If you're using Microsoft® Excel or Word, it's now possible for your entire department to work together without having a get-together. Just add Microsoft Mail.

Doing so will add years to the life of your company's carpet. And, perhaps more importantly, allow you to accomplish tasks that were previously impossible with any E-mail system.

Suppose, for instance, that you're preparing a report in Word. Because it features built-in Mail support, you can zap the report throughout your entire workgroup via Mail. Without ever leaving your program.

And without losing formatting.

Then, if those receiving your report are in Word, they can access your document with one keystroke, digest it, add pertinent info, even attach suggestions for changes. And spit it right back to you without leaving their program.

Now if you think that's whiz-bang, get this: When you combine Microsoft Excel with Mail, you can do much more than share spreadsheets. Thanks to Microsoft Excel's built-in macro language, you can do things like write your own macro to receive, process, and fulfill orders. All without utilizing a single iota of manpower.

And that's just one fine example of how Microsoft Excel and Mail let you consolidate and distribute data across a network automatically. Even if you have both Macintoshes® and PCs.

Now that we've covered a few of the unique ways that Microsoft Excel, Word and Mail work together, we'd like to add one more point. We design all of our applications with one goal: To continually exploit the Macintosh's capabilities in ways that profoundly promote productivity. And, of course, keep users attached to their chairs.

For more information on how to keep your hallways clear, just call us at (800) 541-1261, Department K68. And while you're at it, ask us about The Microsoft Office—four of our best-selling business applications at an astonishingly affordable price.

Microsoft
Making it all make sense®
989 RESULTS

In order to double our commitment to marketing in order to double our end of FY '89. This meant a FY '88 expenditure of $5.9 million to just under $187 million. Total net income increased to $115.8 million in FY '89, from $432,000 in FY '88. This is consistent with our big gains in income from operations. In addition, our current assets more than doubled to $227 million in FY '89, up from $112 million the prior year, along with our increased commitment to the marketing department and

<table>
<thead>
<tr>
<th>Year</th>
<th>West Division</th>
<th>East Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>$432,886</td>
<td>$331,663</td>
</tr>
<tr>
<td>1988</td>
<td>$79,899</td>
<td>$62,361</td>
</tr>
<tr>
<td>1987</td>
<td>$45,732</td>
<td>$165,570</td>
</tr>
<tr>
<td>1986</td>
<td>$73,246</td>
<td>$80,169</td>
</tr>
<tr>
<td>1985</td>
<td>$22,631</td>
<td>$12,537</td>
</tr>
</tbody>
</table>

Page Setup... 
Print... 

Print Preview... 
Print Merge... 
Page Setup... 
Print...

<table>
<thead>
<tr>
<th>Year</th>
<th>West Division</th>
<th>East Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>$115,855</td>
<td>$432,453</td>
</tr>
<tr>
<td>1988</td>
<td>$79,282</td>
<td>$73,321</td>
</tr>
<tr>
<td>1987</td>
<td>$44,256</td>
<td>$69,898</td>
</tr>
<tr>
<td>1986</td>
<td>$44,465</td>
<td>$44,055</td>
</tr>
<tr>
<td>1985</td>
<td>$12,465</td>
<td>$9,908</td>
</tr>
</tbody>
</table>

Common Stock Data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Assets</td>
<td>$334,690</td>
<td>$190,323</td>
<td>$124,164</td>
<td>$71,615</td>
<td>$65,327</td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>34,432</td>
<td>10,519</td>
<td>11,599</td>
<td>5,077</td>
<td>9,940</td>
</tr>
<tr>
<td>Long-term Liabilities</td>
<td>4,578</td>
<td>4,114</td>
<td>3,602</td>
<td>3,293</td>
<td>3,146</td>
</tr>
<tr>
<td>Stockholders' Equity</td>
<td>265,697</td>
<td>167,890</td>
<td>108,964</td>
<td>63,245</td>
<td>52,242</td>
</tr>
<tr>
<td>Total Liabilities and Equity</td>
<td>$334,690</td>
<td>$190,323</td>
<td>$124,164</td>
<td>$71,615</td>
<td>$65,327</td>
</tr>
<tr>
<td>Working Capital</td>
<td>159,805</td>
<td>173,468</td>
<td>127,766</td>
<td>119,489</td>
<td>77,041</td>
</tr>
<tr>
<td>Number of Employees</td>
<td>3,456</td>
<td>2,727</td>
<td>1,831</td>
<td>1,390</td>
<td>1,006</td>
</tr>
</tbody>
</table>

Net Income per Share

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$1.82</td>
<td>$0.91</td>
<td>$1.04</td>
<td>$1.90</td>
<td>$2.59</td>
</tr>
</tbody>
</table>
Microsoft announces an end to the second most common business trip.
Today's offbeat technology could power tomorrow's Macintosh. We spotlight six hot trends waiting to take off—from nuclear-powered computers to space-age gloves for data input. Plus news, rumors, the hottest new products, upgrades, and more.

Features

Word Processing

The Complete Guide to Word Processing

BY CHARLES SPEZZANO

Are you using the right word processor? MacUser tested the ten leading contenders to see which excelled at different writing tasks. Find out what word-processing program can best handle your job. Plus a complete guide to add-on products, from spelling checkers to outliners to bibliography organizers. ....94

Turning the Tables

BY PHILIP ROBINSON

Tired of struggling to produce decent tables with your word processor or page-layout program? Three programs claim to make it a snap: Table Tools, Tycho, and Word 4.0 shoot it out. ....................... 136

Unsafe at Any Frequency?

BY WINN L. ROSCH

Warning: Your Macintosh may be hazardous to your health—but there's an easy cure. For the safety-minded, MacUser Labs measured the radiation emitted from various Mac models. Here's what you can do to reduce your exposure. ....... 147
Power Tools

Hard-Disk- and File-Recovery Methods
BY STEVE COSTA
Someday when you don't expect it and can least afford it, your hard disk will crash. You can't stop it from happening, but you can be prepared. .................. 240

Beating the System
BY MICHAEL SWAIN
Does color enhance your work or just slow your system down? Find out the true cost and benefits in time and productivity of the color Mac. .................. 249

Got with the Program
BY THOM HOGAN
AND KURT W. G. MATTHIES
Can't find the right software? Write your own. MacUser's new monthly step-by-step guide to programming the Mac not only helps you create and customize your own applications — it's also fun and turns you into a more savvy software consumer. .................. 255

MacUser Labs

101 Hard Drives

101 Hard Drives: Buyer's Guide
BY WINN L. ROSCH AND THE MACUSER LABS STAFF
Hard drives mean hard choices. Everybody needs one, but there's a bewildering array of choices — and it's impossible to tell the winners from the losers by looks alone. That's why MacUser Labs designed this blockbuster test of 101 hard drives (with capacities of up to 100 megabytes). After 1,000 hours and countless benchmarks, the best buys emerged. You'll find the results in our comprehensive buyer's-guide table, with in-depth critiques of recommended models. .................. 153

Labs Brief: High-Density-Floppy Drives
BY OWEN W. LINZMAYER AND THE MACUSER LABS STAFF
High-density-floppy drives offer IBM connectivity and 1.4 megabytes of storage. MacUser Labs rates them all to see which ones deliver as promised. .................. 221

Labs Brief: Color LCD Technology
BY VICTORIA VON BIEL, JEFF PITTELKAU, AND THE MACUSER LABS STAFF
For years you could buy LCD projection displays with as many colors as you liked — as long as they were monochrome or gray scale. That's changed forever, as the first generation of color LCDs for the Mac arrives. .................. 230

Opinion

Paul Somerson
Do you feel the need for speed? .................. 23

Robert R. Wiggins
The Mac achieves parity in the fight for government contracts. .................. 29

Jim Seymour
System 7 seems enticing — but what's the real cost? .................. 33

John C. Dvorak
How to succeed in computer sales without even trying. .................. 314

Letters
Readers overthrow totalitarian regimes, stick up for non-Mac portables, gripe about gray-scale monitors, and actually agree with John Dvorak. .................. 10

Advertiser Index .................. 288
Marketplace ... 298
Cover Photo: Walt Benson
Model: Mark Ray, Grinnell
ULTRAPAINT ™
FROM DENEBA.
THE TOUGH NEW
GRAPHICS STANDARD
FOR THE NINETIES.

At last. A next-genera-
tion entry level
graphics program
that doesn't limit its users
to entry level performance.
Or entry level results.

Fact is, UltraPaint
does everything you want it
to today. And tomorrow,
too.

Run it on a MacPlus
and SE, and experience the
ultimate in high resolution
black & white painting, with
the help of just about every
tool you can imagine. And
then some.

Add depth to your com-
positions, using a complete
set of advanced drawing tools
to create up to 8 independent
object-oriented layers.

GREY SCALE EDITING Manipulate scanned
images like a pro, using powerful tools and
effects like contrast & brightness controls,
water droplet, sharpen & blur lighten &
darken, charcoal, smears, and smart
selecting & masking. Produce quality half-
tone printed proofs.

B&W PAINTING Work with all the tradi-
tional painting tools, plus 72-600 dpi
precision and sophisticated features like
a true-to-life airbrush, flexible masking,
and lightening/darkening filters. Keep your
tools all on their own layer, if you wish.

COLOR PAINTING Control the color of
every dot on your screen with multiple
customized 256-color palettes, a program-
mobile multi-color airbrush, advanced
mask & lasso, and professional special
effects like blended fills, color gradients,
and more.

OBJECT DRAWING All the basic drawing
tools, plus advanced features including auto-
tracing of bit maps, Bezier & freehand curves
with complete editing control, multiple arrow-
heads & dashed lines, 256 colors per drawing,
WYSIWYG text and 600 dpi precision.

SUPERPAINT USERS: TAKE A GIANT LEAP UP
THE EVOLUTIONARY LADDER FOR JUST $50.

Simply send your SuperPaint 1.1 or 2.0 Master Disk to Deneba at the address shown, along
with $50 (include check or credit card #, issuer, expiration date & signature). We'll send you
UltraPaint. The new state of the art. (Offer expires April 30, 1990)
RADIUS PRESENTS THE
TWO MOST COLORFUL
PAGES IN THE HISTORY
OF MACINTOSH.

Now for the first time in the history of Macintosh, you can work across two full pages with the photographic quality of 24-bit color. Introducing the Radius DirectColor™ Series.

Completely compatible with Apples 32-bit QuickDraw, it's the precise electronic medium for working with real colors, real type and real photographs across two full pages.

With simultaneous access to every one of the Macintosh’s 16.7 million colors, our Radius DirectColor/24™ is the perfect tool for retouching color photographs or producing high quality publications.

If you don’t require the full Macintosh palette of colors, the Radius DirectColor/16™ lets you work with 32,768 colors simultaneously. And, upgrading to Radius DirectColor/24 is as simple as adding video RAM.

For those of you who use only 256 colors at one time, there’s the 8-bit Radius Color Display™ System.

No matter which Radius color system you choose, you’ll be working across two flicker-free, paper-like pages that give you 30% more working area than commonly seen on other 19 inch displays.

Which means the view of your work is never cropped off at the sides or chopped off at the bottom.

Naturally, you’ll also reap the benefits of all the classic RadiusWare™ features.

Including Tear-off Menus in every application. The ability to capture any portion of your image as a PICT file. Small or large menu bars. And direct control panel access.

So if you’ve been waiting to work with real colors across two real pages, visit a Radius Authorized Dealer. You can find one near you by calling 1-800-227-2795.

And get ready to make some colorful history of your own.
Power to the Users

Pssst... Want to be a power user? You can take the hard way or the easy way. MacUser's newest contributing editor, Thom Hogan, took the hard way.

Thom started in the days of 4-bit computers and 1K RAM chips. He wrote his own software for something called a Polymorphic Systems machine, which looked like a bright-orange toaster — long before Steve Jobs' vision of the Macintosh-as-household-appliance.

Thom became such an early expert that he wrote one of the first computer-book best-sellers, The CP/M User Guide, which eventually sold more than 300,000 copies worldwide. That led to his becoming editor of InfoWorld (long before John Dvorak achieved notoriety there and then went on to glory as the Anti-Editor for a major Mac magazine).

Thom left InfoWorld to serve as director of software for Osborne Computer, creating programs for a portable machine that was too heavy long before rumors of Apple's Macintosh Portable even leaked to the press.

After Osborne sank, Thom wrote more books and dozens of magazine articles, and did a stint as the first and (then) only major magazine columnist writing about programming that new upstart CPU — the Macintosh.

But Thom was never content just to write about the Mac. With his own ideas about what made great software, he started a software-development company, Macreations, which really got up to full speed when Thom met Mac-whiz Kurt Matthias at a user-group meeting. From there, the two developed a working relationship that has blossomed in many ways, one of which is Macreations' new table-editing tool, Tycho, and another of which is the Power Programming column that makes its debut in this month's Power Tools section.

That's how Thom became a power user. For you, it doesn't have to be quite so hard. You can do it the easy way. That's because Thom's sharing his hard-earned expertise in MacUser — in two different forums.

One is the Power Programming column, in which Thom and Kurt will show you step by step how to use THINK C to write real Mac applications. Even if you don't become the acclaimed developer of next year's Eddy winner, knowing how your Mac works on the inside can help you better understand what it does on the outside. Besides, it's a poorly kept secret that programming can be just plain fun.

That's not all, though. Next month, Thom debuts yet another column. That's where he'll explore the latest advances in Mac technology, touring the cutting edge with the insight and wit that are the hallmarks of his writing. It's all part of MacUser's continuing commitment to bring you the best writing from the top experts.

Because we believe that every Mac user should have the chance to be a power user.
Four reasons why
1990 will be the year
of the workgroup.

It's already happening. More and more companies are embracing the idea of workgroup computing. For good reasons, too. Like the ability to swap files, send electronic mail, share printers, and work together more effectively than ever before.

Now, TOPS presents four more . . . the first complete family of powerful workgroup networking products of the 1990's.

**The ideal workgroup network—just add people.**

TOPS Network Bundle for DOS and TOPS Network Bundle for Macintosh are real “firsts!” The first complete workgroup tools in one box. Each gives you the power to share files, printers, and other resources with one person, your group, your department, or your entire organization.

And best of all, both packages come bundled with the all new TOPS InBox, the powerful, yet easy-to-use electronic mail system.

**Complete mail in a box.**

On its own, electronic mail can be the key to a successful workgroup. Which brings us to the new InBox. InBox gives your workgroup a fast, reliable and easy-to-use electronic mail system for up to 20 users.

And InBox Plus provides expandable communications to 100 users per Message Center. In fact, used with other InBox Plus Message Centers, or UNIX Mail, MCI Mail, PROFS, VMS, and other systems, InBox Plus lets you send messages anywhere in the world.

TOPS Network Bundle for DOS, Network Bundle for Mac, InBox, and InBox Plus. Four great products. Four great reasons to make 1990 the year of the workgroup in your company. And the best reasons of all to call TOPS today.

1-800-445-TOPS, ext. 407. When you need connections.
LETTERS

People write to MacUser from all around the world — just ask one of our stamp-collecting editors after she's snared a particularly colorful example. Our international subscribers write for the same reasons that their domestic counterparts do: to request information, to complain about or offer compliments on everything from mail-order houses to multimedia, or just to let us know what's on their minds.

One recent communication, though, especially caught our eye because it presented an opportunity for the Mac and its community to deliver on a six-year-old promise: to help change the world.

DTP: Democracy Transforms Poland

I am a business manager for Gazeta Wyborcza, a daily newspaper that is independent but is sponsored by the Solidarity trade union in Poland. We started publishing in May 1989, and after last June’s elections we made the transformation into a regular newspaper.

Gazeta does not look impressive by American standards — it’s nowhere near The New York Times. It is, however, a very important daily in Poland — I would even say the most important and certainly the most politically influential. Poland’s current prime minister, Tadeusz Mazowiecki, was formerly our editor-in-chief.

We have a daily circulation of 540,000 copies (the largest in Poland). We could easily double the circulation and size if not for lack of printing facilities and paper. One obstacle in our development is the layout and typesetting process of our newspaper. We have about 20 IBM-compatible PCs, which we use as typewriters. The computer printouts are then retyped on ancient Linotype machines. If this seems absurd, it is. The pages are printed on an old-style rotary press.

Macintoshes would be a better solution for Gazeta. I have used an SE for two years. We need good software, though, and here we need help. Our needs concerning software are as follows:

• Composition of 16 (or more) A3 (tabloid) pages daily on three or four Mac IIs (the program must be fast, as there are always last-minute changes).

• Ability to include graphics and photos in the text. We need suggestions on types of scanners and software for scanning and photo manipulation.

• Output to Linotronic typesetting devices.

These are all rather normal needs. We have at least two nonstandard requirements as well. First, Polish hyphenation uses different algorithms than English does. We would have to be able to somehow include the ability to do Polish hyphenation in the program. Second, there are some special characters in Polish. We need software to create AFM-type Polish characters in PostScript that could be used with laser printers and Linotronics.

I would be grateful for any help, suggestions, and encouragement we can get from your readers. You do not know what a great pleasure it is to finally feel like a part of the 20th-century international community and not like a 19th-century communist backwater. I look forward to hearing from you soon and to your help in creating the most beautiful-looking newspaper east of the Berlin Wall.

Greg Lindenberg
Warsaw, Poland

[MacUser readers and Macintosh developers with advice or help to offer can contact Mr. Lindenberg and Gazeta Wyborcza through MacUser or by fax at 011 (4822) 416-920. — Ed.]

Bedtime Stories

Why do otherwise intelligent people insist on referring to computers and other objects as "toys"? Take, for example, Paul Somerson’s November column, “One for the Road...” Not that I want to pick on Paul. He even points out that he’s in good company — practically drooling over the computer-related sexual innuendos of Jean-Louis Gassée.

A human being is not a computer, and vice versa, no matter how many sweet nothings (and occasionally curses) you address to your Mac in the course of a long night together.

Gloria Jewel Leitner
Boulder, CO

Rage in Toyland

I refer to Paul Somerson’s November column and his remarks concerning the "Z80-based toy." I have one of these toys, sir. I also have an original Mac that I have nursed along and upgraded as money has been available. I am a writer/consultant; I travel a lot and write while I’m on the road. I use my Z88 whenever I can pry it loose from the clutches of my wife. I regard it as an excellent productivity tool. Its cost is modest, and it performs precisely as advertised.

Ronald W. Hawkins
Ajax, Ontario
Canada

Plane Spoken

I am a businessman, and I use a Tandy 102 as my portable word processor. It
Take control of Corporate from your Mac.

SEE THE MOVIE.

See how professionals from leading corporations have integrated the number one database technology with the number one user interface: ORACLE for Macintosh. It may give you some big ideas.

Like how to make every computer in your organization a peripheral to your Macintosh. Like how the data on all your computers—mainframes, minis, workstations, LANs and WANs—can appear to reside on your Macintosh.

See all of this free, in the ORACLE for Macintosh video. And once you see the movie, we think you’ll buy the books.

Free Video
Oracle Direct, 20 Davis Drive
Belmont, CA 94002
1-800-ORACLE1, ext. 7679

BUY THE BOOKS.

We wrote the book on databases. It’s received rave reviews and comes with diskettes, for only $999.*

See the movie, or buy the books. ORACLE for Macintosh lets you communicate with ORACLE® data or even IBM’s SQL/DS and DB2. MacUser gives it a four-star review.

June 1989
And our money-back guarantee says we think you will, too.

$999
ORACLE for Macintosh
Oracle Direct, 20 Davis Drive
Belmont, CA 94002

I want to take over corporate, and understand I have a 30-day money-back guarantee. Enclosed is my [ ] check or [ ] VISA [ ] MC [ ] AmEX credit card authorization for:

$999 ORACLE for Macintosh Networking Version (includes an unrestricted license of ORACLE for Macintosh and SQL/Net Networking Software and protocols for Macintosh)

Please add appropriate sales tax.

$15.95 Shipping & handling

Total (Offer valid only in USA)

Name
Title
Company
Address (No PO boxes, please)
City State Zip
Phone
Credit Card Number (if applicable)
Credit Card Expiration Date
Signature
Date

*Accessing database software on other machines requires a separate protocol handler and gateway software for the other machine. Call for additional information.

ORACLE for Macintosh requires Macintosh IIi, IIci, 11c, 11ci with 2 Megabytes RAM, 5 Megabytes hard disk space, 85-key, disk drive, and HyperCard 2.2. Includes 30-day technical support, 90-Day Data, HyperTalk, HyperCard, and Macintosh.

SQL*/Plus, SQL, Pro*C, Macintosh, Programmer's Workshop, and Workstations are trademarks of Oracle Corporation.

Copyright © 1989 by Oracle Corporation. ORACLE is a registered trademark of Oracle. All other company and product names mentioned are trademarks or registered trademarks of their respective companies.
The first complete database to manage names and addresses: Find-and-Change, 2-level-Select, Frequent Finds and Selects, 3-key-Sort, Import, Export, Merge, Dialing, and more. Powerful and fast.

**Direct $99**

Act now! DYNODEX is available direct for a limited time only. Package includes binder, manuals, divider tabs, and 100 sheets of pre-perfed Instant Address Book Paper™. Call now to order. Dealer inquiries welcome. 1-718-935-9501; 1-718-935-0440 fax

**DYNODEX**

1-800-729-3966
Smart investors always buy utilities.

You've invested in a Macintosh to bring out the best in what you do. Now enhance that investment with SuperMac's family of easy-to-use utilities. Programs that protect your work and help you do more in less time.

Don't let your printer regulate your business.

Why stop working just because you're printing? Let SuperLaserSpool and SuperSpool take control. So you can use your computer again seconds after you select "Print." Even if your documents are long and complex.

See if documents have printed, preview them, or zoom in to see part of a page up close. Or send several documents to the spooler and change the printing order later. Both products work faster under MultiFinder than any other spoolers.

SuperSpool works with any ImageWriter. And SuperLaserSpool is the only spooler that works with all Apple printers. Plus, it's the only one compatible with PageMaker 3.0.

MacWeek said, "The speed at which SuperLaserSpool returns control of the Mac to the user is impressive, in some cases even astonishing!"

Keep insider information where it belongs.

Lock up your confidential information with Sentinel, a program that lets you convert any document on your disk into a secure code. No one can open it without the password you define. Or a Cray and about 50 years.

Documents and folders can be grouped together in convenient sets. Then choose one of three advanced encoding techniques, including DES, the U.S. government's official data encryption standard. Sentinel encrypts, locks and unlocks faster than any other program.

The critics at MacWorld said, "...Sentinel provides a simple, effective security tool that does exactly what it claims to do and does it well."

How to recover from a crash.

DiskFit copies files on your hard disk for safekeeping. If your disk crashes, DiskFit can completely restore them. Back up just once, and DiskFit makes a complete record of files called a SmartSet. Then, DiskFit copies only new or modified files to the SmartSet, and deletes old files. You won't waste time copying files that haven't changed, or disk space storing old versions.

Create backups on floppies, tape, Bernoulli cartridges or even other hard disks. Of whole volumes, documents, system or application files. And Network DiskFit backs up AppleShare or TOPS networks.

As MacUser said, "DiskFit is so easy to use and so well designed that it may be the program that gets you to do regular backups on your hard disk—making it more than worth the price."

Add SuperMac's utilities to your Macintosh portfolio.

Put SuperMac's utilities on your buy list. To protect the investment you've made in your Macintosh system, and to do more work in less time.

You'll find our family of utility programs at authorized SuperMac dealers and leading software specialty stores.

End users please circle 89 on reader service card.

Dealers please circle 90 on reader service card.
CanOpener Opens Anything.

Problem: The document you need won't open because the application is missing. Or it's damaged. Or you must browse several documents to find the one you want.

Solution: Get CanOpener.™ It opens anything. So you can grab text, pictures or sound from any document. Even if the application is missing, or the file is corrupted. And browse files fast, or automatically locate files by contents.

CanOpener, $125. It's the one DA you can't afford to be without. So order a copy today. And get into all your files.

For a free information package call: 800-552-9157, or 914-747-3116.

ABBOTT SYSTEMS
CanOpener is a Trademark of Abbott Systems Inc.

Please circle 13 on reader service card.
YOU REALLY LIKE THIS DON'T YOU? POUNDING AWAY AT MY CREDIBILITY.

"Topping TOPS®. There's a new distributed-file-transfer program that's the first direct challenger to TOPS and it has a lot going for it. Like TOPS, Personal Server Network (PSN®), from Information Presentation Technologies (IPT®), passes files among computers without a dedicated file server."

MACUSER, September, 1989

The Personal Server Network (PSN) mission is simple: to provide an easy-to-use, low-cost, safe solution to networking Apple® Macintosh® computers.

With PSN and the IPT family of products, you can go Mac to Mac, Mac to Unix, Mac to PC or any other combination of these three systems. Full bi-directional connectivity is achieved while maintaining each operating system's native interface.

You never need to use a dedicated Macintosh as a server.

PSN only $145 per user. AppleShare® software $799. TOPS $249.

PSN is a product of Information Presentation Technologies, Inc.,
5000 N. Parkway Calabasas, Suite 304, Calabasas, California 91302.

PSN supports the MacPlus® (client only). SE and Macintosh II families. A Personal Server Network license is needed for each Macintosh on the network. AppleShare Client Software. Shipped with each PSN order, is required for all Macintoshes. client and server.

PSN (Personal Server Network) is a registered trademark of IPT (Information Presentation Technologies, Inc.). Other brands and product names are trademarks or registered trademarks of their respective holders.

Please circle 113 on reader service card.
SHARP ANNOUNCES ANOTHER BREAKTHROUGH IN COLOR SCANNING.

THE JX-100. COLOR AND GRAY-SCALE SCANNING FOR $995.

The Sharp JX-100 personal scanner can be summed up in one word: versatility. This revolutionary scanner features three modes of operation—color, true grayscale and monochrome—at up to 200 dpi. Whether you're producing B&W newsletters, color overheads, slides, or picture databases, the JX-100 fits the bill without breaking the budget.

The JX-100's unique viewfinder system allows perfect alignment of originals. And its hands-free scanning action gives you accurate scanning the first time, every time. It comes complete with a cable and software for either the Macintosh®, IBM® PC/AT or Amiga®, giving you total control over the scanner including preview scanning and cropping.

To find out more, call the people with the outstanding track record in color scanning at 1-800-BE SHARP.

©1989 Sharp Electronics Corp. $995 manufacturer's suggested retail price.
Please circle 160 on reader service card.
MORE II is the fastest way to create everything you see here. Nothing else even comes close.

Why? Because MORE II was designed for professionals like you, professionals who organize, plan, manage, and report. For example, MORE II knows that most business communications follow a concise, condensed format. So its powerful outline structure indents, spaces, and numbers your line items and paragraphs for you. In essence, it automates the basics, organizes the details, and shows off your results.

In fact, all six documents above were created instantly from a single To-Do list outline using software templates available from Symantec. The templates supply professional-looking typestyles, spacing, centering and sizing.

You just type in the text.

With output this fast, you'll have extra time for input. And that, in a nutshell, is why 100,000 professionals love MORE.

FREE DEMO DISK
(800) 228-4122 Ext. 763F

Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014. 408/253-9600.

Permitted reprints from Microsoft Excel. **Templates shown will be available five to seven months after December 1, 1989. Write supplies list. MORE II and MUNE are trademarks of Symantec Corporation. © 1989 Symantec Corporation.
FULLY AFP COMPLIANT.
FULLY BI-DIRECTIONAL.
FULLY TRANSPARENT OPERATION.

It provides a common network environment between Apple's Macintosh personal computers and Unix computers.

uShare software provides high-capacity, Appleshare-compatible server and support of compute-intensive applications, particularly in areas such as large data bases, document preparation and mathematical analysis.

Take this software along during the Apple Free Trial Run!

1-800-233-9993
In California: 818-347-7791

No matter how complicated our systems get, uShare has an answer. It looks like installation will be swift and simple.
uShare Alternative
Before You Buy Novell® or 3Com®
Call This Number: 800-233-9993

TAKING THE POWER OF UNIX TO THE MACS...AND BEYOND.

Solbourne Computer

Computer Consoles Incorporated

Data General

UNISYS

Sony

LOOK AT THE NUMBER OF WORKSTATIONS AND SERVERS IT HANDLES.

ALL OF THESE FEATURES ARE AVAILABLE NOW.

1. Electronic Mail
2. Automatic Backup
3. Print Server

5000 N. PARKWAY CALABASAS, SUITE 304
CALABASAS, CA. 91302

FAX: 818-992-5580
D0263 AppleLink

IPT is an Apple VAR. uSHARE is a registered trademark of IPT (Information Presentation Technologies, Inc.) Other brands and product names are trademarks of their respective holders.

Please circle 114 on reader service card.
When you need to communicate, you want to get the point across. Without making trade-offs in what you say — or how you say it. Isn’t this especially true when you have to make your point on paper?

The right typeface can have impact. The wrong one can be a disaster. But what do you do if the right typeface isn’t commercially available? Use Fontographer — the first professional Postscript program for font design. Whether you begin with a scanned image, an existing font template, or draw from scratch — it’s easy to design fonts using Fontographer Right from the start!

With tools like auto-trace, automatic hints, Bezier curves, and an integrated bitmap editor. Fontographer creates downloadable Postscript fonts as precise as your drawings. Your character sets will then print on any Postscript printer, from the LaserWriter to professional typesetting machines.

Fontographer suggested retail price: $495.00

With The Art Importer create fonts which retain the precision of your original drawings — including color information for creating separations.

With The Art Importer create fonts which retain the precision of your original drawings — including color information for creating separations.

A custom logo could be the difference between a boring proposal and a winning one. But how do you quickly create a logo and use it in your 20 page document without pasting and resizing?

The Art Importer* (formerly known as KeyMaster) creates high resolution PostScript fonts from your Macintosh artwork. Now you can use company logos, symbols, signatures, and graphics as typeface characters.

The Art Importer converts images from EPS format created in Aldus' FreeHand*, Adobe Illustrator*, Adobe Streamline* and Bradenbyte Style* and from PICT format in MacDraw I and II, SuperPaint, and other popular object oriented drawing programs. Each Art Importer font supports up to 256 characters for high quality PostScript output from any program — even spreadsheets and word processors.

The Art Importer suggested retail price: $179.00

Now, you can design high-quality type and logos like these. Just add imagination!

So, whether you’re a professional desktop publisher or just starting out with your Mac, don’t make any trade-offs between creativity and productivity — select quality products by Altsys.

Please circle 159 on reader service card.

Clariacations

The toll-free number for Enabling Technologies, publisher of Images with Impact! was listed incorrectly. The correct number is (800) 544-0629.

The reference to an upgrade to SuperCard 1.0 in Help Folder (December ‘89) was erroneous. Silicon Beach Software has not shipped any upgrade to SuperCard, nor has it announced any plans for such an upgrade. It will notify dealers and registered owners as soon as such an upgrade is available. The MacUser Labs Brief on tape backup software (December ’89) incorrectly referred to Retrospect 2.0. The most current version of the program is Retrospect 1.1.

To women but also to Macintosh users in general. You have portrayed us as stupid enough to take a $7,000 machine into a swimming pool.

Hilary A. Sherred
Brooklyn, NY

Why the switch from such incredibly creative covers to models in swimsuits sporting all the coveted characteristics of the current credit-card generation?

Rob Schanneck
St. Paul, MN

I think November’s cover is definitely the most colorful and beautiful in a while, but I had to chuckle when I noticed the Portable. You have the number pad installed (no trackball) and no ADB mouse hooked up. Boy, isn’t she being productive there at the pool?

Tim Winders
Baltimore, MD

If your intention was to portray women executives using computers, then I suggest you get that woman out of her bathing suit, out of the pool, off the telephone, and back at work.

Armand Gilinsky
Boston, MA

If keeping that Portable dry isn’t work, what is? — JB

Clariacations

The toll-free number for Enabling Technologies, publisher of Images with Impact! was listed incorrectly. The correct number is (800) 544-0629.

The reference to an upgrade to SuperCard 1.0 in Help Folder (December ‘89) was erroneous. Silicon Beach Software has not shipped any upgrade to SuperCard, nor has it announced any plans for such an upgrade. It will notify dealers and registered owners as soon as such an upgrade is available. The MacUser Labs Brief on tape backup software (December ’89) incorrectly referred to Retrospect 2.0. The most current version of the program is Retrospect 1.1.
High Performance
MS-DOS® for Macintosh®

MAXIMUM PERFORMANCE FOR THE MAC II SERIES
Orange Micro's Mac286™ 2.1 brings the power of an IBM® AT to your Macintosh II™. Multi-tasking of MS-DOS and Macintosh applications is now possible, with the help of on-board processing and RAM. The Mac286 rates an 8.2 on the Norton Computing Index. That's 6 times faster than any software based solution. Only Mac286 matches the best DOS performance with the best Mac performance.

PRICE PERFORMANCE FOR THE MAC SE
Mac86™ 2.1 brings many of the advantages of Mac286 to the Macintosh SE®. With the power and speed of a PC XT, Mac86 creates a second computer within your SE, capable of independent tasks even while you work in Macintosh applications. Priced to compete with software-only solutions, Mac86 is the clear choice when performance is important.

APPLICATION COMPATIBILITY
Mac286 and Mac86 open new windows of opportunity by ensuring compatibility with major MS-DOS applications. You can use MS-Windows™, Lotus 1-2-3™ or MS-Word® simultaneously with your favorite Mac programs. Fortran, Pascal, and compilers run with Mac286/86 as well, turning your Mac into a full development system.

SHARING HIGH PERFORMANCE
Mac286 and Mac86 don't just add DOS to your Mac, they blend the two environments to maximize your productivity. Mac286 and Mac86 are fully compatible with the TOPS™ network. With an optional utility, you have full use of Apple's SuperDrive™ for DOS files and applications. Copy and Paste graphics and text from MS-DOS programs right into MacWrite™, PageMaker™, or other popular Mac software. Transport files between Mac and MS-DOS formats in two quick steps with Mac286. Whatever your MS-DOS application, Mac86 or Mac286 provide the performance and compatibility you need.

*Not compatible with MacSE/30
Orange Micro, MacII and Mac286, Macintosh, MS-DOS and MS-Word, IBM, are trademarks or registered trademarks of Orange Micro, Inc., Apple Computer, Inc., Microsoft Corp., and International Business Machines, Inc. All other trademarks are the property of their owners.
"Improving on a classic like MacWrite* was no small task," says Steve Singh, Engineering Manager for Claris’ Text Products. "It took a lot of gifted developers, all working together. At breakneck speed. That’s why we chose THINK C to develop the all-new MacWrite II. Its instant linking and source level debugging gave us lightning-quick turn around time. And its simplicity of design allowed everyone to use all of THINK C’s power the first day."

Smooth, fast group level developing. Just one reason professional programmers choose THINK C over competing C implementations. They also depend on THINK C’s integrated multi-window text editor, compiler, linker, source level debugger and auto-make facility for consistently high quality, compact code. It’s the professional’s choice. For individuals. And groups. Steve Singh says THINK C’s blazing speed and interactive performance made developing MacWrite II “a classic team-effort win.”

Call (800) 228-4122 Ext. 347F for more information, or visit a dealer near you.

Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014. 408/254-9600. Owners of 156 or earlier please call 415/964-1440 for upgrade information. *48,000 LPM on a Mac II with an accelerator. 15,000 LPM on standard SE or Plus. Program requires 3 megabytes of RAM. Debugger requires 9 megabytes of RAM and MultiFinder. Hard disk highly recommended. THINK C is a trademark of Symantec Corporation. MacWrite is a registered trademark of Apple Computer, Inc. Other brands and products are trademarks of their respective holders. © 1989 Symantec Corporation.
Quick quiz:
When most users say they want more power, what are they really looking for?
Why hasn’t CAD become more popular on the Mac? Ditto with on-line services?
And what’s the one thing that would help Apple sell to both high-end and beginning users?
The answer to all these questions is simple: raw, screaming, blistering, intoxicating speed.

Speed is seductive and addictive. Once you’ve used a faster machine, you can never go back to anything slower. Operations that once appeared normal on older systems suddenly seem to lag painfully. Delays of just a second or two that were once unnoticed become instantly intolerable.

When users say they want more power, what many of them really want is for everything to work quicker. Keep in mind that computers aren’t all that smart. They’re just fast. And some are faster than others.

But while the Mac’s a fast graphics machine, it could be faster. Just ask speed merchants such as SuperMac’s Steve Edelman, or Andy Singer and Ed Colligan at Radius, or DayStar’s Robert Baggarly, or Curtis Feigel at Dash.

They know that the problem isn’t the current Motorola CPU. Or the Mac’s clock speed. The 25-megahertz 68030 ticking away inside the Iici is plenty fast. And the rumored 33-megahertz screamer due out later this year will be even sprintier.

When users say they want more power, what many of them really want is for everything to work quicker. Keep in mind that

The current architecture contains a handful of serious choke points — older CPUs, slow memory, an aging SCSI standard, the relatively narrow NuBus, and creeping QuickDraw routines. Fortunately, there are some solutions.

CPU: Motorola is no slouch when it comes to shaving nanoseconds. The older 68020 took three clock cycles to do things that the 68030 can do in two. And the 68040 promises to dispatch many of these low-level tasks in just one tick of the clock. The engineers at Motorola learned a lot from their RISC-chip researchers. And, of course, cramming everything tighter onto the chip and goosing the clock yields more speed.

You can hot-rodd your system by installing an accelerator board with a faster CPU from a company such as DayStar or SiCLONE. When Apple soldered in the Iici’s 25-megahertz 68030, one of its executives sniffed that the company wasn’t

match the rest of the SCSI parts — saddling fast SCSI with a slow hard disk won’t do much for you.

NuBus: Many vendors have come up with solutions for getting around the limitations of the Mac’s system bus. It isn’t too hard to cobble together an alternative pathway with a few additional lines or bypass NuBus entirely. (Using burst mode and block transfers can also help somewhat.) The problem is to anticipate what Apple will do next; as soon as it introduces NuBus 2, all these forward-thinking companies will suddenly be stuck with yesterday’s technology.

Video: OK, you can straighten out the main kinks a bit by popping in a fast CPU and a cache. But if you want eye-popping performance gains, the single best way is to supercharge your video. Both SuperMac and Radius now offer QuickDraw accelerators that will leave smoking skid marks on your desktop.

Each approaches the problem differently. Radius was the first to boost video performance, using a dedicated RISC chip originally designed for the British ACORN computer. SuperMac came along later, with custom VLSI circuitry. Radius designed its system to work just with other Radius hardware. SuperMac’s works on many video platforms, including Apple’s. And both produce startling results. (By all accounts, Apple has its own video-accelerator tricks up its sleeve.)

Some delays are worse than others; for infrequent things such as booting their systems, people put their minds to sleep and don’t complain. But in the middle of using an application, painfully slow 32-bit redraws are intolerable.

Both Radius and SuperMac realized that they had to cross a key threshold. Just optimizing things to add a smidgen of

For a faster Macintosh, you don’t have to wait for next year’s models — here are five solutions.
speed wouldn’t work. SuperMac’s Steve Edelman uses the perfect analogy: Imagine if a car took ten seconds to respond when you turned the wheel and you were able to speed things up by a factor of three. While the faster version would now take just over three seconds to do what you wanted, you wouldn’t be able to drive at either of these slow speeds. When it comes to steering a car or moving a mouse, anything less than real time is simply unacceptable.

The trick is not to make a Macintosh just run fast. It’s to make the interactive things happen instantly. Whether you move or scroll a window, or paint with a mouse, everything should be instantaneous, like typing.

When you want to move a window, you really want to drag the window itself around on the screen, not just an outline of it. Power users are accustomed to such compromises, but such details can intimidate new users, who wonder why their window lags behind its outline each time they try to reposition it.

To hook the next generation of computer buyers, Apple will have to make its future systems look (and work) even more like the real world and even less like computers. In the real world, things are responsive. You can pick up a 400-page manuscript and flip instantly through it to any page. No computer can currently match such performance. Video performance has to be improved substantially for this to occur — and this means more graphics, more colors, more performance (and better-written software to exploit these new breakneck systems).

This isn’t just a case of hardware envy or benchmarkmanship. While less than 5 percent of the market uses 32-bit color today, predictions are that three to five times as much will buy 32-bit systems by the end of 1990 — enough to generate critical mass. Acceleration will be standard by then, or the boards won’t sell.

QuickDraw accelerators aren’t the whole story; the rest of the system will have to keep pace. Certain areas will need additional tweaks. One positive trend in this direction is the appearance of sizzling application-specific hardware solutions, such as Radius’ vector-juggling QuickCAD board. Others are in the works.

Still other niches cry out for help — one of the neediest is today’s sorry Tele-type-based 2,400-bps on-line services. As Jean-Louis Gasse points out, we’ll start to see some improvement when the world switches to 9,600 bps. But it’s only when we standardize on 19.2-kilobit-per-second speeds that full-screen Mac interaction makes sense.

The ultimate goal is real-world color, resolution, and interactivity. If you want a taste of the future, test-drive these hot new video boards from SuperMac and Radius. You’ll never go back.
24-Bit Graphics Systems Are A Lot Like Gunslingers.
SuperMac's revolutionary new 24-bit True Color graphics system puts the “quick” back in QuickDraw.

Our Spectrum/24 Series III 24-bit graphics card gives you the fastest QuickDraw acceleration on the planet—making painfully slow QuickDraw operations up to 25 times faster. In fact, some operations in 24-bit mode (like scrolling and screen-fills) are now faster than in 8-bit mode. Some are even as fast as in one-bit mode.

And we accelerated QuickDraw on every Series III 24-bit graphics card—because we consider it a necessity, not an accessory. It's plugged right onto the board, at no extra cost. So it's the only single-slot True Color solution that saves you power and money, as well as time.

And when it comes to looks, there's nothing more impressive than the super-sharp, flicker-free image of our new 19" Trinitron and other color displays. With their 75 Hz refresh rate and Apple-standard 72 dpi WYSIWYG screen-image, True Colors never looked better—all 16.7 million of them. We can even give you accelerated QuickDraw for your Apple 13" monitor with our new, low cost ColorCard/24.

All in all, it's just the kind of innovation you'd expect from the company that invented large screen color for the Macintosh.

So mosey on in to your local dealer and try your hand at accelerated QuickDraw. Ask for a showdown between our Spectrum/24 and any other 24-bit graphics system your dealer can round up.

And for those of you who don't need 16.7 million colors at once, we've also enhanced our Spectrum/8 family—rated “best in its class” by InfoWorld Labs—to give you the sharpest, clearest 8-bit color graphics you can buy.

Call us at 1-408-773-4498 ext. 300 for more information and the name of your nearest SuperMac dealer. Or FAX us at 1-408-735-7250 (dept. 300) for a list of worldwide distributors.

©1989 SuperMac Technology. Spectrum/24 Series III, PixelPaint Professional, and SuperMac are registered trademarks of SuperMac Technology. All other brand or product names are trademarks or registered trademarks of their respective manufacturers.

End Users please circle 67 on reader service card. Dealers please circle 66 on reader service card.
ut Speed Is Everything.
"Clearly in a class by itself."
That's how MACazine judged the MAC-101, our advanced keyboard for the Macintosh.
It's not hard to see why.
With the MAC-101, you can work the same fast, simple way

But MAC-101 can find them a real job. By using our MasterStrokes enhancement software to assign them dozens of mouse or keyboard commands.
Even functions that would otherwise need numerous keystrokes—your mouse works—without leaving your keyboard.
And turn functionless function keys into a major resource.
It's the only keyboard that works with every model Macintosh.
It's also the only one Microsoft recommends for Word*3.
The only one Aldus recommends for PageMaker.
The only one Ashton-Tate recommends for FullWrite Professional.
And the only one Letraset recommends for Ready, Set, Go!

Function is as function does.
Since the function keys on an Apple Extended Keyboard don't relate to most Macintosh software, their only real function is to take up space.

But for IBM types who are feeling their way around on the Mac, the news is even greater.
Because our keyboard is laid out in a standard configuration that's identical to the IBM PC.
Which means that anyone who's used to an AT or PS/2—or a Selectric—for that matter—will instantly know the MAC-101 like the back of their hand.

And type on it accurately, with the confident touch that comes only from tactile, positive-response keys.

"Superb."
That's how PC Magazine sizes up the MAC-101. While MacWEEK calls it "the most important accelerator you can buy for a Macintosh."
You can buy it for under $195—software included.
And since it carries a two-year warranty, you'll be enhancing your piece of mind right along with your Mac.
So call 800/826-5398 (in California 800/592-9602) and find out where you can lay your hands on the MAC-101. Once you do, you won't let go.
Parity

W hen Apple introduced its new Macs this past September, the poor Mac IIci was so heavily overshadowed by its portable sibling that it was almost completely ignored by the press and public alike. Here was Apple’s most powerful CPU yet, a screaming 25-megahertz 68030 with 512K of ROM. (In fact, the IIci was so fast that it required 80-nanosecond DRAM SIMMs, as opposed to the poky 120-nanosecond SIMMs used by the rest of the Mac family.) But the crowds ran right past it to ooh and aah over the Mac Portable (a.k.a. the Dynabrick) — admittedly an impressive engineering achievement but not even in the same league as the IIci in terms of power, speed, and performance.

