**Super RAID- Quantum/Seagate**
**5.2GB SCSI** $779

---

**Illustrator V5.5/6/7/Firewo rks V2** $89/189/159

---

**Kai’s PowerToo l LEN3/V5** $29/69/95
**COMBO Drives: Monitor** $589

---

**Media CenterPro4/0u**
**a**
**arkXpress4** $389/649
**JAZ+ZIP $289**

---

**PC133 • $75/119**

---

**OMega 1.0GB Jaz $75**
**100MB Zip $18**

---

**iMac, G3, 64**
**PowerBooks**

---

**Everything Mac!**

---

**Radio Post dr.**
**199 on card or www.macworld.com/getinfo**

---

**Digital Prepress Systems PrepressBuy Line**
(714) 892-5290
Fax: (714) 892-4361
www.prepressystems.com
e-mail: prepress77@hotmail.com

---

**www.macworld.com/ getinfo**
CALL THE MAC EXPERTS!

Your one-stop source for everything Macintosh—over 30,000 items on sale at better than mail order prices! It's pretty simple: we know a lot about Mac stuff, and we care about our customers.

Software Specials
- Norton Antivirus 5.0 CD
- Norton Utilities 5.0 CD
- PowerTalk option for SL/We
- Norton Antivirus 5.0 CD
- Envelope Cassette for SL 6500
- Sheet Feeder for SL 6500
- Apple FileWrie

Hardware Specials
- Apple Open Box Discounts
- Ethernet Card for LC
- Prodigioante Kit for SL/We
- Print Cartr. for SL/We
- Norton Antivirus 5.0 CD
- Office 98 DEM CD
- New Canon ZR10/50
- Canon Elura
- Sony Muveca

We've made large purchases and taken in hundreds of trade-ins, and now we're clearing them out in one big blowout blast! Give one of our Mac experts a call and make your best deal!

See our web site for complete descriptions and the latest configurations!

Why PowerMax is Special
- Over 30,000 separate software and hardware items at nationally competitive prices.
- Only pleasant, intelligent people work for PowerMax. Sometimes we may have a little too much fun, but we're great people to get to know if you're ever in a Mac world.

Hard Drives, Printers, Displays & More
- Internal 8mm modem for 8-64-3 G3
- Legato CardBus Mouse
- Gravis Firebird ADB Joystick
- PowerTalk option for SL/We
- Internal 800 Mb Apple Drive
- Newer UDF Ice Blue USB Floppy
- Used 17" Apple Trinitron Display
- Used 20" Apple Trinitron Display
- GPS DVD RAM Firewire Drive
- Special on Airport Bases & Cards
- Norton Antivirus 6.0 CD
- *All with warranties
- *Great price/performance ratios

Free! 20 GB Drives with every CDI drive purchased—see our incredible variety of external drives at www.powermax.com!

Canon Printer Bundle
We make it simple for our customers. Buy any G4 and receive a Canon color USB printer FREE!

Xerox NC60 Color Laser Printer Sale—Possibly the best price you ever see on a color laser printer!

PowerMax 17" 720" Trinitron Display 5-year warranty.$1680

800-613-2072

Graphite G4s
DV iMacs™
iBooks™
PowerBooks®
Blue & White G3's
Beige G3's
Software

APPLEMUGSTORE.COM

MAC YET ANOTHER GOOD REASON TO JOIN A MAC USER'S GROUP

Macintosh User Group members enjoy access to a very special Apple-sponsored web site featuring super deals on the latest Apple products as well as factory refurbished and discontinued Macs, and much more! Not a member? Find out how you can get these great deals by calling PowerMax at 800-689-8191.

www.applemugstore.com

The MUG Store. A cooperative venture between Apple and PowerMax to bring MUG members exclusive deals on the latest Mac® products and special offers on discontinued and "factory refurbished computers."