In the intervening months, the IIci finally got some attention. Business users bought the machine in fairly healthy numbers for its performance and easier setup with its integrated video, which eliminates the need for a separate video card (although the performance seekers attracted to the IIci will nonetheless want the improved performance of an add-on video card). But rumors of the follow-up to the IIci (which Apple’s improved internal security has allowed to earn the sobriquet “stealth Mac”) are already swirling fast and furiously, and the IIci’s days in the sun as the top-of-the-line Mac are apparently numbered.

Before the Mac IIci fades into obscurity (in another year or three), let me point out one thing about it that deserves to be remembered. In addition to all its other firsts, the IIci is the first Mac available with parity-checking memory. Parity checking! What on earth is Apple doing, using 20-year-old memory architecture in an advanced Mac II? You can safely assume that if Apple were worried about the integrity of DRAM SIMM memory, it could come up with some way of backstopping that it would be a little more sophisticated than adding a ninth bit to each byte to make the sum of the byte’s bits always odd. Parity checking can detect single-bit memory errors but can miss multiple-bit errors. And while it can detect errors, it can’t correct them. With the IIci’s parity checking, when you get a parity error, you get a system bomb.

So why bother? Why not use some of the more advanced mechanisms that can potentially correct errors, such as cyclical-redundancy checking and error-correcting codes? Because the objective is not to make memory fail-safe. After all, memory failures are very rare occurrences these days. The objective is only to achieve parity with IBM so as to qualify for government contracts and private-sector RFPs (requests for proposals).

Almost as soon as the Mac appeared, people began writing specifications for bid situations that would exclude it from consideration. This practice has a long and undistinguished history. As long as there have been competitive bidding situ-

ations, there have been slanted specifications. Sometimes it’s because of the influence of a strong vendor with an aggressive sales force, sometimes it’s simply because of the preferences of the specification designer, and sometimes it’s unintentional. Despite what the excluded vendor might think, only very, very rarely is it the result of a conspiracy or another illegal act such as bribery. People design specifications based on what they know and understand, and when it comes to microcomputers, that understanding usually begins and ends with the IBM PC.

Excluding the Mac wasn’t hard at first, when limited memory and lack of software and a SCSI port ruled out the early Mac as a contender against the well-entrenched PC. But over time, the Mac kept getting better and better and the hurdles had to be lifted higher and higher, until finally it was the PC that was in danger of being excluded. New obstacles had to be devised to keep the Mac out, and Apple had to keep working to overcome them.

The first major hurdle Apple had to clear was MS-DOS compatibility. Both the government and the business markets are big on standards, and in the desktop-computer arena, the standard has been MS-DOS since 1981 or so. Apple introduced the Mac II and SE, both of which had expansion capabilities, and one of the first cards announced for the Mac II was an 80286 coprocessor board that could run MS-DOS. Software emulation followed later, making MS-DOS capability on the Mac easier and less expensive. With the addition of the FDHD disk drive, Apple made it even easier to move between MS-DOS and the native Mac operating system.

Local-area networking was the next stumbling block thrown in Apple’s way. But Apple actually beat IBM at getting over this particular hurdle with its easy-to-use and easy-to-install AppleTalk network. Of course, at first AppleTalk was useful only for sharing the expensive LaserWriter...
COPY II
for Apple Macintosh
ver. 7

Copy II for the Macintosh is a collection of three utility programs and a new desk accessory, Locate. Copy II combines powerful utilities which enable you to: maintain and repair your floppy and hard disks, create archival backups and allow you to install applications directly onto your hard disk.

Here is what the experts say: "It's a well-rounded collection of useful disk utilities that no Macintosh user should be without." John Gillett, Macworld 5/89

SEARCH AND FIND
Locate is a fast information finder in a desk accessory. You can search for full or partial file names, up to three key words, or both. Once found, Locate displays the information and under Multifinder will launch the application.

Requirements: Mac 512e, MacPlus, Mac SE, Mac II. Supports HFS, MFS, 400K and 800K disks, 1 or 2 drives, hard disks and all available memory.

To Order: see your local dealer.
$39.95

When Apple had cleared all the major stumbling blocks being strewn in its path, only one minor one remained: parity checking.

Macintosh. But Apple spent the time and money and easily cleared the UNIX hurdle.

When Apple had cleared all the major stumbling blocks being strewn in its path, only one minor one remained: parity checking. It was the last thing the PC had that the Mac didn't, and it was put into some contract specifications. With the IIC, Apple nimblly steps over this last feeble hurdle. By making parity checking an option in its top-of-the-line system, Apple has finally achieved parity in the world of RFPs and bidding situations. It may still lose contracts because of other considerations, such as high prices, single-sourcing (only Apple makes Macs, and some contracts call for multiple vendors), and limited warranties (90 days is far short of most specifications), but it won't be because of roadblocks thrown in just to keep the Mac out of the running.
The Right Choice... WriteNow.

“Best New Word Processor”
MacUser Magazine, May 1989

“Readers' Choice”
MACazine, January 1989

“Golden Gavel Award”

AWARDS & RECOGNITION
WriteNow is the highest-rated word processor in the Macintosh world. MacUser Magazine said it best—"WriteNow wins best new word processor hands down."

EASY-TO-LEARN, EASY-TO-USE
If we were to pick one word that our customers use to describe WriteNow, it's usable. A great word processor is more than just a stockpile of features—it's the usability of those features, how easy they are to learn and use, and how they feel under your fingertips when doing real work. Everyone claims ease-of-use, but WriteNow actually delivers it—and our awards and ratings prove it.

BUSINESS POWER & PERFORMANCE
WriteNow has all the power business users need, including: Mail merge; 100,000 word spelling dictionary; multiple columns; in-line graphics; format accelerators (style sheet equivalents); outline indenting, character and word counting, fixed and flexible line spacing, and much more. As important, WriteNow is the fastest word processor in the Mac world, whether you've got a small Mac 512KE or a loaded Mac IIX.

<table>
<thead>
<tr>
<th></th>
<th>Copy &amp; paste large area</th>
<th>Search for a word</th>
<th>Spell check document</th>
<th>Change indents &amp; double spacing</th>
<th>Undo ruler changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>WriteNow 2.0</td>
<td>6.7 sec.</td>
<td>2.9 sec.</td>
<td>7.4 sec.</td>
<td>23.3 sec.</td>
<td>1.6 sec.</td>
</tr>
<tr>
<td>MacWrite II</td>
<td>45.9 sec.</td>
<td>40.2 sec.</td>
<td>33.6 sec.</td>
<td>44.7 sec.</td>
<td>24.7 sec.</td>
</tr>
<tr>
<td>MS Works 2.0</td>
<td>1 min. 50.8 sec.</td>
<td>35.7 sec.</td>
<td>5 min. 13.4 sec.</td>
<td>1 min. 24.1 sec.</td>
<td>1 min. 14.5 sec.</td>
</tr>
<tr>
<td>MS Word 4.0</td>
<td>21.6 sec.</td>
<td>11.0 sec.</td>
<td>3 min. 55.1 sec.</td>
<td>39.4 sec.</td>
<td>25.8 sec.</td>
</tr>
</tbody>
</table>

All tests performed using a 12-page test document on a Macintosh Plus with a 20 megabyte hard disk. Full compatibility performed when necessary. © 1989 T/Maker Company. All rights reserved. The following are registered and unregistered trademarks of the companies listed: WYSIWYG, licensed to T/Maker Co. MacWrite, Apple Computer Inc. MacWrite Users Corp. Microsoft, Microsoft Corp.

Please circle 23 on reader service card.

ATTENTION—MACWRITE & MS WORD USERS!
T/Maker will honor your MacWrite or MS Word upgrade offer. Call today for details.
You have a right to be mad if you pay too much for a big screen display. But a no-name, budget system isn't the answer, either.

Introducing the MegaScreen Rival dual-page 19" black and white display. Superior performance at a price far below that of our major competitors.

Rival is the latest version of the MegaScreen rated Number One by Macworld, May '89. Its 1024 x 820 resolution at 75 dpi is flicker-free, thanks to 75Hz performance.

And the image is bright and clear on the high-quality Zenith monitor. Rival comes complete with a built-in tilt-and-swivel base, cable and controller.

There are versions for the SE, SE/30 and Mac II family—at hundreds of dollars below our major competitors.

Keep your name out of the papers.

You have a right to be mad if you pay too much for a big screen display. But a no-name, budget system isn't the answer, either.

Introducing the MegaScreen Rival dual-page 19" black and white display. Superior performance at a price far below that of our major competitors.

Rival is the latest version of the MegaScreen rated Number One by Macworld, May '89. Its 1024 x 820 resolution at 75 dpi is flicker-free, thanks to 75Hz performance.

And the image is bright and clear on the high-quality Zenith monitor. Rival comes complete with a built-in tilt-and-swivel base, cable and controller.

There are versions for the SE, SE/30 and Mac II family—at hundreds of dollars below our major competitors.

Here's what Rival owners have to say:

"It's crisp and clear and easy on the eyes— that's important when you end up working at it for 10 to 12 hours straight. I really don't know how I got along without it."

— Carol Stieglitz, Graphic Designer

"Our Rival is great. The price nabbed us. We shopped around, and it was far and away the best value."

— Shannon de Herrera, Publisher

Call us at (800) 423-0183 (within California, call (805) 484-3799) to find out where you can buy the MegaScreen Rival from MegaGraphics.

You owe it to yourself, to your budget, and to your computer salesperson.

439 Calle San Pablo, Camarillo, CA 93010 (805) 484-3799 Fax: (805) 484-5870

Macintosh is a registered trademark of Apple Computer, Inc. Zenith is a registered trademark of Zenith Corporation

Please circle 145 on reader service card.
Royal Pains

When Apple announced last May that the long-awaited, much-hyped System 7 operating system for the Mac, due sometime later this year, would include a new system for managing type, the company opened a can of worms that will eventually entangle almost every Mac owner.

I've been talking with people at Apple and other Mac vendors since then, trying to unravel the tangle. Here's an interim report on how this fundamental change may affect you. (For even more on the subject, see "Fine Print," September '89, and "Hot Type: Rising Font Wars" in StartUp News, December '89.)

PROMISES, PROMISES

Apple has already teased and worried us aplenty with advance word on some of the other goodies that System 7 will supposedly include — the performance boost offered by virtual memory, for example.

But none of Apple's well-planned leaks about System 7's glories drew as much interest — and caused as much concern — among Mac owners as did Apple's May announcement that it would be building new type-management tools into the operating system. Not everyone needs or would benefit greatly from such additions as virtual memory, but anyone who uses a Mac will benefit from the kind of type tools Apple is talking about adding to System 7.

If Apple gets it right, that is. And if, in the process, it doesn't create problems for the many Mac owners who have assembled collections of type fonts from Adobe, Bitstream, AGFA Compugraphic, Mergenthaler, Casady & Greene, T/Maker, and many other suppliers.

Simply put, Apple has promised that System 7 will replace the relatively crude type-display tools of QuickDraw, heretofore the heart of Mac display management, with outline fonts built in to the operating system. That should give Mac owners far better looking text on-screen and maximum-resolution output on any supported printer.

Outline fonts are the basis, for example, of Adobe's PostScript system. Rather than storing type fonts in the computer (or printer) as bit maps and then scaling their component dots up and down as you use larger and smaller sizes (or making them fatter or thinner if you choose boldface or lightface options), outline fonts store a single mathematically described character outline and then enlarge, reduce, or otherwise manipulate it to meet your specifications. In the last step, the outline is filled in to form the finished character on-screen or on paper.

Because good-looking output in the Mac universe means LaserWriter output or better, the LaserWriter's PostScript imaging system has been the focus of virtually all work with high-quality type on the Mac. PostScript is a highly portable standard by design, so Mac users can also run off their finished work on PostScript-controlled typesetters (often called imagesetters), such as the popular Linotronic 100 and 300.

QUICKDRAWBACKS

But several problems are associated with relying on PostScript output devices. The most important arises from differences in the way PostScript draws characters for the printer and the way the Mac's QuickDraw routines draw those characters on the screen.

Anyone who's seen 37-point Helvetica or 78-point Times on a Mac screen knows what I mean: They look like hell. QuickDraw looks at the bit maps available in your System Folder and tries to find one in exactly the size you've specified. If it does, it draws that on-screen with good results. (That's why Mac owners are always urged to install as many bit-map, or screen-font, sizes as are available.)

If QuickDraw doesn't find a screen font in the right size, it extrapolates from the bit maps it does find and invariably throws onto the screen crude, jagged characters. It's possible to create custom-sized bit maps where necessary, with U.S. MicroLabs' utility program FontSizer II (featured in last month's column and reviewed in the April '89 issue), but that's a slow, roundabout way to fix a problem that Apple built into the Mac.

The second major problem with this odd-couple pairing of two very different imaging models is that, as novice desktop publishers soon discover, line and page breaks seen on-screen (with QuickDraw imaging) frequently do not match those you see on
Finally, Apples

The HP DeskWriter.
$1195

The HP ScanJet Plus.
$2190
Hewlett-Packard presents the first complete line of peripherals designed specifically for the Macintosh.

The HP DeskWriter personal printer delivers laser-quality text and graphics for much less than other 300 dpi printers. Along with such features as whisper-quiet operation and a compact 15" x 17" x 8" footprint.

The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning. You get both image processing and text recognition for what you would expect to pay for a 4-bit scanner.

And the HP PaintJet color printer puts hundreds of colors right on the desktop. So nearly everyone can create a masterpiece of fine art. Or a masterpiece of business. Because PaintJet can handle everything from spreadsheets to overhead transparencies. Of course, each of our peripherals is backed by the same high level of service and support you've come to expect from HP. Call 1-800-752-0900, Ext. 275G for your nearest authorized HP dealer. And watch the Apples blossom.

There is a better way.
Anything Can Happen After Dark

The Versatile Screen Saver

Choose from ten exciting screen saver modules including flashing lightning bolts, streaking meteors, crawling worms, and a jump to light speed.

To project a sophisticated image, display your company logo as a screen saver, or dim your screen when not in use.

For programmers, After Dark comes with complete technical instructions for building your own screen saving creations.

Your screen won’t burn out. Why should you? For the Macintosh 512KE or better. Retail price $39.95

BERKELEY SYSTEMS
1700 Shattuck Ave., Berkeley, CA 94709
415-540-5535

Please circle 157 on reader service card.

paper (with PostScript imaging).

We’ve seen several answers to this dilemma over the past year, but until Apple announced its intention to add outline fonts to the operating system, there was no clear movement toward one or another of the answers.

Adobe, for example, developed Display PostScript, which uses a single set of font outlines to draw characters on-screen and on paper, thus providing both the high-quality displays and printouts we need and an exact correspondence between screen and paper images.

Although ATM is a first-rate, low-cost add-on and its display quality and display-to-printed-image correspondence are very high, it falls short of the comprehensive, single-imaging-model results of Display PostScript.

Enter System 7

Apple says we’ll find in System 7 a complete outline-font technology, built right into the operating system — where, in the best of all worlds, it ought to be found.

Apple says the technology, code-named Royal, will handle the rendering of all fonts from whatever source (as long as they use Royal technology) and give us great results on-screen. Apple will use the Royal technology in a new line of printers and also will license the technology to firms that want to build compatible printers.

If all this sounds as though Apple has decided to abandon the PostScript-based approach that has made it so successful in the high-quality-output business — well, you’re not far off. Soon, Apple has decided, its printers won’t need expensive PostScript-interpreter licenses anymore because the company is setting its own standard.

That’s a pretty drastic step, but the real issue is what will happen to Apple — having taken on this burden of change, the company will either suffer the costs or reap the rewards. The real question is, What’s going to happen to loyal Macintosh users who have $13,000 worth of Macintosh and LaserWriter equipment and who, very possibly, have anything from a few hundred to a few thousand dollars’ worth of PostScript fonts sitting on the shelf next to their desk? Is all that stuff obsolete?

Not at all, Apple assures us. System 7 will support the fonts we already have (including Royal fonts); our existing output devices (LaserWriters, Linotronic imagesetters, and the like); and, of course, our existing Macintosh computers themselves. If that is, we upgrade to System 7.

Which, I believe, is far from certain.

Royal Reservations

If you thought people were hesitant about moving up to new System releases in the past, you ain’t seen nothin’ yet. I’m convinced that because of the more
Master the power of your software quickly as your own private tutor talks you through the software, step by step. With your hands on the keyboard, trying each new skill as it's explained, you'll learn quickly and thoroughly. Our interactive, hands-on tutorials are available for:

- Macintosh Basics
- Excel 1.5 or 2.2
- FileMaker II
- FreeHand 2.0
- HyperCard

We offer beginning, intermediate and advanced tutorials for each of these software programs, so there's sure to be one that meets your needs.

Use the training that Apple uses for its own employees, and sells under its own name in Australia, Canada, New Zealand, and the United Kingdom.

If you're looking for a fast, convenient, affordable way to unleash the power of your software, call us at 1-800-TEACH-99 or 408-559-8635 and we'll send you a complete catalog — at no charge.
Consistently, people who work with numbers have some noticeable traits. They’re intelligent, organized and thorough—buttoned up, if you will.

Which explains why Microsoft Excel has been the spreadsheet standard for Macintosh ever since it was introduced in 1985. Today, 90% of Macintosh spreadsheet users do their calculating, manipulating, analyzing and presenting with it.

And while Microsoft Excel has always been easy to learn and use, it can now perform all the complex functions you perform, but with labor-saving benefits.

You can easily build complex models, and conveniently link multiple sheets with a simple point and click.

So the left hand knows what the right is doing, we’ve added a feature that will tie your data into Microsoft Word documents. Then update that same data automatically, when

With Microsoft Excel, you can create impressive documents, choosing from 256 fonts and colors, variable row height and shading.

### Profitability by division

<table>
<thead>
<tr>
<th>WinMark Copiers</th>
</tr>
</thead>
</table>

#### WxC 2000

<table>
<thead>
<tr>
<th></th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue (In Thousands)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>$8,400</td>
<td>$12,300</td>
<td>$13,900</td>
<td>$8,700</td>
<td>$13,000</td>
<td>$21,300</td>
</tr>
<tr>
<td>Forecast</td>
<td>$6,453</td>
<td>$8,800</td>
<td>$10,050</td>
<td>$9,460</td>
<td>$12,000</td>
<td>$18,900</td>
</tr>
<tr>
<td>Variance</td>
<td>$1,947</td>
<td>$3,500</td>
<td>$3,850</td>
<td>$(760)</td>
<td>$1,000</td>
<td>$2,400</td>
</tr>
<tr>
<td>%</td>
<td>130%</td>
<td>140%</td>
<td>138%</td>
<td>92%</td>
<td>108%</td>
<td>113%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cost of Goods Sold</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>$1,848</td>
<td>$3,198</td>
<td>$3,475</td>
<td>$2,262</td>
<td>$2,860</td>
<td>$7,663</td>
</tr>
<tr>
<td>Forecast</td>
<td>$1,549</td>
<td>$2,288</td>
<td>$2,312</td>
<td>$1,608</td>
<td>$2,640</td>
<td>$3,969</td>
</tr>
<tr>
<td>Variance</td>
<td>$299</td>
<td>$910</td>
<td>$1,184</td>
<td>$654</td>
<td>$220</td>
<td>$(3,969)</td>
</tr>
<tr>
<td>%</td>
<td>119%</td>
<td>140%</td>
<td>150%</td>
<td>141%</td>
<td>108%</td>
<td>0%</td>
</tr>
</tbody>
</table>

| Gross Profit         | $6,552 | $9,102 | $10,425 | $6,438 | $10,140 | $21,300 |

#### WxC 1000

<table>
<thead>
<tr>
<th></th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue (In Thousands)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>$2,184</td>
<td>$3,198</td>
<td>$3,892</td>
<td>$2,610</td>
<td>$4,030</td>
<td>$5,325</td>
</tr>
<tr>
<td>Forecast</td>
<td>$1,613</td>
<td>$2,200</td>
<td>$2,513</td>
<td>$2,365</td>
<td>$3,000</td>
<td>$4,725</td>
</tr>
<tr>
<td>Variance</td>
<td>$571</td>
<td>$998</td>
<td>$1,360</td>
<td>$245</td>
<td>$1,030</td>
<td>$600</td>
</tr>
<tr>
<td>%</td>
<td>135%</td>
<td>145%</td>
<td>155%</td>
<td>110%</td>
<td>134%</td>
<td>118%</td>
</tr>
</tbody>
</table>
it's been changed in Microsoft Excel. To insure data integrity, we've even built in alerts that will warn you of such grievous errors as circular references. In fact, Microsoft Excel is so bright, it will actually review your worksheet and flag any formulas that don't fit an established pattern.

Furthermore, the search and replace function can make corrections on a global scale. And customized number formatting lets you bend the rules, allowing you to create everything from a 3-digit account code to a 17-digit part number.

Now, we've left a lot out in this short course, but Microsoft Excel hasn't. So be sure to ask your dealer for a complete explanation of its capabilities. And you'll see how Microsoft Excel will make your job easier and better.

Or, if you look at it a different way, you'll become a more effective manipulator and a more efficient calculator.

WinMark Copiers

**MEMO:**

**TO:** Shannon Pitts  
**FR:** Peter Cohen  
**DT:** November 13th, 1989  
**RE:** Presentation to the Board

In preparation for the annual meeting, I've created a 20-minute slide presentation on our successful entry into the small printer market.

The presentation will explain to the shareholders that, on a basis of sound marketing strategy, reinforced with our knowledge of the printer business at other levels, we have been able to grow from a 2 percent share of market, to 9 percent in 18 short months.

To the right is an excerpt of the presentation which illustrates our growth. Anticipated concerns will probably center around quality of service and the ability to meet market demand over the next year.

We should be able to squeel any fears by explaining that our small printers have a very low (4%) field repair call requirement at present.

And our assembly resources here in the U.S. will also be increasing by 97% over the next six months.
Why Sensible Grammar™ is first in its class.

Now anything you write, from a business letter to an annual report, can be stronger and clearer. With Sensible Grammar™, a professional proof-reading program that uses artificial intelligence to check your punctuation, usage, phraseology and more.

Sensible Grammar scans your work for potential errors and automatically displays the sentences in which they appear. It explains what's wrong and even suggests corrections. Making changes is easy—a simple click of the mouse, and you can do anything from inserting proper punctuation to rewriting entire sentences using the built-in sentence editor. And your formatting information remains unaffected.

Sensible Grammar compares your text against a library of over 4500 phrases to identify informal, vague, racist, sexist and other faulty language. It catches embarrassing typographical errors like misused capitalization and repeated words, and alerts you to mismatched verbs and pronouns, needlessly long sentences and more. It even provides a readability analysis.

Sensible Grammar works with WordPerfect, Microsoft Word, Works, and Write, Apple/Claris MacWrite and MacWrite II, T/Maker WriteNow and text files. It costs just $99.95.

So get Sensible Grammar. And be the most effective communicator you can be.

Also available: Bookends™, the reference management database and bibliography preparation system ($99.95).

Sensible Software, Inc. 335 East Big Beaver, Suite 207 Troy, MI 48083 (313) 528-9150

Please circle 31 on reader service card.

Do I think System 7 and the Royal font technology may fail? Of course not. We'll come around sooner or later. And Apple has bought itself a nice insurance policy for the Royal font-management code's success.

Swaine's "Slimming the System." December '89.

Even as hard-disk drives became commonplace, we looked with jaundiced eyes at new system-software releases, wary of the swarms of bugs that had jumped out of the box and stung us with previous new releases.

And, of course, we worried about Apple's zany release-numbering practice for System and Finder pairings—a jumble that got so bad, you may recall, that Apple started including hilariously cross-tabbed compatibility charts in the back pages of each new System manual.

But all that stuff is peanuts compared with what we're gonna be saying about System 7.

Listen: I like the idea of System 7. Virtual memory is swell. Having outline fonts in the operating system is an elegant idea. And I may scream, but I'll upgrade the box or stick in a new chip to get those benefits, if they're really worth it—and if they really work.

But I'm very wary of this forthcoming first release of System 7. The Royal font-management technology has a lot to prove, I think, before we jump in. Sure, Display PostScript eats up computing power—but so will Royal. Sure, it's nice to promise compatibility with everything under the sun, but it's going to be very hard to deliver.

Does that mean I think System 7 and the Royal font technology may fail? Of course not. We'll come around sooner or later. And last September, Apple bought itself a nice insurance policy for the Royal font-management code's success. At the Seybold electronic-publishing conference, Apple and Microsoft announced a cross-licensing arrangement whereby Microsoft would build that same technology into a future release of its OS/2 Presentation Manager operating system for IBM PCs and compatibles.

That gives printer manufacturers leery of investing in the development of Royal-compatible printers a warm feeling: now they won't be gambling so much on the success of Apple's new gambit. Whatever you think of IBM PCs—or of the probable adoption rate of the slow-building OS/2 market—that announcement increases severalfold the potential market for Royal-capable output devices.

Of course, it was also very bad news for Adobe and at least moderately bad news for those who want to see PostScript continue to grow as the imaging model in the computer world. Although the survival of PostScript itself doesn't seem doubtful—too many PostScript-based devices and software packages are out there now for PostScript to disappear—this move will almost certainly diminish its future importance.

It also introduces a large element of chaos into buying plans. Buying at the right point in a given technology's life cycle is a big thing for corporate managers who have to look three to five years into the future, buying equipment that will remain current if not quite on the cutting edge throughout its useful life (and throughout the Internal Revenue Service's three-to-five-year depreciation cycle on business equipment).

Ahh, Apple. System 7 is so enticing. But at what cost?
PRINTS GREAT. LESS SHILLINGS. 
THE NEW $1399 PLP II.

Now you can have everything you ever wanted in a laser printer. Without paying the price.

Introducing the lowest priced laser printer in history: the $1399 PLP II from GCC Technologies. GCC developed the very first personal laser printer in 1987, and has over 10,000 satisfied users...more than everyone else combined.

Finally, a revolutionary printer at a revolutionary price. In fact, at $1399, it's nothing short of a technological marvel.

**Personal Desktop Printing.**

Three years of research and development have put the finest printer technology right on your desktop: a combination of the newest third generation laser engine, GCC's own custom designed integrated circuits, and the market's most sophisticated QuickDraw™ imaging software yet.

Features such as a silent "sleep" mode, a very user-friendly LCD display and an envelope printing desk accessory have been carefully integrated to create a laser printer that truly is personal.

The Highest Quality Printing.

Because PLP II includes 6 outline font families (for a total of 22 individual fonts), its razor-sharp, clean output can be shaped, scaled, and rotated to any point size — all at a full 300 dpi.

These outline fonts, combined with GCC's powerful QuickDraw imaging software, give you unlimited flexibility in producing perfect documents from such applications as PageMaker, "Word," Excel, "MacWrite," MacDraw, "Persuasion," and Canvas.

**Dealer or Direct: Your Choice.**

GCC has made acquiring your new PLP II just as easy as using it. If you would like to see a demonstration and purchase your PLP II today, simply visit one of GCC's authorized dealers. For the location of the dealer nearest you, call 800-422-7777.

To order direct from GCC, call us toll-free from 9 AM to 8 PM (EST) on weekdays, or 10 AM to 4 PM (EST) on Saturdays. Our trained staff can answer your questions and offer advice on any of our products. (Be sure to ask for our free catalog.) Orders received by 8 PM (EST) will be shipped the same day via overnight delivery for only $9.

What's more, when you buy direct from GCC we guarantee satisfaction. If after trying PLP II for up to 30 days you aren't completely satisfied, return it and we'll cheerfully refund your money.

**One Year Warranty.**

PLP II carries a full one year warranty on parts and labor. We also offer repair service at any Xerox™ carry-in service center, or at any one of hundreds of GCC Technologies dealers.

**PLP II. $1399.**

We gladly accept MasterCard, Visa, American Express, or your company's corporate purchase order.

Please circle 108 on reader service card.

---

GCC Technologies...Peripherals with Vision™.

GCC dealers are independent businesses and each may offer different prices, policies, and service arrangements. In Canada 819-263-1403 & 819-569 GCC Technologies, Inc.
WILL IT WORK ON MY MAC???? Good question. You see, most Mac users are now working on machines that have 1 Meg of RAM and the 128K ROM chips (i.e. a Mac Plus, SE, or an earlier Mac that’s been upgraded to that level). For that reason, a great deal of hardware and software requires at least that configuration. So, if you own an earlier Mac 128K or 512K you should always tell us when placing your order. That way we can tell you right away if what you want is compatible. And, if it’s not, we can explain to you the different options for upgrading.

The majority of products we carry are now covered by 30-60 day Money Back Guarantees (as listed here in red). If you’re not happy with one of those products, call us for an authorization and return it with all of the original packaging within the guarantee period for a refund check (or credit on your credit card). We reserve the right to limit quantities on such returns.

Version numbers in our ads are current at press time. You will receive the latest version when you order, because that’s all we sell. Also, all software is not copy-protected, unless indicated otherwise by (CP). Finally, please refer to the four-digit number next to the product when ordering. Thanks!

CheckMark Software ... 60 day MBG
Payroll 4.02—A payroll system for 1 to 1000 employees. All tax tables are included ... 179.

5862 Payroll 4.02 ........ 179.
5863 MultiLedger 1.3 ...... 239.

ACCOUNTING & FINANCE

Aatrix Software ..... 30 day MBG
5872 Checkwriter 2.0 ........ 37.
3976 Aatrix Payroll 3.5 ...... 109.
3958 Aatrix Payroll PLUS 3.1 175.
4021 Aatrix TimeCard 2.0 .... 119.
4020 Aatrix TimeMinder 2.1.2 175.

Chang Labs ... 60 day MBG
1622 Rags to Riches 3-Pak 3.1 ... 289.
1612 Inventory Control 2.6 .... 235.
1615 Professional Billing 2.9 .... 235.
1616 Professional 3-Pak ...... 355.
1618 Retail Business 3-Pak ...... 355.
CheckMark Software ... 60 day MBG
5861 CashLedger 1.3A ... 119.

NUMBERS & DATABASES

Abacus Concepts ... 30 day MBG
4492 StatView SE + Graphics 1.03 199.
4481 StatView 1.03 ..... 285.
5840 SuperANOVA 1.0 (for Mac Plus SE) 465.
5904 SuperANOVA 1.0 (for Mac II) ... 465.
5906 SE + Graphics/SuperANOVA bundle 595.

Practical Peripherals ... 30 day MBG
Macintosh Communications Pack 1.5—External 2400BSA Modem, cable, and top-selling communications software. Hayes compatible, auto-answer. A superior value .... 225.
town of Marlow, New Hampshire

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/334-4444 603/446-7711 FAX 603/446-7791

MacDraft 1.28 . . . . . . . . 143.

Digital Darkroom 1.1 . . ....... 249.

Silicon Press 1.1 . . . . . . . . . 52.

SuperPaint 2.0 . ....... ..... . . 125.

Digital Darkroom 1.2 . . . . . . 249.

Super3D 2.0 . .. . .. . .... . .. . . 315.

SuperPaint 3.0 . . . . . . . . . . . 225.

PixelPaint 2.0 . . ... . ....... 225.

SuperPaint Professional 1.0 .... 395.

SuperPaint Professional 2.0 .... 225.

SuperPaint Professional 3.0 .... 395.

SuperPaint Professional 4.0 .... 395.

SuperPaint Professional 5.0 .... 395.

SuperPaint Professional 6.0 .... 395.

SuperPaint Professional 7.0 .... 395.

SuperPaint Professional 8.0 .... 395.

SuperPaint Professional 9.0 .... 395.

SuperPaint Professional 10.0 .... 395.

SuperPaint Professional 11.0 .... 395.

SuperPaint Professional 12.0 .... 395.

SuperPaint Professional 13.0 .... 395.

SuperPaint Professional 14.0 .... 395.

SuperPaint Professional 15.0 .... 395.

SuperPaint Professional 16.0 .... 395.

SuperPaint Professional 17.0 .... 395.

SuperPaint Professional 18.0 .... 395.

SuperPaint Professional 19.0 .... 395.

SuperPaint Professional 20.0 .... 395.

SuperPaint Professional 21.0 .... 395.

SuperPaint Professional 22.0 .... 395.

SuperPaint Professional 23.0 .... 395.

SuperPaint Professional 24.0 .... 395.

SuperPaint Professional 25.0 .... 395.

SuperPaint Professional 26.0 .... 395.

SuperPaint Professional 27.0 .... 395.

SuperPaint Professional 28.0 .... 395.

SuperPaint Professional 29.0 .... 395.

SuperPaint Professional 30.0 .... 395.

SuperPaint Professional 31.0 .... 395.

SuperPaint Professional 32.0 .... 395.

SuperPaint Professional 33.0 .... 395.

SuperPaint Professional 34.0 .... 395.

SuperPaint Professional 35.0 .... 395.

SuperPaint Professional 36.0 .... 395.

SuperPaint Professional 37.0 .... 395.

SuperPaint Professional 38.0 .... 395.

SuperPaint Professional 39.0 .... 395.

SuperPaint Professional 40.0 .... 395.

SuperPaint Professional 41.0 .... 395.

SuperPaint Professional 42.0 .... 395.

SuperPaint Professional 43.0 .... 395.

SuperPaint Professional 44.0 .... 395.

SuperPaint Professional 45.0 .... 395.

SuperPaint Professional 46.0 .... 395.

SuperPaint Professional 47.0 .... 395.

SuperPaint Professional 48.0 .... 395.

SuperPaint Professional 49.0 .... 395.

SuperPaint Professional 50.0 .... 395.

SuperPaint Professional 51.0 .... 395.

SuperPaint Professional 52.0 .... 395.

SuperPaint Professional 53.0 .... 395.

SuperPaint Professional 54.0 .... 395.

SuperPaint Professional 55.0 .... 395.

SuperPaint Professional 56.0 .... 395.

SuperPaint Professional 57.0 .... 395.

SuperPaint Professional 58.0 .... 395.

SuperPaint Professional 59.0 .... 395.

SuperPaint Professional 60.0 .... 395.

SuperPaint Professional 61.0 .... 395.

SuperPaint Professional 62.0 .... 395.

SuperPaint Professional 63.0 .... 395.

SuperPaint Professional 64.0 .... 395.

SuperPaint Professional 65.0 .... 395.

SuperPaint Professional 66.0 .... 395.

SuperPaint Professional 67.0 .... 395.

SuperPaint Professional 68.0 .... 395.

SuperPaint Professional 69.0 .... 395.

SuperPaint Professional 70.0 .... 395.

SuperPaint Professional 71.0 .... 395.

SuperPaint Professional 72.0 .... 395.

SuperPaint Professional 73.0 .... 395.

SuperPaint Professional 74.0 .... 395.

SuperPaint Professional 75.0 .... 395.

SuperPaint Professional 76.0 .... 395.

SuperPaint Professional 77.0 .... 395.

SuperPaint Professional 78.0 .... 395.

SuperPaint Professional 79.0 .... 395.

SuperPaint Professional 80.0 .... 395.

SuperPaint Professional 81.0 .... 395.

SuperPaint Professional 82.0 .... 395.

SuperPaint Professional 83.0 .... 395.

SuperPaint Professional 84.0 .... 395.

SuperPaint Professional 85.0 .... 395.

SuperPaint Professional 86.0 .... 395.

SuperPaint Professional 87.0 .... 395.

SuperPaint Professional 88.0 .... 395.

SuperPaint Professional 89.0 .... 395.

SuperPaint Professional 90.0 .... 395.

SuperPaint Professional 91.0 .... 395.

SuperPaint Professional 92.0 .... 395.
we’re not slowed down

ICOM Simulations
5682 MacKern 1.0 ............. $115.
5683 Letraset ................. $75.
2621 Ready.Set.Go! 4.5 .... $250.
2619 Image Studio 1.6 ....... $275.
4709 Letrascript 1.0 ....... $275.

Microsoft 30 day MBG
2878 PowerPoint 2.01 ....... $249.

Preferred Publishers 30 day MBG
5751 Exposure 1.1 .......... $54.

Quark 30 day MBG
4621 Quark XPress 2.11 .... $169.
3230 Quark XPress 2.11 .... $459.

Softstream Int’l., Inc. 60 day MBG
4996 UltraSpec 1.0 ........ $95.

Springboard 30 day MBG
3530 Certificate Maker 2.0 ... $22.
3532 Certificate Library .... $18.
4500 Springboard Publisher II .. $109.

Timeworks 30 day MBG
5908 Publish-it! 1.0 ....... $225.

The Complete PC
The Complete ASCII-Page Scannera 402-A versatile personal scanner for desktop publishing. Scan at up to 400 dpi and then resize, scale, rotate, crop or edit your picture with the SmartScan software included. Compact and easy to use $315.

T/Maker 30 day MBG
3635 EPS Illustrations ....... $74.
5167 EPS Business Art .... $74.

PROGRAMMING & HYPERMEDIA

Apple Computer
1118 HyperCard 1.2.2 ........ $42.
1403 Complete HyperCard Handbook .... $22.

Antic Software 30 day MBG
4562 FlexiForm Business Templates I ... $49.
4566 FlexiForm Business Templates II ... $49.
4567 Presentations Pack 3 ... $279.

Bitstream MacFontWare Typeface pkgs ... ea.
Bright Star Technology
6093 Interface 1.0 ........... $229.

Casady & Greene 60 day MBG
MacConnection carries the entire line of Casady & Greene fonts. Volumes 1-122 ... each $46.

Font Pack (Vol. 1-20) ... ea.
Font Pack (Vol. 21-40) ... ea.
Font Pack (Vol. 41-70) ... ea.
Font Pack (Vol. 71-100) ... ea.
Font Pack (Vol. 101-122) ... ea.

Computer Associates/Cricket
1668 Cricket Graph 1.3 ..... $115.
1670 Cricket Presents 2.0 ... $255.

DreamMaker 30 day MBG
4840 Ciphers: Business 1 ... $69.
4841 Ciphers: Business 2 ... $69.

DubleClick Software
1420 World-Class LaserType Vol. 1-9 each $42.

Emerson City 30 day MBG
6098 TypeAlign for ATM 1.0 ... $63.

Farallon Computing 30 day MBG
4684 ScreenRecorder 1.0 ..... $129.
2199 MacRecorder 2.0 .... $162.

Hyperpress Publishing
5435 HyperOne 1.0 ........... $29.
4233 Icon Factory 1.0 ....... $29.
5089 Script Library 1.0 ...... $29.
4265 Script Expert 1.0 ...... $45.
5434 Intelligent Developer 1.0 ... $219.

ICOM Simulations
5681 HyperMON 1.0 ........... $59.
4055 TMON 2.8.2 ... $89.

Individual Software
4719 101 Scripts & Buttons HyperCard 1.0 ... $36.

Microsoft 30 day MBG
4471 QuickBasic 1.0 ....... $65.

Millenium Software 30 day MBG
6105 Hyper X 3.0 ........... $65.

Olduvai
5446 PLUS 1.1 ................. $109.
Silicon Beach 60 day MBG
5100 SuperCard 1.0 ........... $125.

SmathersBarnes 30 day MBG
1478 Prototype 2.1 ....... $189.

Softstream Int’l., Inc 60 day MBG
5440 HyperHit 1.0 ........... $125.

Symantec 30 day MBG
4495 Family Matters 1.0 ....... $28.
Symmetry 30 day MBG
3381 HyperDA 1.2 ........... $49.

Timeworks 30 day MBG
5905 The Hyperworks Organizer 1.0 ... $57.

TML Systems 30 day MBG
3548 TML Source Code Library II ... $39.
4989 TML Pascal II.0 (w/o MPW 3.0) ... $57.
3549 TML Pascal II.0 (w/MPW 3.0) ... $109.

XOR 30 day MBG
3588 ReadRacer-Drive your high-performance 1965 Corvette through 5 environments (5 levels of difficulty in each) running from high-speed desert tracks to twisting mountain roads. Uses digitized sounds and graphics $38.

Somak Software 30 day MBG
ScriptEdit 1.1—Now novice and experienced HyperCard users can create and edit scripts faster and easier than ever, with multiple script windows, global search and replace, HyperTalk pop-up menus and more $49.

Script&lit 1.1-Now Script&lit allows you to create and use pop-up menus and more. $49.

Somak Software 30 day MBG
ScriptEdit 1.1-Now novice and experienced HyperCard users can create and edit scripts faster and easier than ever, with multiple script windows, global search and replace, HyperTalk pop-up menus and more $49.

MacConnection carries the entire line of Casady & Greene fonts. Volumes 1-122 ... call.

We're not slowed down.

The Complete ASCII-Page Scanner 402 - A versatile personal scanner for desktop publishing. Scan at up to 400 dpi and then resize, scale, rotate, crop or edit your picture with the SmartScan software included. Compact and easy to use $315.

Apple Computer
1118 HyperCard 1.2.2 ........ $42.
Bantam Publishing
1403 Complete HyperCard Handbook .... $22.

Antic Software 30 day MBG
4562 FlexiForm Business Templates I ... $49.
4566 FlexiForm Business Templates II ... $49.

Bitstream MacFontWare Typeface pkgs ... ea.
Bright Star Technology
6093 Interface 1.0 ........... $229.

Casady & Greene 60 day MBG
MacConnection carries the entire line of Casady & Greene fonts. Volumes 1-122 ... each $46.

Font Pack (Vol. 1-20) ... ea.
Font Pack (Vol. 21-40) ... ea.
Font Pack (Vol. 41-70) ... ea.
Font Pack (Vol. 71-100) ... ea.
Font Pack (Vol. 101-122) ... ea.

Computer Associates/Cricket
1668 Cricket Graph 1.3 ..... $115.
1670 Cricket Presents 2.0 ... $255.

DreamMaker 30 day MBG
4840 Ciphers: Business 1 ... $69.
4841 Ciphers: Business 2 ... $69.

DubleClick Software
1420 World-Class LaserType Vol. 1-9 each $42.

Emerson City 30 day MBG
6098 TypeAlign for ATM 1.0 ... $63.

Farallon Computing 30 day MBG
4684 ScreenRecorder 1.0 ..... $129.
2199 MacRecorder 2.0 .... $162.

Hyperpress Publishing
5435 HyperOne 1.0 ........... $29.
4233 Icon Factory 1.0 ....... $29.
5089 Script Library 1.0 ...... $29.
4265 Script Expert 1.0 ...... $45.
5434 Intelligent Developer 1.0 ... $219.

ICOM Simulations
5681 HyperMON 1.0 ........... $59.
4055 TMON 2.8.2 ... $89.

Individual Software
4719 101 Scripts & Buttons HyperCard 1.0 ... $36.

Microsoft 30 day MBG
4471 QuickBasic 1.0 ....... $65.

Millenium Software 30 day MBG
6105 Hyper X 3.0 ........... $65.

Olduvai
5446 PLUS 1.1 ................. $109.
Silicon Beach 60 day MBG
5100 SuperCard 1.0 ........... $125.

SmathersBarnes 30 day MBG
1478 Prototype 2.1 ....... $189.

Softstream Int’l., Inc 60 day MBG
5440 HyperHit 1.0 ........... $125.

Symantec 30 day MBG
4495 Family Matters 1.0 ....... $28.
Symmetry 30 day MBG
3381 HyperDA 1.2 ........... $49.

Timeworks 30 day MBG
5905 The Hyperworks Organizer 1.0 ... $57.

TML Systems 30 day MBG
3548 TML Source Code Library II ... $39.
4989 TML Pascal II.0 (w/o MPW 3.0) ... $57.
3549 TML Pascal II.0 (w/MPW 3.0) ... $109.