PowerMax is a division of Computer Stores NW, Corvallis, OR.
### Systems & Peripherals

#### PowerMacs
- G4/300 256/27GB/Zip $2295
- G4/400 320/32GB/Zip $2345
- G4/500 128/20GB/Zip $2800
- G4/800 256/40GB/Zip $3345
- G4/900 320/40GB/Zip $3995
- G4/1100 512/40GB/Zip $5000
- G5/500 128/20GB/56K $1499
- G5/600 256/40GB/56K $2295
- G5/700 512/40GB/56K $3345
- G5/900 1024/80GB/56K $5995

#### PowerBooks
- G3/350 128/4GB/24X $1695
- G3/400 128/4GB/24X $1995
- G3/500 256/4GB/24X $2795
- G3/600 128/4GB/24X $3345
- G3/700 256/4GB/24X $3995
- G3/800 512/4GB/24X $5295
- G3/900 1024/8GB/24X $6995

#### IMAC
- G4/200 32/2GB/CD $995
- G4/300 64/6GB/DVD $1295
- G4/400 128/10GB/DVD $1549
- G4/500 256/20GB/DVD $3349

#### Printers
- LaserJet 4100 $2295
- LaserJet 4500 $2495
- LaserJet 5500 $2995
- LaserJet 5550 $3395

#### Monitors
- Apple Display 15" $399
- Apple Display 17" $499
- Apple Display 19" $599
- Apple Display 20" $699
- Apple Display 21" $989

#### Hard Drives
- 2GB 3.5" $69
- 4GB 3.5" $99
- 8GB 3.5" $199

#### PowerMac G3
- 266MHz/32MB 4GB/CD $1049
- 333MHz/64MB 6GB/CD $1179
- 400MHz/128MB 10GB/CD $1799
- 500MHz/256MB 16GB/CD $2995
- 600MHz/512MB 20GB/CD $4395

#### PowerBook G3
- 366MHz/32MB 2GB/CD $795
- 440MHz/64MB 4GB/CD $1179
- 500MHz/128MB 5GB/CD $1799
- 600MHz/256MB 8GB/CD $2995

---

**Save on Reconditioned Macs & Peripherals!**

**PowerMacs**
- iMac 1GHz/128MB/6GB $199
- iMac 1GHz/256MB/10GB $219
- iMac 1GHz/512MB/16GB $239

**PowerBooks**
- iBook G3 256/8/+/Zip $599
- iBook G3 256/8G/Zip $699

**Monitors**
- Apple Display 15" $129
- Apple Display 17" $169
- Apple Display 19" $199

**To Order Call**
- 1-800-281-3661 DataTech
- www.macworld.com/getinfo

---

**ICN has the largest inventory of Apple parts, USB & FireWire Peripherals.**

**Please call for prices by Ariston & VST**

- PowerMac 9500 $1095 150 MHz 16MB/2GB/CD
- PowerBook G3 $529 16MB/32MB/Dimm

---

**Memory Blowout!**

- 32MB-Dimm $59 16MB-Dimm $29
Compact
Hot Swappable
Fast Backup or Data Transfer
Adaptec Toast M Software
Protective MCE Carrying Case

ASK ABOUT OTHER CUSTOM CONFIGURATIONS & SOLUTIONS!

Apple PowerBook 2000
• 400MHz/1MB L2 cache
• 12GB Hard Drive
• 14.1" Display
• 64MB SDRAM
• 2 FireWire Ports
• 2 USB Ports
• DVD-ROM Drive
• AirPort Ready

$2599

Apple PowerBook 2000
• 500MHz/1MB L2 cache
• 18GB Hard Drive
• 14.1" Display
• 128MB SDRAM
• 2 FireWire Ports
• 2 USB Ports
• DVD-ROM Drive
• AirPort Ready

$3549

Apple iBook
• 366MHz/512KB L2 cache
• 12GB Hard Drive
• 12.1" Display
• 64MB SDRAM
• 1 USB Port
• 6 hour (max) battery
• 24X (max) CD-ROM

$1999

MobileStor
THE BEST Internal Hard Drive Upgrade Solutions for your PowerBook!
For use in PB 2110, 2100, 2100c Series, 22, 3300, 3400, 195, 195c, 8500.

MobileStor 6G
6.6GB $49

MobileStor 12G
12.6GB $99

MobileStor 18G
18.6GB $149

Included FREE in every MCE MobileStor hard drive upgrade solution is the complete MCE PowerBook Hard Drive Installation Kit which includes an illustrated installation manual, and all of the appropriate tools and backup media for the proper installation of your new MCE MobileStor hard drive kit.