XOR 30 day MBG
3588 ReadRacer-Drive your high-performance 1965 Corvette through 5 environments (5 levels of difficulty in each) running from high-speed desert tracks to twisting mountain roads. Uses digitized sounds and graphics $38.
### UTILITIES

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott Systems</td>
<td>$12</td>
</tr>
<tr>
<td>Affinity Microsystems</td>
<td>$100</td>
</tr>
<tr>
<td>Aladdin Systems</td>
<td>$18</td>
</tr>
<tr>
<td>American Power</td>
<td>$15</td>
</tr>
<tr>
<td>Berkeley Systems</td>
<td>$12</td>
</tr>
<tr>
<td>After Dark</td>
<td>$25</td>
</tr>
<tr>
<td>CanOpener</td>
<td>$40</td>
</tr>
<tr>
<td>DishLock</td>
<td>$10</td>
</tr>
<tr>
<td>DiskLock Plus</td>
<td>$40</td>
</tr>
<tr>
<td>Dubi-Clock Software</td>
<td>$40</td>
</tr>
<tr>
<td>Electronic Arts</td>
<td>$40</td>
</tr>
<tr>
<td>Fifth Generation</td>
<td>$40</td>
</tr>
<tr>
<td>HJC Software</td>
<td>$40</td>
</tr>
<tr>
<td>JAM Software</td>
<td>$40</td>
</tr>
<tr>
<td>Loop Software</td>
<td>$40</td>
</tr>
<tr>
<td>MicroLabs</td>
<td>$40</td>
</tr>
<tr>
<td>Microsecond</td>
<td>$40</td>
</tr>
<tr>
<td>MulTiSafe</td>
<td>$40</td>
</tr>
<tr>
<td>MyDiskLabeler</td>
<td>$40</td>
</tr>
<tr>
<td>Network DiskFit</td>
<td>$40</td>
</tr>
<tr>
<td>Panel Power</td>
<td>$40</td>
</tr>
<tr>
<td>PowerStation</td>
<td>$40</td>
</tr>
<tr>
<td>Redux</td>
<td>$40</td>
</tr>
<tr>
<td>Retrospect</td>
<td>$40</td>
</tr>
<tr>
<td>REX</td>
<td>$40</td>
</tr>
<tr>
<td>Sales &amp; Marketing Edition</td>
<td>$25</td>
</tr>
<tr>
<td>SuperGlue II</td>
<td>$40</td>
</tr>
<tr>
<td>SuperMac Software</td>
<td>$40</td>
</tr>
<tr>
<td>SuperSpool 5.0</td>
<td>$40</td>
</tr>
<tr>
<td>Symantec Anti-virus</td>
<td>$40</td>
</tr>
<tr>
<td>Symantec Utilities</td>
<td>$40</td>
</tr>
<tr>
<td>Syngex</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper</td>
<td>$40</td>
</tr>
<tr>
<td>TimeMaster</td>
<td>$40</td>
</tr>
<tr>
<td>TimeCard</td>
<td>$40</td>
</tr>
<tr>
<td>TimeKeeper</td>
<td>$40</td>
</tr>
<tr>
<td>TimeKeeper II</td>
<td>$40</td>
</tr>
<tr>
<td>TimeKeeper III</td>
<td>$40</td>
</tr>
<tr>
<td>TimeKeeper IV</td>
<td>$40</td>
</tr>
<tr>
<td>TimeKeeper V</td>
<td>$40</td>
</tr>
<tr>
<td>TimeMaster II</td>
<td>$40</td>
</tr>
<tr>
<td>TimeMaster III</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper IV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper V</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper VI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper VII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper VIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper IX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper IXL</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XLX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XLI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XVI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XVII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XVIIL</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XVIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXVI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXVII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXVIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXIV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXVI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXVII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXVIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXIX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXIV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXVI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXVII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXVIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXIX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXIV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXVI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXVII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXVIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXIX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXIV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXVI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXVII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXVIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXIX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXX</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXI</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXIII</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXIV</td>
<td>$40</td>
</tr>
<tr>
<td>Timekeeper XIXIIXXXV</td>
<td>$40</td>
</tr>
</tbody>
</table>
Place your order by 8,

**MUSIC & EDUCATION**

- **Arts Nova ... 30 day MBG**
  - 1215 Practical Musica 2.2 ... $72.
- **Bogas Productions ... 60 day MBG**
  - 1461 Studio Session 1.2 SE ... 45.
  - 4255 Super Studio Session 2.0 ... 65.
  - 1459 Heavy Metal Rock ... 13.
  - 1460 String Quartet ... 13.
  - 1456 Country Disk ... 13.
- **Sensible Grammar 1.5.5** ... 53.
- **Bright Star Technology**
  - 3961 Talking Tails 1.0 ... 27.
  - 1402 Alphabet Blocks 1.0 ... 30.
- **Broderbund Software**
  - 4314 Type 1.0 ... 18.
  - 1423 Jamestown Session 1.1 (CP) ... 29.
  - 1422 Geometry 1.2 (CP) ... 58.
  - 4067 Calculus 1.2 (CP) ... 58.
  - 1426 Physics 1.2 (CP) ... 58.
- **Penton Overseas ... 30 day MBG**
  - 5863 VocabuLearn/French (level 1) ... 30.
  - 5867 VocabuLearn/French (level 2) ... 30.
  - 5865 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5867 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5866 VocabuLearn/German (level 1) ... 30.
  - 5888 VocabuLearn/German (level 2) ... 30.
  - 5886 VocabuLearn/Japanese (level 1) ... 36.
  - 5900 VocabuLearn/Japanese (level 2) ... 36.
  - 5887 VocabuLearn/Chinese (level 1) ... 30.
  - 5888 VocabuLearn/Chinese (level 2) ... 30.
- **Carina Software**
  - 5726 Voyager 1.2 ... 89.
  - 4367 MacDrama 1.01 (CP) ... 31.
  - 4483 Perceive 1.0 ... 49.
  - 5854 MusicProse 1.0 ... 169.
- **Davidson & Associates**
  - 1734 Math Blaster! 1.0 (CP) ... 26.
  - 6126 Math Blaster Mystery (CP) ... 26.
  - 4978 Spellwright II 1.0 (CP) ... 26.
- **Sensible Software**
  - 3375 Sensible Grammar 1.5.5 ... 53.
  - 4692 Bookends 1.7 ... 53.
  - 3422 More II 2.0 ... 245.
  - 4504 Acta Advantage 1.0 ... 65.
- **Symantec ... 30 day MBG**
  - 4314 Type 1.0 ... 18.
  - 4367 MacDrama 1.01 (CP) ... 31.
  - 4483 Perceive 1.0 ... 49.
  - 5854 MusicProse 1.0 ... 169.
- **Farallon Computing ... 30 day MBG**
  - 2273 ConcertWare + 4.0 ... $38.
  - 2271 ConcertWare + MIDI 5.0 ... 99.
- **Learning Company ... 30 day MBG**
  - 5864 VocabuLearn/Chinese (level 1) ... 30.
  - 5867 VocabuLearn/Chinese (level 2) ... 30.
  - 5865 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5867 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5866 VocabuLearn/German (level 1) ... 30.
  - 5888 VocabuLearn/German (level 2) ... 30.
  - 5886 VocabuLearn/Japanese (level 1) ... 36.
  - 5900 VocabuLearn/Japanese (level 2) ... 36.
  - 5864 VocabuLearn/French (level 1) ... 30.
  - 5867 VocabuLearn/French (level 2) ... 30.
  - 5865 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5867 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5866 VocabuLearn/German (level 1) ... 30.
  - 5888 VocabuLearn/German (level 2) ... 30.
  - 5886 VocabuLearn/Japanese (level 1) ... 36.
  - 5900 VocabuLearn/Japanese (level 2) ... 36.
  - 5864 VocabuLearn/Chinese (level 1) ... 30.
  - 5867 VocabuLearn/Chinese (level 2) ... 30.
  - 5865 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5867 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5866 VocabuLearn/German (level 1) ... 30.
  - 5888 VocabuLearn/German (level 2) ... 30.
  - 5886 VocabuLearn/Japanese (level 1) ... 36.
  - 5900 VocabuLearn/Japanese (level 2) ... 36.
  - 5864 VocabuLearn/French (level 1) ... 30.
  - 5867 VocabuLearn/French (level 2) ... 30.
  - 5865 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5867 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5866 VocabuLearn/German (level 1) ... 30.
  - 5888 VocabuLearn/German (level 2) ... 30.
  - 5886 VocabuLearn/Japanese (level 1) ... 36.
  - 5900 VocabuLearn/Japanese (level 2) ... 36.
  - 5864 VocabuLearn/French (level 1) ... 30.
  - 5867 VocabuLearn/French (level 2) ... 30.
  - 5865 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5867 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5866 VocabuLearn/German (level 1) ... 30.
  - 5888 VocabuLearn/German (level 2) ... 30.
  - 5886 VocabuLearn/Japanese (level 1) ... 36.
  - 5900 VocabuLearn/Japanese (level 2) ... 36.
  - 5864 VocabuLearn/French (level 1) ... 30.
  - 5867 VocabuLearn/French (level 2) ... 30.
  - 5865 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5867 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5866 VocabuLearn/German (level 1) ... 30.
  - 5888 VocabuLearn/German (level 2) ... 30.
  - 5886 VocabuLearn/Japanese (level 1) ... 36.
  - 5900 VocabuLearn/Japanese (level 2) ... 36.
  - 5864 VocabuLearn/French (level 1) ... 30.
  - 5867 VocabuLearn/French (level 2) ... 30.
  - 5865 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5867 VocabuLearn/Italian (level 1) ... 30.
  - 5869 VocabuLearn/Italian (level 2) ... 30.
  - 5866 VocabuLearn/German (level 1) ... 30.
  - 5888 VocabuLearn/German (level 2) ... 30.
  - 5886 VocabuLearn/Japanese (level 1) ... 36.
  - 5900 VocabuLearn/Japanese (level 2) ... 36.
  - 5864 VocabuLearn/French (level 1) ... 30.
  - 5867 VocabuLearn/French (level 2) ... 30.
"I must be crazy to play a child’s game."

Dear MacConnection,

My hard drive crashed the other evening when I mistakenly tried to install an un-installable game. I envisaged prolonged down time and thought, "I must be crazy to use my business computer to play a child’s game." With dark clouds blowing through my mind, I rang your technical support department. They worked me through several routines, and within minutes my hard drive was working normally again. They even helped me clear up some mysteries about my System 6.0 that baffled me. Wow MacConnection!

That’s terrific technical support!

Bill Warren
New Hampshire Hydraulics, Inc.
Merrimack, NH

MacConnection

MacConnection, 14 Mill Street, Marlow, NH 03456  1-800/334-4444  603/446-7711  FAX 603/446-7791

© Copyright 1990 PC Connection, Inc. MacConnection is a division and trademark of PC Connection, Inc., Marlow, NH.

Just for the record, all the ads in this series feature photographs of real live MacConnection customers and the real live letters they wrote us. Really!
Over 5633 LaserWriter Printer Stand . . . . . . . 28.
2559 Mouseway Pad . 7.
2547 lmageWriter II Dust Cover . . 9.
4808 Laser Labels
4810 Laser Labels 8
4809 Laser Labels 2" x 4"
4657 LaserWriter II Cover . . . . ....... 10.
2559 Mac Plus Cover . . . . . . . . 8.
1722 ImageWriter II Cover . . 8.
1723 ImageWriter II Cover . . 8.
1720 Mac Plus Cover . . 10.
1724 Mac SE Cover . . 10.
1725 Mac SE Ext. Keyboard Cover Set . . 10.
4657 LaserWriter II Cover . . 10.
1710 The Organizer . . . . . . . . . . . . 23.
2563 Mouse Pocket ADB . . . . . . . . 8.
2577 Tilt/Swivel . . . . . . . . . . . . 11.
2568 Maccessories Super Base . 34.
2579 Mac II Monitor Cable Extension Kit . 33.
2267 Printer Muffler 60 . 43.
1723 Mac SE Ext. Keyboard Cover Set . . 10.
4623 Solid Oak Disk Case, made by New
0664 Apple Security Kit . . 34.
2585 Printer Muffler 80 . 43.
4971 Modem/FAX Protector 20 . 25.
4862 SE Protection Pak (ext. keyboard) . 75.
5230 PowerBacker 800 . . 749.
5228 PowerBacker 1200 . . . . . . 949.
1721 Mac SE Ext. Keyboard Cover . . . . 10.
3618 ImageWriter II Carry Case. 45.
3617 Mac Plus SE Carry Case . . 55.
4015 Mac SE & Ext. Kybd. Carry Case . 69.
6195 Mac IICy Carry Case . . 85.
6096 The Organizer . . 239.
2693 Moustrak Pad L/F . . . . . . . . 9.
6064 Apple Color Monitor Polarizing Filter 63.
4612 LaserWriter 11 Dust Cover . 17.
2699 Mac SE Ext. Keyboard Cover Set . . 10.
5064 Apple Color Monitor Polarizing Filter 63.
5063 Apple Color Monitor Polarizing Filter 63.
5065 Full Page Display Polaring Filter . 63.
5066 Two Page Display Polaring Filter . 63.
4941 Mac II Monitor Stand . . . . . . 64.
2567 System Saver Mac (platinum) . . . . 63.
2566 System Saver Mac (neige) . . 63.
2546 A B Box (DIN-8) . . . . 63.
2568 Mac II Stand and Cable Kit . 64.
2561 MasterPiece Mac II . . . . . . . . 105.
2589 PowerBacker 360 . . . . . 339.
2578 PowerBacker 520 . . . . . . . 399.
5067 PowerBacker 800 . . . . . . . 749.
2567 System Saver Mac . . . . . . . . 63.
5069 PowerBacker 1200 . . . . . . . 949.
4970 Fanny Mac OT . . . . . . . 59.
2570 Mac II Dust Cover . . . . . . . 17.
2580 Mac II Stand . . . . . . . . 20.
2545 Universal Copy Stand . . . . . 22.
2573 Tilt/Swivel (platinum) . . . . . 22.
2578 Extra Long ADB Keyboard Cable . . 25.
2579 Mac II Monitor Cable Extension Kit . . 23.
4972 Power Tree 10 . 19.
4973 Power Tree 20 . . 27.
4974 Power Tree 50 . . . . 54.
2565 Apple Security Kit . . . . . . . . 34.
2566 Maccessories Super Base . . . . . . 34.
2585 Printer Muffler 80 . 43.
2586 Printer Muffler 80 Stand . . . . . . 24.
4070 System Saver SE . . . . . . . . 52.
2566 System Saver Mac (platinum) . . . . 63.
2567 System Saver Mac (neige) . . 63.
2566 System Saver Mac . . . . . . . . 63.
2546 A B Box (DIN-8) . . . . 63.
2569 Mac Plus/SE w/System Saver Cover . 9.
2558 lmageWriter II Dust Cover . . 9.
2547 lmageWriter II Dust Cover . . 9.
2589 Universal Printer Stand . . . . . . 15.
6066 Custom Control Panel . . . . . . 15.
4970 Modern/FAX Protector 10 . . . . 15.
4971 Modern/FAX Protector 20 . . 25.
4126 LaserWriter II Dust Cover . . 17.
5578 PowerBacker 520 . . . . . 399.
4123 Mac -101 Keyboard—Includes macro program,
4861 SE Protection Pak (std. keyboard) . . 65.
4662 SE Protection Pak (ext. keyboard) . 75.
4662 SE Protection Pak (ext. keyboard) . 75.
4861 SE Protection Pak (std. keyboard) . . 65.
4862 SE Protection Pak (ext. keyboard) . 75.
4861 SE Protection Pak (std. keyboard) . . 65.
4862 SE Protection Pak (ext. keyboard) . 75.
4861 SE Protection Pak (std. keyboard) . . 65.
4862 SE Protection Pak (ext. keyboard) . 75.
4861 SE Protection Pak (std. keyboard) . . 65.
1731 Mac -101 Keyboard—Includes macro program,
1799 Mac -101 Keyboard—Includes macro program,
1731 Mac -101 Keyboard—Includes macro program,
## MEMORY & DRIVES

### 1 Meg SIMMs

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1097 Low profile 80 nanoseconds SIMMs at the best prices. 2 year warranty. call</td>
</tr>
</tbody>
</table>

### Cutting Edge ... 30 day MBG

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1907 MacSnaps II 4.0</td>
</tr>
</tbody>
</table>

### Dove Computer ... 60 day MBG

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1904 MacSnaps II 4.0</td>
</tr>
</tbody>
</table>

### TheComplete PC

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>5004 TheComplete Half-Page Scanner/400</td>
</tr>
<tr>
<td>5003 TheComplete Page Scanner/600</td>
</tr>
</tbody>
</table>

### Thunderwave ... 30 day MBG

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>3648 ThunderScan 5.0 with PowerPort</td>
</tr>
<tr>
<td>4994 LightningScan</td>
</tr>
<tr>
<td>3645 Mac II Power Accessory</td>
</tr>
</tbody>
</table>

## STORAGE MEDIA

### Verbatim ... 60 day MBG

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>3772 3 &quot;1/2&quot; DS/DD Disks (10)</td>
</tr>
<tr>
<td>3773 3 &quot;1/2&quot; HD Disks 1.44 Meg (10)</td>
</tr>
</tbody>
</table>

### Sony ... 60 day MBG

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>3297 3 &quot;1/2&quot; DS/DD Disks (10)</td>
</tr>
<tr>
<td>6148 3 &quot;1/2&quot; DS/DD Disks 3 Pak (30)</td>
</tr>
<tr>
<td>3298 3 &quot;1/2&quot; HD Disks 1.44 Meg (10)</td>
</tr>
</tbody>
</table>

### MAXELL ... 60 day MBG

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>2782 3 &quot;1/2&quot; DS/DD Disks (10)</td>
</tr>
<tr>
<td>2783 3 &quot;1/2&quot; HD Disks 1.44 Meg (10)</td>
</tr>
</tbody>
</table>

### 3M ... 60 day MBG

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>3943 DC2000 Tape Cartridge</td>
</tr>
</tbody>
</table>

## ACCESSORIES

### Apple Computer

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1113 Black ImageWriter Ribbon</td>
</tr>
<tr>
<td>1114 LaserWriter Plus Toner Cartridge</td>
</tr>
<tr>
<td>1115 LaserWriter II Toner Cartridge</td>
</tr>
</tbody>
</table>

### Avery ... 60 day MBG

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>4864 Disk Labels 31/2&quot; (Qty 250)</td>
</tr>
<tr>
<td>5392 Disk Labels—Laser 3 1/2&quot; (Qty 630)</td>
</tr>
<tr>
<td>5403 Address Labels 3 1/2&quot; x 4&quot; (Qty 1000)</td>
</tr>
<tr>
<td>5865 Address Labels 3 1/2&quot; x 1 1/2&quot; (Qty 3750)</td>
</tr>
<tr>
<td>4811 Transparencies 8&quot; x 11&quot; (Qty 50)</td>
</tr>
<tr>
<td>4813 Round Labels 3 1/2&quot; (Qty 150)</td>
</tr>
<tr>
<td>4812 Laser Labels 3 1/2&quot; x 1 1/2&quot; (Qty 2000)</td>
</tr>
</tbody>
</table>
START UP

You've been reading about Adobe Type Manager for months, but you're still wondering if it's the greatest thing since sliced bread. Worry no more. We took a good look at ATM and found a few slices missing. Find out which ones in our review. Then check out our reviews of the latest versions of 4th Dimension and Double Helix. Plus reviews of Cause, KaleidaGraph, RasterOps' bargain 24-bit ColorBoard 264, the Cordless Mouse, and more. And Robert Wiggins and Steve Bobker will fill you in on their latest discoveries that'll increase your productivity. But first we'll start off with a quick look at some technologies that may find their way into your life real soon.

CONTENTS
Adobe Type Manager.64
4th Dimension ..........65
Double Helix ............66
SiliconDisk ................70
KaleidaGraph ..........71
Cause .......................71
ColorBoard 264 ......72
Dialoger and ScriptEdit ..........73
The Cordless Mouse .98
Level5/Macintosh ......88
Roland D-50/550
Librarian/Editor.......91
EDITED BY RUSSELL ITO

TECHNOLOGICAL INNOVATION isn't always where you expect it. In 1968, in The Graduate, Dustin Hoffman's character, Ben Braddock, got some famous one-word advice about the future: "Plastics." And plastics are still hot — like the high-tech polycarbonate used in the Mac Portable. We scoured a range of technologies and found some new ones that we'd steer Ben — and other budding young Mac engineers — toward today.

Nuclear Batteries
As anyone who's picked up a Macintosh Portable knows, batteries are a heavy issue. Apple's lead-acid package was a novel solution, but when it comes to portables, less is truly more.
Rechargeable lithium cells may be one answer. Lithium cells have a shelf life of ten years and are small and light. Current models can be recharged by a computer's main power or even by sunlight.
And what about nuclear batteries? Peripheral Systems, Inc., of Portland, Oregon, is working on a battery that will directly convert alpha and beta particles from radioactive isotopes (specifically strontium-90) into electricity, packing 75 watts into a cell the size of a soup can.

Continuous-Tone Color Printers

Thermal color printing doesn't necessarily mean wax thermal printing anymore. Thermal dye sublimation printers, like these, use heat to convert layers of dye into gases that bond into continuous, pure tones. The result is photo-realistic images.

If even the best thermal color printers aren't good enough for you, continuous-tone color printers are the answer. Some of these units have already begun to appear (from Kodak, Canon, and Du Pont/Adobe), and although the printers are expensive (from $7,000 to about $75,000), as is their output, prints emerge with apparent resolutions of two or three times the actual number of dots per inch, with near-photo quality.

In thermal printers, a ribbon lays three (cyan, yellow, magenta) or four (cyan, yellow, magenta, and black) layers of dye down on a special sheet of paper. When heat is applied to each pixel, the dyes change to a gas and bond into a continuous, pure tone — without dithering.

Eureka! Six Technologies in

BY RUSSELL ITO AND VICTORIA VON BIEL

TECHNOLOGICAL INNOVATION isn't always where you expect it. In 1968, in The Graduate, Dustin Hoffman's character, Ben Braddock, got some famous one-word advice about the future: "Plastics." And plastics are still hot — like the high-tech polycarbonate used in the Mac Portable. We scoured a range of technologies and found some new ones that we'd steer Ben — and other budding young Mac engineers — toward today.

Nuclear Batteries
As anyone who's picked up a Macintosh Portable knows, batteries are a heavy issue. Apple's lead-acid package was a novel solution, but when it comes to portables, less is truly more.
Rechargeable lithium cells may be one answer. Lithium cells have a shelf life of ten years and are small and light. Current models can be recharged by a computer's main power or even by sunlight.
And what about nuclear batteries? Peripheral Systems, Inc., of Portland, Oregon, is working on a battery that will directly convert alpha and beta particles from radioactive isotopes (specifically strontium-90) into electricity, packing 75 watts into a cell the size of a soup can.

Continuous-Tone Color Printers

Thermal color printing doesn't necessarily mean wax thermal printing anymore. Thermal dye sublimation printers, like these, use heat to convert layers of dye into gases that bond into continuous, pure tones. The result is photo-realistic images.

If even the best thermal color printers aren't good enough for you, continuous-tone color printers are the answer. Some of these units have already begun to appear (from Kodak, Canon, and Du Pont/Adobe), and although the printers are expensive (from $7,000 to about $75,000), as is their output, prints emerge with apparent resolutions of two or three times the actual number of dots per inch, with near-photo quality.

In thermal printers, a ribbon lays three (cyan, yellow, magenta) or four (cyan, yellow, magenta, and black) layers of dye down on a special sheet of paper. When heat is applied to each pixel, the dyes change to a gas and bond into a continuous, pure tone — without dithering.
RISC

Reduced-instruction-set computing (RISC) is just around the corner. Several RISC NuBus boards are already out that give you the processing power of a mainframe, but they work with only a limited number of applications. In just a few years, you'll have a Mac on your desk with a RISC CPU. Apple is already exploring the possibility of developing a Motorola-88000-based Mac — so soon you'll be able to complain about your 1ci's performance.

Caveat: Don't be surprised if with this RISC-y move, Apple replaces the Mac operating system with a UNIX-based operating system.

Blue LEDs

Although red and green LEDs (light-emitting diodes) have been common for years, blue LEDs haven't been manufactured in high enough volume to bring their prices down. But with Cree Research of Research Triangle Park, North Carolina, announcing its ability to produce blue LEDs in quantity, the future of LED-based video suddenly looks very interesting.

By using LEDs, monitors can now be wall-sized — or bigger — without the alignment, brightness, and color problems common to projection units.

PostScript Fax

Fax modems are great, but if you want to send your latest Illustrator masterpiece and have it appear in all its PostScript glory, you're out of luck — at least right now. Coming soon, however, you'll be seeing PostScript laser fax/printers. Adobe is already working on this technology, and you may see it incorporated into products as early as next year.

NewsLine

SHUT DOWN
SAN JOSE/PALO ALTO/MENLO PARK, CA — In a single month, three Mac companies have ceased operations. Prim, a hard-disk-drive manufacturer, has declared bankruptcy under Chapter 11. Prim laid off nearly 200 employees, about 35 percent of its work force. The filing was at least partially the result of the company's failure to deliver its promised 760-megabyte Winchester drive on time. That project has been scrapped, although Prim has announced plans to continue developing its 3.5-inch 400-megabyte drive. Mansfield Systems, publisher of Table Tools, has closed permanently, having lost its venture-capital support. It made no statement on the future of Table Tools. Mediagenic has decided to drop TENpointO, whose products included Focal Point II, Open IT!, Reports, and Business Class. Upgrades and further development of all the TENpointO products have been discontinued, and Mediagenic is seeking a buyer for the entire line.

THE SONY NETWORK
NEW YORK, NY — After a successful buyout of Columbia Pictures, a division of Sony called Sony Microsystems Corp. has now entered the computer-network industry, with the purchase of a 20-percent share in Information Presentation Technologies. IPT publishes Personal Server Network (PSN), a TOPS competitor. In another agreement, IPT agreed to buy Sony's NeWS UNIX workstations.

NEXT IN LINE
REDWOOD CITY, CA — In a response to complaints about the slowness of its erasable optical drive, NeXT has announced a lower-priced network-node version of the NeXT Computer, with a 40-megabyte hard-disk drive instead of the optical unit. The new NeXT machine is intended for use on a network and not as a stand-alone workstation. Data is still stored on the network server, with the hard-disk drive serving use primarily as a local virtual-memory storage device.
## CARE OF YOU!

### MONEY BACK GUARANTEE!

**POLICIES**

- Visa, Mastercard & AMEX accepted.
- Credit card is not charged until order is shipped.
- California residents add 6.5% sales tax.
- Hours: Mon - Fri, 10-11 EST.
- Sat Noon - 5 EST.
- Call (818) 501-6581.
- FAX (818) 501-3760.
- All prices & policies subject to change without notice.

### SHIPPING

- $3. UPS Standard Air/Blue. Hardware over 10 lbs will be shipped ground.
- Same day shipping on orders placed by 9:30 pm EST, if items are on hand.
- Return defective software will be replaced immediately by the same item. Call (818) 501-0661 for R.A. number before return.

Money Back Guarantee

- Most products have a 30-day money back guarantee. Please inquire when you order.

### MONEY BACK GUARANTEE!

**SHARP**

- JX-450 Color Scanner: $595
- JX-300 Color Scanner: $395

**SHODAN**

- Hummingbird 3Mb/hz Accel: $125
- Hummingbird 1Mb/hz Accel: $245

**SIMMS**

- 1 Meg Simms 100, 80, 70 ns: $Call

**SUPRA**

- S4200 Baud External Modem: $129

**SYSTEMGATE**

- Floppy Drive 800k: $145
- Tape Drive 155Mb: $495

**TARGUS**

- Mac SE Ext. Keyboard Case: $69
- Imagenwriter II Carry Case: $48

**THUNDERWARE**

- HDTV 5 Gate: $48
- LightScribe 5: $23

### REMOVABLE HARD DRIVE

- JX-900 1.44MB Drive: $195

### SPECIAL R

- WordPerfect: $179

### Intensive Care

- Mac IIcs: 4 meg RAM, 80 meg internal: $499
- SIMMs 70 nanoseconds: $99

Please circle 169 on reader service card.
Bobker's Dozen

Good Things and Small Packages

1. Lookup 2.0
   The two best spelling checkers currently available are 'Thunder II' and Spellwell. Lookup is just a hair behind them, and if, like Thunder II, it could open automatically in selected applications, it could be the spelling-checker champ. Lookup is published by the publisher of Spellwell, so you can access the large, excellent Spellwell dictionaries, including the specialized ones.
   Although Lookup uses the Spellwell dictionaries, it isn't the much-longed-for DA version of Spellwell, even though it is a DA (and an INIT). Being a DA is an advantage, but it also means that the many of the special grammar-checking features standard in Spellwell are not included in Lookup.
   The original value of Lookup was its ability to quickly check any word on the fly. This version does that even quicker and better. Interactive spell checking is unobtrusive and barely affects performance. Lookup is a spelling checker for all reasons.
   Version 2.0, Requires System 6.0 or later, $59.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061-1844; (408) 423-0689.

2. PageMaker Portfolio: Manuals
   Owning a quality page-layout program doesn't guarantee high-quality output. In fact, the reverse is very nearly true—plenty of desktop-published output looks awful. This problem often becomes obvious when a project is large or complex.
   Aldus offers a very nice solution for people who are tasked with the creation of manuals. Rather than rely on chance or less-than-professional-level design skills, manual creators can select the most appropriate of the ten basic templates provided here and then follow the excellent and explicit directions. Each base design has several variations and usage notes, so that picking the best template for a job is quite straightforward. The manual is, by itself, an excellent tutorial in good manual design.
   There's no reason to have the quality of a desktop-published manual limited by its design. Using these templates, all you have to worry about is the quality of the text and graphics.
   Aldus offers two other PageMaker Portfolios. One contains newsletter templates, and the other has basic business-communications forms. They're each priced at $99.95.
   Requires PageMaker, $89.95. Aldus, 411 1st Ave., Suite 200, Seattle, WA 98104; (206) 622-5560.

3. Bomber
   Bomber is an exciting HyperCard-based game that makes excellent use of HyperCard's graphics and sound abilities. The sounds provide both background ambience and important information. The publishers sensibly includes a set of headphones so that you can play without disturbing others. The action involves flying a B-17 bomber on raids over Europe during World War II. New pilots are given easy missions; veterans draw challenging long-range raids. Luck plays a part in the outcome, but skill usually prevails. The controls are easy to learn, although some of the cockpit controls are small and somewhat difficult to find when you're fighting off a determined attack — that only adds to the realism.
   Requires 1 megabyte, HyperCard 1.2.1 or later, and a hard-disk drive. $39.95. In-Line Design, 70 W. 95th St., Suite 26F, New York, NY 10025; (212) 222-4857.
5 Rendezvous

This personal-information organizer has been around for years (literally), and the current version isn't much different than its first versions. But one of those differences is crucial. This version is not copy-protected, and every previous version was protected heavily.

Aside from having a well-designed and useful calendar, a planner, a diary, and to-do-list forms, Rendezvous includes an alarm function that can be tied to any entry. The to-do list automatically rolls over to the next day any items not checked off. While the overall feature set isn't that snazzy, it feels very comfortable and is adaptable to the ways that most people use planners and diaries.

There are a few things Rendezvous needs in order to become king of the personal-information-management heap: There's no address and phone section and no automatic data transfer between sections. Both of these additions would help. Rendezvous also needs an accessory DA. As is, only MultiFinder users can get full value from Rendezvous.

Version 2.5. Requires Mac 512K or later and System 6.0 or later. $200. PMC TeleSystems, P.O. Box 5127, Vancouver, British Columbia, V8W 4A8 Canada; (604) 256-8949.

6 HandOff

One of the least-loved features of the Finder is its graceless reaction when you double-click on a document and the application is missing. You get a rude dialog box and that's it. The Finder doesn't care that the document can be read by other applications — in fact, you can almost always use another application to read most kinds of documents.

HandOff totally eliminates this problem. Instead of telling you that you're out of luck, HandOff presents a dialog box that lets you select the application you want to use to open the document. Substitution can be on a one-time basis, or can be made automatically for every subsequent document of this type.

That's not all this handy utility does. It can direct any document with a specific file-name extension to a particular application. This is particularly useful for people who transfer files from the MS-DOS world, where everything has a filename extension.

HandOff, which is controlled via the Control Panel, works well and is unobtrusive in its automatic-substitution mode. The current version doesn't work with the Desktop Manager that comes with AppleShare, but that was the only problem I found.

Version 1.0. Requires System 4.6 or later. $125. Abbott Systems, 62 Mountain Road, Pleasantville, NY 10570; (800) 652-8157 or (914) 747-9116.

Version 1.1.1. Requires Mac Plus or later and System 6.0 or later. $49.95. Software Innovations, P.O. Box 811, Allen, TX 75002; (214) 727-2228.

7 Felix

Sometimes a new version isn't better than the old version. That's the case with the Felix puck-type pointing device. Originally made only for non-ADB Macs (Pluses and earlier models), it is now available in an ADB version.

The Felix takes a while to get used to. Once you get the hang of it, though, it is quick and precise. In this version, the button is on top of the puck and feels loose and cheap. The two side-mounted buttons of the original felt better and made for easier operation. This version has different angles on the left and right, and while I think it is designed for right-handers, the feel of the overall shape was better when I used it with my left hand.

8 CanOpener

The first thing you notice about CanOpener is that the interface is odd-looking — very NeXT-like, in fact. Despite that, it works just like any other Mac program. CanOpener is yet another search-and-retrieval utility. It's powerful and efficient, and has enough unique features to make it worth a look, as long as you have a need for a program such as this.

CanOpener's special features include the ability to display text, EPSF, PICT, PICT II, and MacPaint graphics, and it can also play sounds within documents. The bits and pieces you locate in your searches can all be collected in libraries that function like Scrapbook files do.

On the performance measures that count with this sort of utility — search speed and the ability to work well in the background — CanOpener scores quite well. Once you get used to its controls, CanOpener is a workable, efficient tool.

A nice touch is the provision of an application for best use under MultiFinder and a comparable DA for those who prefer not to use MultiFinder.

Program operation is quite intuitive, but the skimpy manual doesn't reveal enough about accessing the program's enormous power.

Version 1.0. Requires System 4.6 or later. $125. Abbott Systems, 62 Mountain Road, Pleasantville, NY 10570; (800) 652-8157 or (914) 747-9116.

Version 1.1.1. Requires Mac Plus or later and System 6.0 or later. $49.95. Software Innovations, P.O. Box 811, Allen, TX 75002; (214) 727-2228.
Many of the programs covered here are small utilities that aren’t absolutely necessary for top performance. Your Macintosh performs perfectly well without them, but you get more out of it when you use them. The best of these utilities are simple to use, as transparent as possible, and flaw-free.

POWERicons is one of these utilities. It creates duplicate application icons that you can place with your data files or wherever convenient. You still have to have the applications, but you don’t have to search through folders for them. A POWERicon can have documents attached to it, and you can set special POWERicons to print a batch of documents.

You can control POWERicons through the Control Panel. Setting up POWERicons is quick and simple, and the program works exactly the way the manual says it should. If you have lots of folders and keep your data separate from your applications—which is generally a good idea—then POWERicons can be a real time-saver.

Version 1.0. Requires System 5.0 or later. $79.95. Magic Software, 1602 Cascio Drive, Bellevue, NE 68005; (800) 342-6243 or (402) 281-0670.

The manual is long and pretty well written, and you must read it. If you don’t, you won’t get far. After all, this is programming. The index is overeager, often directing you to passing references instead of main points.

Version 2.0. Works on any Mac. $89.95. Dahl-Click Software, 5016 Deering Ave., Chatsworth, CA 91311; (818) 700-9525.

The entire Mail Rater package is well over a megabyte in size, but when you run it for the first time, it extracts the exact data necessary for your zip code from the 600 possibilities. It installs that information within its smallish (91K) main stack, allowing you to erase the data stacks. The resulting localized stack is used in conjunction with a postal scale.

When you enter the weight of a letter or package, the class of mail, and the desired options, Mail Rater displays the proper postage.

Mail Rater is ideally suited for small businesses that send out a reasonable volume of mail, and it should be able to more than pay for itself in fairly short order.

Version 1.1. Requires HyperCard 1.2.2 (included with package) or later and a scale. $49.95. Tight Line Software, 27601 Forbes Road, Suite 5G, Laguna Nigel, CA 92677; (714) 387-0087.

The manual is long and pretty well written, and you must read it. If you don’t, you won’t get far. After all, this is programming. The index is overeager, often directing you to passing references instead of main points.

Version 2.0. Works on any Mac. $89.95. Dahl-Click Software, 5016 Deering Ave., Chatsworth, CA 91311; (818) 700-9525.

I’ve had MCS for years, but I had overlooked it until Mike Morton of Honolulu, Hawaii, jogged my memory.

MCS is a high-speed file-transfer program. With it, you can transfer an entire list of files to another MCS-equipped Mac while simultaneously receiving a list of files from the Mac you’re transmitting to. All this occurs in less time than any other program (using the same modem) takes to transfer data in one direction.

The major flaw in this version is that it doesn’t automatically hang up the phone when the file transfers are complete; someone must hang around and do that job manually.

Version 1.1. Requires Mac Plus or later and a compatible modem. Shareware: $15. Mainstay, 5311-9 Devry Ave., Agoura Hills, CA 91301; (818) 991-6540; AppleLink: 60897; CIS: 76894, 1526.
Say Goodbye to Financial Hassle!

Why waste time doing your finances? Quicken slashes time and effort every month...perfectly organizes your finances...and provides instant insight into your money matters.

Breeze Through Financial Chores
Quicken takes the drudgery out of routine finances. It automates everything from bill paying to bookkeeping...reconciliation to reporting. Quicken does in minutes what used to take hours.

Quicken actually learns your regular bills. Just confirm payment amounts, and in seconds, Quicken performs 14 bookkeeping steps, categorizes expenses, and hands you printed checks addressed for mailing. And, Quicken keeps perfect records of all your handwritten checks.

A Bigger Picture with Smaller Effort
Quicken automatically organizes your finances. Imagine always knowing how much money you have...and exactly where it's going. At the click of a button, Quicken generates insightful reports such as Income and Expense, Cash Flow, Budget vs. Actual, Job Costing, and more.

Relax at Tax Time
Stop dreading tax time. Quicken keeps important tax data at your fingertips automatically. In seconds, you can print an itemized list supporting your deductions. Plus, Quicken links directly to top selling tax software like MacIntax.

NEW VERSION 1.5
FAR MORE THAN A CHECKWRITER
• Far more flexible reports:
  • Multi-column reports show spending and profit trends over time. 
  • A/R aging and customer history reports
  • A/P reports by supplier 
  • "Modesless" reports recalculate automatically on screen
  • Improved payroll handling
  • More ways to split transactions
  • New wallet-size and laser voucher checks
  • New Canadian dates and tax categories

The World’s #1 Best Seller
Quicken is the best selling business and personal finance software in the world. Ken Landis of MacUser gives Quicken the highest rating of five mice and says, "Quicken is a great program...the industry standard." Broadway playwright ("Mame") Robert E. Lee remarks, "This astonishingly simple program...is truly true to its name. Indeed, it does quicken the time required for routine bookkeeping."

No Computerese or Accounting Mumbo Jumbo
Quicken is so easy, you’re up and running in minutes. That's because the whole program looks and works just like the paper checkbook and register you’ve always used. Quicken doesn’t change how you do your finances, only how fast you finish them.

Powerful Business Features
Over half of Quicken’s customers use it for small business bookkeeping; Quicken produces financial statements such as P&L, Tax Summary, and other useful management reports. It forecasts your cash flow, and tracks A/R, A/P, payroll, jobs, clients, properties, and more.

YES, I want to say goodbye to financial hassle and try Quicken. If I'm not completely satisfied, I may return it within 30 days for a full refund. Quicken Version 1.5 for Macintosh, US $59.95, includes free shipping by air. California residents, please add sales tax. For coupon orders, allow 10 days for delivery (longer to Canada).

Name
Address
City State Zip
Daytime Phone (

Preferred payment method (check one):

• Check enclosed (no purchase orders or COD, please)

• Visa

• MasterCard

• American Express

Card No
Exp. Date

Signature

Mail to:
66 Willow Place
Menlo Park, CA 94025-3967

Or, call: 1-800-624-8742 in U.S. and Canada for charge card orders.

Current Quicken users: To upgrade, call the 800 number above.

G-MU02
When you want more data analysis power from your Macintosh, the only game in town is SPSS.

When you've got to know the score, you need more than an ordinary stat package. You need the most powerful data analysis software ever created for the Macintosh: SPSS.

Only SPSS for the Macintosh gives you all the same analytical capabilities as our legendary SPSS mainframe and workstation software.

So you get more ways to turn data into knowledge.

Our Macintosh user interface puts you in control of data and file management. Basic and advanced statistical procedures like time series analysis and forecasting, nonlinear regression, discriminant analysis and more. Plus award-winning presentation graphics and tables to let you display your results.

In short, you get more statistical methods and features with SPSS than with any other Mac software.

And SPSS also gives you one other vital feature: the SPSS support team that's come through for over a million users in the last 20 years.

So if you're serious about winning, don't settle for anything less than the power you need. Find out more about SPSS by calling [312] 329-3303.

And get the knowledge to be first in your field.

SPSS is a registered trademark of SPSS Inc. Macintosh is a registered trademark of Apple Computer, Inc. VAX is a trademark of Digital Equipment Corporation.

Please circle 12 on reader service card.
"FOR KILLER PRESENTATION GRAPHICS, GET THE PUBLISHER.

IT'S AWESOME SPEED AND CRISP, CLEAR IMAGES MAKE IT THE PRINTER OF CHOICE.”

Dean Tanji, President
Abracadabra Slide Production, Inc.
Award-winning creator and producer of presentation graphics for Fortune 500 companies

CALL 1-800-223-2479 TODAY FOR THE DEALER NEAREST YOU.

For information please circle 178 on reader service card. For dealer inquiries please circle 179 on reader service card.
If seeing is believing, Adobe Type Manager™ is making believers out of a whole new world of Macintosh® users. The kind of long-suffering users who've had to accept the fact that the type on their printed pages has always looked as jagged as the text on their screens. If you're one of those people, you know exactly what we mean.

But you should also know it never has to look that way again.

Adobe Type Manager converts that difficult-to-read text into smooth, legible type. On your Macintosh screen and, more importantly, out of your Apple ImageWriter®, Hewlett-Packard DeskWriter™ or other QuickDraw™ devices, including film records and fax machines.

And this exciting new program does it all for a mere $99.

Which means you don't need a high-cost printer to produce high-quality text. That's because Adobe Type Manager is based on Adobe's own PostScript® page description language, the technology used by the world's leading laser printers.

Nor do you need a lot of time to install it or power to run it.

You can install Adobe Type Manager by simply dragging it into your system folder. And since it requires only one megabyte of memory—and supports virtually all Macintosh software—every user has what it takes to look better.

Once you see the difference Adobe Type Manager makes with its 13 resident fonts, you'll want to build your own high-quality type library.
Because, the more typefaces you have, the more clearly you'll be able to express your ideas. You can start with the 22 additional fonts in the Plus Pack for just $198. That way you'll have the same 35 outline fonts included in the LaserWriter® NT and NTX printers.

Then if you really want to expand your options, you can choose from the more than 550 professional-quality typefaces in the Adobe® Type Library, as well as other PostScript Type 1 fonts.

And since most Type 1 fonts are supported by Adobe Type Manager, they can be scaled to virtually any size or set in any style, without losing their integrity. In fact, the only thing you'll lose is your jagged edges.

So call 1-800-344-8335 for the name of your nearest Adobe Authorized Dealer (outside the U.S.A. and Canada, call your local distributor).

Because it's easy to see how you can start looking better.

Adobe Systems Incorporated

Look for this symbol on computers, printers and other products that include PostScript software from Adobe Systems. It's your guarantee of quality and compatibility.

Times® Roman, Bold & Bold Oblique

Helvetica® Regular, Oblique, Bold & Bold Oblique

Courier Normal, Oblique, Bold & Bold Oblique

Symbol

This is actual, unretouched ImageWriter output at 80 pt. and 12 pt. sizes using Adobe Type Manager.
When you need a change of face.

You bought ATM™ to clean up your text; now add TypeAlign to throw your text a curve—or give it a new slant. And do it so intuitively, you’ll wonder why everyone doesn’t do it our way.

TypeAlign is incredibly easy to use—no special drawing programs or skills needed. Just choose a tool to draw an arc, straight line or freehand curve. Type on the line you just drew—your words appear instantly on screen. Adjust the spacing between letters and words until it’s just the way you like it. Then rotate, manipulate, distort to your heart’s content.

Since TypeAlign is a desk accessory, you install it once in your Macintosh™ computer, then use it in just about any application. And you can print your creation on any ATM-supported printer or other device, including Apple® ImageWriters®, LaserWriters® and Hewlett-Packard® DeskWriters® and PaintJets®. Of course, TypeAlign works with any Adobe® PostScript® font, too.

Let's face it. If you have ATM, you need new TypeAlign, too. Especially with a suggested retail price of only $99.95. To find out where you can buy it, call Emerald City Software at 1-800-223-0417, in CA 415-324-8080.

TypeAlign™—a new desk accessory exclusively for Adobe Type Manager™ owners.
Small Business Retailer

If you dislike adapting your business to an inflexible accounting package, you might like Small Business Retailer (SBR), which, since it's a set of FileMaker II templates combined with custom menu scripts, can be customized to fit your retail business. SBR includes a Sale Order template, which combines with a Sale Detail template to create remarkably complete invoices and will even print shipping tags and envelopes for mailing; a Names template for keeping customer and vendor lists, which also prints envelopes or mailing labels; Purchase Order and Detail templates, which work like the Sale Order and Sale Detail templates; and templates for Employees, Inventory, Accounts Receivable, and Accounts Payable.

Even if these templates aren't exactly to your liking, you can adapt them to your business. There is a catch, however: To get the update password, you must pass a quiz that proves you understand how the system works. This novel approach keeps you from accidentally damaging or changing the databases until you know what you're doing (or until you hire a consultant who does). The documentation is not extensive, so the more you know about FileMaker, the better off you'll be.

SBR is an interesting, attractively priced alternative to both custom and commercial software. But to get the most out of these templates, be prepared to do a lot of work in setting up your own system.

Requires Mac Plus or later and FileMaker II. $295. Packer Software, 12 Roosevelt Ave., Mystic, CT 06355; (800) 572-8955.

Service Industry Accounting

Service Industry Accounting (SIA) is a specialized accounting package that is designed for professionals, tradespeople, and small manufacturers. It handles job cards, billing, accounts receivable, accounts payable, inventory, and general ledger. SIA takes a book-oriented approach, and its Australian origins occasionally make its terminology hard to follow.

SIA has Sales, Jobs, Inventory, Ledger, and Purchase books. The Jobs book handles estimates and quotes as well as invoicing, and it keeps track of and analyzes employee time. The Purchase book tracks your suppliers and your purchases from them. The Ledger book is essentially a general ledger. The Sales and Inventory books are exactly what their names imply. Together, they form a functional accounting system that isn't difficult to learn.

SIA's interface is unattractive and for the most part looks more like you'd expect an MS-DOS application to look, although it does sport a few graphic flourishes. Reports are utilitarian, and the 200-page manual is simply adequate. As with most accounting systems, you need to try it out and consult with your accountant to make sure it's compatible with your existing systems.


DataFrame XP Series Hard Disks

SuperMac has been around since the very early days of the Macintosh, and its DataFrame hard-disk drives have a long history. Over the past year or two, SuperMac has gotten a lot of publicity for its financial wheeling and dealing, as it was first acquired by SMS and then spun back off from it. So you may not be aware that SuperMac is once again on its own and has completely redesigned its DataFrame line of hard-disk drives. External DataFrames are still upright, but most of their air vents are gone, as they are now cooled by fans. Internal versions of some DataFrame models are also available for the Macintosh II.

If you have been avoiding DataFrames because you thought SuperMac was still in financial turmoil, you should take a look at its new product line. These drives are fast and reliable. Their vertical design lets you put them where you might not be able to fit a drive now. DataFrames still come with special versions of SuperMac's DiskFit backup software and print-spooling utilities.

SuperMac, 405 Patterson Ave., Sunnyvale, CA 94086; (408) 254-2202.
The table Apple would have designed, had they gone into the furniture business.

Any company with the vision to create a product as elegant and useful as the Macintosh would have hit it big in any industry.

Fortunately, Apple chose computers. We, on the other hand, chose to make furniture. More specifically, the MacTable.

Like the Macintosh itself, the MacTable was created to put information at your fingertips, quickly and easily. We accomplish this by thinking of the workspace not as an inflexible monolith, but as a network of individual surfaces onto which you can place each of your Mac components, like your printer, modem, external drive, mouse, even manuals. Everything with plenty of elbow room, easily within reach, and there when you need it.

Next, each surface tilts to optimize your eye-to-screen and hand-to-component efficiency. Rest assured that as your comfort increases, so does your productivity.

Finally, there's the overall design — sleek, contemporary, and mindful of the future of your computing needs. Because MacTable's surface panels can be arranged, your workspace can accommodate any model of Macintosh, from the Plus to the Mac II... to who knows what.

Surprisingly enough, all of this Mac-like versatility and European beechwood framing is more than affordable: only $299 for MacTable and $139 for the optional roll-away cabinet (doubles as a Laserwriter stand); $279 for the matching, ergonomically balanced chair; lateral file cabinet $239; bookshelves $119; and two-door cabinet $159.

MacTable. It's the workspace that organizes the tools that organize your life. And it's available by calling (800) 722-6263 which, by the way, is not Apple's phone number.

MacTable. The ultimate Mac peripheral.

To order your MacTable or for more information call:
TOLL FREE (800) 722-6263
in WA state (206) 481-5434
Prices do not include U.P.S. shipping.

ScanCo
P.O. Box 3217, Redmond, WA 98073-3217

Please circle 2 on reader service card.
DynoDex

DynoDex is an address book with a lot of bells and whistles that comes with an attractive Filofax-like six-ring binder and special paper for printing out your address book for those times when your Macintosh isn’t with you. DynoDex can intelligently import data from text files, and it even comes with a HyperCard stack for preparing HyperCard Address stacks or Focal Point I and II Directory stacks for importing.

If DynoDex came with a DA that let you look up names and numbers while in other applications and gave you a little more flexibility in output appearance, it would be almost perfect. Its price might seem a bit high, but when you have hundreds and hundreds of dollars tied up in a Filofax or LeFax binder, DynoDex looks like a real bargain by comparison.

Market Master

Market Master is one of those niche products that, if you can use it at all, can quickly become indispensable, but if you don’t need the specific tasks it performs, you can’t really use it. Market Master runs a sophisticated direct-marketing effort. You define your strategy, as simple or as complex as you want, and once you lay it out, Market Master is ready to keep track of it for you. Market Master will run your mail campaigns, including generating customized form letters, tracking responses, reminding you to make follow-up telephone calls, and generally keeping track of all aspects of your marketing campaign.

Market Master is a run-time Double Helix application; you don’t need to know Double Helix to use it, although general knowledge of a database system will help. Market Master R/A adds results analysis for judging the effectiveness of your campaign. Market Master Manager adds the ability to track numerous salespeople and is available with multiuser capability. The multiuser version requires Double Helix’s separate multiuser kit.

Version 1.0. Requires Mac Plus or later, sheet-feedable printer (LaserWriter II series preferred), and System 6.0. $149.85; additional paper, $24.95 per 100 sheets. Portfolio Systems, 168 S. Rushing Ave., Brooklyn, NY 11205; (800) 729-3968.

Business Bookshelf

Dr. Macintosh

In his years as editor of the now-defunct Macazine, Bob LeVitus picked up a lot of tips and hints on how to be a power user. In Dr. Macintosh, he passes on his knowledge — and not just his knowledge: He canvased the power users who frequent CompuServe’s MAUG forums and got their hints, tips, and techniques as well.

Dr. Macintosh gives a good overview of how the Macintosh works and ways you can make it work for you. It covers the basics, the System and the Finder, hard disks, backing up, disk and file recovery, hardware, printers, and telecommunications. And you can read what the experts think, in Chapter 9, which reprints LeVitus’ favorite tips from the pros. Even if you already consider yourself a power user, Dr. Macintosh can probably teach you a trick or two. If you’re new to the Mac, a wealth of information awaits you.

$19.95. Addison-Wesley Publishing Co., Jacob Way, Reading, MA 01867; (617) 944-9700.
Adobe Type Manager

Adobe's font utility isn't perfect, but it's still a worthwhile investment.

On-screen jaggies are the bane of desktop publishers, especially for text in large point sizes: most PostScript printers can find a lot in ATM to salivate over. Manipulating text is easier when the characters' on-screen appearance more closely parallels the printed output. And if you work with paint programs such as MacPaint, in which everything is bit-mapped even when you're dealing with PostScript fonts, you'll find your text, especially in large point sizes, drastically improved.

Then, of course, there's the question of how ATM doesn't work. It doesn't work with any fonts created by Altsys' Fontographer - the so-called Type 3 fonts. Installing ATM on your Mac causes peculiar behavior in some programs. For example, with ATM installed, Laser Paint Color 11's text tools just give up the ghost. And the right sides of letters are clipped off in CompuServe Navigator's main online window.

Solutions to many of these application-specific problems should be available soon, though. Adobe is working with many third-party developers to help them release new ATM-compatible versions of their programs.

Adobe's program promises substantial benefits to ImageWriter owners as well — and Adobe's ads are strongly targeting this market — since they can now print out Adobe fonts in exceptional quality — even at large point sizes (see the figure below).

But even Mac users who output to PostScript printers can find a lot in ATM to salivate over. Manipulating text is easier when the characters' on-screen appearance more closely parallels the printed output. And if you work with paint programs such as MacPaint, in which everything is bit-mapped even when you're dealing with PostScript fonts, you'll find your text, especially in large point sizes, drastically improved.

Then, of course, there's the question of how ATM doesn't work. It doesn't work with any fonts created by Altsys' Fontographer — the so-called Type 3 fonts. Installing ATM on your Mac causes peculiar behavior in some programs. For example, with ATM installed, Laser Paint Color 11's text tools just give up the ghost. And the right sides of letters are clipped off in CompuServe Navigator's main online window.

Solutions to many of these application-specific problems should be available soon, though. Adobe is working with many third-party developers to help them release new ATM-compatible versions of their programs.

The ATM manual says you need to keep only the Roman bit-mapped fonts installed in your System. ATM generates styles on-screen without the bold or italic bit maps installed, but you still need bold and italic printer fonts. (ATM includes bold, italic, and bold-italic outline fonts for Times, Helvetica, and Courier.)

I found ATM's rendering of italics lacking in the 10- and 12-point sizes.
Some letters seemed appreciably larger than others within the same word. These on-screen anomalies disappear when you use type larger than 12-point.

Although these were the only problems I encountered after nearly a month of daily use, discussions on CompuServe indicate that incompatibilities between ATM and other programs are more common than my experience indicates. Complaints about ATM — and especially about its advertised ability to dramatically boost the quality of ImageWriter output — are widespread. In my ImageWriter tests, using Word 4.0 and MacWrite II (version 1.1), I ran into several inconsistencies, including dropped characters, arbitrary word wrap and margin changes, and generally poorer quality with the Preserve Character Shape option instead of the Preserve Line Spacing option. Mac Plus and SE users also experience significantly slower performance overall. Your best bet is to try ATM with the applications and hardware configurations you use most often before you buy it. ATM is good, but it’s not a panacea for your printer problems.

Warts notwithstanding, this product is a welcome addition to the DTP tool set. It opens up the Adobe type collection — one of the largest sources of exquisitely designed PostScript type in the world — to ImageWriter users. And it brings a degree of accuracy to typographical graphic design that is truly refreshing. ATM’s first version is a good start, but it could still use improvement. Future versions should be even better.

— Gregory Wasson

### Get Info

**Adobe Type Manager**

**List Price:** $39 (includes printer fonts for Times, Helvetica, Courier, and Symbol).

**Published by:** Adobe Systems, 1565 Charleston Road, P.O. Box 7900, Mountain View, CA 94039-7900; (415) 961-4400.

**Version:** 1.01.

**Requires:** Hard-disk drive or two 800K drives; System 6.0.2 or later.

**Application Size:** 130K.

**Compatibility:** Mac Plus or later.

---

### DATABASES

#### 4th Dimension

The best Mac relational-database program is now faster, better documented, and more powerful.

Billed as the most powerful database for a personal computer, ACIUS’s 4th Dimension 1.0 was never criticized for “user hostility.” Instead, its most glaring shortcomings were clumsy documentation and lack of speed. Version 2.0 has the kind of speed users want and is easier to use than ever, and its documentation has been completely rewritten.

4th Dimension 2.0 is a rare treat. It’s a complete rethink of a high-quality product that brings compatibility with its predecessor while giving users more than they’d ever hoped possible.

**WHAT’S NEW**

Version 2.0 has more than 350 new features. The User mode, which always included many functions that had to be programmed in other databases, now has even more. For example, a List of Files window lets you easily switch among multiple files, setting input and output layouts on the fly. An Enter in List function allows you to change record values without double-clicking into an input layout.

The import and export functions are much faster, and you can perform them without creating an input layout. The Quick Report Editor features mixed fonts, formulas, and statistical functions such as sum, average, and count. The label generator lets you easily define a mailing label, properly collapses empty lines, and shows a page preview.

The new Search by Layout feature lets you bypass the Search Editor. You can enter comparison operators such as less than or equal to (<=) and greater than (>) directly into the search fields.

Whereas version 1.0 created a lot of problems I encountered after nearly a month of daily use, discussions on CompuServe indicate that incompatibilities between ATM and other programs are more common than my experience indicates. Complaints about ATM — and especially about its advertised ability to dramatically boost the quality of ImageWriter output — are widespread. In my ImageWriter tests, using Word 4.0 and MacWrite II (version 1.1), I ran into several inconsistencies, including dropped characters, arbitrary word wrap and margin changes, and generally poorer quality with the Preserve Character Shape option instead of the Preserve Line Spacing option. Mac Plus and SE users also experience significantly slower performance overall. Your best bet is to try ATM with the applications and hardware configurations you use most often before you buy it. ATM is good, but it’s not a panacea for your printer problems.

Warts notwithstanding, this product is a welcome addition to the DTP tool set. It opens up the Adobe type collection — one of the largest sources of exquisitely designed PostScript type in the world — to ImageWriter users. And it brings a degree of accuracy to typographical graphic design that is truly refreshing. ATM’s first version is a good start, but it could still use improvement. Future versions should be even better.

— Gregory Wasson

#### 4th Dimension version 2.0 makes the Mac’s best relational-database program even faster, more powerful, and easy-to-use. One major time-saver is the use of standard button actions. Using this pop-up list, you can add predefined buttons to a database without any programming.

4th Dimension version 2.0 makes the Mac’s best relational-database program even faster, more powerful, and easy-to-use. One major time-saver is the use of standard button actions. Using this pop-up list, you can add predefined buttons to a database without any programming.

**WHAT’S NEW**

Version 2.0 has more than 350 new features. The User mode, which always included many functions that had to be programmed in other databases, now has even more. For example, a List of Files window lets you easily switch among multiple files, setting input and output layouts on the fly. An Enter in List function allows you to change record values without double-clicking into an input layout.

The import and export functions are much faster, and you can perform them without creating an input layout. The Quick Report Editor features mixed fonts, formulas, and statistical functions such as sum, average, and count. The label generator lets you easily define a mailing label, properly collapses empty lines, and shows a page preview.

The new Search by Layout feature lets you bypass the Search Editor. You can enter comparison operators such as less than or equal to (<=) and greater than (>) directly into the search fields.

Whereas version 1.0 created a lot of
4th Dimension version 2.0 offers a wide range of data-entry and control objects. Defining an object is simply a matter of selecting an item from the pop-up menu in this dialog box.

Beyond that point, but if you do, ACIUS has added several powerful new programming features. Menus are now much simpler to use in custom applications. You can easily associate menus with layouts without using the special menu-handling routines that characterized 1.0 custom applications. Menus associated with input layouts work in the user environment.

Pointers are a new data type that can make code easily portable among applications and can substantially reduce the number of global routines in custom applications. They make the Execute command almost obsolete.

The last exciting bit of the 4th Dimension 2.0 cornucopia that I’ll discuss here is the way it handles transactions. Sensitive posting operations such as accounting routines need to be completed, or the data will be invalid. You can ensure that all steps in a group of data operations are completed; if they aren’t, the data is restored to its pretransaction state. Transactions run at single-user speed, even in a multiuser setup.

There’s a lot that’s new to version 2.0. What’s not new is the elegance of the applications you can create. The best just keeps getting better.

—Louis E. Benjamin, Jr.

**Get Info**

**4th Dimension**

List Price: $795.

Published by: ACIUS, 10351 Bubb Road, Cupertino, CA 95014; (408) 252-4444.

Version: 2.0.8.

Requires: Hard-disk drive.

Application Size: 1,190K.

Compatibility: Mac Plus or later.

Copy Protection: None, but a serial-number scheme prevents multiple network users from running copies with the same serial number.

**Databases**

**Double Helix**

Odesta’s unique nonprocedural database program may be the right choice for both broad-minded developers and the code-shy.

With its latest release, Version 3, Double Helix joins the other relational-database programs (4th Dimension, Omnigraffle, and FoxBASE++) with a major upgrade. It’s still unique in its nonprocedural, object-oriented approach, using icon building blocks to construct a database application through graphical representation instead of programming code. It is form-driven, and unlike its competitors, it lets users take full advantage of every feature of the system without having to learn a Pascal- or C-like programming language.

**WHAT'S NEW**

Version 3 has improved performance and a host of powerful new features that keep it in the front of the relational-database pack. The manuals have been rewritten and are even better than before, especially for novices who don’t know what a database is and don’t know how to start building a database application from scratch.

One of the most frustrating things about developing large, complex databases with the old Helix was finding your way around within the proliferation of icons on the desktop. Odesta has rectified that situation by adding two new viewing modes: View by Name and View by Kind. Both views display the icons in a list-type format similar to the Macintosh system’s View by Name option.

Each line tells you the type of icon (field, abacus, and so on), the icon’s label, and some further information, depending on the type of iconic object. When looking at the Collection window, you can see the total number of icons in each data relation (Odesta’s idiosyncratic term for a data file) as well as the current number of records. In addition, there is a space for commenting on each icon so you can add descriptive information, thereby documenting the system. You can print these views of a relation directly or dump the entire collection to a text file.

Another tremendous improvement is the ability to select multiple objects on a form by shift-clicking and then moving them as a group or changing a specification such as font size, in one operation. You can now also specify fonts in any point size. If you are using a template and want to change an included subform, you can double-click on the subform and go right to it. An additional big time-saver is the ability to double-click on any template object and have a window pop up that lets you set all the pertinent specifications for the object at once. The content of the window varies, depending on the object. If it’s a data rectangle, you can select and see the field in addition to the
Double Helix's specification window for a data rectangle on a template lets you specify all the rectangle's attributes, including selection of a default value, in a single operation with just a few simple actions.

Enhancements allow you to attach a data-entry form of your choice to a list or subform. With this capability, you can locate a record on a list and, by double-clicking on it, open the chosen entry template, displaying the record so you can make changes. As usual with Helix, this feature is easy to implement and requires no programming as such.

Other new features include a User tile that lets you get the name of an active user in a multiuser environment, and two new tiles that let you post the time a record is accessed or updated.

**WHAT'S UP/WHAT'S DOWN** Performance has been improved, most noticeably on list queries and in the multiuser environment, where time-slicing takes place between guests doing certain operations. Multiuser Helix has its own server and does not require TOPS or AppleShare, although it is compatible with them.

Double Helix is still the easiest-to-use relational-database development tool by far, especially for nonprogrammers. Although it can still use improvement (a pop-up choices list would be nice), and the lack of a variable-length subform makes obtaining certain types of reports a hassle, it is generally as powerful as its brethren and in some cases more so. You can also maintain indexes on calculated values (nonstored data), such as a concatenated name. Furthermore, the multiuser version can, optionally, update screens across the network when records are added or changed.

If you're new to databases and want a powerful development tool, Double Helix is a good choice. Even if you're used to procedural code, its unique approach deserves serious consideration, especially if you're not myopic in your views.

—Gary Hirschberg

### Double Helix

**List Price:** $595; multiuser version (four nodes), $495 extra.  
**Manufactured by:** Odesta, 4084 Commercial Ave., Northbrook, IL 60062; (800) 323-5483 or (312) 498-5615.  
**Version:** 3.0.  
**Requires:** System 6.0 or later; hard-disk drive.  
**Application Size:** 758K.  
**Compatibility:** Mac Plus or later.

---

**REVIEWS**

---

**Get Info**

---

**Double Helix**

List Price: $595; multiuser version (four nodes), $495 extra.  
Manufactured by: Odesta, 4084 Commercial Ave., Northbrook, IL 60062; (800) 323-5483 or (312) 498-5615.  
Version: 3.0.  
Requires: System 6.0 or later; hard-disk drive.  
Application Size: 758K.  
Compatibility: Mac Plus or later.
Usually, the technology available to computer users just plods along—with competing products repeating one another's so-called improvements.

But once in a blue moon there's a great leap of innovation. Something new appears that's so well thought out, so smart, that the way you work may never be the same again.

WIZ™ by CalComp, for example. WIZ is an exciting new productivity tool. Combining the easy-to-use features of a mouse with the power of an "intelligent" graphics pad to enhance every pointing, tracing and drawing function you do.

WIZ meets the needs of virtually every Macintosh and PC user—from novice to advanced. Because WIZ gives you the convenience and flexibility of six programmable buttons, a cross-hair pointer and 1000 dpi for pinpoint accuracy, along with
a user-definable mouse area. What's more, WIZ unleashes the full power and speed of your software. Optional templates for most major programs eliminate tedious pull-down or bar menus. Because WIZ templates put the commands you use most at your fingertips for instant access. And for the artist in you, WIZ offers an optional pen for drawing.

There's no rolling ball or moving parts. Nothing to clean. And WIZ has a five year warranty backed by CalComp, a world leader in computer graphics for over 30 years.

But the most amazing thing about WIZ is that you get it all for an introductory price under $200.

See WIZ at your local dealer or call 800-CALCOMP.
WIZ by CalComp.
Everything else is just a mouse.

Please circle 49 on reader service card.
SiliconDisk

If money's no object, here's the fastest storage device you can buy.

Here's a way to accelerate your Mac without opening the computer or installing any software. SiliconDisk, from ATTO Technology, is a data-storage device known as a RAM disk that's neither computer memory nor a disk.

Basically, SiliconDisk is a box filled with RAM chips connected to a SCSI port. It connects to your Macintosh and behaves just like a normal hard disk, but it doesn't keep any data when you shut the power off.

But like computer memory, it's all electronic—no moving parts. The result is blinding speed in accessing data. MacUser Labs' tests on a Mac II show SiliconDisk is more than twice as fast as a hard-disk drive for applications that are I/O intensive, such as reading and writing files or booting up the system. For computational tasks, we found the performance to be almost the same as that of a hard disk.

SiliconDisks come in sizes from 24 megabytes to 128 megabytes, and you can order a custom unit of up to 512 megabytes. But all this power doesn't come cheap. This is the Maserati of storage devices, starting at $4,995 for the 8-megabyte unit and costing up to $52,595 for 128 megabytes. (ATTO Technology could not quote a price on a 512-megabyte unit because it uses 4-megabyte RAM chips, which had unstable prices at press time.)

SiliconDisk guides data between the dynamic-RAM chips and the SCSI port through the use of a Motorola 68020, the same CPU as in the Mac II. It also uses fairly fast RAM chips rated at 100 nanoseconds. ATTO claims a 0.5-millisecond access time (300 times faster than the 15-millisecond access time of a fast hard-disk drive).

We benchmarked a 24-megabyte PRO 24, which worked without a glitch. Because the unit is internally terminated, though, it works properly only at the end of a SCSI chain. This can be a pain if you use removable SCSI devices or if another device on the chain is also internally terminated. Presumably, one reason for this design decision is that resistors are cheaper than terminators, but because the PRO 24 costs more than $10,000, that decision seems the very definition of a false economy. Also, because your data disappears when you turn the power off, built-in battery backup for protection against unexpected power failures would be a welcome feature.

At these prices, the SiliconDisk is not a drive for the masses, but it's very useful in applications where time is money and I/O is the name of the game. These include using it as a network file server with a large database and as an electronic hard disk for a graphics workstation doing electronic prepress, where file sizes can easily reach a dozen megabytes or more. If you need the fastest storage device that money can buy, the SiliconDisk is for you.

—John Rizzo
KaleidaGraph is a solid data-analysis and graphing package. Its major components are (clockwise from upper right): the data-entry spreadsheet, RPNI-based macro calculator, Formula Entry window, and Plot (output graphics) window.

analysis package. With such charting options as fine, scatter, double-y, probability, x-y, stack histogram, polar, and more, KaleidaGraph version 2.0 offers an impressive wealth of graphing and data-analysis features for demanding users.

WHAT IT IS KaleidaGraph comes with two versions of the application—one for Mac IIs (or any Macintosh with a math coprocessor) and one for 68000-based Macs—and is built around a data-entry and -editing spreadsheet, an algebraic-formula window for data manipulation, a graph-output/editing screen, and an RPNI (reverse Polish notation) calculator.

The latest version of KaleidaGraph offers spreadsheet dimensions of 256 columns by 32,000 rows, which is a welcome addition for users who were cramped by version 1.1’s limited size. Data can be imported but only as delimited text files. An innovative feature of version 2.0 lets users annotate their data with the Posted Note option on the Data menu.

HOW IT WORKS You can manipulate data sets either with the RPNI calculator or with the Formula Entry window. The RPNI calculator is similar in appearance and functionality to HP calculators: 1,000-program-step capability, 100 memory registers, programming operators, an 8-level automatic stack, and conditional testing. You can enter programs in a text window and store them to a file. Users afraid of RPNI calculators can use the Formula Entry window, which is similar to the formula-entry window in Excel. In addition to basic math operators, the Formula Entry window allows algebraic-manipulation functions such as absolute value, log, and sine, as well as polynomial-, spline-, weighted-, and exponential-curve fitting.

Generating a graph from the foremost data window is as simple as pulling down the Gallery menu and selecting one of the 15 graph types from the menu items. To the left of the graphic output is a set of plot tools that allows the addition of lines and labels, object erasing, moving and resizing of the graph, coordinate identification, and a zoom-in feature. With the Axis Options item on the Plot menu, users can change the scale of the x-or y-axis from linear to log, the number of major and minor tick marks, the color of various objects and their fill pattern, and the minimum and maximum values to be plotted. The latest edition of KaleidaGraph allows the plotting of up to 20 dependent variables simultaneously and has support for up to 16 plot windows. Data from several spreadsheets can also be consolidated into a single graph. KaleidaGraph graphs can be saved in KaleidaGraph proprietary, PICT, or MacPaint formats.

Overall, KaleidaGraph runs swiftly and without any problems on a 2-megabyte Mac IIx with an Apple RGB monitor, as well as on a standard Mac SE. The software is easy to use and is a vast improvement over the previous version. And although it may not have all the bells and whistles of some of the fancier statistical packages, it’s still a solid, reliable performer. For users looking for a first-rate data-analysis and graphing package, KaleidaGraph easily fills the bill.

—Jeffrey A. Steinberg

| REVIEWS

GRAPHICS

KaleidaGraph

If you need a dedicated graphing and analysis package, KaleidaGraph is an excellent choice.

In creating a custom database (either flat-file or relational), your first choice must be between hard-wired, nonprogrammable packages that are easy to use but inflexible and programmable procedural programs that are more flexible but also more complex. Maxem, however, is blurring this distinction with its new product, Cause, which aims to be an easy programmable application generator for nonprogrammers.

WHAT IT IS Cause is as much a compiler as it is a database product. Its sole purpose is to make churning out custom database applications intuitive and double-clickable at that.

Most custom programming in business today is concerned with database crunching, so Maxem calls Cause a personal programmer. This slogan is too encompassing to be accurate but captures the promise of this clever program. Cause is clever because it offers an innovative, all-graphic front end on a relational-database engine (c-tree, licensed from FairCom, to be exact). Completely gone are syntactical fine points you have to remember and type.

| DATABASES

Cause

Here's an unusual—and partially successful—approach to database programming for nonprogrammers.
You accomplish all database and programming functions by clicking on icons and choosing menu commands. The result is a program you compile and run within a run-time module called Effect.

An interesting feature of Cause is that the applications you develop are almost entirely portable to DOS machines, because the noncompiled source and data files are DOS-compatible. You do need a separate DOS version of Cause or Effect, however, so you can recompile and run your application there (in Character mode, by the way, which greatly diminishes the graphics capabilities but makes it usable on virtually any DOS machine).

HOW IT WORKS For all its cleverness, Cause has some problems. The program’s slogan implies that it’s more like a souped-up Pascal than an icon-driven 4th Dimension. Its terminology is also often misleading. Where most databases refer to fields, Cause uses the nonstandard term items. To make matters worse, it calls at least two other things — variables and the elements of a window — items. Another terminological travesty is that dialog boxes are called memo windows.

And speaking of windows, don’t expect Cause to let you build standard Mac windows; a read-only Help window is as close as you get. Ditto for the menu bar — your application can’t define and use pull-down menus, which means you have to be satisfied with creating nonstandard Mac applications in which Quit is a button in a dialog box instead of a command in the File menu.

The manual suffers from its insistence on burying advanced issues. Most of the important database information, for example, is relegated to densely packed sections of the Technical Supplement. And the tutorial does not cover the critical topic of linking databases.

Version 1.0 shows definite signs of being a first version — many of its tools are awkward to use. (Why do you need a special tool to resize a window and a different one to move it? The Text Format dialog box doesn’t show you what sizes are installed.)

Maxem has big plans for Cause, including the ability to compile to a true stand-alone (not run-time) product and a network version. With luck, it’ll tighten up the interface and rewrite the manual. (As we went to press, Maxem released version 1.04, which arrived too late for inclusion here. Version 2.0 was expected to ship in December 1989. — Ed.)

— Dave Vallulis

HARDWARE

ColorBoard 264

RasterOps’ video board costs only a few hundred dollars more than Apple’s 8-bit version, but it displays millions more colors.

Until now, true color, photo-realistic graphics have been an expensive proposition, requiring thousands of dollars for a video board and monitor. The RasterOps ColorBoard 264, the first 32-bit video board for less than $1,000, has changed all that.

Besides its low price, the ColorBoard 264 saves you the cost of an expensive new monitor because it works with a standard Apple 13-inch color monitor, as well as with many other monitors, including the Sony 1302 and 1304, NEC multisync, and Mitsubishi 35-inch model. It also works with a 30-hertz NTSC video monitor.

In addition to displaying 16.7 million colors or 24 bits per pixel (the older 8 bits are for auxiliary information and aren’t used currently), the ColorBoard 264 also displays in 1, 2, 4, or 8 bits, just as an ordinary Apple video card can. This is important because you’ll want to turn the number of colors down when you’re not working on true color graphics. Pixels of 24 bits present more information for the CPU to process — even if it’s not graphics data — which results in some sluggishness in redrawing screen images, even on a Mac IIfx. With a word processor in 24-bit mode, for instance, the current line blinks with each additional character typed — and even a fast CPU won’t prevent this.

The problem is a combination of QuickDraw and NuBus — neither of which is fast enough to pass the data. The ColorBoard uses 100-nanosecond RAM to get as much out of NuBus as it can, but NuBus is still a bottleneck. The SE/30
version of the ColorBoard 264 ($1,295) is faster in 24-bit mode because it uses that computer's speedy Processor-Direct Slot, which is a direct line to the CPU. Even so, performance will still be slower in 24-bit than in 8-bit mode.

The board itself doesn't require a specific amount of RAM in your Mac, but most 24-bit applications need at least 4 megabytes. The ColorBoard 264 does require System 6.0.3 or later and Apple's 32-bit QuickDraw INIT. (This INIT will be built in to System 7.) For users who have an earlier version of the System, RasterOps supplies System 6.0.3 on-disk but doesn't include a copy of the Apple Installer or a script. The manual doesn't mention that you can put a 6.0.2 installer and script on the 6.0.3 disk, and it also doesn't tell you that you need to drag the 6.0.3 General and Monitor cdevs, as well as the QuickDraw INIT, manually — even with a 6.0.3 or 6.0.4 installer script.

These inconveniences aside, the ColorBoard 264 is a solid board and an exceptional value that may replace Apple's 8-bit board as the color standard.

— John Rizzo

**ColorBoard 264**

- **List Price:** NuBus version, $995; SE/30 version, $1,295.
- **Manufactured by:** RasterOps, 2500 Walsh Ave., Santa Clara, CA 95051; (408) 562-4200.
- **Requires:** System 6.0.3 or later; 32-bit QuickDraw.
- **Compatibility:** Mac II family (or SE/30).

### Review:

The RasterOps ColorBoard 264 is a 24-bit color-video board that costs only a few hundred dollars more than the Apple 8-bit card but displays 16.7 million colors, rather than Apple's 256.

My review of the ColorBoard 264 is also a solid board and an exceptional value that may replace Apple's 8-bit board as the color standard.

— John Rizzo

### HyperCard

#### Dialoger and ScriptEdit

**SERIOUS STACK HACKERS NOW HAVE TWO POWERFUL TOOLS TO ADD TO THEIR ARSENALS.**

Dialoger and ScriptEdit are HyperTalk utilities intended for people who spend a lot of time programming. Dialoger, in particular, ought to be reserved for those who relish getting their hands sandy in order to build a sandcastle bigger than the next.

Built into HyperTalk are two commands, Ask and Answer, that produce simple, standard dialog boxes. The XCMD-based Dialoger expands the use of dialog boxes within HyperTalk by an order of magnitude, a superb achievement in light of how important dialog boxes are to the Mac interface.

Dialoger lets programmers create modal or modeless dialog boxes of four different designs: Standard, Titled, Shadow, and Plain. Within these dialog boxes, you can add any of the following items: radio buttons, check boxes, push buttons, icons, pictures, editable text, static text, pop-up menus, and lists.

You create dialog boxes by dragging items from a palette and placing them in a box. Dialoger provides alignment and graphics-importation tools and has other tools that let you preview and export dialog boxes. The package also comes with help, reference, and example stacks.

Dialog boxes are called up in scripts in much the same way as are the Ask and Answer commands. However, the interpretation of the result of the user's action requires detailed attention to parameter characteristics. Whereas HyperTalk returns its dialog result in the simple variable `It`, Dialoger returns a complex, formatted variable called `dResult` that, unlike in HyperTalk, can be controlled while the dialog box is being displayed.

Strangely, the best and worst things about Dialoger are the same thing: its complexity. Much of the manual talks about DITL and DLOG resources interspersed with PICTs, ICONs, CDEFs, LDEFs, and CICNs. It reads like a chapter of *Inside Macintosh*. Even intermediate programmers might get lost, and the manual is partly at fault because it has no overview, summary, or index.

If Dialoger is not as handsome as it could be, it harnesses so much of the Toolbox's Dialog Manager capabilities that it's an exceptional tool for experienced programmers.

Dialoger is a HyperCard utility that lets programmers create custom dialog boxes such as this one, using the palette on the right. It's a complex package that includes a lot of the Mac Toolbox's Dialog Manager capabilities.

ScriptEdit lets users open one or more script windows at a time — each with an information bar at the top containing status information and pop-up vocabulary lists behind the buttons.

Whereas Dialoger aims to make stack interaction easier, ScriptEdit tries to make stack writing more convenient. ScriptEdit has a set of new windows with enhanced editing capabilities that replaces HyperCard's single script window.

The most significant improvement of ScriptEdit's editor is its ability to have multiple scripts on-screen at the same time, including scripts from different
Macintosh computer and new Kodak Diconix printer

WHAT'S ONE WITHOUT THE OTHER?

KODAK
Introducing the Kodak Diconix M150 plus printer. Don’t take a Mac anywhere without one. Now you can print out a sudden revision, a quick letter, an instant overhead anywhere!

Just think of all the things you can do if you have a printer with your Macintosh computer. Those last-minute improvements on the presentation. And the letters and reports that could be on their way right now. Then there's the sheer convenience of being able to read what you write before you get back to the office.

It's all easy if you have the new Kodak Diconix M150 plus printer. It's easy to carry (3.1 lbs.), prints PostScript®-quality outline fonts using Adobe Type Manager™ software, as well as presentation graphics. And it works as well on the desktop as it does on the road. No printer in the world is quieter, smaller or lighter.

Go ahead, give in to temptation, call for the name of your nearest dealer in the U.S. or Canada: 1 800 255-3434.

The new vision of Kodak
**Up to Date**

**Changes New and Noted**

**PERSUASION,** Aldus' presentation package, has been upgraded to version 2.0. New features include support for color PostScript output, 15 transition effects (such as wipes and fades), thumbnail views, improved speaker support and outlining capabilities, enhanced text handling and importation (including support for Microsoft PowerPoint files), and immediate access to any slide from within the Slide Show mode. $495; upgrade, $75 for registered users (free if purchased after August 9, 1989). Aldus, 411 First Ave. S., Seattle, WA 98104-2871; (206) 628-2383.

**MACWRITE II** from Claris has had its first upgrade. Version 1.1 utilizes Claris’ proprietary XTND architecture that lets developers easily create file translators for use with Claris products. MacWrite II 1.1 comes with 30 special translators from DataViz, and future DataViz translator sets will be directly accessible from within MacWrite II. Speed has been improved, and the HyperCard-based help system can now be customized through links to HyperCard stacks. Built-in virus protection has also been added. $249; upgrade, free to registered users of MacWrite II. Claris, 5201 Patrick Henry Drive, Box 58168, Santa Clara, CA 95052-8168; (408) 987-7000.

**SMARTFORM DESIGNER** version 1.1, from Claris, features improved forms-management capabilities and stronger integration with database and spreadsheet programs and other applications. Version 1.1 can export EPSF files and can save multiple forms in a single file, creating “form sets.” $399; upgrade policy was not final at press time. Claris, 5201 Patrick Henry Drive, Box 58168, Santa Clara, CA 95052-8168; (408) 987-7000.

**RAGTIME 3,** the combination word-processor, spreadsheet, and page-layout package, is now in version 3.0, with a new U.S. distributor. New features include improved graphing and page-layout capabilities (with 3-D pie charts and text flow around any frame type), image processing that lets users scan images directly from within RagTime 3, a spelling checker with eight dictionaries, typographical macros, and dynamic integration of spreadsheet calculations within a text document. $599; upgrade, $150 for registered users. RagTime, 400 Walnut St., Suite 501, Redwood City, CA 94063; (415) 780-1800.

In HyperCard, in which each object can contain its own programming code, the single-window limitation hampers a programmer’s ability to integrate the many parts of a stack. Some programmers simply refuse to tuck away code in buttons and fields and opt instead for calling handlers in a background script so all their work is consolidated.

ScriptEdit offers a solution to the problem of fragmented pieces of code in more ways than merely supporting multiple script windows. It’s implemented as a DA, and selecting the ScriptEdit menu item brings up the Objects window, which contains a list of all the scripts in the stack — including hidden buttons and fields.

At the top of the Objects window are five buttons representing the five types of HyperCard objects. Programmers can filter the list of available object scripts by highlighting the appropriate object button. The Objects window also contains an Open button for opening scripts directly and two directional buttons for navigating the stack underneath.

Once you have opened a script window, you have a few additional tools not available through HyperCard’s built-in editor. The newest little tool is an Edit menu command for commenting or uncommenting sections of code. The command places or removes two hyphen characters (--), which are HyperCard’s comment markers, before every line of a selection.

Other features include the ability to insert tabs, search and replace, compare two scripts, undo the last action for each window, and change the edit-window text to a single font and size. Also, each edit window has a hideable information bar with pop-up menus that list HyperTalk vocabulary. When an item is chosen, the word is inserted into the script. This last feature would be much more useful if it offered true help information instead of a simple insertion.

ScriptEdit is a clean, focused utility for HyperCard programmers who crave additional text-editing capability. Other programmers might find its offering limited, reasoning that one windowful of programming code at a time is plenty. [At press time, Somak Software released a new version of ScriptEdit. The version 1.1 upgrade is available free to registered users and fixes a few minor bugs, as well as adding an optional feature that displays object names in boldface if the object contains a script and in plain text if the script is empty. — Ed.]

— Carrie Moss

**Get Info**

**Dialoger**


**ScriptEdit**

If you're on the firing line, you need Dow Jones online.

People are counting on you. Relying on your speed. Your smarts. Your information.

Feel the heat? Not when you're online with Dow Jones News/Retrieval—the business news and information service from the publisher of The Wall Street Journal, Dow Jones & Company, Inc.

With News/Retrieval it's easy to screen sales prospects, identify acquisition candidates and research competitors. Stay ahead of events and track fast-breaking situations like never before. Spot the trends that signal opportunity. Spark new ideas, develop incisive strategic plans, or compile a wealth of financial data to give yourself a unique information advantage.

Only News/Retrieval gives you news just seconds after it hits the Dow Jones newswires; exclusive access to the full text of The Wall Street Journal, and fingertip access to information from over 185 publications, including Fortune, Forbes and Business Week; D&B reports; detailed profiles of over 5,000 companies; and more—to help you make cool, confident decisions.

Online has never been easier—one service even lets you enter search commands in plain English!

Discover how easy it is on the firing line when you're online with News/Retrieval. For more information or to order now ($29.95 includes 3 free* hours), call today.

1-800-225-3170, Ext 669.

Dow Jones News/Retrieval
Online with business.

*Offer expires February 28, 1991. New domestic and Canadian subscribers only. Free time is per account and must be used within 30 days of receipt of passwords. Some services have special charges that are excluded from the free time offer. © 1989 Dow Jones & Company, Inc. All rights reserved.

Please circle 34 on reader service card.
A MacWarehouse Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable, overnight service will have your Kit in your hands tomorrow!

MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spreadsheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require techni­cians in lab coats. You don't even need a soldering iron. Just open your Mac, slide out the main circuit board, and plug in your memory card. Complete installation instructions are included with each memory kit.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one mega­byte on each card and are usually sold in pairs — (2@$95 each).

The chart explains exactly what you need to achieve the desired level of performance.

<table>
<thead>
<tr>
<th>Amount of Memory</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MB</td>
<td>Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion.</td>
</tr>
<tr>
<td>2½ MB</td>
<td>Remove only two 256K SIMMs, install two 1M SIMMs.</td>
</tr>
<tr>
<td>4 MB</td>
<td>Replace all four 256K SIMMs with four 1M SIMMs.</td>
</tr>
<tr>
<td>4 MB</td>
<td>Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.</td>
</tr>
<tr>
<td>5 MB</td>
<td>Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.</td>
</tr>
<tr>
<td>8 MB</td>
<td>Remove all four 256K SIMMs, install eight 1M SIMMs.</td>
</tr>
</tbody>
</table>

To open your Mac Plus or SE, you'll need a specially designed tool — it's available from us as part of a handy tool kit for just $15.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single Inline Memory Modules). Each one mega­byte SIMM card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120 ns Samsung kits is $95. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nano­seconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor needs 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

OVERNIGHT DELIVERY

Place your order by 12:00a.m. (E), weekdays and we'll deliver overnight for just $3.00. There's never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.

MacWAREHOUSE

1-800-255-6227

Call toll-free
Twenty-four hours a day, seven days a week.
Inquiries 1-201-567-7240
Fax 1-201-905-9279

MacWAREHOUSE

30 DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your MacWarehouse Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return the product, postage paid, in its original condition, with the original packaging and documentation.

ONE YEAR WARRANTY. MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.
Buy a Hard Drive Now And Save Up To $300

“The best deal in hard drives just got better!”

Between now and February 28th, MacWarehouse is offering savings on every hard drive we sell. So, if you’re thinking of buying a new hard drive, your timing couldn’t be better. Check out our sale prices and your savings, compared to our December 1989 prices, in the chart.

We offer drives by leading manufacturers like Cutting Edge, C.M.S., Quantum, Dolphin, PLI Infinity Turbo and others — all at unheard of low prices.

Let our helpful sales staff take the hassle out of buying a drive. They’ll tell you which drive mechanism uses. They’ll also tell you about access speed, reliability, software and the manufacturer’s warranty.

MONEY BACK GUARANTEE
They’ll tell you which drives come with the MacWarehouse 30-day money back guarantee. Try one at home. And if, for any reason, you’re not 100% satisfied, just return it to us within thirty days and we’ll refund your money.

Then there’s the MacWarehouse Loaner Drive Program. Buy from MacWarehouse and if you ever have a problem, you won’t be without a drive for more than a few hours.

READY TO USE
A hard drive from MacWarehouse couldn’t be easier to use. We’ll tell you which ones come pre-formatted — ready to use right out of the box. You just plug in, turn on your Mac and go!

If you do need any help, the MacWarehouse Technical Support staff is standing by our toll-free lines to assist you.

LIMITED TIME OFFER
MacWarehouse sale prices, based on capacity, are shown in the chart. Also shown are savings from pre-holiday prices. (This is a limited time offer, valid through February 28, 1990.) Overnight delivery is just $3, anywhere in the Continental United States.

So call us now and tomorrow morning you’ll be up and running with the best hard drive deal in the business!

<table>
<thead>
<tr>
<th></th>
<th>20 + MB</th>
<th>30 + MB</th>
<th>40 + MB</th>
<th>60 + MB</th>
<th>80 + MB</th>
<th>***40+ Removable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting Edge</td>
<td>359 $80</td>
<td>479 $20</td>
<td>525 $24</td>
<td>609 $20</td>
<td>699 $40</td>
<td>829 $70</td>
</tr>
<tr>
<td>CMS, MacStack</td>
<td>459 $70</td>
<td>499 $46</td>
<td>599 $26</td>
<td>649 $50</td>
<td>769 $30</td>
<td>839 $36</td>
</tr>
<tr>
<td>Dolphin, Integra</td>
<td>429 $70</td>
<td>479 $116</td>
<td>549 $170</td>
<td>615 $163</td>
<td>695 $300</td>
<td>879 $260</td>
</tr>
<tr>
<td>PLI, Infinity Turbo</td>
<td>-</td>
<td>569 $20</td>
<td>619 $26</td>
<td>-</td>
<td>-</td>
<td>1099 $21</td>
</tr>
<tr>
<td>*Quantum Internal</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>499 $26</td>
<td>-</td>
<td>829 $40</td>
</tr>
</tbody>
</table>

Savings are calculated from MacWarehouse December 1989 published prices. *Quantum drives are for internal installation and require a 3.5 Internal Drive Kit for $3. **PLI is a 5.25 turbo drive. ***40 = meg Removable Cartridge Drives come with 1 cartridge. Additional cartridges available.

MacWAREHOUSE
1-800-255-6227
Call toll-free
Twenty-four hours a day, seven days a week.
Inquiries 1-201-367-0440
Fax 1-201-905-9279
© MacWarehouse Inc.

MacWarehouse 30-Day Money Back Guarantee
Many of our drives come with the MacWarehouse 30-Day Money Back Guarantee. If, for any reason, you’re not completely satisfied, call us within thirty days of receipt for a return authorization number and full refund of the purchase price.
OVERNIGHT DELIVERY
ONLY $3.00
(See details below)

MacGolf Classic (XOR Corp.)
This is the premium edition of MacGolf, featuring vivid full-screen color graphics with unsurpassed screen image detail. Contains the original 2 MacGolf courses and 4 additional MacCourses, for a total of 108 holes to play. New features include 5 enlargement options for close-up viewing, 9 practice greens, a driving range, installiability on hard disks and much more. Plus, SE, and II (entertainment) $53.