CardBus Upgrade Service
for PB 2400 & 3400/63
Turn your PowerBook into a Video PowerHouse!

CardBus Upgrade Service
$349

Kritter USB Camera $119

Kritter SV Camera $139

RATOC Systems

CBFW2 FireWire CardBus PC Card $149

CB31PB Ultra SCSI CardBus PC Card $259

CardBus & iBook Memory Upgrades!!
See our web site for latest pricing!

Apple Computer

PowerBook 2400 $249

PowerBook G3 99/2000 $129

USB CDRW Drive $39

Kensington Notebook MicroSaver Security System $43

TARGUS USB Mobile Mini Mouse $29

iVoice USB Microphone $19

Expansion Bay Device Protective Case $19

USB Floppy Drive $99

MACWORLD August 2000 171
<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>RAM</th>
<th>Storage</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4/MT</td>
<td>233MHz</td>
<td>128MB</td>
<td>DVD</td>
<td>$999</td>
</tr>
<tr>
<td>G4/MT</td>
<td>350MHz</td>
<td>256MB</td>
<td>ZIP</td>
<td>$1399</td>
</tr>
<tr>
<td>G4/MT</td>
<td>400MHz</td>
<td>512MB</td>
<td></td>
<td>$1999</td>
</tr>
</tbody>
</table>

**Memory & Upgrades**

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>RAM</th>
<th>Storage</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4/MT</td>
<td>233MHz</td>
<td>128MB</td>
<td>DVD</td>
<td>$999</td>
</tr>
<tr>
<td>G4/MT</td>
<td>350MHz</td>
<td>256MB</td>
<td>ZIP</td>
<td>$1399</td>
</tr>
<tr>
<td>G4/MT</td>
<td>400MHz</td>
<td>512MB</td>
<td></td>
<td>$1999</td>
</tr>
</tbody>
</table>

**Call for all PowerBooks.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>RAM</th>
<th>Storage</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4/MT</td>
<td>233MHz</td>
<td>128MB</td>
<td>DVD</td>
<td>$999</td>
</tr>
<tr>
<td>G4/MT</td>
<td>350MHz</td>
<td>256MB</td>
<td>ZIP</td>
<td>$1399</td>
</tr>
<tr>
<td>G4/MT</td>
<td>400MHz</td>
<td>512MB</td>
<td></td>
<td>$1999</td>
</tr>
</tbody>
</table>

**Call for all other PowerBooks.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>RAM</th>
<th>Storage</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4/MT</td>
<td>233MHz</td>
<td>128MB</td>
<td>DVD</td>
<td>$999</td>
</tr>
<tr>
<td>G4/MT</td>
<td>350MHz</td>
<td>256MB</td>
<td>ZIP</td>
<td>$1399</td>
</tr>
<tr>
<td>G4/MT</td>
<td>400MHz</td>
<td>512MB</td>
<td></td>
<td>$1999</td>
</tr>
</tbody>
</table>

**Call for all other PowerBooks.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>RAM</th>
<th>Storage</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4/MT</td>
<td>233MHz</td>
<td>128MB</td>
<td>DVD</td>
<td>$999</td>
</tr>
<tr>
<td>G4/MT</td>
<td>350MHz</td>
<td>256MB</td>
<td>ZIP</td>
<td>$1399</td>
</tr>
<tr>
<td>G4/MT</td>
<td>400MHz</td>
<td>512MB</td>
<td></td>
<td>$1999</td>
</tr>
</tbody>
</table>

**Call for all other PowerBooks.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>RAM</th>
<th>Storage</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4/MT</td>
<td>233MHz</td>
<td>128MB</td>
<td>DVD</td>
<td>$999</td>
</tr>
<tr>
<td>G4/MT</td>
<td>350MHz</td>
<td>256MB</td>
<td>ZIP</td>
<td>$1399</td>
</tr>
<tr>
<td>G4/MT</td>
<td>400MHz</td>
<td>512MB</td>
<td></td>
<td>$1999</td>
</tr>
</tbody>
</table>

**Call for all other PowerBooks.**
MEMORY
The Best Memory Prices & Guarantee
800-662-7466
Secure online ordering: www.datamem.com
Lifetime Memory Replacement Guarantee
DMS will meet or beat anyone’s price!