ACCESSORIES

Apple
Toner Cartridges LaserWriter ........................................... 115.
Avery Labels (full line available) ................................. 25.
Color Codor 3.5 Diskette ............................................. 4.
Laser 3.5 Diskettes .................................................... 29.
Laser File Folders ...................................................... 6.
Laser Transparencies ................................................. 22.

Basic Needs, Inc.
HardTop Keyboard Covers ........................................... 15.
HardTop ImageWriter Covers ....................................... 17.
Keyboard Flip ........................................................... 6.
ImageWriter or LaserWriter ........................................... 12.
Mac Plus and keyboard .............................................. 11.
Mac SE, and exd, or reg, keyboard ............................. 11.
Mac II and exd. keyboard ......................................... 12.
Universal Laser Printer Stand ..................................... 28.
Computer Friends, Inc.
MacTracker (IW & II) .................................................... 41.
Curtis
Computer Tool Kit (52 pc.) ........................................ 49.
Curtis Clip .............................................................. 6.
Disk Holder (holds 40) ................................................ 40.
Jewel Surge Suppressors ............................................. 9.

Ergotron
MacTra SE ................................................................... 68.
MacTra II-RGB ............................................................ 75.

GOfer (Microlytics)
The ultimate test finder. A powerful software utility that searches, finds and retrieves text. Searches through countless files on your hard disk drive or floppy disks to find the text you need. A phrase, a fact, a note, a date. If you need it, GOfer finds it in seconds. You can automatically import the section of text into the document you're currently working in. You save hours searching through files. GOfer operates as a Macintosh desk accessory. (utilities) $47.

Circular Polarizing Filter .............................................. 35.
Kleen & Dry CHT Pads .................................................. 5.

Polaroid
Mix it up III Cartridge .................................................. 43.

Macinware Carrying Cases (I/O Designs)
The I/O family of carrying cases protects your Mac and its peripherals against damage whenever you need to take your Mac on the road. The outer covering is made of high-quality lightweight nylon with web strap reinforcement. The SE Extended Case has an inside padded compartment that can accommodate the extended keyboard. The interior is padded to protect the equipment. Comes in Black or Navy. (accessories) $75.

MacSnap 5245 and 5485 (Dove)
Get an unbeatable combination of performance and productivity for your SE with Dove's MacSnap 5245 and 5485. MacSnap 5245 gives you versatility by combining one meg of memory with the universally compatible MacSnap SCSI interface and external port. And for even more system flexibility, MacSnap 5485 features SCSI complete with two of RAM for the ultimate SE enhancement. Enjoy access to a greater variety of software and improve your performance in a Snap! (memory) MacSnap 5245-$539.

MacSnap 5485-$999.

Smack-a-Mac.............................................................. 9.
SoundSight ............................................................. 35.
FastKeys 2.0 ........................................................... 35.
Targus, Ltd.
Deluxe Plus SE-XKE Case (black) .................................. 69.
ImageWriter II Case (black) .......................................... 45.
Mac Plus/SE Case (black) ............................................. 55.

ACCOUNTING AND PERSONAL FINANCES

Arixtra
Checkwriter ........................................................... 37.
Payroll 3.5 .............................................................. 103.
Payroll PLUS or TimeMinder ........................................ 114.

Bedford (Computer Associates)
Simply Accounting .................................................... 219.
Brown-Waghs Publishing
Macledgers .............................................................. 159.
Service Industry Accounting ........................................ 200.
DAC
Doc-Easy Light ......................................................... 42.
Intuit
QuickQuick 1.5 ......................................................... 36.
Layered, Inc.
at Cncl ............................................................... 289.

Casino Master (Centron)
Become a Master of Casino Gambling! Five separate casino games include Blackjack Ace, CrapsMaster, Roulette Master, PokerMaster, and Baccarat Master. Exact table simulation, mouse controlled betting, selectable bankroll, stored win/lose statistics and complete manual included. Now available in dazzling color in the Mac II version!! Recommended and used by professional gamblers! (entertainment) Buy individual games for $27 each or get the 5 game Casino Master Package for $49, or the Deluxe Mac II color version for $55.

BLANK MEDIA

B.A.S.F. made in U.S.A
OS/DD (box of 10) ...................................................... 15.
OS/High Density (1.44 Meg) ........................................ 29.

Peripheral Land, Inc.
Turbo 40 Cartridge ..................................................... 115.

Sony
DS/DD (box of 10) ...................................................... 14.

GUARANTEE
Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.
The Mac Portable!

It's here at last. It has all the attributes of your own machine, plus awesome new screen technology, (fifty percent larger than the SE screen), 6 - 12 hour rechargeable batteries and a built-in optional 40MB hard disk. Imagine all the power and convenience of your Mac in a 15.7 pound portable package.

And you can win the new Macintosh Portable by entering the MacWarehouse PORTABLE COMPUTER GIVEAWAY.

FREE CATALOG!

We carry more than 1200 Macintosh products, including all the latest releases and new versions. We pride ourselves on getting new products first. If you can't find what you need, call us for a free copy of our latest catalog.

Aperture Visual Information Manager

(Aperture Technology)

Aperture moves Macintosh graphics into a new dimension by integrating a precision drawing system with a powerful database manager. Aperture allows you to create detailed drawings, attach data to objects in your drawings, produce reports, link drawings together, and display data on your drawings to form complete applications. Whether you are an architect, engineer, designer, space planner, facilities manager, or someone who needs to communicate complex ideas and information, Aperture will become your program of choice. (graphics) $729.

Panorama (ProVUE)

Panorama combines the speed and simplicity of a spreadsheet with a forms generator, an outline, and business graphics. Think of it as a database manager that looks like a spreadsheet. It's macro recorder simplifies common operations. It can turn any ordinary database into an outline with up to seven levels. Panorama also creates personalized form letters (and mailing labels) without a separate word processor. Winner of 1988 MacUser Eddy Award. (database) $205.

MacInTax Federal '88-1040 (Softview)

MacInTax Federal '88-1040 guides you through the process of preparing your Federal Taxes (eight state tax modules also available at $56 ea.). Just type in the requested numbers, and MacInTax does the rest. When finished, print the completed return on the LaserWriter or the ImageWriter. If you used MacInTax last year, it reads those files and brings forward relevant items, saving time and reducing errors. Its tax planner shows the effects of various tax strategies. (finance) $65.

MacWarehou se Portable Computer Giveaway

1690 Oak Street, P.O. Box 1579, Lakewood, NJ 08701

When you order by phone or mail, you are automatically entered in the drawing. You can also mail this coupon or call our contest entry line. 1-800-367-0787. (In CT., call 1-203-852-8968)

MUBØ

Name ____________________________
Address ____________________________
Apt. ____________________________
City ____________________________ State ________ Zip ________

OFFICIAL ENTRY COUPON

I'm Kerry, call me at:

MacWAREHOUSE
1-800-255-6227
(1-800-ALL-MACS)

Inquiries: 201-367-0440
FAX: 201-905-9279

Call anytime — day or night 24 hours a day, seven days a week

*Midnight Express service available weekdays.

Your name is automatically entered into the drawing when you order from MacWarehouse. (Or just mail in the Entry Coupon.) And don't forget, absolutely nobody beats MacWarehouse for great prices, free technical support and fast, dependable, OVERNIGHT service. You won't find a better source for your Macintosh needs.
Orbital Mech
A responsive spaceflight and docking simulator designed for all who've wondered at the stars, the motions of objects in orbit, and about what it would be like to fly a spacecraft in orbit. (entertainment) $29.

Desktop Publishing

Aaps
MicroTV ............................ 289.

Aldus
PageMaker 3.02 ..................... 385.

PageMaker Color Extension ...... 149.

Broderbund
DTP Advisor ........................ 47.

Data Translation
PhotoMac .......................... 609.

Emerald City Software
Smart Art I, II, or III .......................... ea. 85.

Icon Simulations
MacKern .............................. 119.

Letraset
Color/Font or Studio .......................... Call.

Ready,Set,Go! .......................... 275.

Olduvai
Plus 1.1 ............................... 95.

Read-It! 2.1 (OCR) .................. 249.

Read-It! Personal 2.0 ............... 125.

Read-It! TS (ThunderScan) ........... 79.

SuperSpool/SuperLaserSpool
SuperSpool for direct Connect ImageWriters and SuperLaserSpool for all networked or non-networked Apple printers, are best-selling print spoolers that let you work and print at the same time. The fastest spoolers available. Can handle large and complex graphics, spreadsheet or database documents. Special desk accessory allows you to see and manipulate the print queue: delete documents, re-order documents to another printer. (utilities)

SuperSpool - $58.
SuperLaserSpool (single-user) - $89.

SuperSpool for direct Connect ImageWriters and SuperLaserSpool for all networked or non-networked Apple printers, are best-selling print spoolers that let you work and print at the same time. The fastest spoolers available. Can handle large and complex graphics, spreadsheet or database documents. Special desk accessory allows you to see and manipulate the print queue: delete documents, re-order documents to another printer. (utilities)

SuperSpool - $58.
SuperLaserSpool (single-user) - $89.

MiniCad+ 2.0 (Graphsoft)
This year MiniCad+ is the people's choice, winning both the U.S. and Austrian MacWorld World Class Awards for CAD. For the price of most 2D CAD packages, MiniCad+ provides 2D, 3D, a hotlinked spreadsheet and a programming language. The quality is unsurpassed. (CAD) $159.

Quark
QuarkXPress ............................ 169.

Xpress ................................. 459.

Springboard
Springboard Publisher II ................. 109.

TimeWorks
Publisher-II ............................ 225.

Disk Drives/Boards

Artemide Technologies, Inc.
HardPac Mac 20 Meg ................... 460.

HardPac Mac 40 Meg ................... 749.

HardPac Mac 80 Meg ................... 1099.

HardPac Mac 105 Meg .................. 1229.

CMS
MacStack 20 Meg ...................... 459.

MacStack 30 Meg ...................... 499.

MacStack 45 Meg ...................... 599.

MacStack 60 Meg ...................... 649.

MacStack 80 Meg ...................... 769.

Cutting Edge
BOOK EXTRML Floppy Drive ............. 149.

SyQuest Removable 45 Meg ............ 829.

Under the Mac 20 Meg .................. 829.

Under the Mac 30 Meg .................. 479.

Under the Mac 45 Meg .................. 629.

Under the Mac 60 Meg .................. 699.

Dayna Communications
Dayna File Single 360K (5 1/4") ........ 525

Dayna File Dual 360K & 1.44M ........ 720.

Blueprint
This new professional-level 2D CAD program has it all at an unbelievable price. Layers, ellipses, DXF, constraint palette, high precision, auto-dimensioning, hatch, symbol library, encapsulated postscript file format and much more. (graphical) $79.

Dolphin Systems Tech
Integra 20 Meg ......................... 429.

Integra 30 Meg ......................... 479.

Integra 40 Meg ......................... 549.

Integra 60 Meg ......................... 619.

Integra 80 Meg ......................... 689.

Flipper 44 Meg ......................... 879.

Fujitsu
800K Disk Drive .......................... 175.

Kenmaster Technology
Drive 2.4 ................................ 339.

Rappol ................................. 209.

PCPC
MacROM Hard Drives ................... 489.

Peripheral Land, Inc.
Infinity Turbo 40 Meg .................. 1098.

Turbo Floppy 1.4 ....................... 359.

Quantum
Quantum 40 MB Raw Drive ............ 499.

Quantum 80 MB Raw Drive ............ 829.

RasterOps
RasterOps Colorboard 264 ............... 760.

WealthBuilder (Reality Technologies)
Turn your Mac into your own financial planner. Taking into account your financial profile, the goals that you want to accomplish and the risk that you are willing to assume, WealthBuilder searches for the best investments available to fulfill your objectives. The program also allows you to change your investment strategy and immediately view your impact on your overall financial picture. WealthBuilder is your personal tool to a brighter financial future. (finance) $165.

Educational/Personal

Beacon Technology
GEMS of the Word .................. 25.

BrightStar
Alphabet Blocks 3.01 .................. 30.

Talking Tiles ......................... 27.

Bootware Software
ResumeWriter Pro .................. 56.

Davidson
Math Blaster ......................... 27.

Speed Reader II ....................... 56.

First Byte
The Dinosaur Discovery Kit ........... 27.

The Puzzle Storybook ............... 27.

The Rhyming Notebook .............. 27.

Fair Tide Technologies
Navigator mono .................. 199.

Help Software, Inc.
Desktop Help for Excel ............ 50.

Learning Company
Math Rabbit ......................... 31.

Reader Rabbit ......................... 37.

MicroTech
Elementary Signer ................... 49.

Finger Speller ......................... 29.

The Software Toolworks
Mavis Beacon Teaches Typing ......... 29.

Visionary Software
Synchronicity ......................... 39.

Voice & Video Instruction Videos
HyperCard or Pagemaker 3.0 ...... ea. 35.

Word 4.0 Video Tape .................. 35.

Entertainment

Access Software, Inc.
World Class Leader Board .......... 27.

Artover .......................... Bridge 6.0 ....................... 24.

Daily Double Horse Racing .......... 16.

GrailQuest ......................... 19.

Broderbund
Ancient Art of War At Sea ........... 27.

Shufflupac Cafe ....................... 24.

Where in the World is Carmen ........ 27.

Bull City Software
Morality's Revenge ................... 36.
Technology" and an onboard microprocessor to achieve very high resolution combined with simple use. Felix is a division of MicroWarehouse, Inc. MacWAREHOUSE is a trademark of MicroWarehouse, Inc. 

**TopS Network Bundle for the Macintosh (TOPS)**

The TOPS network allows you to quickly and easily share files, electronic mail and printers between your Apple Macintosh, IBM PC and Sun Workstation. It includes all the software necessary to get your Macintosh working for you. Providing data, accessing multi-user applications and sending electronic mail. All of TOPS functions are completely user-implimentable, saving you time and money. 

**CAD/CAE**

- ClarisCAD ...................................... 595.
- Generic GADD Level 1 ......................... 155.
- Strata Vision 3D ............................. 375.

**Communications**

- CE Software 
  : InOut (1 to 5 Users) ................. 129.
  : Quick Mail 2.0 (1-10 Users) ........... 249.

- DataVIZ 
  : MacLink Plus w/Cable 4.1 .............. 125.
  : MacLink Plus/Translators 4.1 ......... 89.

- Dow Jones 

- Hayes 
  : Smartcom II-1.1 ......................... 87.

- InSignia Solutions 
  : Soft PC (Mac II) ......................... 245.

- MacComet 
  : AccuWeather Forecaster ............... 58.

- Prodigy 
  : Internet Starter Kit ....................

- Prometheus 
  : Acknowledge ........................... 289.

- MACKNOWLEDGE ......................... 149.

**Software Ventures**

- Microphone II v.3.0 ....................... 219.
- Traveling Software 
  : LapLink ................................ 81.

**Database Software**

- Acquis 
  : 4th Dimension 2.0 ....................... 469.
- AEC Management Systems 
  : AEC Information Manager ............... 409.
- Clock 
  : Omnis 5 ................................ 359.

- Graphics 
  : ClarisCAD ...................................... 595.
  : Generic GADD Level 1 ......................... 155.
  : Strata Vision 3D ............................. 375.

- Communications 
  : CE Software 
    : InOut (1 to 5 Users) ................. 129.
    : Quick Mail 2.0 (1-10 Users) ........... 249.
  
- DataVIZ 
  : MacLink Plus w/Cable 4.1 .............. 125.
  : MacLink Plus/Translators 4.1 ......... 89.

- Dow Jones 

- Hayes 
  : Smartcom II-1.1 ......................... 87.

- InSignia Solutions 
  : Soft PC (Mac II) ......................... 245.

- MacComet 
  : AccuWeather Forecaster ............... 58.

- Endevour Planner 
  : Endeavour Planner puts you in charge of complicated projects. Its easy to use GTANT chart display lets you point, click and drag on any item. Each project can have its own calendar. You can adjust schedules midstream when conditions change, or lock in fixed deadlines. (business) $89.
Bullseye
Ferrari Grand Prix or P51 ea 32
Fokker Tri-plane 24
Gun Master ea 49
Joseki Tutor ea 30

Swivel 3D • Studio/8 • Studio/1
(Paccomp & Electronic Arts)
FREE OFFER! Buy Studio/8 and Swivel 3D and get Studio/1! Free! Use Swivel 3D to create 3D objects and Studio/8 to add full-color backgrounds and touch-up. Use Studio/1 to animate your 3D objects in b/w. Ideal for prototyping, architecture and product design. (graphics) Purchase Studio/8 and Swivel 3D for $624 and get Studio/1 FREE! (A $149.95 value.)

Lunar Rescue or MacGolf 2.0 ea 34
MacGolf Classic ea 53
Road Racer ea 39
NFL Challenge ea 54
Parno's holster
Felon 2.o ea 31
Telesis color version ea 24
Springboard ea 29
Hidden Agenda ea 36
Studio Zero ea 29
Targus Carrying Case ea 69

Adobe
Adobe Type Manager ea 56
ATM Plus Pack 199
Fonts (full line available) ea ea 279
Forms and Schedules ea 229
Presentations ea 279
Textures, Fills, and Patterns ea 129

Altays
Formula Top 2.0 ea 52
The Art Importer 2.0 ea 89
Emerald City Software ea 62
Letraset ea 275
LetraFont (various) ea 89

Tactic Software
AnFonts Vol. 1, 2 or 3 ea 55
Orange Mac ea 69

Aperture Technology
Aperture Visual Information Mgr. ea 729
Broderbund
Drawing Table ea 75
Quark XPress ea 129
Cassidy & Greene
Vivid Impressions Vol. 1 ea 67
Claris
MacDraw II ea 295
MacPaint 2.0 ea 95

Cricket (Computer Associates)
Cricket Color Paint ea 179
Cricket Draw ea 139

Dream Maker
Scenes, Business Images ea 69
MacGallery ea 27

Electronic Arts
Studio/8 ea 299

Graphsoft
Blueprint ea 349

Innovative Design Design
Dreams ea 269
MacroMind ea 139
MacroMind Accelerator ea 445
VideoWorks II ea 175

Metro ImageBase
(Full Line Available)
Art Decor or ReportMaker ea ea 76
Newsletter Maker or Business ea 76

Mindscape
ZING ea 139

Multi Ad Services
ProArt, Bus., Sports or Holidays ea 95
Paccomp ea 399
ModelShop ea 399
Swivel 3D ea ea 319


circa Mac

Silicon Beach
digital Darkroom ea 249
Super 3D ea ea 315
SuperPaint 2.0 ea 125

SuperMac
celPaint 2.0 ea 225

celPaint Professional ea 395
Tactic Software
cel Clips Vol. 1 ea 51
cel Clips Vol. 2 ea 65

celSound Clips Vol. 1 or 2 ea ea 49

celZedic
deskPaint 2.0 ea 65

GRAPHICS AND DESIGN
3G Graphics
Images w/Impact ea 52
Graphics & Symbols ea 52
Business 2 ea 55
Accents & Borders 1 ea 55
Adobe
Illustrator 68 ea 279
Photoshop ea Call
Streaming ea 229

Egas Development, Inc.
Showcase F/X ea 199
Aludra ea 345

MacPhonebook 2.0

Dust Covers
Basic. Need dust covers look great! Machine stitched and custom fitted. The covers are made from washable ripstop nylon and won't crack, yellow, or fade like similarly priced vinyl. (accessories) Starting at $11.

CanOpener
Information retrieval utility for the Mac. CanOpener will search anywhere, and lets you retrieve just about anything: including text, pictures and sounds. Locate text inside pictures, and gives you the whole picture! Anything you retrieve with CanOpener can be stored in it's library, so the next time you need it, it's just a click away. (utilities) ea 65.

Full Targus Macintosh line.
available in black, blue, burgundy, and platinum. (accessories) ea 66.

CanOpener
Information retrieval utility for the Mac. CanOpener will search anywhere, and lets you retrieve just about anything: including text, pictures and sounds. Locate text inside pictures, and gives you the whole picture! Anything you retrieve with CanOpener can be stored in it's library, so the next time you need it, it's just a click away. (utilities) ea 65.

CanOpener
Information retrieval utility for the Mac. CanOpener will search anywhere, and lets you retrieve just about anything: including text, pictures and sounds. Locate text inside pictures, and gives you the whole picture! Anything you retrieve with CanOpener can be stored in it's library, so the next time you need it, it's just a click away. (utilities) ea 65.

CanOpener
Information retrieval utility for the Mac. CanOpener will search anywhere, and lets you retrieve just about anything: including text, pictures and sounds. Locate text inside pictures, and gives you the whole picture! Anything you retrieve with CanOpener can be stored in it's library, so the next time you need it, it's just a click away. (utilities) ea 65.

CanOpener
Information retrieval utility for the Mac. CanOpener will search anywhere, and lets you retrieve just about anything: including text, pictures and sounds. Locate text inside pictures, and gives you the whole picture! Anything you retrieve with CanOpener can be stored in it's library, so the next time you need it, it's just a click away. (utilities) ea 65.

CanOpener
Information retrieval utility for the Mac. CanOpener will search anywhere, and lets you retrieve just about anything: including text, pictures and sounds. Locate text inside pictures, and gives you the whole picture! Anything you retrieve with CanOpener can be stored in it's library, so the next time you need it, it's just a click away. (utilities) ea 65.
Promodem 2400M

The ProModem 2400M provides a complete communications package for your Macintosh. Operates at 2400, 1200 and 300bps and includes MACKNOWLEDGE and cable. MACKNOWLEDGE is the first Macintosh software program that manages to simplify the task of communicating. Click on icons to configure your mode, log on to major online services and send and receive electronic mail. (modems) $199.

Cordless Mouse by Mobius uses the latest Infra-Red signal transmission technology to give you more freedom and smoother movements when performing mouse functions. Features a 8-bit, 12 MHz CMOS CPU, 200 dpi high resolution, 600mm/sec speed and low-friction Teflon footpads. ADB adapter included. (input/output) $99.

HandOff

HandOff lets you open any document from the finder, even if its application is missing. You can specify a compatible substitute based on the document's creator or file-name extension, even across networks. Jean-Louis Gassee calls it “a nice, unobtrusive and very much needed extension to my Macintosh.” (utilities) $35.

Hand Off lets you open any document missing. You can specify a compatible substitute based on the document’s creator or file-name extension, even across networks. Jean-Louis Gassee calls it “a nice, unobtrusive and very much needed extension to my Macintosh.” (utilities) $35.

WingZ has completely new documentation including a 525-page HyperScript volume, new features, enhanced 3-D graphics, expanded capabilities in WingZ HyperScript development language and much more. (business) $269.

Payroll PLUS handles any number of employees (limited only by disk space), plus special accounting for restaurant employees, contractors, and commissioned sales people. It can manage the payroll from up to ten different income sources or rates. Payroll PLUS prints forms 1099 and itemizes and accumulates straight time, overtime, double time, vacation, holiday and sick pay. It can also calculate prorated sick and holiday pay based on hours worked. (finance) $149.

Mac-101 Keyboards (DataDesk International)

Features 101 keys including a numeric keypad, a separate T-shaped cursor keypad, Cancel Key, Option and Command keys at both ends, definable function keys, plus scrolling, page control, and zooming keys. Manufacturer's two year warranty. (input/output) $129. International Versions also available.

General Computing Company

WriteMove Ink Jet Printer ........ 585.
Monitor Color Monitor 14" ........ 599.
Microtects DataMate 900 Personal Organizer .. 6.5.
Microtek Microtek MSF-300GS Scanner .... 1589.
Monitor Multiscreen Video Card w/Princeton 15" monitor 529.
Kopy Kat Crystall Print Publisher ........ 3445.
Seiko America Seiko America MatrixWriter (dot-matrix) ... 235.
Kraft Sharp The Wizard ........ 249.
Lightning Scan 369.
ThunderScan 5.0 ........ 187.

WingZ 1.1

With WingZ, the largest, fastest and most versatile spreadsheet for any microcomputer-you can combine numbers, words and graphs on a single page. Ver. 1.1 of WingZ has completely new documentation including a 525-page HyperScript volume, new features, enhanced 3-D graphics, expanded capabilities in WingZ HyperScript development language and much more. (business) $269.

HyperDialer (DataDesk International)

Now you can connect your Macintosh to your existing business or home telephone for automatic dialing with Apple's HyperCard. DataDesk's HyperDialer is designed specifically for HyperCard's touch-tone dialing capabilities and works with-line business phones without requiring a modem or dedicated phone line for automatic dialing. Automatically dials HyperCard, SideKick, Focal Point, CAT, SuperCard and QuickDesk phone numbers. It connects to Mac speaker port not a precious serial port. (hardware) $29.

MEMORY UPGRDES/ACCELERATORS

1 MEG SIMMS $29.
Metro ImageBase Electronic Art (Metro ImageBase)
High quality 300 dpi electronic art from one of the world’s leading publishers of ready-to-use art. Enhance brochures, menus, reports, newsletters and presentations. One large image per file and 100 per package. Packages available: Newsletter Maker, Business Graphics, Computers & Technology, ReportMaker, Borders & Boxes and 9 others. (graphics) $76 ea.

Shiva
NetBridge ........................................ 339.
NetSerial X232 .............................. 279.
TOPS
NetPrint ........................................... 119.
FlashBox .......................................... 123.
FlashCard ......................................... 159.
Repeater ........................................... 129.
Teleconnectors ................................... 29.
Disk Lock .......................................... 108.
TOPS DOS .......................................... 115.

SECURITY AND VIRUS PROTECTION
ASD Software, Inc.
FileGuard ....................................... 125.
FileGuard Extend (office 5-pack) .... 309.
TWINS ............................................ 139.

Fifth Generation
Disk Lock .......................................... 108.

NETWORKING PRODUCTS
Connect Inc.
MacNet ............................................. 47.
Dove
FastNet SCSI .................................... 749.
FastNet III ................................. 375.
FastNet SE or SE/30 ea. 375.
Telnet
Timbuktu 3.0 .................................. 65.
Timbuktu Remote 1.0.1 ................. 129.
TrafficWatch ................................. 129.
PhoneNET PLUS ......................... 139.
PhoneNET Repeater ...................... 310.
PhoneNET Star Controller .......... 1065.
Infosphere
Liason ............................................. 175.
Microcom Software ............... 275.
Carbon Copy Mac ..................... 119.

Great Wave
Concertwave+MIDI 5.0 .................... 78.
HIP Software
Harmony Grid .................................. 59.
Intelligent Music
OvalTune ......................................... 95.
Passport Designs
NoteWriter ....................................... 325.
Passport MIDI Interface ............ 89.
Primaera Software
Different Drummer ....................... 59.
Re reporter
Music Publisher ............................. 375.
Resonate
Listen 2.0 ......................................... 62.

SPELLING/DICTIONARY THESARUS CHECKERS
Abacus Concepts
StatView II ...................................... 285.
StatView SE+Graphs ................... 199.
BrainPower
StatView 512+ (requires 512k) .... 149.

Deneba Software
BigThesaurus ............................... 59.

Lexicorp
Word Finder 2.0 ............................. 56.
Sensible Software
BookEnds ......................................... 53.
Sensible Grammar .......................... 51.

STATISTICAL ANALYSIS
Abacus Concepts
StatView II ...................................... 285.
StatView SE+Graphs ................... 199.

BrainPower
StatView 512+ (requires 512k) .... 149.

FastLabel (Vertical Solutions)
End label hassles with FastLabel - the revolutionary way to print labels on the ImageWriter and LaserWriter. Preformatting instantly creates labels. One step text loading from any commercial database. Save hours of your valuable time! (business) $45.

D2 Software
MacSpin 2.0 ..................................... 189.
Deltal
MacSafe or NightWatch ea. 87.
QuickLock ................................. 57.
Mainstay ........................................ 59.
AntiToxin ....................................... 59.
Symantec Corporation
S. A. M ........................................... 63.

DOLLAR guaranteE
Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.

COMPUSERVE SUBSCRIPTION KIT (CompuServe)
This is the largest on-line data service. It includes electronic mail, bulletin boards, forums, and shopping galore! Kit includes 250 page user manual and includes $25 worth of free CompuServe time.

$9.95

COMPUSERVE NAVIGATOR
Saves you time and money by totally automating your on-line tasks. Allows you to select what you want by pointing and clicking--before you log on.

$39

COMPUTER PRODUCTS


UTILITIES
Abbott Systems
CanOpener ...................................... 65.
Affinity
Tempo II ......................................... 79.
Aladdin Systems, Inc.
Programming Assistant ................ 99.
Shortcut .......................................... 49.
ALSoft
DiskExpress II ......................... 147.
Font/DA Juggler ......................... 42.
MultiDisk ........................................ 49.
Master Juggler ............................. 64.
Berkeley System Design, Inc.
Shopping Cart II ......................... 50.
CE Software
DiskToy 4.0 ..................................... 65.
QuickKeys 1.2 ............................... 64.
Caoer
OmniPage ...................................... 549.
Central Point Software
CompuMac (with MacTools) .... 214.
PC Tools Deluxe For Mac .......... 45.
Dantz Development
Retrospect ...................................... 149.
Emerald City Software
Liquidalk 1.0 ................................. 149.
Fifth Generation
FastBack II ..................................... 107.
PowerStation 2.5 ............................ 34.
Pyro ............................................. 15.
Suitcase II ...................................... 44.
GO Technology
MacTree Plus .................................. 46.

Shortcut (Aladdin Systems, Inc.)
Stay in touch wherever you go! Shortcut is the software “bridge” that connects AppleTalk networks, locally or remotely. Dial into AppleShare, MacServe, or TOPS servers. Access your E-mail anywhere, anytime. Use LocalTalk nets for better performance. Even print to a LaserWriter from EtherTalk. Only Shortcut combines cost effectiveness with maximum flexibility, performance, and irreplaceable network security (including per-user authorization, dial-back, and call logging). (networking) $175.

Shortcut (Aladdin Systems, Inc.)
Great Wave
Concertwave+MIDI 5.0 .................... 78.
HIP Software
Harmony Grid .................................. 59.
Intelligent Music
OvalTune ......................................... 95.
Passport Designs
NoteWriter ....................................... 325.
Passport MIDI Interface ............ 89.
Primaera Software
Different Drummer ....................... 59.
Re reporter
Music Publisher ............................. 375.
Resonate
Listen 2.0 ......................................... 62.

Great Wave
Concertwave+MIDI 5.0 .................... 78.
HIP Software
Harmony Grid .................................. 59.
Intelligent Music
OvalTune ......................................... 95.
Passport Designs
NoteWriter ....................................... 325.
Passport MIDI Interface ............ 89.
Primaera Software
Different Drummer ....................... 59.
Re reporter
Music Publisher ............................. 375.
Resonate
Listen 2.0 ......................................... 62.

Great Wave
Concertwave+MIDI 5.0 .................... 78.
HIP Software
Harmony Grid .................................. 59.
Intelligent Music
OvalTune ......................................... 95.
Passport Designs
NoteWriter ....................................... 325.
Passport MIDI Interface ............ 89.
Primaera Software
Different Drummer ....................... 59.
Re reporter
Music Publisher ............................. 375.
Resonate
Listen 2.0 ......................................... 62.

Great Wave
Concertwave+MIDI 5.0 .................... 78.
HIP Software
Harmony Grid .................................. 59.
Intelligent Music
OvalTune ......................................... 95.
Passport Designs
NoteWriter ....................................... 325.
Passport MIDI Interface ............ 89.
Primaera Software
Different Drummer ....................... 59.
Re reporter
Music Publisher ............................. 375.
Resonate
Listen 2.0 ......................................... 62.

Great Wave
Concertwave+MIDI 5.0 .................... 78.
HIP Software
Harmony Grid .................................. 59.
Intelligent Music
OvalTune ......................................... 95.
Passport Designs
NoteWriter ....................................... 325.
Passport MIDI Interface ............ 89.
Primaera Software
Different Drummer ....................... 59.
Re reporter
Music Publisher ............................. 375.
Resonate
Listen 2.0 ......................................... 62.

Great Wave
Concertwave+MIDI 5.0 .................... 78.
HIP Software
Harmony Grid .................................. 59.
Intelligent Music
OvalTune ......................................... 95.
Passport Designs
NoteWriter ....................................... 325.
Passport MIDI Interface ............ 89.
Primaera Software
Different Drummer ....................... 59.
Re reporter
Music Publisher ............................. 375.
Resonate
Listen 2.0 ......................................... 62.
MacEnvelope 4.1 and MacEnvelope Plus (Symex)
Envelope and Label printing in one package. MacEnvelope 4.1 combines all of the features of envelope and label printing in one easy-to-use package. Import up to 1600 addresses per file. Unique Postal Bar Coding speeds delivery and saves money on postage (for bulk mailers). Over fifty preformatted ready-to-use label and envelope styles. Create/save layouts, print graphics, messages, fonts, and colors. $65.
MacEnvelope Plus saves up to 100,000 addresses per file. Provides list management features such as comments, flags, multi-level sorting and print range. (Business) $149.

ICOM Simulations
On Cue .................................. 35.
Insight Development
MacPrint: .................................. 95.
Magic Software
AutoSave II ................................ 29.
BackMate: .................................. 50.
POWERmotions or POWERmenus ea. 33.
Mainstay
Capture 2.0 ................................ 49.
Microlytics
GOfiler .................................. 47.
Oultui .................................. 47.
QShare .................................. 139.
MultiClip ........................ .................. 50.

WORD PROCESSORS

Williams & Macias
DiskFinder: .................. 27.
myDiskLabeler ............................... 33.
StickyBusiness 1.07 .................. 89.

ICOM Simulations
On Cue .................................. 35.
Insight Development
MacPrint: .................................. 95.
Magic Software
AutoSave II ................................ 29.
BackMate: .................................. 50.
POWERmotions or POWERmenus ea. 33.
Mainstay
Capture 2.0 ................................ 49.
Microlytics
GOfiler .................................. 47.
Oultui .................................. 47.
QShare .................................. 139.
MultiClip ........................ .......... 50.

Claris
MacWrite II ............................................. 185.
Microsoft
Word 4.0 ........................................ 249.
New Horizons Software
WordMaker ........................................ 69.
Symmetry
Acta Advantage w/DA .................. 65.
TMaker ........................................ 119.
WordPerfect Corp.
WordPerfect ........................................ 185.
Working Software
QuickLetter ................................. 73.

PCPC
HFS Backup 3.0 ................................. 54.
presoft Publishers
Exposure .................................. 54.
Software Innovations
HyperDad .................................. 139.
SuperMac
DiskFit 1.5 or SuperSpool 5.0 .... 58.
Sentirelli 2.0 ................................. 87.
SuperLaserSpool 2.0 (single user) 83.
SuperLaserSpool (5-pack) ........... 295.
Symantec Corporation
SUM II .................................. 95.
Tactic Software
POWERlt .................................. 149.
Icon-It 2.0 ................................. 45.

WordPerfect ................. 185.
WinNow 2.0 ................................. 360.
WordPerfect Corp.
WordPerfect ............................. 185.

CONTEST RULES: 1. Entries must be received on or before 4/5/93. 2. Winners selected in random drawings by alter­nates for Micro Warehouse Inc. (MWI), whose decisions are final. 3. Mac Portable Computer prize subject to availability. MWI reserves the right to substitute wholesale value up to $6,000. 4. Winners responsible for taxes. 5. Odds of winning depend on number of entries. All prizes will be awarded. 6. MWI will announce the winners on or around 6/1. 7. Winners notified by mail. 8. Winner's refusal to change alternate will be selected by random drawing. 9. Contest open to US residents, except where prohibited by law. 10. Employees of MWI and suppliers not eligible. 11. Prize one Mac Portable with 4MB hard disk and 16MB software and media prizes.

MacTilt II (Ergotron)
The MacTilt II from Ergotron elevates your Mac II monitor four inches. Provides a full 20 degree tilt, and rotates 360 degrees for viewing comfort. Its smooth adjustability, superior design and construction make this stand superior to less expensive plastic stands. It requires only the touch of your finger to adjust. (accessories) $75

CONTEST RULES: 1. Entries must be received on or before 4/5/93. 2. Winners selected in random drawings by alter­nates for Micro Warehouse Inc. (MWI), whose decisions are final. 3. Mac Portable Computer prize subject to availability. MWI reserves the right to substitute wholesale value up to $6,000. 4. Winners responsible for taxes. 5. Odds of winning depend on number of entries. All prizes will be awarded. 6. MWI will announce the winners on or around 6/1. 7. Winners notified by mail. 8. Winner's refusal to change alternate will be selected by random drawing. 9. Contest open to US residents, except where prohibited by law. 10. Employees of MWI and suppliers not eligible. 11. Prize one Mac Portable with 4MB hard disk and 16MB software and media prizes.

Two Page Monochrome Monitor (Cutting Edge)
Every Mac II and Il+ user can now justify the expense of a big screen with the new Cutting Edge 10" Two Page Monochrome Display System. The Cutting Edge Monitor includes the interface card and matches just about all the features of other big screen display systems costing twice as much. It has a flicker-free refresh rate of 70 Hz and a high resolution of 72 DPI. Like all Cutting Edge products it comes with a one year warranty and a 30 day money back guarantee. (Hardware) $599.

Two Page Monochrome Monitor (Cutting Edge)
Every Mac II and Il+ user can now justify the expense of a big screen with the new Cutting Edge 10" Two Page Monochrome Display System. The Cutting Edge Monitor includes the interface card and matches just about all the features of other big screen display systems costing twice as much. It has a flicker-free refresh rate of 70 Hz and a high resolution of 72 DPI. Like all Cutting Edge products it comes with a one year warranty and a 30 day money back guarantee. (Hardware) $599.

Two Page Monochrome Monitor (Cutting Edge)
Every Mac II and Il+ user can now justify the expense of a big screen with the new Cutting Edge 10" Two Page Monochrome Display System. The Cutting Edge Monitor includes the interface card and matches just about all the features of other big screen display systems costing twice as much. It has a flicker-free refresh rate of 70 Hz and a high resolution of 72 DPI. Like all Cutting Edge products it comes with a one year warranty and a 30 day money back guarantee. (Hardware) $599.
HARDWARE

The Cordless Mouse

Build a better mouse for the same price —
with no wires attached.

Everyone who uses a Mac uses a
cursor or pointer control device.
Most people use the Apple-supplied
mouse. Aside from quality, it’s free and
is a fast, precise controller. But if it’s lost,
damaged, or destroyed and you need
a new one, Apple charges an arm and a
tail for a replacement (Part # A9M0331,
suggested list price: $149.95). For that
price, you can get a
better mouse called,
apply enough, The Cordless Mouse.

But some folks shouldn’t wait for the
demise of their incumbent mouse. If you
use large monitors or simply don’t like
the supplied mouse, consider an alterna-
tive. In particular, consider this easy-to-
control, very precise mouse.

As its name implies, there is no physi-
atical connection between this mouse and
its receiver, which plugs into the old-
dstyle (DB9) mouse port of a Mac Plus or
earlier. An adapter is provided for ADB-
equipped Macs, and the mouse houses
the electronics for both systems. The
connection is a beam of infrared light.

Since The Cordless Mouse isn’t con-
ected to anything and rides on slightly
rounded Teflon pads at each corner and a
ball that’s more centered than the ball in
Apple mice, it has a wonderful feel. Its
precision is 200 dpi, the same as that of
the Apple mouse. This mouse performs
well and has relegated my beloved Ken-
sington TurboMouse trackball to part-
time use.

The maximum range between mouse
and receiver can be up to 8 feet, but 9- to 18-
inch seems optimal. You can work
right up against the receiver if neces-
sary, although that can be a bit difficult. No
special plate or grid is required, but a
good mouse pad helps, and you must keep
the line of sight between the mouse
and the receiver clear. The manual says
that very bright lights might affect per-
formance, but I experienced no problems
in a bright room — even with a halogen
flashlight shining directly into the trans-
mitter and receiver.

The mouse case is
nicely rounded. It has a
Start button on the
left side (The Cord-
less Mouse automotive-
ly powers off after
ten minutes of inac-
tivity). There are two
buttons on the top,
both having the same
effect (a mouse click).
The ball and its well
are easy to clean.

The Cordless Mouse is a third-party
alternative that costs no more than
Apple’s model — but has no wires.

Apple’s standard Mouse edev controls
speed and click performance.

The only complaints I have about this
mouse involve the buttons. They feel
weak, and I don’t see the advantage of
having two on the top. (In fact, there’s a
thin plastic sheet under them that covers
both switches). If your finger rests in the
center, on the split between the buttons,
the operation feels odd. The Start button
is badly placed for right-handed users.
Your thumb sits on it and you keep press-
ing it, which doesn’t do any harm but
feels awkward (as if something should
happen but nothing does). This would be
an ideal place for the main mouse button
(for right-handed users).

STILL, The Cordless Mouse is a better
rodent. [Shortly after this review was
written, Practical Solutions began ship-
ing a single-button version of The
Cordless Mouse. — Ed.]

Steven Bobker

LANGUAGES

Level5/
Macintosh

Information Builders’ PC
expert-system shell
doesn’t quite make it
as a Mac application.

Level5/Macintosh is a Mac ver-
sion of the popular PC expert-
system shell, but in most respects, it’s less
capable than its PC and mainframe-itera-
tions. Level5’s inference engine, the code
that makes it an expert system, is solid
and has a good reputation, but you’ll be
disappointed by its delivery and knowl-
edge-engineering environments. This
program looks more like a PC application
than any other product I’ve seen on the
Mac. Because Level5 runs on the IBM
PC and IBM mainframes under VM and
MVS, file compatibility is a plus — but
that hardly justifies ignoring the Mac
interface.

WHAT IT IS Building knowledge bases
in Level5 involves entering structured
text into a text editor. The Production
Rule Language, or PRL, and its 91 re-
served words comprise a powerful represen-
tative language for building knowl-
edge-based systems. PRL statements are
entered into the built-in text editor with-
out any of the traditional AI tools such as
graphic editors, rule browsers, and other
interactive operators.

Although you can create good expert
systems with Level5, developers must
structure their rules much more carefully
than they might in systems with interac-
tive facilities. Many fact types, including
strings, simple facts, attributes, and
numeric information, need to be defined
at the front end of the file if there is any
ambiguity about how they will be used in
"The Abaton scanner gave me great definition in just minutes."

Every issue of my newsletter takes shape easily now that I use the Abaton Scan 300/GS. Because this 8-bit scanner delivers 256 shades of gray, that's 240 more than the 16 shades you get from a 4-bit scanner. And that means each scanned image scan has more tone and better definition.

Abaton doesn't stop there. They make the body of my work easier to publish by adding Letraset's Image Studio software. With Image Studio, I can touch up, change, and rearrange my images so every issue of my newsletter looks as good as the physiques I profile.

If you already have a 4-bit Abaton or Apple scanner, Abaton also offers an 8-bit upgrade. It can be installed in your home or office in less than 30 minutes, without any sweat on your part.

With all these choices, it's easy to get great definition without a heavy workout. If you want to see more, call Abaton at 1-800-444-5321. And let Abaton make your ideas easier to publish.

Abaton
We Make Your Ideas Easier to Publish™

Please circle 61 on reader service card.
Now that you bought Excel...

Now, for the first time, a complete accounting Microsoft Excel spreadsheet General Ledger AR/AP/Inventory program that looks like manual books, works like manual books yet offers all the advantages of computerization. Accounting the way you've learned it, translated to the speed and power of Microsoft Excel, the ultimate spreadsheet. No long start-up periods, no extensive employee training, no difficulty in audit... just the most logical, fastest, most flexible way to keep books you've ever seen. For information, call Absolute Solutions at 1-800-458-3399 in CA, 1-800-633-7666 Natl., 1-619-966-8000 Intl.

...Computerized Classic Accounting™

"CCB is the most unique client accounting package available to date...CCB takes relatively time-consuming and cumbersome tasks and makes them simple...CCB represents the most powerful interactive analysis tool reviewed to date"

-Bob Wolff, Computers in Accounting

"CCB is the only computer accounting product that returns us to real accounting"

-Dr. Samuelson, Pepperdine University
a knowledge base. Goals must be stated in a goal outline before they become active conclusions to rules. New rules, facts, and goals are not activated until the knowledge base is compiled. Not only does this take the fun out of building a system, but it also removes the exploratory nature of knowledge-based system design.

Knowledge entered into the text file is not checked for syntax errors until it is compiled — and then only one error is detected at a time — so Level5 users are denied the psychological satisfaction of seeing a rule completed and accepted on the fly. When Level5's compilation process finally transforms a text file into a knowledge base, the delivery system is acceptable and works efficiently, but its overall look is bland.

Level5's knowledge bases and their underlying structure are the best part of the Level5 system. PRL includes facilities for proven Attribute-Value (A-V) representation techniques, along with numeric facts, strings, and simple facts (strings of characters that are either true or false).

A-V pairs represent knowledge as a series of fact-value combinations (for example, "The color IS red"). When a compiled knowledge base encounters an A-V, it gathers all values of A-V pairs throughout the knowledge base and displays a single input screen. This reduces the number of questions that a user is required to answer. A-V pairs can be single-valued or multivalued.

Expert systems are made of knowledge, but knowledge is not entirely textual. With Level5, numeric facts can easily be incorporated into a knowledge base. Level5 has provisions for mathematic, trigonometric, and algebraic expressions.