MEMORY UPGRADES FOR
Computers • Printers
Notebooks • Digital Cameras
- Accelerators & CPU Upgrades
- Hard Drives & CD-ROM Drives
- Modems for Mac & PCs
- Monitors-Std. color to Pro Mods.
- UMAX Color Scanners
- EPSON Stylus Color Printers
- Networking Connection Prods.

MEMORY SPECIALISTS
- Printers
- Monitors
- Supplies
- Scanners
- Media
- Hard Drives
- Modems
- Software
- Accessories
- Cables/Adapters
- Mice/Input Devices
- Keyboards
- Network Products
- Hubs/NICS

Serving Mac User’s
Since 1991.
We sell only NEW,
Grade A Full
MFG Spec Ram
Low Prices &
Personalized Service

CD-ROM PRODUCTION
1000 Retail-Ready Stamped CDs
Includes two color discs, four color glossy insert & tray cards, jewel case, and poly wrap. Complete turnkey — just send a CD-R and art files! Call for details.

100 Duplicated CD-Rs in 24 Hours
Available with B/W or color labels. In your choice of stock packaging. Or add custom printed packaging (sleeves or inserts & tray cards) in only 2 days more!

We Also Offer:
- CD-R silk-screening service
- CD-R duplicators, blank CD-Rs and supplies through our online store at www.svcd.net

Call today: (800) 255-4020
or visit us online.

SO YOUR HARD DRIVE SPLIT AND TOOK ALL THE DATA WITH IT?
PROFESSIONAL DATA RECOVERY SERVICES.
HARD DRIVES, FLOPPY DRIVES, SYQUEST IOMEGA, ORB AND OPTICAL.
SAME-DAY SERVICE AVAILABLE. REASONABLE RATES.
VIRTUAL ALL OPERATING SYSTEMS, GUARANTEED RESULTS™.

800-743-0594
online quotes http://www.totalrecall.com

Be a rocket scientist!
Some people think upgrading your Mac is rocket science. Well, become a rocket scientist, then! Astound your PC-using friends and neighbors by just upgrading your own computer. It’s easy, and you can do it yourself. We’ll leave it up to you to tell them you had a little bit of help from us. After all, you did the actual work.

DELUXE COLOR PRINTING!
Our ultra thick, deluxe high gloss cards stand out from the rest! FREE SAMPLES Call Now!

SO YOUR HARD DRIVE SPLIT AND TOOK ALL THE DATA WITH IT?
PROFESSIONAL DATA RECOVERY SERVICES.
HARD DRIVES, FLOPPY DRIVES, SYQUEST IOMEGA, ORB AND OPTICAL.
SAME-DAY SERVICE AVAILABLE. REASONABLE RATES.
VIRTUAL ALL OPERATING SYSTEMS, GUARANTEED RESULTS™.

800-743-0594
online quotes http://www.totalrecall.com

Circle 199 on card or www.macworld.com/getinfo

Used Macs & PowerBooks
WANTED!
WE BUY USED MACS!
TOP $$$ PAID

Memory & Upgrades
Data Recovery • Digital Production • Printing Services

Used Macs & PowerBooks
WANTED!
WE BUY USED MACS!
TOP $$$ PAID

Memory & Upgrades
Data Recovery • Digital Production • Printing Services

Used Macs & PowerBooks
WANTED!
WE BUY USED MACS!
TOP $$$ PAID

Memory & Upgrades
Data Recovery • Digital Production • Printing Services

Used Macs & PowerBooks
WANTED!
WE BUY USED MACS!
TOP $$$ PAID

记忆 & 优化
数据恢复 • 数字生产 • 打印服务

Used Macs & PowerBooks
WANTED!
WE BUY USED MACS!
TOP $$$ PAID

Memory & Upgrades
Data Recovery • Digital Production • Printing Services

Used Macs & PowerBooks
WANTED!
WE BUY USED MACS!
TOP $$$ PAID

Memory & Upgrades
Data Recovery • Digital Production • Printing Services

Used Macs & PowerBooks
WANTED!
WE BUY USED MACS!
TOP $$$ PAID

Memory & Upgrades
Data Recovery • Digital Production • Printing Services
WHOLESALE WATERLESS COLOR PRINTING
FROM YOUR COMPUTER FILES

1000 FULL COLOR BUSINESS CARDS FOR $100
Sup. retail price $179

1000 FULL COLOR POSTCARDS FOR $149
Sup. retail price $249

Printed waterless at 300 line screen from your computer files on Super Premium 10pt. Kromekote with our FREE scratch-resistant aqueous coating.

FEATURING 300 LINE SCREEN WATERLESS OFFSET PRINTING

Rates for Brochures, Booklets and Flat Sheets are also available.

4-COLOR WATERLESS SPECIAL

1,000 24" x 36" POSTERS
24" x 36" 4-Color Posters printed 4/0 from your computer files at 300 line screen on 100 lb. Gloss Text. Price includes full bleed and FREE aqueous coating. Get 2,000 for only $1,999

SUGGESTED RETAIL $2,294

Digital Imaging

Slides & Negatives
4x5 Transparencies/Negs $3.75
Large Posters & Displays
48" x 36" $45
Scanning: Hi & Lo Res
Kodak Photo-CD Scans
Short Run Color Printing
Show & Tell

www.show-tell.net
212 840-2912 212-840-7953 (fax)
shootel@ibm.net • shootel@aol.com

www.mcrecovery.com

When you absolutely, positively have to get your data back...
• 24hr. Emergency Data Recovery
• Worldwide Services

G3/IMac
Desks, Parts
In Stock!

Logic Boards:

$199
IMac G3 Logic Board
From $199

G3 MiniTower from $999
G3 400Mhz Zif CPU $299
Apple 2gb Scsi HD $99
Apple 24x CD Rom $99

Power Computing Specialists
To See Daily Specials Go To
www.AllMac.com

2202 N. First Street San Jose, CA 95131 • 800 933-4962
Repair • Upgrade • Buy • Sell • Trade New • Used • Refurbished
7 good reasons to choose DriveSavers:

1. Fastest, most successful data recovery service available.
2. Recommended and certified by all drive companies to open the drive and maintain the warranty.
3. Advanced, proprietary recovery techniques.
4. 24-hour, onsite, and weekend service available.
5. Retrieve recovered data instantly with DATAEXPRESS™ over secured Internet lines.
6. Featured in MacWorld, Mac Addict, MacWeek, Popular Mechanics; also by CNN, BBC, Forbes, and many others.
7. Federal and State Contracts.

“Data Recovery: 800-440-1904

For Mac - (Hard Drives, Opticals, Removables)

Free evaluations. All recoveries are 100% satisfaction guaranteed. Complicated / top priority projects are our specialty.

1-800-563-1167

Datarec.com

Data Recovery Labs
USA • Canada • Japan

Datarec.com
The Dawn of a New Error

What Do Apple's Error Messages Have Against Pronouns, Anyway?

Upon marrying a surgeon, I discovered a surprising characteristic of doctors: When writing professionally, they write exclusively in passive voice: "The patient was examined," not "I examined the patient"; "The wound was cleaned and dressed," not "We cleaned and dressed the wound"; "A folder cannot be replaced by a file"; and so on. It's as though 12 years of English class had never happened.

Imagine, then, the sense of irony I feel on realizing that exactly the same phenomenon haunts my other marriage—to the Mac. The otherwise elegant Mac OS is one giant, seething mass of awkward, passive-voice messages: "The document could not be printed;" "A folder cannot be replaced by a file;" and the immortal "The command could not be completed, because it could not be found."

Apple's problem: It's afraid to use pronouns. It doesn't want the computer, an inanimate object, to call itself "me" and you "you." Maybe avoiding "I" and "me" is Apple's way of ducking blame; maybe the programmers think that if they write "AppleTalk could not be opened" instead of "I couldn't open it," it won't occur to us that the computer caused its own problem.