String facts are included for gathering and reasoning on string data, such as people's names, dates, and other information that does not fit easily into other Level5 fact types.

The general structure of the Level5 knowledge base is much like its underlying Pascal code. A complete knowledge base must have the following elements, in order: title, shared facts, database declarations, fact-type declarations, parameter-initialization statements, control elements, goals, rules, information-display texts, and the word END.

**HOW IT WORKS**

On VAXes, mainframes, and PCs, Level5 is attractive because of its close links to Information Builders' Focus database. The Mac version of the product communicates only with TDF (tab-delimited format) files. Most expert-system vendors have followed this route in lieu of there being a Macintosh database standard, but forcing users to save extensive knowledge bases in TDF files removes much of the convenience associated with knowledge/database interactions. Level5 also interacts with HyperCard, although the interface is anything but elegant.

The main problem with Level5 is its lack of Mac expression. Knowledge-base deliveries retain the single font used in the text editor, and Level5's MacPaint, PICT, and PICT II display capabilities do not allow interaction in questions. Most Mac shells, including comparably priced ones such as Instant-Expert Plus and Intelligent Developer, have facilities for interactive graphics. The only interface techniques that make any "Mac sense" are the appropriate use of radio buttons and check boxes with A-V pairs. Information Builders has a basic understanding of Macintosh interface techniques, but its implementation seems stark and antiseptic.

I found Level5 to be a steady and reliable delivery vehicle for knowledge bases developed for an IBM audience. New users can find plenty of help in the tutorial and reference texts. Because many knowledge bases have been developed in PC, VAX, and IBM mainframe environments, Level5 may be a crossover product for companies trying to deliver corporate knowledge to their Mac-using rebels.

But as a Macintosh knowledge-base development system, Level5 is a poor representation of the market.

— Daniel W. Rasmus

**Roland D-50/550**

**Librarian/Editor**

Despite their quirks, these DAs are big time-savers in an environment where time is money.

One hone of the Mac-based electronic-music studio has been the multitude of functions that the Mac performs — one at a time. You couldn't edit or load synthesizer sounds while your sequencer was running — until now.

**WHAT IT IS**

Two DAs from Zero One Research — the Roland D-50/550 Librarian and Roland D-50/550 Editor — let you transfer sounds between these popular synthesizers and the Macintosh, as well as edit the synthi's current patch, all without quitting your current application or running MultiFinder.

Each DA can be attached to the System or to a specific application. A single disk — containing the DAs and three banks of D-50/550 sounds — comes bound with the manuals for Zero One's D-10, D-20, D-110, and MT-32 software. Although they probably were not translated from another language, the manuals are poorly written: disorganized, redundant, and incomplete. Fortunately, both DAs are simple enough to learn in a few hours.

Using the Librarian to transfer a 64-patch bank of sounds in either direction is moderately distracting, but it gets easier with practice. You have to click on both the mouse and the D-50's front panel.
If you like what the Macintosh™ did for personal computing

...You'll love what we did for small-business accounting

Easy. Powerful. If you thought they didn’t go together, consider what the Macintosh did to redefine personal computing.

It lets users concentrate on what they were trying to achieve or produce, while other systems forced them to focus on the operation of the computer itself. The amazing success of the Macintosh shows that when thinking people are given a choice between simplicity and power, they’ll take both!

Those who created the Macintosh realized that it takes more time, more work, and more creative thinking to make something simple than it does to make something complicated. Their success has enabled us to create easy-to-use, affordable accounting programs for small and medium-sized businesses of all kinds.

To see if one or more of our programs can work for you, just give us a call. We'll send you a free demo disk of all three programs, reprints of recent reviews, and dealer names in your area.

You'll see for yourself just how easy and painless accounting on the Macintosh has become.

MultiLedger™

An integrated accounting program which combines General Ledger, Accounts Payable, Accounts Receivable, and inventory tracking. Generates checks, customer invoices, customer statements, and a wide variety of financial and management reports. Prints on ImageWriters, LaserWriters, and many other printers.

Payroll

A complete payroll system for organizations with 1 to 1000 employees. Use it as a stand-alone program or integrate it with either of our ledger programs. Calculates both employee and employer taxes and deductions. All state and federal tax tables and parameters are included and can be modified by the user.

Cash Ledger

An "entry-level" General Ledger program for those who don't need payables, receivables, or inventory tracking. Shares many of the same G/L features and advantages of MultiLedger, including check-writing, bank reconciliation, and financial reports. Upgradable to MultiLedger if more features are needed in the future.

Comments from recent reviews

"My favorite all-around accounting program is CheckMark Software's MultiLedger/Payroll set. It was the simplest and most logical I examined that provided a reasonably full set of capabilities. Its price/performance ratio represents an excellent bargain."

Macworld / September 1988

"MultiLedger is ideal for the small business. It's easy to set up and use and has an amazing set of accounting features when compared to other programs that cost more and don't offer much more power."

MACazine / March 1989

"I don't know of any other Mac accounting software which contains so many features and modules for the price."

Computers in Accounting / January 1989

"A welcome and impressive bonus is the Payroll program which can be linked to MultiLedger... MultiLedger and Payroll are a bargain for companies that don't need a networked system."

MacUser / April 1989

"Our favorite package was MultiLedger... it's the most elegant, usable and Mac-like of all the packages we reviewed... CheckMark offers unlimited free telephone support to all users. This policy would lead to bankruptcy if the program were as confusing as others."

The Macintosh Buyer's Guide / Spring 1989

CheckMark Software Inc.

1520 East Mulberry / Suite 200
P. Collins, Colorado 80524
Phone 303-454-3541 FAX 303-454-0429

Full-functioning demo disk available

1-800-444-9922

Dealer inquiries welcome

Macintosh, ImageWriter, and LaserWriter are trademarks of Apple Computer, Inc. MultiLedger is a trademark of CheckMark Software, Inc.
several times, manipulate your MIDI interface if it's a JamBox, and then wait. Transferring single patches, tones, and partials requires a similar effort. Once I'd discovered the rubric, however, it proved to be a fast and fairly reliable way to get a new sound into the D-50, from either the Finder or a sequencer.

Transferring sounds while running Passport Design's Master Tracks Pro (MTP) or Mark of the Unicorn's Performer went smoothly — as long as no sequence was actually playing. A Master Tracks sequence stopped cold when I tried a transfer, and I had to reset MTP's MIDI setup to get it to play again (although the D-50 did get the patch). Performer fared better — after hanging up for only about three seconds, it played a momentary flurry of notes (presumably the ones it had missed during the transfer) and resumed the sequence with the new sound. An attempt to boot either Editor or Librarian in Dr. T's KCS Level II crashed the System every time.

The Zero One user interface is useful. A patch window merely one-eighth the size of the Mac screen leaves a good view of your application and lets you scroll, eight patches at a time, through an entire 64-patch bank. You can also click to see it all at once by filling the screen with eight windows. Clicking in the window toggles the display from patches to the upper and lower tones that compose them and allows you to transfer any of these tones to the synth or copy or move them to another file. The Windows toggle causes open patch windows to disappear or reappear — very convenient screen management.

The Zero One Editor incorporates a step recorder that remembers the last 100 changes made to a patch, which allows you to step back through them. Of the two available editing aids, the first initializes a patch to useful starting points, such as brass and percussion; unfortunately, the categories in my program were not always useful. The second interpolates the settings of two different patches to create a hybrid third. You can select the parameters and set the degree of interpolation.

**HOW IT WORKS**

Zero One's Editor is fast and easy. Ordinary editing, although it suffers somewhat from nonstandard graphics and sluggish on-screen sliders, is terrific. You can change the parameters on numerous partials at a time with readable click-and-drag graphics for each of the instrument's envelopes and standard value sliders for other parameters. There are separate windows for each major function, including TVA and TVF times and levels, and all the D-50's structures and output configurations can be edited with a click.

The patches that come with this software range from the cliché to the useless. In general, you can forget about them, although some might be useful as sound effects.

Despite their shortcomings, these DAs offer a few tremendous time-saving features (e.g., the Librarian's ability to read a file created by Opcode Systems' D-50 editor/librarian and send it to the synthesizer). The company supports them well and provides competent help on the phone.

— Tim Tully

---

### Rumor Manager

**Gossip, Guesses, and Goings-On**

#### As noted last month, there are going to be lots of new Macs in 1990. The first five years (1984 to 1989) brought forth 11 Macs (128K, 512K, 512KE, Plus, SE, SE/30, II, IIx, IIcx, Iici, and Portable). There's a 50-50 chance that you'll see 11 or 12 new Mac CPUs in 1990 as Apple releases machines aimed at very specific niche markets (rich users, not-rich users, engineers, professionals such as lawyers and doctors, this one is a doozy, educators, and more).

This burst of CPUs will revitalize a market that mainly seems to generate big, do-everything applications with too many features. The new Macs will encourage niche programs, especially if Apple goes ahead with the extensive software-bundling program that it almost initiated with the Portable.

Initial portable marketing plans called for all units to have hard disks loaded with more than 25 megabytes of brand-name applications, including all the best-sellers. The only reason the plan fell through was because the legal eagles couldn't get all the agreements dotted and crossed to their satisfaction in time.

Some outrageous security breaches perpetrated by phone phreaks have recently been, uh, heard of. They will cause virtually all dial-in setups and electronic services to switch to callback modems by the end of the year. Passwords just aren't enough anymore.

Look for a SCSI disk that can be configured to automatically write all data twice, once to each of either two user-specified partitions or to two separate SCSI disks. This is called hot data backup and is currently very popular with folks in the graphic arts industry. The Sun OS currently incorporates this type of multiple-write backup, as do Novell file servers.

Also expect a new drive mechanism from SyQuest that can be shared among Macs and IBM PCs. The disk would, of course, be bootable on only one system.

Heard any good rumors lately? If we use your rumor, we'll send you a token of our appreciation and promise not to use your name. Anonymous contributions are also accepted.

---

**Get Info**

**The Roland D-50/550 Librarian/Editor**

**List Price:** $199.  
**Published by:** Zero One Research, P.O. Box 301, Brisbane, CA 94005; (415) 467-5007.  
**Version:** Librarian 2.0; Editor 2.0.  
**Requires:** Roland D-50/550 synthesizer.  
**Application Size:** Editor, 65K; Librarian, 60K.  
**Compatibility:** All Macs.
A rose is a rose is a rose, but all word processors are not alike. The program that’s ideal for writing one kind of document may be a dud at handling another type. The sort of activity you engage in most often — writing to customers; generating form letters; struggling with columns of text and numbers; writing highly structured technical manuals; preparing complex documents; or, perhaps, writing articles such as this one — should determine the word processor you use. So instead of telling you which word processor is the best in the universe, I’m going to match real-life writing jobs with the talents of FullWrite Professional 1.1, MacWrite II 1.1, Microsoft Word 4.0, Microsoft Works 2.0, Microsoft Write, MindWrite 2.2, Nisus 2.03, WordMaker 1.0.1, WordPerfect 1.0.3, and WriteNow 2.0. For a more detailed, side-by-side, comparison of features, see Table 2.

Writing Letters

Every program mentioned here lets you write letters, so you may as well get one that doesn’t take a month to master and doesn’t cost an arm and a leg. Microsoft Write, WriteNow, and MacWrite II are three relatively easy-to-use low-cost programs. The question is, is there anything to recommend one over the others for writing letters and similar documents?

After writing several letters, you will probably decide on a particular set of features you prefer for all your letters — a certain font, for example, and perhaps a particular line spacing. With WriteNow and MacWrite II, you can set up a blank stationery document that opens automatically in all new windows and contains the specifications you like, so you don’t have to reset them each time.

As you become a veteran letter writer, you may feel that you routinely format certain paragraphs of a letter in a style different from the main text. With WriteNow, as a shortcut to making individual ruler changes each time you switch paragraph format, you can copy all the format settings from one paragraph and paste them into others. With MacWrite II, you can copy only indents, tab stops, text alignment, and line spacing from one paragraph to another without setting each option separately.

In addition, letters are always dated. Write can insert a date only in a header. Who wants to create a header for a simple letter? WriteNow’s Insert Date command inserts the date at the insertion point or in place of the current selection. MacWrite II also has such a feature.

Finally, you should check the spelling in every letter you write. Write’s spelling checker is adequate. MacWrite II has a mediocre spelling checker that is slow on a Mac Plus or SE. WriteNow’s is great — faster than either of the others and almost uncanny in its ability to suggest the

By Charles Spezzano
For a limited time, we've bundled our best-sellers into two affordable packages:
Try them during Apple's Free Trial Run!

To make using your Macintosh a far more rewarding experience, we have three simple suggestions.

MacDraw II, MacWrite II, and FileMaker II. Claris' three powerful, best-selling software programs.

With its arresting graphics capabilities, MacDraw II gives you everything you need to design, illustrate, publish and present.

Though undeniably sophisticated, MacWrite II is also a refreshingly straightforward word processor.

A far cry from other Macintosh packages that sentence you to months of hard labor at the manual.

And our FileMaker II database manager is the favorite among Mac users for managing and reporting mountains of information.

All three best sellers work together as well as they do alone.

Which is why we've bundled them for a limited time in two very affordable packages: MacWrite II/ MacDraw II/ and MacWrite II/FileMaker II.

So make a break for your local Claris dealer today (call 1-800-729-2292 ext. 7 for the one nearest you).

After all, it would be criminal to let an offer this good escape.

© 1989, Claris Corporation. 5201 Patrick Henry Drive, Santa Clara, CA 95052.
Claris is a trademark and MacDraw, MacWrite, and FileMaker are registered trademarks of Claris Corporation. Mac and Macintosh are registered trademarks of Apple Computer, Inc. This offer is not valid outside the U.S.

Please circle 186 on reader service card.
Eight good reasons to
Mind Your Own Business.

1. M.Y.O.B.™ is the new, integrated accounting
   program that works the way you do. For
   starters, M.Y.O.B. does your general ledger, and
   analyzes your P&L, Balance Sheet and budgets.

2. M.Y.O.B.'s checkbook alone can run many
   businesses. It prints checks (including recur­
   ring payments), reconciles accounts, analyzes
   cash flow, cash receipts and disbursements.

3. Whatever you sell, M.Y.O.B. accounts for it.
   With item or service invoices; automatic receiv­
   ables journals; instant analysis of sales and
   receivables; and automatic statements.

4. It's never been easier to track purchases
   and payables: M.Y.O.B. calculates taxes and
   discounts; settles returns and adjustments, and
   handles payments to open purchase orders.

5. Keep track of any item from widgets to
   the billing hours in your day; automatic item
   pricing and backorder information on invoices;
   on-screen analysis of inventory.

6. M.Y.O.B.'s card file tracks customers,
   prospects and vendors. The contact log tracks
   your activity and totals billable time. It even
   helps you do mass mailings.

7. Unlike any other accounting program,
   M.Y.O.B. organizes your entire business. It
   shows past due invoices; jobs due; inventory
   to re-order; customers to call; expenses by job.

8. This may be the best
   reason of all. This com­
   plete, integrated program
   is only $99! With a 30-day
   money-back guarantee.

All this for only:
$99

A fully-functional demo disk
is available for $5.

TELEWARE

The people who developed Dow Jones Market Manager PLUS™
and Andrew Tobias: Managing Your Money™ for the Macintosh

Please circle 8 on reader service card.
correct spelling for every typo I come across in my documents. WriteNow wins hands down on this one. (For information on stand-alone spelling-checker packages, see the “Spelling It Right” sidebar.)

When all is said and done, WriteNow stands out as the best choice for the frequent letter writer because it’s generally the fastest word processor on all types of Macintoshes (see Tables 1a and 1b), is easy to use, and contains the features you’re most likely to need for this task. For the same reasons, among the three programs considered so far, it is also the best “first word processor” for students.

**Spelling It Right**

It used to be that the only way to check your spelling in a Mac word processor was to use a stand-alone spelling checker. That’s not true anymore — almost every writing program with a pretense of completeness has a built-in spelling checker these days. Does that mean that stand-alone spelling checkers have vanished? Hardly. Their ranks are multiplying as each fills its own niche.

**Graham Speller 1.1 ½**

Graham Speller is a DA that captures and displays everything you type, rings when it thinks it sees an error, and gives you a chance to correct it. It includes a thesaurus and a macro capability like Thunder II’s, but it’s uncomfortable to use and not at all intuitive. Better spelling checkers are available.

**Pros:** Inexpensive.

**Cons:** Tough to understand and use. The program has nothing to distinguish it from its competitors.

**Graham Software**

8609 Ingalls Circle

Arvada, CO 80003

(303) 422-0757

$44.95

**LookUp 2.0 ½**

Working Software offers a pair of utilities — LookUp and Spellswell — each aimed at a slightly different audience. LookUp is a DA that checks spelling as you type. Requires a Mac Plus and two 800K drives.

**Pros:** Because it’s a DA, convenient to use. Might be a better first choice than Spellswell.

**Cons:** Interface isn’t as clear and feature set isn’t as complete as Thunder II’s. Can’t open automatically in selected applications as Thunder can.

**Working Software**

P.O. Box 1844

Santa Cruz, CA 95061-1844

(408) 423-5556

$74.95

**Spellswell 2.2**

Spellswell gives a huge list of possibilities when it encounters a suspected mistake, but it runs only as a stand-alone. You must leave your writing application (if you’re not working under MultiFinder), launch Spellswell, and tell it which document you want it to check. But Spellswell has been around forever. It works with most Mac word processors (it’s bundled with several) and also with Working Software’s medical, legal, scientific, and geographic dictionaries. If there’s a standard stand-alone, it’s Spellswell. Requires a Mac 512KE with two 800K disk drives or a hard-disk drive.

**Pros:** Excels at adding words to a user dictionary, checking for homonyms, and maintaining a separate dictionary for each document. Also checks for stylistic considerations, such as the correct number of spaces after a period at the end of a sentence.

**Cons:** Not built in. Hard to use.

**Working Software**

P.O. Box 1844

Santa Cruz, CA 95061-1844

(408) 423-5556

$74.95

**Thunder II 1.1**

This top-of-the-heap program installs as a cdev. It checks your spelling as you type (if you want it to), automatically replaces common misspellings, and even performs search-and-replace functions in PageMaker. Its interface is attractive, its feature set is complete; and it’s quick, well thought out, and accurate. Thunder II can check spelling inline or by batch. Sets a new standard. Requires 1 megabyte and an 800K drive; hard-disk drive recommended.

**Pros:** Slick, accurate, fast, complete, and friendly — nearly the perfect spelling checker.

**Cons:** Maintaining dictionaries too complex. Batch search-and-replace too hard to configure.

**Electronic Arts**

1820 Gateway Drive

San Mateo, CA 94404

(415) 571-7171

$79.95

— Daniel J. Rosinbaum
After having invented the scanner...
In the '70s, Datacopy invented the first electronic digitized camera. And Kurzweil invented the first reading machine for the blind. Xerox Imaging Systems is the combination of those two companies. We've had more to do with the invention of scanning than anyone.

As a result, we've had more experience to help us develop better scanning solutions. And we bring you more of them, from image to text, low-end to high-end, Mac to PC (or PS/2), than anyone else. See for yourself.

Make your scanner read what it never could before. Go beyond the range of OCR with AccuText. It brings the power of omni-font Intelligent Character Recognition (ICR) to the most popular scanners, and your Apple Macintosh.

And unlike other OCR products, AccuText is one of the first true applications of artificial intelligence.

Scan thousands of different type-styles, and AccuText will learn them automatically and recognize them forever. It gives you the most accurate document recognition available on the Macintosh.

Even scan a facsimile or poor quality photocopy and AccuText will decipher it.

And when you show AccuText a document, it will reconstruct its format automatically, more precisely than virtually any other OCR product. It's almost like photocopying onto your screen.

There's no simpler way to get almost any document into the most popular word-processing, spreadsheet, database or publishing programs.

The big value in text scanning. With its artificial intelligence-based Kurzweil text recognition, the Discover Model 30 is an outstanding value.

Like our top-of-the-line K 5100, it accurately recognizes thousands of typestyles, multi-columns, landscape documents, graphics mixed with text — and many other "real world" documents that give traditional scanners trouble.

The Model 30 also has an optional 30-page document feeder, and several features to handle larger workloads.

Load a stack of documents, and it will scan each automatically into its own file.

You can also store pages quickly as images, and save recognition for a more convenient, off-peak time.

This kind of power and range make it the top-performing scanner in its class.

The smartest scanner for heavy workloads.
The Kurzweil 5100 is our top-of-the-line scanner for high volume, high accuracy work.

Its predecessor, the K 5000, was named an Editor's Choice by PC Magazine. In a 33-page comparison of scanners, they called it "unbeatable."

The K 5100 has all the K 5000's strengths. Its Kurzweil ICR gives you the most accurate recognition, over the widest range of documents, of any scanner on the market.

What the K 5100 adds is an interactive Text Verifier. This lets you teach the scanner the rare character it can't learn automatically, such as an engineering symbol. Your answer increases automatic recognition. As a result, you can scan much material outside the reach of other scanners.

The K 5100 is also a workhorse. Its durability is unmatched in the industry.
It has the ease of a 50-page feeder. And an angled bookedge, to make scanning bound material easier.

It has a number of other features to make high production scanning a snap. Ask us to show you.

Grayscale special effects.

Even if you're up against a publishing deadline, you can now retouch photographs and artwork right on your screen, with more control and a quicker turnaround than ever before.

Gray F/X makes your PC into the equivalent of a professional photolab.

With your mouse, and simple window menuing, you can remove or cover mistakes. Merge multiple images. Shrink. Enlarge. Improve contrast. Modify with an assortment of air-brushes. And work with a number of other tools and special effects.

Unlike other photo manipulation programs that just do a lot of "tricks," Gray F/X is first on the PC to give you the range of control and subtlety necessary for high-quality photo output.

The delay, and expense, of sending out for retouching belong to the past.

Capture images for publishing.

Now you can quickly scan images directly into the most popular desktop publishing programs, without having to exit your application. Thanks to four new utilities.

ImageCopy works with all publishing and graphics programs on the Apple Macintosh. VP•Mate supports Xerox Ventura Publisher 2.0. And Page•Mate works with Microsoft Windows and Aldus PageMaker 3.0. PM•Mate works with OS/2 Presentation Manager versions of PageMaker and Ventura Publisher.

When you are not running a publishing program, use MacImage software to capture images with any Datacopy scanner, and your Macintosh. Or PC Image with Datacopy scanner, Microsoft Windows and your PC, PS/2, or compatible.

Both programs give you a number of ways to enhance framing, contrast and halftones.

If you have our MicroFax PC fax board, you can even import images by phone.

We make it simpler than ever to give a great image to your work.

This is just a sampling of solutions. With the broadest line in scanning, we're better prepared than anyone to solve your problem in a snap.

Let us show you.

Call us at 1-800-248-6550

Xerox Imaging Systems, Inc.
The triumph of mind over paper.
Processing Form Letters

"In my business, I regularly send out form letters to my customers, who now number in the hundreds. I want the word processor with the best mail merge system." With mail merge, you combine a form letter with a mailing list. The program automatically places each name and address in the form letter for printing. To meet this demand, you might expect to have to purchase a high-end word processor. But you don’t — MacWrite II has an elegant mail merge facility that helps you bypass the tedium of setting up a form letter and the file of names and addresses to be inserted into it.

Every word processor that handles mail-merge requires you to set up a data document and a form letter. In all these programs, you set up the data file by listing the desired fields across the screen. The fields are separated by tabs in MacWrite II, but you can define them with commas in some other programs. On each row below the list of field names, you enter the actual data for each record, and then you open a new window and create the form letter (see Figure 1a).

With all mail-merge systems, there has to be some way for the program to know that a particular field name in the letter means "insert data from this field of each record at this point in the letter." This is usually indicated by surrounding the field name in the form letter with what are called field delimiter symbols, such as << and >>. With most programs, including such giants as Word 4.0, you type the << and >> before and after each field name in the letter, a time-consuming task at best and one that can introduce errors such as extra spaces where you don’t want them. With MacWrite, by contrast, as you write the letter, you insert a field simply by selecting it from a pop-up scroll list of field names from the data document. Double-click on the field name in the list, and MacWrite II pastes it into your letter, along with the field delimiter symbols. MacWrite also lets you insert IF/THEN/ELSE conditions into form letters by double-clicking on them from the same scroll list.

Best of all, the menu from which you select fields and conditions can be opened and left on-screen like any other window while you create the form letter (see Figure 1b). Nice.

Creating Columns and Tables

All word processors claim to handle multiple columns. So why do many Mac users become desperate
Despite the proliferation of word processors, there appears to be a niche for almost all of them — except for Microsoft Write, which doesn’t do anything better than any of its competitors does. By identifying the type of writing you do most, you should be able to find a package you’ll be reasonably happy with.

Many people have introduced themselves to the world of Mac word processing by buying Microsoft Works, an integrated package that also includes spreadsheet, database, telecommunications, and drawing modules. Works is a good buy if you want basic function­ality in each mode, even though the word-processing module is mediocre. Power users, however, will quickly outgrow the package.

On the lower end of the word-processing scale, WriteNow will seduce letter writers and high school students into the bliss of word processing. It’s fast on all types of Macs, keeps text centered on­screen as you write, and has a great spelling checker. Plus it stays out of your way while you write, better than any other program does.

MacWrite II makes mail-merge straightforward, with a menu­driven system for constructing letters and data documents, and handles snapping columns with equal elegance. Its spelling checker is mediocre, however, so you might want to get an additional spelling checker to round it out.

If you want an inexpensive basic package that has a good array of graphics capabilities, give WordMaker a shot. You should be forewarned, however, that WordMaker is slow and has limited file­import and -export capabilities.

On the other end, both MindWrite and Nisus are useful for technical writers. If you’re looking for a terrific tool for organizing technical documents, then MindWrite is probably your best bet; its blend of outlining and word processing allows you to rearrange in more ways than a manic interior decorator.

On the other hand, Nisus can search through, retrieve from, and manipulate text in multiple open and closed files — making the construction of a technical document from pieces of other documents an almost humane undertaking. In addition, its graphics integration is exactly what every Mac word processor should have (but none of the others have it). Nisus is the only power program that is also fast on its feet.

FullWrite Professional has many great features for preparing complex text-and-graphics documents, but its restriction to large systems, its turtlelike speed, and its unfriendliness toward large files still prevent it from being as useful as it could be. Maybe the next release will unleash its potential and make it available to users of 1-megabyte systems.

WordPerfect is a good choice if your organization has a mix of Macs and PCs and other machines that run it. Its files are transportable across the board and retain all their formatting. Otherwise, because of its interface, it has few redeeming qualities and reasons to adopt it solely for Mac use.

Microsoft Word 4.0 is still the crowd’s heavyweight champ. It’s slow compared with WriteNow or Nisus, but it’s fast enough not to have gotten in my way in the writing of two books. It handles columns well, and the new Table feature is the only way to create multicolumn text tables. For writing and editing documents that don’t include a lot of graphics, Word 4.0’s combination of keyboard editing commands, glossaries, and style sheets gives you back whatever time its spelling checker and other slow spots take away, and more. Its connections to Excel and Microsoft Mail give it added value in a business setting.
when they are faced with creating a multicolumn page? Take the worst-case scenario — using Microsoft Word to create columns. This program's multiple-columns feature is no more than a token gesture. It lets you create only snaking newspaper-style columns, not parallel ones. (Snaking text flows from the bottom of one column to the top of the next column on the same page; with parallel columns, when the text reaches the bottom of the page, it continues in the corresponding column on the next page.) And you can't view the text on an editing screen in columns — you can use the Preview mode to see the columns, but you can't edit them on the preview screen. Worst of all, Write automatically formats the whole document, including the first page, with the number of columns you've chosen with Page Setup.

WriteNow's handling of columns isn't much better. To set intercolumn spacing, you must adjust the columns' paragraph margins until you get the setup you want, which can be a painful trial-and-error process. And you are limited to four columns.

The Complete Guide to Word Processing

The Right Word

People tend to either love thesauruses or hate them. Some writers say that if you can't think of the right word on your own, you have no business using it. But not everyone is a writer, and sometimes even writers need help.

BigThesaurus

BigThesaurus claims to have more than a million synonyms, offering a more complete list than any of its competitors does. It breaks the synonyms into categories according to shades of meaning and defines each shade — the word ability, for instance, has seven such meaning groups.

BigThesaurus also gives antonyms and compares words. If you like, you can elect to see just synonyms. Surprisingly, of all the thesauruses reviewed, only BigThesaurus lets you drag the thesaurus around within your window or send it behind your word-processing document. Other products simply pop up an unmoving, modal window.

Pros: Has more than a million words, arranged with shades of meaning. Entries seem able to track your train of thought.

Cons: Can't quit while running another application under MultiFinder.

Geneuta Software
3305 N.W. 74th Ave.
Miami, FL 33122
(305) 594-6965
398.95

Language Master 2.1

Less well known but nicely done is Language Master, which gives you a smaller list of synonyms but helps keep them into defined groups in much the way BigThesaurus does. Even better, Language Master recognizes how confusing a synonym search can be and always displays the word you originally started with. It has a built-in dictionary that defines each word and tells you precise shades of meaning of every word.

BigThesaurus does.

Proximity Software
3511 N.E. 22nd Ave.
Fort Lauderdale, FL 33308
(305) 566-3511
$99

Word Finder 2.0

Both BigThesaurus and Language Master do a far more complete job than Word Finder, which has come a long way, based on a years-old endorsement by the polysyllabic William F. Buckley, Jr. Word Finder breaks synonyms into meaning groups but doesn't explain the shades of meanings as its competitors do. A version of this utility comes bundled with Word (but works only with Word). If you use Word and have a copy of Word Finder sitting around, the price is tough to beat.

Pros: Comes free with Word. Fast.

Cons: At least one step behind the times. Provides only lists of words without pointing out subtle differences of meaning between close synonyms. Modal Word Finder window can be in only two fixed positions.

Microlytics, Inc.
#2 Tobey Village Office Park
Pittsford, NY 14534
(716) 248-9150
$59.95

— Daniel J. Rosenbaum
Figure 2: Word’s table command lets you build tables and charts easily. Each cell can contain text or graphics and can be formatted independently.

Word Processing with Style

Until now, the only thing wrong with style or grammar checkers is that they haven’t been ready for the real world. Either they’ve been so strict that they’ve been unusable, or they’ve been so permissive as to be almost useless. What style checkers really need is a breakthrough in artificial intelligence, so the computer can truly analyze a writer’s style and make suggestions that make sense within the existing text. We won’t be getting such honest machine-based literary criticism in the near future. But the state of the art for style checkers has become a little better of late, with some new style checkers around the corner (refer to the “On the Horizon” sidebar).

MacProof 3.2.1

MacProof, from the Swiss company Lexpertise, is a DA that analyzes text placed on the Clipboard. That’s an odd way of going about it — why a DA and why doesn’t it work on the file itself? But idiosyncrasies aside, MacProof turns out to be surprisingly reasonable. The program can check for four different kinds of mechanical errors (such as spelling and punctuation), seven kinds of usage mistakes (overly formal or offensive words), and weak structures. It helps you analyze the logical structure of your writing by showing you the beginnings and endings of paragraphs. Also, MacProof can show you how each of your sentences starts, allowing you to see if you’ve fallen into stylistic ruts. Requires Mac Plus or later and System 6.0 or later.

Pros: Assistance is straightforward, accurate, and not overbearing. The structural analysis is helpful, as is the homonym checker.
Cons: Insightful but not rigorous. Suite of style checks somewhat limited.

Sensible Grammar 1.55

Sensible Grammar is a tough table-driven program that checks for more types of errors than you might have thought could exist. It can take apart a piece of writing more ruthlessly than the English Teacher from Hell. Requires Mac 512KE or later and System 4.1 or later.

Pros: Thorough. Adjustable levels of exactitude. Lets you change the phrase tables to which your writing is compared.
Cons: Too pedantic. Sensible Software Inc. 335 E. Big Beaver, Suite 207 Troy, MI 48083 (313) 528-1950 $99.95 — Daniel J. Rosenbaum

Figure C: Sensible Grammar’s screens are crowded and unfriendly. Its evaluations are overly picky and may be ego-brising, even though you can tone them down.
The best thing next to your Macintosh

Now you can download spreadsheets, word processing documents, even name and address stacks from your Macintosh to the Cambridge Z88 two pound portable computer and take them with you, everywhere.

Change your files or create new ones on the Cambridge Z88 using the built-in word processor, spreadsheet and other applications. Upload them to your Macintosh when you return.

MacWrite, text and WKS files can be transferred between your Macintosh and the Cambridge Z88 using a cable that connects to your Macintosh's modem port, and software that uses a standard Macintosh interface.

Cambridge Z88 Systems for Macintosh users include the Cambridge Z88, cable and software to transfer files, carry case and batteries.

HyperCard With the optional HC Organizer stack, you can transfer names, addresses, phone numbers and to-do lists.

Memory Cambridge Z88 Systems for Macintosh users provide up to one megabyte of memory, all available for your data files.

Display The Cambridge Z88's display is a supertwist LCD with eight lines by 106 characters.

Keyboard The Cambridge Z88 has a silent keyboard, so you can use it anywhere - in meetings, libraries, classrooms.

Batteries The Cambridge Z88 runs on 4 AA disposable batteries for up to 20 hours, and your data is safe for months - you won't even lose data when you change batteries.

Peripherals The Cambridge Z88 is only 8.25"x11.5"x.875", but it's a complete computer and can be used with a pocket modem, a serial or parallel printer.

Operating system With the Cambridge Z88's task-switching operating system you can have several documents open simultaneously, and quickly switch from one to another. When you return to a document - even after switching off - you'll find it exactly as you left it, without booting, loading, opening, saving, closing or quitting.

HCOrganizer is a trademark of MA Solutions

Cambridge Z88 Systems for Macintosh users from $699

TO ORDER OR FOR MORE INFORMATION

800-888-3723

CAMBRIDGE NORTH AMERICA
424 CUMBERLAND AVE., PORTLAND, ME 04101

Macintosh & HyperCard are trademarks of Apple Computer

Please circle 189 on reader service card.
The Complete Guide to Word Processing

document in WordPerfect is so much slower than the program’s normal scrolling speed that you may regret having put your text into columns.

Word 4.0 and FullWrite automatically adjust and balance the length of your columns so they come out even. Then they let you switch back to a one-column layout on the same page. When it comes to parallel columns, it isn’t that WordPerfect is clumsy, but it’s that Word 4.0 is great. To create parallel columns with Word 4.0, you simply select Insert Table from the Document menu and a spreadsheet-like grid appears on-screen (see Figure 2). Text automatically wraps within each cell, and the rows expand to the size of the largest cell in the row. You can specify the number of rows and columns when you insert the table into your document, or you can start with the default of one row and two columns and add more of either when you need them. You can also easily adjust column widths even after you’ve entered text — the text rewraps to fit the new cell size.

If you’ve ever created a document with multicolumn tables and then endured the agony of trying to keep each row and column in line while you added and deleted text, working with Word 4.0’s Table feature will be a pleasurable experience. One reader recently complained in a letter to the editor that you could boil an egg while waiting for Word 4.0 to insert a table (it actually takes only about three to ten seconds on my Mac 512KE, depending on the size of the table). The reader failed to mention that you could prepare eggs Benedict for 20 while trying to set up a similar table with any other word processor.

Writing Technical Manuals

Writers of technical documents don’t start with a blank page and construct something out of pure creative energy. The software guides I write are all rector-set projects — I construct a new book from many existing files (and, often, bits and pieces of those). In this type of writing, the ability to organize material is of paramount importance. MindWrite and Nisus both have special features that make organizing work much easier.

Because MindWrite integrates word processing and outlining better than does any other program, it’s easy to turn pages of paragraphs and headings into an outline and then collapse the outline to show just the headings, to get an overview of the document’s structure. Move a heading in this collapsed view, and all the text under it moves too. Or expand the outline (or just sections of it), grab a paragraph from a section with MindWrite’s efficient grabber hand, and move it into another section. All sections are renumbered automatically (see Figures 3a and 3b).

When you need a list of bulleted paragraphs, simply press Command-8 and then Command-R — no need to bother with hanging indents. When you’ve finished the list, press Command-H and then Command-I, to return to ordinary paragraphs.

If you have bits and pieces of text or text and graphics that you would like to pull into a new section, it’s easy with MindWrite’s Disjoint selection. Start by selecting the items in the order in which you want them organized when they are brought together. Once you’ve selected all the items, position the grabber hand to the left of any one of them, hold down the mouse button to close the hand, and then drag the hand to the

Figures 3a and 3b: (a) When you grab a section of your outline with the grabber hand and move it to another location, MindWrite automatically renumbers all the sections. Multiple views of your document can be in different modes. (b) When you write an outline in MindWrite, headings are automatically marked with diamonds or numbers and indented.

On the Horizon

Coach Professional 3.1, which should be out by the time you read this, is a combination spelling checker and thesaurus installed as a DA. It contains two dictionaries for spell checking (one is a shorter, less-memory-intensive version of the other) and BigThesaurus, which Deneba Software also sells as a stand-alone. The spelling checker suggests typographical or "phonetic" corrections to misspelled words, and a utility allows users to build specialized dictionaries of legal, medical, and technical terms. You can run Coach Professional with another application under MultiFinder.

Coach Professional works with several word processors but not with Jazz, Microsoft Word 1.05, WordPerfect, or FullWrite Professional. Requires Mac Plus or later and System 4.2 or later. S199. Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122; (800) 622-6827 or (305) 594-695.

Grammatik Mac, from Reference Software International, installs as a DA. It contains two dictionaries, a grammar checker, and a thesaurus. Requires Mac Plus or later and System 4.2 or later. $199. Reference Software International, 330 Townsend St., Suite 123, San Francisco, CA 94107; (800) 872-933 or (415) 541-0222.

— Sarah Vanderstaf
Nation's Most Popular Macintosh Training Workshops Now On Video

DAYTONA BEACH, FL- Twenty MacAcademy™ workshops are now available on video tape. This valuable and exciting new video training series came as a result of a request from Helena, Montana.

One day we received a call from a gentleman wanting more information on our MacAcademy training locations. As you may know, MacAcademy teaches people how to use the Macintosh computer. We teach a lot of people, over 18,000 each year, in 65 major metro areas. We’re proud of the fact that both beginning and advanced Macintosh users, all over the country, have found MacAcademy to be an excellent, low priced, training solution.

The gentleman wanted to know when we would be presenting MacAcademy in Montana. Sadly, I had to tell him probably never. There just aren’t enough Mac users in Montana to make a workshop financially feasible. I told the caller he could attend in Denver or Salt Lake City, but he still didn’t seem satisfied. Finally, he said that if we ever put the workshops on video tape he’d be glad to invest in a set. What a great idea!

Now our training videos are being used by thousands. Not just people who live in Montana, but by MacAcademy graduates, large corporations, school districts, and Mac users in all lines of work.

Our 2-hour, VHS MacAcademy Videos are now available for only $49 each. A complete list of programs can be found in the coupon below.

MacAcademy Video Training tapes offer tremendous advantages for today’s Macintosh user. When using our videos you actually see the steps take place on a Macintosh screen. A small inset will show you the instructor and the mouse or keyboard. Our instructors are MacAcademy’s highest rated teachers and are highly trained and effective.

Training videos offer the advantage of building a learning and reference library. If you ever want to brush up on a technique you simply go back to the video and review the technique demonstrated. Videos offer the unique flexibility of teaching both individuals or hundreds of people at one sitting.

In addition to a super $49 price, our videos also carry a 30-day satisfaction guarantee. If you’re not totally satisfied, simply send the tape back for a full refund. MacAcademy will continue offering the nation’s highest rated live training courses in major cities. But in addition, you may also build your Macintosh training library.

Videos may be ordered by phone with credit card information, or by mail with check, credit card, or purchase order. You may also send orders by FAX. Your business is appreciated and your satisfaction is guaranteed.

location you’ve chosen for the new section. The items are gathered, ordered, and relocated automatically. You can even conduct a search operation that finds all headings and paragraphs that contain a specified word or phrase and gather them together in a separate window.

Similarly, creating a table of contents is smooth and easy with MindWrite. Just select Table of Contents from the Search menu, and then select the number of heading levels you want included in the table. That’s it. MindWrite pulls everything into a new window with headings and their page numbers neatly listed.

Nisus doesn’t match MindWrite’s ability for rearranging parts of a document, but it can do several useful tricks that no other word processor can do. First, Nisus lets you search through multiple open or closed files. Nothing you’ve ever written is out of

**Corresponding with DAs**

If you frequently need to write a letter when you’re in an application that’s not conducive to letter writing or you just want a convenient way to crank out business letters, memos, and envelopes, you can choose from several available DAs. If all you need is a quick way to print envelopes, KiwiEnvelopes! and Labels and Envelopes Deluxe take the guesswork out of positioning an address correctly for printing on envelopes and labels. Some applications offer more, such as an address file and access to databases.

**ExpressWrite**

ExpressWrite, a DA created expressly for writing letters, has an intuitive interface; variable fonts, sizes, and styles; and a global ruler. It also has a pop-up menu for standard letter types and a paragraph-insertion feature. Requires Mac 512KE or later.

**Pros:** Can merge with any standard database program or DA Retriever (from Exodus) for printing multiple selected envelopes and labels.

**Cons:** Has no graphics capabilities.

Exodus Software
8220 Winton Road, Suite 304
Cincinnati, OH 45231
(513) 522-9011
$99.95

**KiwiEnvelopes! 3.0**

An easy-to-use, inexpensive DA, KiwiEnvelopes! prints addresses on letter- or business-size envelopes, one at a time. It positions the address according to font, size, and style and lets you add a one-line message or bar code at the bottom. Requires Mac 512KE or later.

**Pros:** AutoPaste feature for transferring addresses from a word processor or its own address file to KiwiEnvelopes! and bypass of Print dialog box for streamlined envelope creation.

**Cons:** Only two envelope sizes. Font styles restricted to plain, boldface, and italic.

Kiwi
6546 Pardall Road
Santa Barbara, CA 93117-4842
(805) 685-4031
$49.95

**Labels and Envelopes Deluxe 2.4**

Labels and Envelopes Deluxe lets you print just one address or your entire mailing list on any size of envelope or label (you can also print multicolumn, multilow labels) in your choice of font, size, or style. It doesn’t recognize lines that start with a parenthesis, so it automatically omits phone numbers when printing. You can quickly customize a label or envelope by selecting the address box in the Label Layout mode. Drag it to the preferred location, or drag the corner to enlarge the box. Requires Mac 512KE or later.

**Pros:** Good program if you do lots of mailings and use a variety of envelope sizes.

**Cons:** Works exclusively with text and tab-delimited address files.

Eastgate Systems, Inc.
P.O. Box 1307
Cambridge, MA 02238
(617) 924-9044
S29

**QuickLetter 1.01**

QuickLetter is a DA for writing letters and memos and addressing envelopes that offers full control over fonts and styles and lets you save your most used template as a default. You can import a logo for letterhead stationery or for properly positioning the text (you can choose not to print the graphic). Requires Mac 512KE or later.

**Pros:** Page Preview, which lets you grab text and move it for better positioning. Has its own address book with auto-selection for quick and easy letter and envelope addressing. Tab-delimited data can be imported into address book. Envelope addressing and printing capabilities rival the best word processors.

QuickLetter is a DA for writing letters and memos and addressing envelopes that offers full control over fonts and styles and lets you save your most used template as a default. You can import a logo for letterhead stationery or for properly positioning the text (you can choose not to print the graphic). Requires Mac 512KE or later.

**Cons:** Can print only one envelope at a time.

Working Software, Inc.
Box 1184
Santa Cruz, CA 95061-5696
(408) 423-5696
$124.95

— Laura Johnson

Figure I: QuickLetter lets you use a picture as a letterhead (the MacUser letterhead, for example). You can opt to print the letterhead or just use it for lining up text. In Page Preview, you can change the placement of your text effortlessly — just drag it to the desired location.
Introducing MarkUp, Workgroup Editing & Review Software

It's ironic that documents created with hi-tech efficiency revert to archaic methods for review: lots of paper, red pencils, scribbles, mail delays and wasted time. Now there's real improvement for group editing, review and approval — MarkUp.

Here's how it works: print an image of a Macintosh document to disk from any application with MarkUp Document Creator. Publish it electronically to a workgroup for review.

Group members don't even need the creating application, just MarkUp. Reviewers work simultaneously — on a network or by transferring files — making comments on transparent overlays of the MarkUp document.

MarkUp provides tools to rewrite, annotate, highlight, strike out, correct, manage and approve documents of all types. It even keeps a journal and status of editing activity.

When review is completed, use MarkUp's powerful merge feature to combine a group's comments and print the annotated document as a basis to rework the original. Better yet, open the original document next to the MarkUp document with MultiFinder and copy changes directly.

Real productivity improvement means working better — together! Whether your group numbers two or twenty-two, you'll produce higher quality documents in much less time. Reduce paper traffic, meetings and travel. Use MarkUp for reports, drawings, letters, spreadsheets and proposals.

Inquire about MarkUp today. Take a step toward making your mark, together.

For more information or the dealer nearest you, call:

Mainstay
5311-B Derry Avenue
Agoura Hills, CA 91301
(818) 991-6540

Inquire about MarkUp today.
Take a step toward making your mark, together.

For more information or the dealer nearest you, call:

Mainstay
5311-B Derry Avenue
Agoura Hills, CA 91301
(818) 991-6540

Please circle 7 on reader service card.
its reach. Second, you can do almost anything imaginable to searched-for text. For example, you can add or change the formatting of specified items in any file, or you can index every boldfaced word in each of 20 documents and then pull all the indexes into one new file and re-sort them (see Figure 4). Third, you can automate any set of procedures with Nisus' built-in macros and programming commands. Of course, you have to be willing to master these features or have someone on hand who can do it.

Add in Nisus' multiple editable clipboards and multiple undos (up to 300), and you have an obsessive organizer's dream word processor. As messy as you may be with the information you store, Nisus can keep it within reach when you're ready to assemble your technical document. WordPerfect is the former champ at file management, letting you look into any file on your disk without closing your current document. But Nisus goes far beyond WordPerfect's capabilities.

Preparing Complex Documents
As you move up the word-processing ladder into what is often called high-end or heavyweight writing, you enter the realm in which you don't just write — you prepare documents. Complex documents may have lots of long quotes that have to be justified and indented on both sides. They may need footnotes and endnotes. A table of contents and an index may be required. And several levels of headings, each with its own format, are usually needed.

The prime contenders for this type of writing are FullWrite Professional, Word 4.0, and Nisus. The best-looking program for this type of job is FullWrite Professional. Along with many other users, I was excited by its arrival after years of vaporware status. And straight out of the box, it did look great. It offers not only the usual headers and footnotes but also posted notes and bibliography entries that are automatically compiled when the document is printed. But the amount of RAM that FullWrite needs is enormous: I couldn't load the spell-checker into a 1-megabyte machine. And even on an SE with 2 megabytes, it ran slowly. The final letdown came when the program rejected a 50-page document as too large on a 2-megabyte system. Version 1.1 handles large files better, but this program works best on a Mac II or later machine.

Word 4.0 is faster than FullWrite is, but it's not fast. In fact, the only

Bibliographic Databases

Certain kinds of documents, including academic and legal papers, have specific formatting requirements for footnotes and endnotes. Meeting these annotation requirements becomes more difficult when documents go through many revisions. Numbered references go out of sequence, and tracking specific citations and cross-references becomes a task beyond the capabilities of most word processors because they are not database programs with sophisticated searching functions. Specialized bibliographic programs have arisen to address these needs. Two of the better ones are presented here.

EndNote 1.2.1... \textsuperscript{1/2}
EndNote is a DA that works in conjunction with word processors — including MacWrite, WriteNow, Microsoft Word 4.0, and WordPerfect 1.0.3 — as well as with text-only files. The program is also available as a separate application for use with a word processor under MultiFinder. You can paste formatted in-text citations directly into a word-processing document, and EndNote then creates a bibliography from the citations. Requires Mac 512KE or later and System 4.1 or later.

Pros: Being a DA, allows easy access to word-processing files for pasting in citations.
Cons: Cannot print formatted bibliographies from the application itself. Search capability much more limited than Pro-Cite's. No on-screen help. Current version does not work with MacWrite II.

Niles & Associates
2000 Hearst St.
Berkeley, CA 94709
(415) 655-6666
$129

Pro-Cite 1.3.4... \textsuperscript{1/2}
Pro-Cite provides complete database management for bibliographies. It has 45 criteria for searching through the database by author, title, date, and so on. It can do two or more searches on different criteria simultaneously, and you can specify the bibliographic style of the entries. (Major feature upgrades, including a less complicated interface and cleaner documentation, are planned for version 1.4. The new version, which will require System 6, should appear in the first quarter of 1990.) Requires Mac 512KE or later, two floppy-disk drives, and System 4.2 or later.

Pros: Powerful database manager. Flexibility in formatting bibliographies is almost unlimited. Sophisticated search and sort capabilities.
Cons: Works only with text files. Menu bar and dialog boxes overly complicated and nonintuitive. Takes too much time to prepare bibliographies, particularly long ones. Commands for some formatting options needlessly obscure. Documentation big and unwieldy.

Personal Bibliographic Software, Inc.
P.O. Box 4250
Ann Arbor, MI 48106
(313) 966-1580
$395

- Sarah Vandershaf
Introducing software that thinks. There has never been personal computer design and drafting software this powerful, this fast or this intuitive. Vellum thinks. Its radical new technology automatically pinpoints and aligns geometry as you draw. Built-in intelligence allows you to draw virtually freehand, yet set precise dimensions at any time. Finally, the days of complex commands and weeks of training are gone. Vellum has made industrial-strength design click on the Macintosh. For a demonstration see your Ashlar dealer or call (408) 746-3900.

Please circle 3 on reader service card.
You have a perfectly good word processor, so why do you need a DA text processor or text editor? Well, let's say you're working on a database and you decide to jot down a few quick notes. If you don't have MultiFinder, you have to close your application, open your word processor, write down your ideas, close your word processor, and then go back to your original application. Why bother? With a DA text processor, you never have to leave what you're working on.

**FlashWrite**

FlashWrite, a shareware text editor, can be assigned a keyboard-command-equivalent launch code. (The default is Command-Return.) When you use the launch code, FlashWrite literally flashes onto your desktop. The program lets you choose what creator signature to assign to a saved file. Then, the next time you open that file, it launches that program. Any text file can be imported into FlashWrite, and anything written in FlashWrite can be exported as text. Requires Mac 512KE or later.

**Pros:** Most accessible of text processors examined here. Features multiple-page documents and colored fonts on suitably equipped Mac IIs.

**Cons:** Not a power users' tool. More a replacement for Apple's Notepad. Shareware, available from CompuServe $10

**miniWRITER 1.5**

Also a shareware product, miniWRITER is a second-generation text editor in the tradition of MockWrite, a simple text-editing DA (also called Notepad+). ImageWriters can be exquisitely slow when imaging a Mac font, but with miniWRITER, you can get superior output in a fraction of the time. (miniWRITER comes with a printer font that gives you a WYSIWYG representation of the ImageWriter's Draft-mode font.) For quick draft documents, you may find the printing-speed improvement so dramatic that you will give up font control for convenience.

**Pros:** Fast ImageWriter printing. Good basic tool for quick text editing; word, line, and character counts and smart quotes.

**Cons:** Find function is primitive.

Shareware, available from CompuServe Maitrey Design P.O. Box 1480 Goleta, CA 93116 $12

**QUED/M 2.07**

QUED/M stands for Quality Editor with Macros — and the emphasis is on quality. It really shines in macros and searching. The Macros feature also lets QUED/M function as an appointment book or text database. Plus, QUED/M's ability to search through unopened files gives the macros extra power. Programmers will particularly like the ability to edit a program in QUED/M and use its built-in switching to load the compiler. Requires Mac 512KE or later.

**Pros:** Beats other text editors by a long shot. Elegant and uncluttered appearance. Can build complex search-and-replace patterns. Has ten clipboards available at all times, accompanied by file markers that act as bookmarks.

**Cons:** Syntax for building search-and-replace patterns awkward to learn for those not familiar with UNIX and grep. Doesn't support spell checking as you type.

Paragon Concepts, Inc. 990 Highland Drive, Suite 312 Solana Beach, CA 92075 (619) 481-1477 $119

**SideKick 2.0**

Borland's SideKick is really a licensed copy of CE Software's MockWrite. Both programs are simple text editors with few features beyond the ability to open ASCII text files and edit them, allowing text from other files to be inserted. Requires Mac 512KE or later.

**Pros:** One of the first replacements for Apple's Notepad. Remains a good basic (and inexpensive) replacement.

**Cons:** Limited to 32K of text. Find function is primitive.

Borland International 1800 Green Hills Road Scotts Valley, CA 95066 (408) 438-8400 $39.95

**Vantage 1.1**

This DA looks more like an application than a DA, doing everything that every other text editor DA does and more. To QUED/M's list of features, Vantage adds an 80,000-word dictionary, columnization, prefix and suffix string assignments, installable external functions, and an iconic menu bar. The Convert menu lets you change the capitalization of selected sentences and is also the home of control-character adding and stripping, conversion of spaces to tabs (and vice versa), and line numbering. You can also add prefix and suffix strings to your text file if your application calls for them. Requires Mac 512KE or later.

Version 1.5 should be out by the time you read this. The major difference is that 1.5 has true word-wrap capabilities, whereas 1.1 does not.

**Pros:** Works more like a word processor than a text editor, except that it lacks font control.

**Cons:** Macro function much more limited than QUED/M's. Find function cannot compare to QUED/M's.

Preferred Publishers 5100 Poplar Ave., Suite 617 Memphis, TN 38137 (901) 683-3383 $99.95 ($15 for upgrade to 1.5)

Daniel Rasmus

**Figures Ja, Jb, and Jc:** These three DAs represent the evolution of the Notepad DA. Notepad+ (MockWrite) is a basic text editor with features, miniWRITER is a shareware DA, and Vantage is a replacement DA with built-in font control for the ImageWriter's native font. Vantage (Jc) not only edits text but also spell-checks it and supports external functions and macros.
MacUser magazine and Ingram Micro D have joined forces to offer resellers the Macintosh Pocket Selling Guide. It's a pocket-sized reference tool packed with everything a salesperson needs to better explain today's advanced Mac Products. Some of the Guide's features include a complete listing of MacUser's highly respected MiniFinders, and an industry directory that lists support information for Macintosh vendors. Exclusively MacUser!

Dealers—to order your copy call:

Ingram Micro D
800-555-1212

Please circle 176 on reader service card.

The Complete Guide to Word Processing

fast Mac heavyweight word processor is Nisus — a big plus for Nisus. Word 4.0's spelling checker takes so long to suggest the correct substitute that I end up typing it myself. Even finding the misspellings takes too long. After I'd written a couple of books this way, Nisus' spelling checker had me smiling.

Nisus has several other nice features. If you've ever wanted to draw an arrow from one place to another in a document, try Nisus' graphics-within-text facility. If you feel creating an index or table of contents, you'll appreciate Nisus' speed and ease of use. If you jump around your documents looking for related pieces of text, you can use Nisus' cross-referencing feature, which lets you maintain accurate references to other parts of your document.

But Nisus doesn't have it all. Its major deficit is its lack of style sheets. Only Word has them, and they definitely make a difference.

The style sheet has to be the most misunderstood feature in the entire realm of word processing. When Microsoft first introduced style sheets for PC versions of Word, few users could figure out how to use them. But the way they are implemented in Word 4.0 makes them a suitable topic for "Sesame Street." Say, for example, you want the level-1 headings of your document centered and styled in Geneva 14 bold. Create one heading that way, and tell Word it's your Head 1 style (see Figure 5). Then, whenever you want to use that style of head, pull down the Style menu on the ruler and click on Head 1.

Word has been criticized because styles can't be stored independently of documents. But Word 4.0 lets you import the heading styles from one document to another with a few keystrokes or mouse clicks. So if you have a set of styles you use frequently, you can store them all in one style document and quickly import them anytime you need them. An advantage of this system is that if you have several sets of heading styles, you don't have to invent cute names to distinguish one level-2 head from other level-2 heads. Instead, when you want the set of heading styles one editor, publisher, or boss likes, just grab those all at once.

Although FullWrite and Nisus have ways to transfer styles from one paragraph to another, these systems don't allow easy changing of all text set in a particular style. Word 4.0 does. Just change the style definition, and everything defined in that style changes to conform to the new definition. To complete the package, a new $25 upgrade to PageMaker 3.02 lets it import Word 4.0 documents, styles and all.

In addition to providing style sheets, Word 4.0 outdoes all its competitors with a full array of customizable keyboard editing commands. For some reason, few word processors provide an easy way to select a sentence. Nisus lets you select a line, but how often do you pull a line out of the middle of a paragraph? But users delete, copy, and move sentences all the time. Word 4.0 lets you do this without dragging the mouse. Similarly, to change fonts with Word 4.0, simply press Command-Shift-E and enter the first two letters of the font name. Such keyboard shortcuts save immeasurable time over the course of creating a book or long business report.

At the moment, Nisus and Word 4.0 seem to be the top contenders for heavyweight word processing. Like FullWrite before it, Nisus arrived on the scene destined to overthrow Word, according to many reports. Whether Nisus will replace Word 4.0 for your writing depends on three questions, however. First, to what extent do you see your word processor as a file manager? After test-driving Nisus and talking to several Nisus converts, it became clear to me that one of its main attractions is its macro/search system. In the hands of experienced programmers, it can become an indispensable tool for indexing, cataloging, converting databases to documents, and other such tasks.
The second Nisus-versus-Word consideration is the size of your documents. Nisus’ speed is due, in part, to its keeping itself and your document in RAM. However, this limits the size of document the program can handle. Word 4.0, by contrast, uses a virtual-memory system in which parts of the program or the document are moved back and forth between memory and disk. If your documents fit into Nisus, its speed may convert you from Word. If they don’t, you’ll either have to get a Mac with more memory or use Connectix’ Virtual on a 68030 Mac.

The final question is, how often do you use spreadsheet data in your documents? Unlike Nisus, Word 4.0 can form dynamic links with Excel spreadsheets. If your business documents often incorporate spreadsheet data, you may want the combination of Word 4.0 and Excel, which gives you a tightly integrated package.

Preparing Text/Graphics Documents

As with mail-merge, this might be an instance in which you would assume that you need a high-end program. But do you really need all that power and complexity if you’re putting together a one-page flier or a classroom handout or an overhead transparency? You may not want to tame a tiger such as Nisus or FullWrite for such simple jobs. Two much less expensive and easier-to-master choices for such lightweight desktop-publishing tasks are MacWrite II and WordMaker. MacWrite II supports color text and lets you place MacPaint and PICT graphics directly in documents. But WordMaker, the lowest-priced word processor discussed here, places pasted graphics (whether bit-mapped or object) into a layer of a document above the text. So you can place them almost anywhere, even on top of text, as long as solid colored areas of the graphics don’t hide your words. And when you move a section of text, any attached graphics move with it. You can even wrap lines of text around graphics by setting separate margins for each line. This is not something you would want to do if you were creating a document with 50 illustrations, but it’s no trouble for a one- or two-page graphics-and-text document (see Figure 6). With this surprising array of graphics capabilities, WordMaker is a great buy for short text-and-graphics documents. The need to add such “objects” as a graphic or a boxed paragraph in the middle of a page of your document may dramatically change your word-processor preference.

For bigger jobs, try Nisus or FullWrite. With Nisus you can create...
1·800·248·0800

Our savings are huge and our advice is free.
SOFTWARE

33 Stencil, Hobo &
Brushscript ...................... 93.
34 Aachen. Revue. Univ. Roman
1st Aid Software
& Freestyle Ser. ............ .. 123.
1st Aid Kit Deluxe ..
... .. 116.
35 Carta ............................ 61.
Anti Virus Kit ...................... 48.
36 Lucida .. .................... 123.
Complete Undelete ............. 36.
37 Univers . ...
.... 243.
3G Graphics
38 Univers Condensed ... 180.
Images Wit/1 Impact
39 Futura Light ... ............... 180.
Business 1
.............. 64.
40 Stone Seril ........... ..... 180.
Graphics & Symbols 1 ....... 49.
41 Stone Sans Serif .......... 180.
Liaison ........... .... . $175.
42 Stone Informal ............. 180.
A. Bonadio & Associates
lnfosphere
43 Corona ..
............... 93.
Expressionist 2.03 .............. 78.
Extends t11e reach of Ap·
44 Eurostile ....................... 180.
pleT,1/k, connecting local net­
45 Excelsior ......
.. 93.
works toget11er with t11e con·
46 Futura .......................... 180.
venience of remote. dial-up
47 Futura Condensed ........ 243.
access.
48 Lucida Sans .... ........ 123.
Symmetry
49 Memphis ......................243.
Definitive Management
101 Adobe Garamond Expert
50 Helvetica Compressed .... 93.
andProject Planning. At
Collection ....................... 123.
51 Italia ...
...... 93.
last, an easy to access
102 Candida ........................93.
52 Belwe
..... 123.
planning software for
103
Franklin Gothic No. 2 .... 93.
53
Caslon
3,
Caslon
540
...
123.
business managers. A
54 Goudy Extra Bold &
104 Ulopia ..
.... 180.
friendly interface com·
Heavyface ........................ 93.
105 Ulopia Expert Coll. ...... 123.
Sticky Business ... .... $89.
bined1vithextensivepro·
55 Janson Text 55, Janson
106 ITC Berkeley Oldstyle .. 243.
fessional tools provides
Williams & Macias
Text 75 ........................... 123.
107 Antique Olive II ........... 123.
everything needed for
Extensive label making utility.
56
ITC
Eras
......................
180.
108 Parisan/Umbra .............93.
the planning, presenta­
Preformattedtemplatesforla­
57 ITC Kabel ..................... 123.
109 Mistral/Reporter ........... 93.
tion andexecution proc­
bets. cards & tags. Choose
58 OCR-A. OCR·B, MICA ..... 93.
110 Nuptial/Cascade/
esses of successful
size. shape & layout of com·
59 Helvetica 1 ................... 123.
Medici .........
. .... 93.
management.
manly used labels.
11 1 BauerBodoni 11 .......... 123.
60 Helvetica 2 .................. 180.
112 Meridien ................... 180.
61 Helvetica 3 ................... 180.
Aatrix
113 Copperplate Gothic .... 243.
62 Times Ten .................... 123.
CheckWriter II .................... 36.
63 Kau fman
................ 93.
114 ITC Novarese .............. 180.
Payroll 3.5 ........
.......... 94.
64 Clarendon .....
.... 93.
115 Kiinstler Script ............. 93.
Payroll Plus
...... 149.
116 lndustria ................... CALL
65 Peignot .......................... 93.
TimeCard ............................ 99.
117 ITCSourvenier II ........ 123.
66 New Caledonia ............. 243.
TimeMinder 2.1 ............... 145.
67 ITC Clearface .
........ 243.
1t8 Badoni II .................... 123.
119 Russell Square .............93.
68 Americana
...... 123.
Abbott Systems
Type Manager: much
69 ITC Serif Gothic .
... 180.
120 Charlemagne/Trajan ... 123.
CanOpener V.1.0 ................ 64.
smoother & more teg ­
70 Century Expanded ...... 93.
121 Lithos ........................ 123.
AC/US
ibteon-screen text & dra·
71
Serita
...
..........
180.
122
Cononwood/Ponderosa
4th Dimension 2.0 ............. 465.
matically improved
72 Caslon Open Face ........... 61 .
lronwood/M e squ~e/Junipe r
Addison
Wesley
tmageWriter printing.
73 Frutiger ....................... 243.
Ornamenls .......... . ..... 123.
Programmers Online
74 LinotypeCentennial ...... 243.
Emerald City
Advanced Software
Companion 2.1 ...
...... 32.
75 Stempel Garamond ...... 123.
DocuComp .................... ... 87.
Type Align: exclusively
76 Weiss ........................... 123.
Adobe
AEC Management Systems
for ATM owners: give
77 Garamond 3 ................ 123.
ATM Plus Pack
........ 112.
ACE Information Mgr. ....... 409.
type achange offace with
78 Univ News, Commercial Pi
Illustrator 88 ..
........ 278.
FastTrack Schedule ........... 110.
new convenient DA for
Univ Greek & Math Pi .......93.
Streamline ............
..... 228.
use with all major appli·
Affinity Microsystems
79 Avenir 1 ....................... 180.
True Form ............. ........... 220.
cations.
Tempo II .............
.. 74.
80 Avenir 2 ....................... 180.
Type Manager .................... 57.
87 ITC Bauhaus ................ 123.
Aladdin Systems
Adobe Postscript Fonts
82 Antique Olive ................ 123.
Short Cut ............................ 46.
1 Palatino ........
..... 123.
81 Walbaum ...... .............. 123.
.... CALL
Stuttll Deluxe ..
2 ITC Bookman ................. 123.
3 ITCZapf Dingbats & ITCZapf
Aldus
Chancery Med. Ital. ........... 92.
Freehand 2.02
. ... 348.
4 ITCAvant Garde Goth. .... 123.
PageMaker3.02 ................ 398.
Aladdin Systems
5 New Gen. Schoolbook .... 123.
PageMaker Color Ext. ... 149.
Leap to folders and files.
....... 123.
6 Optima .........
Persuasion .......
.368.
find lost files. save files
7 ITCSouvenir .................. 123.
Al Soft
in new folders decom­
8 ITC Lubalin Graph ......... 123.
DiskExpress II
... .... 55.
press Stufflt files. and
9 ITCGaramond ................ 123.
Master Juggler ................ 49.
much, much more. With
1OITC American Typewriter &
MultiDisk
..........................
. 41.
SHORTCUT and Stuff/I.
ITC Machine
...... 93.
Al/sys
you can literally increase
11 ITC Benguiat & Friz
FONTastic Plus ...
. ...... 51.
your hard drive capacity
One Mb SIMMS ........... . .
Ouadrata ....................... 123.
Fonlographer 3.0 .
.. 249.
from 50%to 75 %. Writ·
12 Glypha ...................... 123.
Call for cu"ent prices
ten byRaymondLau. au·
Antic Software
13 Helvetica Lt & Blk ........ 123.
One Mb SIMMs (Single In line
thor of the ever popular
14 Helvetica Condensed .... 243.
Bus. Forms tor PageMaker
Memory Module) suitable for
StuffIt.
15 Trump Medieval ........... 123.
Vol. 1Human Resources ..... 27.
any Mac. Upgrade your RAM
16 Melior .......
..... 123.
Vol. 2 Operation s/Admin..... 27.
and give your Macintosh a
17 ITC Galliard ........ ........ 123.
Vol. 3 lnvenlory/Stock ......... 27.
bigger byte.
18 ITC New Baskerville ...... 123.
FlexForm Business Templates
19 ITC Korinna .
.... . 123.
Volume I ...........
.... 47.
83 Life ....
.......... 93.
20 Goudy Old Style ....... ... 123.
Volume II .....
...... 47.
84 Concorde .................... 123.
21 Sonata ...........
........ 61.
Ashton-Tate
85 Gothic 13 & Tempo ........ 93.
22 Century Old Style ........... 93.
dBASE Mac .
.. 294.
86 Cochin
......... 123.
23 ITCFranklin Gothic ....... 180.
Penton Overseas
Full Impact ....................... 248.
88 Saban
................. 123.
24 ITC Cheltenham .. .......... 123.
FullWrite
Professional
.......
255.
Dynamic foreign lan­
89 Hiroshige .....................243.
25 Park Avenue .. . .......... .. ... 61 .
guage program! This
90 A. Becklin F. Fraktur. Present
Berkeley System Design
26 Bodoni .................... ... .. 123.
interactive HyperCard
Ser. & Helv I. .................. 123.
Atter Dark .......................... 24.
27 Lener Gothic ................ 123.
stack is available in five
91 Dom Casual ................... 93.
Stepping Out 2.01 .............. 50.
28 Prestige Elite ................ 123.
languages & two levels.
92 Post Antiqua .................. 93.
Blyth Software
29 Orator ........................... 93.
Each program contains
93
Folio
......
......
123.
Om nis 5 lncrementer Disk
30 News Gothic ................ 123.
two 90 min. audio cas­
94 Linoscript & Linotext ...... 93.
Single User ......................... 74.
..... 180.
31 ITCTiffany ......
settes. complete wordlist
95 Vag Rounded ............... 123.
Omnis 5 Single User . ... 345.
32 Cooper Black .................. 93.
& HyperGard 1.2. Per·
96 Akzidenz Grolesk
.. 123.
Borland lnterna//onal
feet bi/lingualaid for stu·
97 lmpressum .. ................ 93.
Reflex Plus ..
....... 188.
dents, travelers, educ,1·
98 Bauer Badoni ..
. 123.
SideKick 2.0 ................ ... 67.
tors. & business people
Turbo Pascal 1.1 ................ 67.
as well.
100 Adobe Garamond ....... 180.
Turbo Pascal Tutor 1.0 ....... 49.


The inside story on hard drives.

From the outside, hard drives look very different.

Remove the fancy case and the true manufacturer is revealed.

You could spend a bundle for one of their fancy cases.

Or, save a bundle for exactly the same drive from the MacZone.

When you look inside the cases you'll discover the brand names are the same. The real difference is cost. The choice is yours — and so are the savings.

What's in a name? Read the reviews and see. At the MacZone we believe it all comes down to quality and savings. We sell only the best drives — Quantum, Seagate and SyQuest, to name a few. And we buy directly from the manufacturers so we can pass the savings along to you.

Our experienced staff can assist you in designing the hard drive that best suits your needs. That way you'll know exactly what's inside. We'll format it, test it, put it in your case choice, warranty it and ship it to you overnight for $3. And as an added, no cost feature, you'll receive our exclusive Zoner Loaner guarantee. To put it simply, nobody builds and backs a hard drive as well as we do.

The reviews are in so don't hesitate. Phone the Zone during our convenient hours and be prepared for straightforward answers to your questions. No obligation to buy and no hard pressure. Just knowledgeable advice. Ask us. We'll give you the inside story.

Hard drive details on page 3 of our ad

1-800-248-0800
Intl: (206) 883-1975 Canada: 800-248-0344 FAX (206) 881-3421
Our savings are huge and our advice is free.
Zoner Loaner drive overnight.

Rest assured. If a drive you've purchased from us goes down during its warranty period, we'll ship a Zoner Loaner to you overnight.

Fujifilm Disks
Receive a FREE Fujicolor QuickSnap camera with every 3 boxes ordered. Tested & certified 100% error-free, complete with Fujifilm's limited lifetime warranty. 10 pack DS or HD disks in standard beige or special rainbow pack (5 different colors, screen cleaning cloth included & sturdy disk storage case).

Double Sided or High Density see listings

Mac 101 Keyboard ................. $135.

MacTech
A complete intelligent data communications system. The SmartLink 2400S package comes with SmartLink 2400 baud modem, Mac to modem cable & Bitcom communications software. SmartLink 2400SM includes the same AND MPU Class 5 error correction built right into the modem.

SmartLink 2400S...$139/2400M...$245.

Micron & NEC
Eight-bit color is now easily affordable and readily available for your viewing pleasure in the form of the Micron Xceed Color Card pictured here with the NEC MacSync 14" color monitor, another cost-effective alternative to more expensive run of the mill color monitors.

Micron Xceed...$385/NEC MacSync$498.

Overnight Delivery $3 Dollars

8AM-1AM EST
8am-1am EST, 5am-10pm PST, M-F 9am-9pm EST, 6am-6pm PST, S&S

Design a MacZone Drive

Let the Zone put together your perfect drive. Pick a drive. Pick a platinum or black case, or internal kit. We'll put it together, test it and guarantee it with the Zoner Loaner Program, and a 1 or 2 year drive warranty and send it out to you today for delivery tomorrow!

MacZone Hard Disk Cases & Internal Mounting Brackets

Black or Platinum Cases for Full Height Drives $220
for Half Height Drives $178
for Syquest Drives $178
Internal Mounting Brackets for 3.5" Drives $39
for 5.25" Drives $49

Syquest
44 Mb Removable Drive $625
44 Mb Cartridges $89
3.5" Half Height Drives
CDC CDC 135 Mb $1795
CDC 172 Mb $1950
Connor Connor 100 Mb $788
Quantum Quantum 40 Mb $410
Quantum 80 Mb $648
Quantum 160 Mb $788

Seagate
Seagate 20 Mb $315
Seagate 30 Mb $365
Seagate 45 Mb $398
Seagate 60 Mb $530
Seagate 80 Mb $598
5.25" Half Height Drives
CDC CDC 170 Mb $1595
Micropolis Micropolis 150 Mb $1148
Micropolis 330 Mb $1695
MiniScript MiniScript 150 Mb $1128
Seagate Seagate 60 Mb $460
Seagate 80 Mb $495
5.25" Full Height Drives
CDC CDC 150 Mb $1398
CDC 330 Mb $1645
CDC 600 Mb $2885
Micropolis Micropolis 675 Mb $2938

Turbo Bundle Turbo Cache Turbo Optimizer Turbo Back Turbo Bundle Turbo Bundle Turbo Bundle $120
Power Up Address Book w/Leather Notebook Holder Address Book Fast Forms Fast Forms Fast Forms Preferred Publishers Database Exposure Exposure Vantage Pro Plus Software Wall Street Investor Promethean MacKnowledge
Promethean MacKnowledge

ProVUE
Panorama 1.1 $199
Quark XPress 2.12 $455
QuarkXtras $55
QuarkStyle $169
Sabastian Software Image Grabber 2.0 $31
Safari Bulk Mailer 3.23 $77
Silicon Beach Software Digital Darkroom $248
Super 3D $375
Super Card $128
Super Paint 2.0 $124
SmeltersBarnes Prototyper 2.1 $185
Smith Micro Software QuickLink $48
Softview (MacIntax '89)
MacIntax Federal CALL
MacIntax Professional CALL
California Supplement CALL
New York Supplement CALL
Software Ventures Microphone 1.5 $109
Microphone II $215
Solutions Backfax $124
Curator $72
SmartScript & Clipper $45
Super Glue III $61
Bright Star Technology
Hyper Animator 1.5 .......................... 98
Interface ......................................... 254
Birdseed
PostScript Plus .................................. 34
Printer Shop ................................. 155
Case
DimPage 2.0 ..................................... 549
Cassady & Greene
AM. Single User ............................... 179
AME 1-5 Users ................................. 584
AME 10-1 Users ............................... 978
QuickDEX ........................................ 31
BigThesaurus ................................. $58.
Deeba
Desk Accessory thesaurus wš
1,000,000+ root words,
$1,000,000+ possible synonyms,
& unlimited cross-reference.
The most advanced
desk reference ever!
Better than a thesaurus,
better than an encyclopedia,
unclo cluttered 
with confusing instructions.
Easiest to use!
No sales tax!

CE Software
Calendar Maker 3 ............................... 31
DeskTop 4.0 ................................. 166
In/Out 8.0 (User) ............................. 186
In/Out 1-10 User ............................. 186
MockPackage Plus ......................... 21
QuickKeys 1.2 ................................. 64
QuickMax 1-5 Users ......................... 169
QuickMax 10 Users ......................... 255
Central Point Software
Coffee Break 1.2 .............................. 20
PC Tools Deluxe .............................. 46
Charg Labs
C.A.S. ............................................. 228
Check Mark Software
Cash Ledger ..................................... 115
MillLeager 1.3 ................................. 235
Payroll ........................................... 175
Claris
Claris Cad ......................................... 598
FileMaker II ...................................... 228
MacDraw II ....................................... 268
MacPaint 2.0 .................................... 97
MacProject II 2.0 ......................... 370
MacWrite II ....................................... 89
TintuKhu 3.0 (30 Pack) ........ 1315
TintuKhu Remote ......................... 128
Traffic Watch ................................. 128
Discoration
Disk Look 108 .................................. 107
Disk Basic ........................................ 34
Disk Fox ........................................ 49
DiskSuite ........................................ 44
Emerald City Software
SmartArt 1, 2, or 3 .......................... 84
Type Align ....................................... 21
Generic Software
Generic CAOD Level 1 ...................... 84

Hydes
Smartcom II ..................................... 85
Help Software
Desktop Help for Excel ....................... 52
High Performance Systems
STEL A............................................. 385
HIC Software
Vex ............................................... 52
ICOM Simulations
HyperTMT ....................................... 58
On Cue 1.3 ...................................... 35
TMOM 2.6-2 ................................. 89
Individual Software
101 Macros for Excel ....................... 36
101 Scripts & Buttons for HyperCard ..... 36
Inform
WinGraFX ....................................... 248
Infosphere ...................................... 175
Innovative Data Design
Dreams ......................................... 268
MacDrath 1.2 .................................. 144
Insight Development
MacPrint 1.1 ................................... 75
Insigina Solutions
Soft PC ........................................... 24
Intui
QuickDraw ....................................... 245
IPT ............................................... 265
PSN ............................................... 119
Jamb Software
Smart Alarm Clock Single User .......... 48
Kotl Marsh
MacSafe .......................................... 87
Light Weight .................................. 87
QuickLook ...................................... 56

Kini Software
Kinevelopes .................................. 38
Layered
At Once ....................................... 265
Insight Export Accounting ........................ 38
Accounts Payable ................................ 39
Accounts Receivable .......................... 39
General Ledger ............................... 39
General Payroll .................................. 39
General Time Billing .......................... 39
Inventory ........................................ 39
Letterset
ImageStudio .................................... 274
LetterStudio .................................... 274
ReadyGetGo 4.5 .............................. 274
Lexportix U.S.A. Inc. ........................ 114
Mac Project II/3.2 I .......................... 114
Loop Software
Picture Book ................................. 39
Mac Master
MacExpert + .................................... 28
MacMaster
MicroMacro Director ......................... 488
MicroMacro Accelerator ..................... 117
MicroMacro CD-ROM ........................ 49
VideoWorks II .................................. 172
Super Card ...................................... $79.

Kinesis
Silicon Beach
HyperCard enhancement.
SuperTalk language includes
additional commands &
functions to industry standard
HyperTalk.

MacZone Page 2 of 6

Business Hours
Our phone lines are open for orders:
Mon - Fri: 8am to 9pm Eastern Time
Sat & Sun: 9am to 6pm Eastern Time
Customer Service & Tech Support:
Mon - Fri: 8am to 9pm Pacific Time
10am to 9pm Eastern Time

Ordering Information
We accept VISA, MASTERCARD, AMERICAN EXPRESS &
DISCOVER Card.

International Orders
We accept VISA, MASTERCARD, AMERICAN EXPRESS &
DISCOVER Card.

Warranties & Guarantees
All products are covered by a 90 day limited warranty...
1-800-248-0800

Our savings are huge and our advice is free.

Dove Computer
When speed is what you need, this external CPU caching device allows the internal instruction cache to be turned on or off. Equipped with a 32k PALs, internal instruction bank of static RAM, a TAG chip, and control.

SuperMac Software
Disk FL 1.5 .... 58
Network Disk FL 225
PixelPaint 2.0 .... 224
PixelPaint Professional 235
Symbian 2.0 83
SuperLaserScan 1-User 85
SuperLaserScan 5-User 289
SuperLaserScan 5.0 58
Survivor Software
Invoice II 52
MacMoney 3.0 59
Symantec
Just Enough Pascal 49
LightSpeed Pascal 2.0 92
More II 249
S.A.M. 65
S.U.M. II 94
Think C 4.0 165

White Knight 11.0 .... $99.
FreeSoft ( Formerly Red Ryder) now an even better solution to your telecommunication needs. send in the White Knight. Also includes Okylo 1.0.

Symmetry
Acta Advantage 64
HyperDAC 1.2 49
Key Plan 245
Picture & Word Retriever 54
Synergy Software
Kaleidagraph 2.0 145
VersaTerm 4.0 88
VersaTerm Pro 2.20 174
Synex
MacEnvelope Plus 179
T/Maker
Click Art Business Images 29
EPS Illustrations 74
WriteNow 2.0 CALL
Tactical Software
ArtClip 1st Ed 49
ArtClip 2nd Ed 68
ArtFonts X2 52
ArtFonts Pack 129
FontShare 129
Icon享 49
Sound Chips 1 or 2 ...... each 50.

TGS Systems
ProGraph 126
Timeworks
HyperWorks Organizer 59
Publish 238

TML Systems
TML Pascal II 3.0 56
... with MPW 3.0 108
TML Source Code Library 99

TOPS
InBox 3.0 CALL
TOPS DOS Version 99
TOPS Mac Version 139
TOPS NetPrint 2.0 117

Telecom Graphics
EPS Color Clip Art (by Subject) Birds, Domestic Animals 98
Fish 98

Layered
The next generation in business accounting software. So easy to learn, many business managers will be completely at ease doing their own accounting. So fast & flexible, professional accounting and bookkeeping firms can now use the Mac for handling numerous companies & volume data.

Dove
SCI- Port Adapter 109
MacScan Upgrade 524 (512k to 1Mb) 189
524 (128k to 1Mb) 192
524 (64k & 128k) 235
548 (128k to 2Mb) 432
548 (128k to 2Mb) 415
548 (512k w/500) 475
Marathon 200 SE Accelerators M5E1 (68020 Board) 419
M5E2 (w/1Mb) 715
M5E3 (w/8881 chip) 599
M5E4 (68030 Accelerator w/68811 & 1Mb) 895
Marathon 300 SE Accelerators 32MHz - Mac II 965
32MHz - Mac IX 975
32MHz - SE 305 995
Irwin
Excelsior XI 20 MHz CALL
Excelsior XI 25 MHz CALL
Macintosh
One MB SIMM 49
250k SIMM Module CALL

Motorola
Math Co-Processors 68882 - 16MHz 289
68882 - 25MHz 299
68882 - 33MHz 655
68882 - 40MHz 748

Orchid Technology
Mac Spark II 249

Bulk Mailer ... $77
Bulk Mailer Plus ... $189
Satori Software
Vers. 3.23 Powerful mail list management, Zip & alpha sorts, etc.

Total Systems
Gemini 220/320 Accelerators 68020 SE - 16MHz 297
68020 SE - 25MHz 1118
68300 SE - 16MHz 976
68300 SE - 25MHz 1118
68300 SE - 33MHz 1118
GenUp 149

Desktop & REMOVABLES
Everex - EMAC Drives 60 Mb Tape Backup 658
150 Mb Tape Backup 1199
EMAC 60Mb/60Ladi Deluxe 1495.
PCLsystrran 4725
PLI (Peripherial Land, Inc.) Infinity 40 Turbo 998
Infinity 40/80 Turbo CALL
Infinity Removable Optical Disk Drive 600 Mb 3998

TrueCapture 324

Vocal CD - 3 Portable
CD ROM Drive 495.

Quuest
44 Mb Cartridges 89

MONITORS & CARDS
Micron - Color Video Cards
Aardvark Color Cards 10-78 - 8 Bit Mac II 598.
6-40 - 8 Bit Mac II 358
NEC Monitors
MacSync 14" Color 555
Multicolor 20" Color 2695.

Rastertops
ClearVue SE 19" Monitor 1655.
ColorBoards
10x for Mac II Series CALL
10x for Mac 6570 SE CAL
242 (2 Mb Color) 3995

Sony Color Monitors
14" 1300 116 HSC Multiscan 798.
16" HSC Multiscan 2498.
19" HSC Multiscan 3188.

SCANNERS
Abaton
Scanner 3003/S (6 Bit) 1465
Scanner 3003/S (8 Bit) 1168.

Logitech
Scan Man 320.

ThunderScan
Lightning Scan 368
ThunderScan 5.0 179.
Paracomp

Silicon Beach
Award winning Super Paint combines Paint and Draw in one easy to use power graphics program. Includes features like AutoTrace to automatically convert Paint graphics into Draw objects, customizable Airbrush, and a freeware tool to easily sketch editable Bezier curves.

Swivel 3D

Super Paint

SuperPaint

CE Software
Runs in background on any network. Check in, check out, leave word where you’ll be & when you’re back. Notifies you when someone gets in. Automatically signs you in when you return. Your Mac & your put start-up down, and passwords so you won’t be checked "out without permission.

Phone the Zone-
8 a.m.-1 a.m., E.S.T.
Fax the Zone-
24 hours a day
include credit card, expiration date, daytime phone -
(206) 881-3421

1-800-248-0800

INTL: (206) 883-1975 CANADA: 800-248-3044 FAX (206) 881-3421

Our savings are huge and our advice is free.
You have no experience.

program (FIVE mouse
24-bit color drawing...the Kingdom might
age, theKingdom might
SuperHandOn
Discovery Software
Arkamoon

PlayMaker Football ... $32.
Bravestund
Pick your squad design plays on the chart wizard, call them
in game situation vs. friends or the Mac. Excellent ani-
inated play screen.

Electronic Arts
Band's Tale ... 31
ChisMaster 2160 ... 32
Chuck Yeager's
Advanced Flight Trainer ... 31
Might & Magic II ...
Might & Magic II
Panzer Battles ... 28
Patton Vs Rommel ... 14
InLine Design
Bomber ... 25
Lucastum
Pipe Dream ... 28
Micro League Sports
Micro League Baseball II ... 35
MicroProse
Pinball ... 32
Microsoft
Flight Simulator 1.02 ... 32
Miles Competing
Foot's Errante ... 31
Harrier Strike Mission II ... 31
Puzzle Gallery ... 26
Mindscap
Aussie Poker Poker ... 19
Balance Of Power 1990 ... 30
Colony ... 29
Crossword Magic ... 29
Dea Vu ... 29
Dea Vu II ... 29
Gaussian ... 29
ShakeNough ... 29
Trust & Betrayal ... 29
Uninvited ... 29
Sprint System
AutoDuel ... 23
Modbus ... 23
Ogre ... 16
Space Rogue ... 30
Premier Software
NetTrek ... 34
Strategic Conquest 2.0 ... 34
Shodan
Lspechain ... 29
Silicon Beach Software
Apache Strike ... 24
Beyond Dark Castle ... 24
Dark Castle ... 22
Wiscon
Warcraft ... 35

Bullseye Software
Ferrari Grand Prix ... 32
P-G Mustang Flight Simulator ... 31
Cassidy & Greene
Crystal Quest 2.2 ... 25
edWriter Editor ... 49
Centro
Casino Master B & W ... 44
Casino Master Color ... 49
Galo East
Super HandOn
Discovery Software
Arkamoon

Software Tools
Cribbage King/Gin King ... 38
Hunt For Red October ... 31
Life And Death ... 31
Sphere
Falcon 2.0 ... 30
Gate 1.4 ... 26
PT-109 ... 26
Salisbury Royale ... 19
Salisbury Royale (Color) ... 19
Tetris (Black & White) ... 19
Tetris (Color) ... 22
Spinmaker
Sangor IV ... 26
Strategic Simulations, Inc.
A&D Pool Of Radiance ... 32
Strategic Studies Group
Hall Of Montezuma ... 30
Toren Sixy
Sands Of Fire ... 34
Warwick ... 26
Tyoyo, Inc.
Nemesis Go Master ... 47
Nemesis Joseko Tutor ... 28
XOR Corporation
Lunar Rescue ... 33
Mac Racquetball ... 36
MacCourses ... 19
MacGolf ... 32
MacGulf Classic ... 52
NFL Challenge ... 49
Pic Challenge ... 26
Road Racer ... 38
Taskmaker ... 28

Educational

Bible Research Systems
(KJV, NIV, NKJV, RSV) ... 164
Broderbund
Alphabet Blocks ... 29
Calculus ... 58
Geometry ... 58
Physics ... 58
Type ... 18
Davidson & Associates
Math Blaster ... 26

Penton Overseas
VocalzLearn/ice
French ... Level 1 or 2 ... 29
German ... Level 1 or 2 ... 29
Italian ... Level 1 or 2 ... 29
Japanese ... Level 1 or 2 ... 29
Spanish ... Level 1 or 2 ... 29

1-800-248-0800
Our savings are huge and our advice is free.

Preschool Pack ... $41

Nordic (MacKids)
6 color educational games, including: AlphaWorks, Bar
Math, Concentration, Connect The Dots, Counting 1, 2, &
ShapeWorks.

Personal Training Systems
Learn88 Training Series
A1 Beginning Spanish ... 36
A2 Int. Illustrator ... 36
A3 Creating Special FX ... 36
A4 Prec. Drawing Tech ... 36
MacTeach Training Series - The Basics
B1 Plus & SE w/HD Office ... 35
B2 Plus & SE w/HD Office ... 35
B3 Q&F w/HD Office ... 35
B4 Beyond the Basics ... 35
Learn Freehand Training Ser.
FH1 Beginning Freehand ... 35
FH2 Int. Freehand ... 35
FH3 Creating Special FX ... 35
FH4 Prec. Drawing Tech ... 35
Learn FileMaker Trainer Ser.
FM1 Beginning FileMaker ... 35
FM2 Int. FileMaker ... 35
FM3 Advanced FileMaker ... 35
FM4 Tips & Techniques ... 35
HyperEasy Training Series
H1 Using HyperCard ... 36
H2 Creating or Stacks ... 36
H3 Basic Scripting ... 36
H4 Advanced Scripting ... 36

AegonPersuasion Training
LP1 Beg. Persuasion ... 36
LP2 Int. Persuasion ... 36
LP3 Creating Templates ... 36
LP4 Creating Advertising
MasterWorks Training Series
M1 Database & Form Let. ... 36
M2 Advanced Database ... 36
M3 Spreadsheets ... 36
M4 Word Processing
Page/Text/Training Series
P1 Beginning PageMaker ... 35
P2 Int. PageMaker ... 35
P3 Tips & Techniques ... 35
P4 Advanced Features ... 35

LoweWord Training Series
V1 Beginning Level ... 35
V2 Intermediate Level ... 35
V3 Advanced Level ... 35
V4 Additional Features ... 35

Exoterte Training Series
X1.1 MasterCard Training ... 36
X2.1 Core Training ... 36
X3.1 Advanced Training ... 36
X4.1 Designing Graphs ... 36
X5.1 Building Databases ... 36
X6.1 Beginning Macros ... 36
X7.1 Advanced Macros ... 36
X8.1 Macros for Excel 2.2 ... 36
X9.1 What's New for 2.2 ... 36

Simon & Schuster
Typing Tutor IV ... 28
Software Tools
Mavis Beacon Typing ... 28
Typing Made Easy ... 28
True Basic
Algebra ... 33
Artificial Intelligence ... 33
Calculus ... 33
Discrete Mathematics ... 33

SuperMac Software
The popular precision 24-bit color drawing program (FIVE mouse
24-bit color drawing...the Kingdom might
age, theKingdom might
SuperHandOn
Discovery Software
Arkamoon

Canvas 2.1.1

CALL

Taskmaker...... $28.