Apple's writers twist themselves into knots trying to avoid pronouns, but there's simply no elegant way to do it. Sometimes they give up and just omit the I-word, resulting in a crude shorthand: "Could not update the settings." Unfortunately for them, God put pronouns on this earth for a reason; trying to write error messages that never refer to either you or the computer is like trying to write a novel without ever using the letter e.

It doesn't have to be this way. Plenty of error messages in other programs include pronouns with great success, and even manage to be entertaining. The C Compiler in MPW (a Macintosh programming tool kit) gives you messages like this: "You can't modify a constant, float upstream, win an argument with the IRS, or satisfy this compiler." Or this: "Type in (cast) must be scalar; ANSI 3.3.4, page 39, lines 10-11. (I know you don't care, I'm just trying to annoy you.)"

Whoever wrote Eudora has a similar sense of humor. Its famous error messages include "That pesky MacTCP is acting up again" and "Memory is tight—Live Dangerously." Now, honestly, wouldn't you like the Mac OS a lot better if it exhibited that much personality? Not only would you not mind having encountered a glitch, you'd actually kind of like it.

Oh, all right, I know hell will freeze over before Apple writes funny error messages into the Mac OS. And Apple certainly does better than Microsoft, whose error messages sometimes lie outright. (Double-click on the CD-ROM icon when you don't have a disk inserted, and you're told that "The device is not ready.")

But I know a way Apple could fix its error-message problem without soiling its shiny corporate shoes: adopt an error-message philosophy like that of Citibank. It's worth standing behind a total stranger at a Citibank cash machine just to read the messages, which sound like a particularly worshipful butler. "Hello—how may I serve you?" it says when you first sign in. When you sign off, it says, "Thank you. It's always a pleasure to serve you." And if you get your password wrong, it takes the blame: "I'm sorry, I don't recognize that password"—not "That's not the right password, you idiot!"

Well, we know it's just an inanimate piece of software—but darn it, you walk away from that cash machine with a spring in your step. You feel good about yourself, having given that little machine a chance to take pride in a job well done. Apple thinks people love their Macs now? If it introduced pronouns and a little bit of humility into its error messages, people would not just love their Macs—they'd prostrate themselves in a religious frenzy.

Only one solution would make a better fit with Apple's artistic sensibility: to write all error messages in haiku. In 1996, Salon.com's contest to write haiku error messages showed us just how much better the world would be if error messages went along the lines of this one by reader David Dixon:

Three things are certain:
Death, taxes, and lost data.
Guess which has occurred.

BAD THINGS HAPPEN WHEN THE COLOR IS WRONG

The XANTÉ® ColourLaser™ gives you oversized printing capabilities up to 13’ x 19’ (330mm x 483mm), and spot-on matches for all your color printing jobs using XANTÉ’s TrueColour Calibration.

ColourMatch software* lets you dial in even the most subtle color variations to create in-house proofs that match the actual press run, shade for shade, nuance for nuance.

It’s all in the box: true Adobe® PostScript® 3™, PhotoQuality Color, and more.

The ColourLaser from XANTÉ—a whole new palette of creative possibilities.

*S*Standard on the ColourLaser Professional Model.

SAVE UP TO $700 IF YOU PURCHASE BY AUGUST 31, 2000

© 2000 XANTE CORPORATION. XANTE and XANTÉ ColourLaser are trademarks or registered trademarks of XANTE CORPORATION. Adobe, PostScript, PostScript 3, and the PostScript logo are trademarks or registered trademarks of Adobe Systems, Incorporated. Other brands and product names are trademarks or registered trademarks of their respective holders. XANTE CORPORATION, Post Office Box 14506, Mobile, AL 36616, tel: 334-473-6500, fax: 334-473-6503.
Dang. Forgot the racing stripes.

But that's about it, in terms of souped-up, sports-car qualities. Introducing TurboRing, the world's first trackball with patented Scroll Ring technology and three programmable buttons. Now, you can blast through long documents. And whiz through Web pages. All in sheer, ergonomic bliss. The idea of comfort and handling at high speeds is coming to a whole new Autobahn. Your desktop. For more information, visit www.turboring.com. And please, buckle up.