On the face of it, you might think that the Kingdom is
no longer. You must re-
test order and prosper-
ity to the Kingdom, but
you have no experience.
To gain the tools and
with his guide, you can
whelming and your cour-
age, the Kingdom might be saved!

SuperMac Software
The popular precision 24-bit color drawing program (FIVE mouse
24-bit color drawing...the Kingdom might
age, theKingdom might
SuperHandOn
Discovery Software
Arkamoon

Canvas 2.1.1

CALL

Taskmaker...... $28.

On the face of it, you might think that the Kingdom is
no longer. You must re-
test order and prosper-
ity to the Kingdom, but
you have no experience.
To gain the tools and
with his guide, you can
whelming and your cour-
age, the Kingdom might be saved!

SuperMac Software
The popular precision 24-bit color drawing program (FIVE mouse
24-bit color drawing...the Kingdom might
age, theKingdom might
SuperHandOn
Discovery Software
Arkamoon

Canvas 2.1.1

CALL

Taskmaker...... $28.

On the face of it, you might think that the Kingdom is
no longer. You must re-
test order and prosper-
ity to the Kingdom, but
you have no experience.
To gain the tools and
with his guide, you can
whelming and your cour-
age, the Kingdom might be saved!
Pre-Calculus/Trig .................................. 33
Probability Theory .................................. 33
Trust STAT .................................................. 33
True Basic Combo Pack (includes Course/Work Book) ..... 39
Algebra Combo ............................................. 39
Calculus Combo ............................................. 39
Pre-Calculus Combo ....................................... 39

MUSIC
Art Nova ..................................................... 68
Bagas Predictive ............................................. 68
Super Studio Session ...................................... 68
Studio Session .............................................. 44
Brass, Country, Heavy Metal.................. each 13
Saxophones, Sound Effects, or String Quarte. .... each 13

Pre-Composition

MacDirector ........................................... $79.

Dustshield
A fine outlet power control center/surge protector. Fits under the Mac and controls all your peripherals at your fingertips.

Retrostar
A Lasting Impression
A polish catching resume template fully formatted in Microsoft Word. Quick and easy to use - just highlight the template and replace with your own information. Manual provides helpful writing tips. Effective for students to CEO's. Cover Letter edition also available. Four mouse rating.

RésumExpert ........................................... CALL

Portofolio Systems
The Instant Address Book™. Fast on-line personal database that elegantly prints double-sided address pages for Flotax and most organizer systems. Includes "no-fuss" letteraper and powerful database functions like find, sort, select, delete, import, export, merge, and much more.

Dynaex ................................................. $96.

Personal Training Systems
Mastering Mac software CAN be an enjoyable experience. More to listen to lectures, going to classes, or struggling through manuals. These interactive tutorials are just like having a private trainer at your side who talks you through the software step by step.

Personal Training .............................. see listings

Northedge Software
This 1986 Ediny Award winner (Best New Professional Financial Package) keeps track of all billable time, and business expenses like telephone time, copier use, supplies, postage, etc. A professional quality package for professional business people.

Timeslip III ............................................. $168.

Dantz Development
New version. Works just like a filing cabinet, handling all the work of storing, retrieving, backing up files. Retrospect manages everything for you. Can be programmed to automatically archive and back up whenever you want. Compatible with tape, disk cartridge drives, networked and TOSIP file servers, and more.

Retrospector 1.1 ........................................ $154.

ACCESSORIES
Abaton
Pro Point ADB (SE & II) .................. 79
ACCO
Disk Page (2 Pages) .................. 6

Addison Wesley
Inside Macintosh, Vol. 1: 21
Inside Macintosh, Vol. 2: 21
Inside Macintosh, Vol. 3: 21
Inside Macintosh, Vol. 4: 21
Inside Macintosh, Vol. 5: 23
Inside Macintosh, X-Ref: 9
Macintosh Programming
Secrets .............................................. 19.

Advanced Gravis
MouseStick ............................................. 64.
MouseStick (ADB) ...................................... 79.

Apple
HyperCard 1.2 ........................................... 39.
MacTermenh ............................................. 69.

American Power Conversions
UPS 1100E ................................. $269.

Apple
Apple HyperCard .............. each 13.
Apple HyperCard .............................. each 22.

Apple

Datashield
Hyper Dialer ............................................. 24.
Mac 101 Keyboard .............. 135.

Drugshield
MacDesktop ...................... 79.

Ergon
Mac enthusiast .......................... 63.
Mouse Cleaner 360° ............................. 9.

Fujitsu
Rainbow Card DS .................. each 13.
Double Sided - 10 Pack ........ each 12.
Double Sided - Bulk (Units of 50) each 762.
High Density - 10 Pack ........ each 22.
High Density - Bulk (Units of 50) each 2,10.

Fujitsu
600x0 Disk Drive ............. 149.

Golden Raspberries
4 Color Ribbon ...................... 7.
Black Ribbon .......................... 3.

Goldstein & Blair
Macintosh Bible ...................... 23.

Help Software Inc.
Desktop HTML Help for Excel . 51.

Kelimar Designs
Teakwood Disk File Cabinet
45 Disks ........ each 14.
90 Disks ........................ each 21.
135 Disks ........................ each 29.

Kensington Micros
Apple Security Cable Kit ....... 34.
Desk Cover Mac SE ............. each 8.
Mac II Stand w/Extension Cables ......... 64.
Super Base ...................... 39.
System Saver Mac Fan ......... 64.
Tilt Swivel ...................... 25.
Turbo Mouse ........................ 108.
Universal Printer Stand ....... 17.

Keytronics Keyboards
Mac Pro KB-105 ADB ........ 125.

Krat
QuickStick ADB .......................... 49.
QuickStick .......................... 49.

Kurtis To ADB Adapters
8.5" x 11" Stylus .............. each 25.
12" x 12" Stylus ................ each 38.
12" x 17" Stylus ................ each 62.

Cordless 4 Button Cursor .... each 24.

Make the Zone your one stop Mac shop for software, hardware, accessories & peripherals.

1-800-248-0800

Our savings are huge and our advice is free.
The Complete Guide to Word Processing

The Structuring of Words

Before you sit down to write, you often have to collect your thoughts. You come up with new ideas; organize them; and then, no doubt, reorganize them again and again. Although a word processor is good for writing down your ideas, it’s not so great for organizing them. Enter, the outliner. Our first six here are stand-alone, the last three integrated with a word processor.

Acta Advantage 1.01

Acta Advantage is available as both a DA and an application. It includes the usual features such as sorting, multiple-font control, multiple labeling schemes, smart quotes, accepting PICT II and lesser graphics, and a Find feature. It is structured hierarchically—with levels designated as mother, daughter, sister, and aunt—and you can create each level with one keystroke. Acta lets you extend headlines to word-wrapped paragraphs, so you can gradually develop an outline into a whole document. Its smart Paste feature lets you bring information in from spreadsheets or other applications via the Clipboard. Requires Mac 512KE or later.

Pros:
- Easy access through DA or double-clickable application
- Can open multiple documents
- Exports to many programs, including MacWrite, Works, and RTF

Cons:
- Lack of advanced text-formatting features

Inspiration 2.0

This visual outliner lets you map your ideas graphically and then produce a standard outline for printing. It doubles as a flowcharting and systems-analysis tool. You can represent different ideas by different shapes and can link idea blocks by selecting and dragging them. You can select symbols via palette, menu, or keyboard commands. Symbol shapes include basics (such as ovals), flowchart shapes, business symbols, and designer shapes (light bulbs, pushpins, and more). Requires Mac 512KE, one 800K drive, and System 4.2 or later.

Pros:
- Visual environment
- Easy to use
- Lets you move freely between outline and graphics

Cons:
- Multiple links to the same item appear in outline only once
- Grid-based graphic layout
- Lack of control over path of connecting lines

MORE II

A powerful outlining and organizational program, MORE II came from the likes of PC ThinkTank and MORE 1.0. Features include gathering marked headlines, calendar generation, sorting, numeric calculations, and even phone dialing. Unlike most other dedicated outliners, it includes headers and footers and can generate a table of contents from the outline. (Word processors with outliners also have these features.) Its unique Library function lets you keep paint graphics, draw images, outline formats, and rules in separate libraries.

Pros:
- Rules feature lets you set global or local rules for formatting options, such as type style, tabs, and labeling
- Can easily convert outlines to bulleted charts or tree structures

Cons:
- Severely limited compared with either a graphics-based outliner such as Inspiration or heavier-duty programs such as Acta and Outlook
- Lacks any text-formatting features
- Prints only in Geneva 12 or Helvetica 12.

More

Calliope Plus 2.1

Calliope uses a series of labeled light bulbs and arrows to represent ideas and the links between them. Each light bulb can have a simple nonscrolling word-processing window attached to it. Ideas can be connected and reconnected as needed. Requires Mac 512KE or later.

Pros:
- Can print or export text blocks to a disk file in ASCII format, ordered according to sequence defined by graphic view

Cons:
- Severely limited compared with either a graphics-based outliner such as Inspiration or heavier-duty programs such as Acta and Outlook
- Lacks any text-formatting features
- Prints only in Geneva 12 or Helvetica 12.
Outlook is a DA with a clean interface and good speed. Its bundled utilities (it's part of the SideKick package) make it a good value. Writers, scientists, and journalists can bang out idea after idea without thinking about anything except pressing Return to start a new heading. The SideKick package also includes an Apple Notepad replacement, a terminal-emulation DA, a spreadsheet DA, an area-code-lookup DA, a phone logger, and several other items. Requires Mac 512KE or later.

**Pros:** Easy DA access. Fast and easy to use. Handles multiple open outlines.

**Cons:** Exports only in text. Headings don't word-wrap. Lacks the formatting features of more-advanced outlines.

---

**Think 'n Time 1.1**

Think 'n Time is a horizontal outliner with text, date, and calculation capabilities that let it double as a project manager. The Text mode provides a standard text editor much like miniWRITER or MockWrite. Enter numeric information into a Think 'n Time document, and the outliner is transformed into a calculator that can sum budgets, track estimates, or compare new-car prices. Requires Mac 512KE.

**Pros:** Only outliner besides MORE II that does calculations. Good for developing schedules. Convenient hierarchical menu.

**Cons:** Only single fonts can be used in a window. Only other control is for line breaks.

---

**Word 4.0**

As much as some people may hate to admit it, Word 4.0 is one of the best word processors available for the Mac — with the exception of its outliner. It has the worst outliner of any reviewed here. When you enter its Outlining mode, the screen shifts, taking on a very different appearance.

**Pros:** Workable system that provides a necessary organizational tool within Word's larger framework.

**Cons:** Stodgy and limited. Cryptic icons. Sections don't renumber automatically.

---

Daniel Rasmus and Laura Johnson
a graphic object directly in the text by going into the Graphics mode and using the graphics tools. While in the Graphics mode, you can paste a graphic into your text as an object graphic and have the text flow through it or wrap around it. While in the Text mode, you can paste an object graphic into your text and it will become a character graphic, which acts just like a text character.

Feature for feature, however, FullWrite Professional comes closer to the capabilities of dedicated page-layout programs than does any other Mac word processor. FullWrite offers adjustable kerning, leading, and guttering. It can flow text and columns around graphics, and it includes an integrated drawing module. Again, its downfall so far has been its restriction to big Macs, its slow speed, and its erratic aversion to large files.

For real desktop publishing, don’t kid yourself into thinking you can get by without a page-layout program. Why do you think word processors such as Nisus include filters you can install into PageMaker to enable you to place your documents into it?

The Integrated Document

The word-processing module in Microsoft Works 2.0 occupies a unique niche in the Mac writing world. It is one of five modules in an integrated package. The others are spreadsheet, database, telecommunications, and drawing modules. Even on a 1-megabyte Mac Plus running without MultiFinder, you not only can draw directly in a document (rather than draw in a separate program and then cut and paste), but you can also quickly cut and paste spreadsheet or database information. In addition, while on-line in the telecommunications module, you can use a word-processing window to write a message and then upload it. When you capture data, it automatically becomes a word-processing document. So if you routinely do any such tasks or would if you had Works, it may be just what you need.

Unfortunately, the word processor is mediocre, much more like Write than Word. It can’t handle multiple columns. You have to resort to a draw procedure in which you create columns as text objects. To create a header or footer, not only must you type it into a small box on the Page Setup screen but you must also regress to typing commands that would be primitive even for a DOS word processor, such as &R for flush right or &P and &D to include the page number and date. In addition, the word processor lacks many of Word’s most useful keyboard commands as well as its footnoting capability and

---

**Table 1a: Word-Processor Performance Benchmarks: Mac SE**

<table>
<thead>
<tr>
<th>Word Processor</th>
<th>Open Document</th>
<th>Global Font Change</th>
<th>Search &amp; Replace</th>
</tr>
</thead>
<tbody>
<tr>
<td>FullWrite 1.1</td>
<td>0:49</td>
<td>1:31</td>
<td>5:15</td>
</tr>
<tr>
<td>MacWrite 1.1</td>
<td>0:24</td>
<td>1:24</td>
<td>5:04</td>
</tr>
<tr>
<td>MSWord 4.0</td>
<td>0:14</td>
<td>1:40</td>
<td>3:11</td>
</tr>
<tr>
<td>MSWorks 2.0</td>
<td>1:22</td>
<td>2:57</td>
<td>3:37</td>
</tr>
<tr>
<td>MSWrite 1.0</td>
<td>0:09</td>
<td>1:19</td>
<td>0:59</td>
</tr>
<tr>
<td>MindWrite 2.1</td>
<td>0:44</td>
<td>2:17</td>
<td>0:43</td>
</tr>
<tr>
<td>Nisus 2.0</td>
<td>1:04</td>
<td>2:54</td>
<td>2:29</td>
</tr>
<tr>
<td>WordMaker 1.0</td>
<td>1:39</td>
<td>2:54</td>
<td>2:29</td>
</tr>
<tr>
<td>WordPerfect 1.0</td>
<td>0:54</td>
<td>2:54</td>
<td>2:29</td>
</tr>
<tr>
<td>WriteNow 2.0</td>
<td>0:37</td>
<td>2:54</td>
<td>2:29</td>
</tr>
</tbody>
</table>

These ten word processors were tested on a Mac SE to see how fast they could open and change a 122-page document from several font sizes and formats of Geneva to New York.
its style sheets. There is no writing task for which the Works word processor alone is the best choice, but if you want a cheap and easy route to creating documents with charts, drawings, database records, and spreadsheet numbers, the Works package is the only game in town.

**Connecting with DOS and Mail**

Despite many users’ desire to have a Mac-based universe, some people still have to deal with the task of working on a document on both PCs and Macs. If you find yourself banging your head in frustration when translating and reformatting DOS files to Mac files (and vice versa), then WordPerfect is the program for you. Although WordPerfect for the Macintosh is a half-hearted transformation from the PC world and has a clumsy, un-Mac-like interface, Mac WordPerfect files are universally exchangeable, formatting intact, with almost every type of computer system. This can make all the difference for corporations that support ten different systems at the same time.

When you’re using word processing within a work-group setting, in which more-complex interchange is possible among people performing different functions, Word has a definite advantage. Word’s File menu has commands that let you send the document you’re working on through the Microsoft Mail server. When you select Send Mail, Microsoft Mail opens; your document title is already in the subject area, and the document is automatically included. All you do is write a message. This first example of interapplication communication saves only a few steps, but along with the further integration of Microsoft Mail with Excel, it’s a glimpse of the future.

**Unending Search**

Word processors have the ability to evoke passionate feelings in their users. This fact has led to a quest for the one great word processor that serves all the writing and document-preparation needs of every user better than any other program. Perhaps that dream will be fulfilled one day — by Word 10 or Nisus 4 or WriteNow 7.

But for the moment, Mac users who want the best tool for every possible writing job will have to stack their hard disks with a half a dozen programs and become nimble at using MultiFinder and handling file transfers. It’s an imperfect world after all.

Charles Spezzano writes about psychology and personal computers. He is the author of two books and numerous articles on IBM and Macintosh hardware and software.

---

**Table 1b: Word-Processor Performance Benchmarks: Mac IICx**

<table>
<thead>
<tr>
<th></th>
<th>Open document</th>
<th>Global font change</th>
<th>Search &amp; replace</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time in minutes:seconds</td>
<td>Time in minutes:seconds</td>
<td>Time in minutes:seconds</td>
</tr>
<tr>
<td>FullWrite 1.1</td>
<td>0:15</td>
<td>0:45</td>
<td>1:30</td>
</tr>
<tr>
<td>MacWrite II 1.1</td>
<td>0:26</td>
<td>0:39</td>
<td>1:44</td>
</tr>
<tr>
<td>MSWord 4.6</td>
<td>0:11</td>
<td>0:39</td>
<td>1:21</td>
</tr>
<tr>
<td>MSWorks 2.00a</td>
<td>0:26</td>
<td>0:39</td>
<td>1:21</td>
</tr>
<tr>
<td>MSWrite 1.0</td>
<td>0:26</td>
<td>0:39</td>
<td>1:21</td>
</tr>
<tr>
<td>MindWrite 2.1</td>
<td>0:26</td>
<td>0:39</td>
<td>1:21</td>
</tr>
<tr>
<td>Nisus 2.0</td>
<td>0:26</td>
<td>0:39</td>
<td>1:21</td>
</tr>
<tr>
<td>WordPerfect 1.8.3</td>
<td>0:26</td>
<td>0:39</td>
<td>1:21</td>
</tr>
<tr>
<td>WriteNow 2.0</td>
<td>0:26</td>
<td>0:39</td>
<td>1:21</td>
</tr>
</tbody>
</table>

A Mac IICx was used for the second suite of tests: opening the document, changing the font from Geneva to New York, and replacing 520 occurrences of the word network to not work.
**Word-Processor Report Cards**

In the world of word processors, as in other application areas, mouse ratings don’t tell the whole story. You should weigh ratings against target features to make the best buying decision.

**FullWrite Professional**

1.1

FullWrite Professional combines outlining and word processing with page-layout and drawing features. It includes an integrated drawing module and has the most features of any Mac word processor, but execution can be slow and clumsy. Its memory and speed requirements, combined with its complexities, make this one for the pros.

- **Pros:** Can flow text and columns around graphics. Mixed column formats on the same page. Posted note and bibliography entries. Adjustable kerning, leading, and guttering.
- **Cons:** Positioning a box of text or a graphic object on a page is awkward. To perform at acceptable speeds and do useful work, requires at least a Macintosh II and more than 2 megabytes of memory but is still one of the slowest word processors on the market.

- **Requires:** Mac Plus and two 800K drives or a hard-disk drive; 2 megabytes to use spelling checker.
- **List Price:** $395.
- **Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502; (213) 329-8000.

**MacWrite II**

1.1

MacWrite has an excellent interface and a mail-merge function. It supports translation between 24 Mac- and IBM-compatible word-processing applications; optional MacLink/Plus Translators add ten more.

- **Pros:** Powerful search-and-replace function. Elegant multiple-column handling. Mail-merge setup is the easiest of all word-processing programs.
- **Cons:** Doesn’t allow multiple headers and footers or condensed or expanded text styles. No way to change all similarly formatted paragraphs in one step. Spelling checker is weak.

- **Requires:** Mac Plus, two 800K drives or a hard-disk drive, and System 6.0 or later.
- **List Price:** $249.
- **Claris Corp., 5201 Patrick Henry Drive, P.O. Box 58169, Santa Clara, CA 95052-8168; (408) 987-7000.

**Microsoft Word 4.0**

4.0

A versatile heavyweight word processor with the most usable features for the Mac, this is the only word processor with true style sheets that export formatting to popular page-layout programs. It’s also the only one with a Table feature — an important consideration in certain disciplines.

- **Pros:** Editable page view. Multiple on-screen columns. Full array of keyboard command shortcuts. Menu items can be rearranged and easily assigned keyboard equivalents. Has glossaries. Spreadsheet-like Table feature. Hot links to Excel and Microsoft Mail.
- **Cons:** Spelling-checker word suggestions slow. Klunky outline. Interface nonintuitive. Can be difficult to learn.

- **Requires:** Mac Plus, two 800K drives or a hard-disk drive, and System 3.2 or later.
- **List Price:** $395.
- **Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8090.

**Microsoft Works 2.0**

word-processing module 1/2

Standing alone as a word processor, this is an uninspired program, but its built-in drawing layer and quick and easy access to the integrated spreadsheet, database, and telecommunications modules may make it the product of choice for some users.

- **Pros:** No easier product for producing a document containing text, numbers, and charts.
- **Cons:** The larger the file, the slower Works gets. Cryptic codes for formatting headers and footers. No features that make it better than any other word processor at any type of writing task that doesn’t require access to spreadsheet or database information.

- **Requires:** Mac Plus, two 800K drives or a hard-disk drive, System 6.0 or later, and Microsoft Mail.
- **List Price:** $295.
- **Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8090.

**MindWrite 2.2**

2.2

MindWrite is a gem for handling the creation of a technical manual or any document that is more structured outline than narrative text. It integrates outlining and word processing better than any other program. It comes with a basic set of file-translation filters.

- **Pros:** Easy to reorganize sections. Sophisticated Search and Select options. Full array of keyboard commands. Tiled windows in which text can be wrapped to fit margins or window borders. Great at creating bulleted lists.
- **Cons:** No footnotes. Few layout features.

- **Requires:** Mac with 1 megabyte, two 800K drives or a hard-disk drive, and System 4.2 or later.
- **List Price:** $195; $250 with MindWrite Express (a set of filters for importing and exporting to Mac, PC, Wang, and VAX word processors).
- **Delta Point, Inc., 200 G Heritage Harbor, Monterey, CA 93940-2483; (408) 648-4000.

**Nisus 2.03**

2.03

RAM-based and the fastest of the heavyweight word processors, Nisus lets you search through multiple open or closed files. A cross-referencing feature lets you maintain accurate references to other parts of your document. You can create graphics within the program and intermix them with text.

- **Pros:** Extraordinary macro-programming and search-and-replace features. Excellent built-in graphics capabilities. Multiple editable clipboards and multiple underlines.
- **Cons:** Looks and feels more like a text editor than a word processor. No side-by-side columns feature. Keeping the program and all open documents in memory limits file size on 1-megabyte Macs.

- **Requires:** Mac Plus, two 800K drives or a hard-disk drive, and System 4.2 or later.
- **List Price:** $395.
- **Paragon Concepts, Inc., 990 Highland Drive,
WordMaker 1.0.1

A light-middleweight word processor, WordMaker is great for simple text and graphics documents.

Pros: Two-layered system, graphics on top of text, allows total freedom in placement of objects. Least expensive Mac word processor.


Requires: Mac Plus and System 4.1 or later.

List Price: $124.95.

WordPerfect 1.0.3

WordPerfect is a good choice for offices running the program on PCs and other non-Mac systems and needing compatibility, but not so good otherwise.

Pros: Good spelling checker, internal file-management system, and macro maker. Does both sneaking and parallel columns.


Requires: Mac Plus, two 800K drives or a hard-disk drive, and System 4.2 or later.

List Price: $395.

WriteNow 2.0

The quintessential basic writing program for the Mac, WriteNow has a good balance of useful features and is fast and efficient at almost everything it does. It has an excellent interface and is a good first word processor.

Pros: Multiple headers and footers. Fast spelling checker that almost always comes up with the word you meant to type. All attributes can be copied from one paragraph to another.

Cons: Multiple columns limited to four.

Requires: 128K Mac (512K recommended), 800K drive, and System 3.2 or later.

List Price: $195.

DiskTop Version 4.0 from CE Software

"The new DiskTop 4.0 package is the ultimate finding device. If you can't find it with DiskTop or Gofer, it's not there."

-Bob LeVitus, Author, Dr. Macintosh

If you've ever wished the Macintosh Finder was ... well, better at finding ... we have great news for you! The new version of DiskTop, the multipurpose disk management toolkit from CE Software, makes finding files and information within files so much faster and easier that you'll wonder how you ever lived without it.

Here's an example of DiskTop 4.0's power: You need to make room on your hard disk. Quickly. Tell DiskTop to find all files over 300K last modified between last January and June. Use the DiskTop "Move" button to delete them from your hard drive and put them on floppies. DiskTop will retain a list of those files too, so you can be selective.

Also new in version 4.0: You can teach DiskTop to automatically launch the programs you use most often, or even documents. You can launch directly from the DiskTop menu with a double click or use the DT Launch menu. You save keystrokes, mousestrokes, and most important, your time! And this power is instantly accessible within DiskTop.

And DiskTop 4.0 includes Gofer, a $79.95 value, at no extra cost! Now you have the power to search the contents of files. It's very handy when you're looking for a phrase, fact or note, but can't remember which file it's in.

We've listed but a few of the new features that make DiskTop 4.0 the most capable and essential tool for finding, launching and working with information on a Mac. We've enhanced every corner of the product, adding the features you, our users, told us you wanted.

Current registered DiskTop users can upgrade to version 4.0 for $30. If you're still waiting to discover the power of DiskTop, call 1-800-5-CESOFT today for the name of the nearest CE Software retailer or direct supplier.

CE SOFTWARE INC

1854 Fuller Road, PO Box 65580, West Des Moines, Iowa; 1-800-5-CESOFT. Suggested retail price for DiskTop is $99.95.

DiskTop is a trademark of CE Software, Inc. Other names may be trademarks or registered trademarks.

Please circle 180 on reader service card.
# The Complete Guide to Word Processing

## Table 2: Features of Word Processors

<table>
<thead>
<tr>
<th>Statistics</th>
<th>FullWrite Professional</th>
<th>MacWrite</th>
<th>Microsoft Word</th>
<th>Microsoft Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of basic application</td>
<td>750K</td>
<td>451K</td>
<td>669K</td>
<td>591K</td>
</tr>
<tr>
<td>Size fully configured</td>
<td>1,338K</td>
<td>1,319K</td>
<td>1,200K</td>
<td>919K</td>
</tr>
<tr>
<td>Memory required</td>
<td>1 MB, 2 recommended</td>
<td>1 MB</td>
<td>512K</td>
<td>785K</td>
</tr>
<tr>
<td>List price</td>
<td>$395/$99 (educ.)</td>
<td>$249</td>
<td>$395</td>
<td>$295</td>
</tr>
</tbody>
</table>

## Characters/Fonts

| Font sizes available (points) | 1 – 127 | 1 – 500 | 2 – 124 | 1 – 72 |
| Change font size by points   | yes     | yes     | yes     | no    |
| Smart quotes                 | yes     | yes     | yes     | no    |
| Small caps                   | yes     | yes     | yes     | no    |
| Strike-through               | yes     | yes     | yes     | yes   |
| Superscript/subscript        | yes     | yes     | yes     | yes   |
| Extend/condense              | yes     | no      | yes     | no    |
| Show nonprinting characters  | yes     | yes     | yes     | no    |

## Pagination

| Page preview                 | yes | yes (editable) | yes | yes |
| Page breaks                  | yes | yes            | yes | yes |
| Manual page breaks           | yes | yes            | yes | yes |
| Editable page view           | yes | yes            | yes | no  |

## Windows

| Multiple windows in a document | no  | no  | 22  | no  |
| Multiple files open           | RAM-limited | 7   | 22  | RAM-limited |
| Split windows                 | no  | no  | yes | no  |
| Horizontal scrolling          | yes | yes | yes | yes |

## Find/Change

| Search selected block only   | no  | no  | yes | yes |
| Tab/Return                   | yes | yes | yes | yes |
| Wildcard                     | yes | yes | yes | no  |
| Go to page                   | yes | yes | yes | yes |

## Formatting

| Rulers: inches, picas, points, cm | yes | yes | yes | in., cm |
| Maximum page width (inches)      | paper size | paper size | 22 in. | 15 in. |
| Tabs: left, right, center, decimal | yes | yes | yes | yes |
| Style sheets                    | yes | no  | yes | no  |
| Copy paragraph formats           | yes | yes | yes | yes |
| Page number, time/date stamps    | yes | yes | yes | yes |
| Global-change size/style        | yes | yes | yes | yes |
| Change case                     | yes | yes | yes | yes |
| Manual/hyphenation              | yes | yes | yes | no  |
| Footnotes, auto-numbered        | end page/document | end page/document | end page/document | no  |

## Importing and Exporting Files

One of the most important functions a word processor can perform is to read and write documents formatted in other programs. In this category, Clari's MacWrite II I.1 is the clear winner; its XTND technology provides hooks into MacWrite II, letting the application use a wide variety of file translators from DataViz.

### FullWrite Professional 1.1
- **Reads:** MacWrite 2.2, 2.5, 4.5, 4.6, 5.0, Microsoft Word 3.0, 3.01, 3.02, 3.03, MultiMate; Acta Advantage II
- **Writes:** MacWrite 4.5

### MacWrite II 1.1
- **Reads:** MacWrite 5.0, 5.9, MacWrite II; Microsoft Word 3.0, 4.0, PC 4.0, 5.0; Acta Advantage 3.0; AppleWorks; MacPaint; Microsoft Write; Microsoft Works; PICT; RTF; WordPerfect (Mac), WordPerfect (PC) 4.2, 5.0; WriteNow; additional formats from DataViz
- **Writes:** MacWrite 5.0 and MacWrite II; Microsoft Word 3.0, 4.0, PC 4.0, 5.0; Acta Advantage 3.0; AppleWorks; MacPaint; Microsoft Write; Microsoft Works; RTF; WordPerfect (Mac), WordPerfect (PC) 4.2, 5.0; WriteNow 1.0, 2.0

### Microsoft Word
- **Reads:** MacWrite 5.0; Microsoft Word 1.0, 3.0, 4.0, PC 5.0
- **Writes:** MacWrite 5.0; Microsoft Word 1.0, 3.0, 4.0, PC 5.0

### Microsoft Works
- **Reads:** MacWrite 5.0; RTF
- **Writes:** MacWrite 5.0, 5.6, Microsoft Word as RTF; RTF
<table>
<thead>
<tr>
<th>Microsoft Write</th>
<th>MindWrite</th>
<th>Nisus</th>
<th>WordMaker</th>
<th>WordPerfect</th>
<th>WriteNow</th>
</tr>
</thead>
<tbody>
<tr>
<td>286K</td>
<td>410K</td>
<td>565K</td>
<td>139K</td>
<td>512K</td>
<td>102K</td>
</tr>
<tr>
<td>512K</td>
<td>1,000K</td>
<td>1,585K</td>
<td>399K</td>
<td>1,400K</td>
<td>210K/324K</td>
</tr>
<tr>
<td>512K</td>
<td>512K</td>
<td>700K</td>
<td>512K</td>
<td>1 MB</td>
<td>200K - 400K</td>
</tr>
<tr>
<td>$125</td>
<td>$250/$195</td>
<td>$395</td>
<td>$124.95</td>
<td>$195</td>
<td>$195</td>
</tr>
<tr>
<td>7 - 72</td>
<td>6 - 24</td>
<td>1 - 255</td>
<td>4 - 127</td>
<td>1 - 127</td>
<td>4 - 127</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>RAM-limited</td>
<td>RAM-limited</td>
<td>RAM-limited</td>
<td>RAM-limited</td>
<td>RAM-limited</td>
<td>RAM-limited</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>in. only</td>
<td>in. only</td>
<td>cm</td>
<td>points, cm. in.</td>
<td>cm, in.</td>
<td></td>
</tr>
<tr>
<td>22 in.</td>
<td>27 in.</td>
<td>24 in.</td>
<td>printer-limited</td>
<td>printer-limited</td>
<td>17 in.</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>text styles</td>
<td>no</td>
<td>no</td>
<td>para. fragments</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>end page/document</td>
<td>no</td>
<td>end page/document</td>
<td>no</td>
<td>end page/document</td>
<td>end page only</td>
</tr>
</tbody>
</table>

Microsoft Write
Reads: text: MacWrite 5.0; Microsoft Word 1.0, 3.0, 4.0, PC 5.0
Writes: Microsoft Write; text: MacWrite 2.0; Microsoft Word 1.0, 3.0, 4.0, PC 5.0

MindWrite 2.2
Reads: text: MacWrite 4.5, 4.6, 5.0; Microsoft Word 1.0, 3.0, Acta Advantage 3.0, ThinkTank
Writes: text: MacWrite 4.5, 4.6, 5.0; Microsoft Word 1.0, 3.0, Acta Advantage 3.0

Nisus 2.03
Reads: text: MacWrite 4.5, 4.6; Microsoft Word 3.0
Writes: text: MacWrite Clipboard

WordMaker
Reads: text: MacWrite 5.0
Writes: WordMaker; text: MacWrite 5.0

WordPerfect
Reads: text: MacWrite 4.5; Microsoft Word 3.0, YayWord
Writes: text: Microsoft Word 3.0

WriteNow 2.0
Reads: text: MacWrite 4.5, 4.6, 5.0; Microsoft Word 3.0, 4.0 via RTF
Writes: text: MacWrite 5.0; Microsoft Word via RTF
### Table 2: Features of Word Processors, continued

<table>
<thead>
<tr>
<th>Graphics</th>
<th>FullWrite Professional</th>
<th>MacWrite</th>
<th>Microsoft Word</th>
<th>Microsoft Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import via Clipboard</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Graphics tools</td>
<td>yes</td>
<td>no</td>
<td>size and crop</td>
<td>yes</td>
</tr>
<tr>
<td>Built-in drawing feature</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Supports color text</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Input color graphics</td>
<td>no</td>
<td>256</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Create color graphics</td>
<td>no</td>
<td>no</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Headers/footers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum size (% of page)</td>
<td>33%</td>
<td>98%</td>
<td>100%</td>
<td>1 line</td>
</tr>
<tr>
<td>Graphics in</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>First page only</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Odd/even-pages option</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Multiple</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Page makeup</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum number of columns</td>
<td><em>/-in. columns</em></td>
<td>10</td>
<td>unlimited</td>
<td>unlimited</td>
</tr>
<tr>
<td>Variable column width</td>
<td>using sidebars</td>
<td>yes</td>
<td>in tables</td>
<td>yes</td>
</tr>
<tr>
<td>Auto-parallel columns</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Snaking columns</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Columns on-screen</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Tables</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Sidebars</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Text wraps around graphic</td>
<td>square/irregular</td>
<td>no</td>
<td>square</td>
<td>no</td>
</tr>
<tr>
<td>Create boxes or borders</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Auto binding gutter</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Auto-center page vertically</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Typographic controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kerning</td>
<td>yes</td>
<td>no</td>
<td>manual</td>
<td>no</td>
</tr>
<tr>
<td>Leading/line spacing</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Leading increment</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Math typesetting</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Organizational functions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sorting</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Auto-indexing</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Word count</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Table of contents</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Built-in outliner</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Mail-merge</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Dictionary size (words)</td>
<td>100,000</td>
<td>100,000</td>
<td>120,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Glossary feature</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Thesauruses size (words)</td>
<td>220,000</td>
<td>220,000</td>
<td>220,000</td>
<td>NA</td>
</tr>
<tr>
<td>Auto-revision tracking</td>
<td>1 level</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Built-in macro maker</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Discontiguous selection</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Keyboard sentence select</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Keyboard paragraph select</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

132 February 1990 MacUser
<table>
<thead>
<tr>
<th>Microsoft Write</th>
<th>MindWrite</th>
<th>Nisus</th>
<th>WordMaker</th>
<th>WordPerfect</th>
<th>WriteNow</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>256</td>
<td>8</td>
<td>256</td>
<td>no</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>no</td>
<td>8</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>100%</td>
<td>50%</td>
<td>40%</td>
<td>30%</td>
<td>100%</td>
<td>25%</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>NA</td>
<td>1</td>
<td>8</td>
<td>1</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>no</td>
<td>graphics layer</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>1</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>square, irregular</td>
<td>square, irregular</td>
<td>no</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>manual</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>partial</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>point</td>
<td>point</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>80,000</td>
<td>90,000</td>
<td>115,000</td>
<td>100,000</td>
<td>115,000</td>
<td>50 &amp; 100,000</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>42,000</td>
<td>NA</td>
<td>10,000</td>
<td>NA</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>
Now the person making the presentation can make the presentation.

The old adage, "If you want something done right, do it yourself," couldn't be more true than when you're making a presentation. Or, right now, more possible.

In fact, all you'll really need is Microsoft® PowerPoint® software and an Apple® Macintosh® to run it.

It's the easiest, most cost-efficient way to assemble a professionally looking presentation from conception to completion, right from your own desktop.

PowerPoint gives you the power to create your own picture-perfect overhead transparencies, flipcharts, 35mm color slides, speaker notes, and audience handouts. In such record-breaking time that there'll be nothing for you to do the night before the big day but sleep.

Its built-in word processor (complete with spelling checker) and drawing tools allow you to mix text and graphics in countless ways. You can use different typefaces, logos, special effects like shaded backgrounds, drop shadows, and diagrams. Or you can copy charts, tables, and illustrations from other programs, like Microsoft Excel and Adobe Illustrator 88® with a simple cut and paste.

You can also standardize a format automatically. And you can easily make global changes with the Slide Master, which instantly executes your revisions throughout.

At any point along the way, the Slide Sorter feature lets you view slides one by one or scan your entire presentation at a glance, or simply rearrange the order with a point and click.

Then, whenever you're ready, you can print out all your presentation materials—from attention-getting overheads to handy speaker notes—without ever leaving your desk.

If 35mm slides are in order, simply send your presentation to the nearest Genographics® center, the leading presentation graphics service bureau, and your slides will be on their way in 48 hours.

And remember, the best part of doing a presentation all by yourself comes afterward. When you get all the credit.

I want to do it myself. Please send me a FREE Working Model of Microsoft PowerPoint for the Macintosh.

Name: ____________________________
Address: ____________________________
City: ___________ State: ___________ Zip: ___________ Phone: ___________

Call (800) 541-1261 Dept. K27. Or mail to Microsoft, Attention PowerPoint Working Model, One Microsoft Way, Redmond, WA 98052-6399.

Microsoft
Making it all make sense.
A NEW TRADE ROUTE

A direct route should be possible by sailing westward
- Shorter, therefore faster and safer
- Hitherto unexploited by the English or Portuguese

New World Expeditions — March 14, 1491

With artfully designed PowerPoint overheads, your presentation will be the center of attention.

The PowerPoint Slide Sorter lets you put your presentation in order with a simple point and click.

You'll create 35 mm slides in your choice of 16.8 million decorator colors with a Mac™ II.

Your audience will flip over charts like this, created entirely with PowerPoint.

The Slide Show feature turns your Macintosh into a projector—for quick rehearsals or slick on-screen presentations.

PROPOSED ROYAL FUNDING

- Ship and crew
- Supplies
- Printing Costs
- Total Estimated Budget

ADVANTAGES FOR SPAIN

- Remember to how to install and maintain
- Congratulations on their recent victory over the Moors
- Agree with their decision to start the destruction
-endeavor

EXPLORATION SCHEDULE

Select troops
- Main troops
- Support troops
- Pickup supplies
- Sail back to Spain

New World Expeditions — March 14, 1491
Table Makers
Making tables on a Macintosh has sometimes been a feat in itself. You could employ tab stops in a word-processing or page-layout program to line up the rows and columns of data. Or with a spreadsheet, you could use some sleight of hand with tab leaders, subscripts and superscripts, line spacing, and other such controls to adjust the cells. Tables were tough because they lay in a dead zone halfway between text and graphics — and outside the realm of most Mac programs (see the “Making Tables by Hand” sidebar).

By the fourth quarter of 1989, three “table editors” had appeared, each with a good sampling of the features necessary for building tables. Microsoft Word added a table-making feature in version 4.0. Macreations released Tycho, a “stand-between” application for grabbing data from a source such as a database, positioning the data in a table, and then exporting the table to a page-layout program. And Mansfield Systems released Table Tools, a dedicated table-making program that could also “shuttle” information to and from graphics programs and spreadsheets and then ship the results to a page-layout program.

As this article went to press, Macreations was set to release version 1.1 of Tycho and Mansfield was set to release version 2.0 of Table Tools. Both are described in the “BetaWatch” sidebars. Then, Mansfield Systems declared bankruptcy. The company hopes to keep Table Tools alive, but we don’t know whether the program will be available when you read this. Nevertheless, its approach offers some important features. — Ed.] Here is a comparison of the three table editors.

Appearance and Approach
Each program has strengths and weaknesses. Word completely integrates tables and word processing, but as you’ll see, it has limited formatting and graphics ability and hides its table commands in several different menus. Tycho has the most import and export options and a simple menu structure, but it does not have any direct connection to word processors, spreadsheets, or graphics programs. Table Tools has a complex structure, with several different modes and power levels. It doesn’t offer the text-export options of Tycho or the integration of Word, but it does have a shuttle for direct interaction with Excel and graphics programs.

Each program has its own look and feel. Word 4.0 spreads its table-making feature over several menus. The Document menu contains an Insert Table option, the Edit menu has a Table option for editing, and the Format menu holds the Cells choice for styling. Word can create a table from scratch or convert selected text into a table. There’s some intelligence in the conversion: It inspects the selected text and guesses the format. A Word table can have up to 20 columns but is limited to the width of a single page. It can have any number of rows and can cross page boundaries. Only Word, not Tycho 1.0 nor Table Tools 1.0, can automatically

By Phillip Robinson
and completely paginate a multipage table for printing. Once you’re done with a Word 4.0 table, you can keep it in Word for printing or use a utility such as Capture to grab it as a PICT image and export it to a page-layout program.

Table Tools 1.0 looks like a single-page-layout program that just happens to specialize in tables. It has a pasteboard surrounding the table and a tool palette for selecting, cropping, drawing diagonal lines, and positioning the table. A mode palette lets you choose among three modes: Text, Table, and From Within. The mode dictates which pull-down menus appear. The Text mode is for editing, and the Table mode is for working on graphics, borders, formats, and table subobject (cell element) alignment, and the advanced level offers a Style Sheet menu and manager. Tables can have up to 512 rows and 128 columns, subject to memory restrictions. Tables can be created fresh or from imported SYLK, tabbed-text, or comma-delimited data and can be exported through the Shuttle feature or as saved PICT images.

Tycho (named after Tycho Brahe, the famous 16th-century Danish astronomer and maker of astronomical tables) is a “stand-between” application, neither integrated with a word processor as is Word’s Table feature nor hot-linked to other programs via a shuttle as is Table Tools. Tycho accepts data from a spreadsheet or

### Making Tables by Hand

To make tables without a table-making application, you need a word-processing, page-layout, or spreadsheet program. Because exporting a PICT image of a table to a page-layout program is difficult from a word-processing or spreadsheet program, most publishing professionals prefer page-layout packages.

To make a table with a word processor such as MacWrite or WriteNow, you estimate the width of the columns you need, enter the appropriate margins and tabs, and fill in the first row of information. Then you enter a carriage return to force a new row, using line-spacing controls to adjust row height. You can save your tab and line-spacing scheme on a style sheet for reuse. Unless you’re using Word’s table maker, you don’t have word wrap within cells, precise control over row heights, or automatic sizing of cells to contents. If you decide to fuse adjacent cells into one larger cell, you’ll have a real fight on your hands.

If your table cells for graphics, a word processor is a feeble tool. It might import graphics to a particular position, and even crop or size an image, but it probably won’t let you shade cells, draw diagonal lines through them, rotate graphics (or even text) within cells, and so on. A page-layout program has more graphics finesse than a word processor. It can import a much wider range of image formats, and can work with color.

For serious typographic control such as leading, kerning, and hyphenation within cells, you need a page-layout program such as PageMaker, Ready.Set.Go!, or QuarkXPress. These programs offer greater point precision than do word processors. QuarkXPress, for example, gets down to .001 points for line leading and down to .005 ems for kerning. With page-layout programs, you also gain alignment guides, word wrap within cells, and precise text and graphics positioning within cells. Such programs don’t automatically create a grid of cells, though — you have to calculate the measurements yourself. And you’ll have to recalculate if the text you enter happens to break the original boundaries. The table won’t adjust its format to the data — the data has to fit the table structure.

Spreadsheet programs such as Excel have built-in rows and columns, with simple commands for adjusting their sizes. These programs can sort rows or columns, perform math operations, set number formats in detail, and work on enormous tables. Presentation spreadsheet programs such as Wingz and Full Impact include a host of graphics commands for cell shading, drawing border lines, and so on. But spreadsheet programs don’t have rulers, tabs, and leading for positioning cell entries, nor do they automatically size cells to contents. They’re rarely equipped with spelling checkers or footnoteing features, and most don’t allow you to import graphic images into cells.

A publication spreadsheet program such as RagTime combines spreadsheet calculations and easy row/column editing with typographic controls and many word-processing commands. However, it can place imported graphics only outside the table, not within one of its cells. RagTime 3, which adds 32-bit color, was scheduled for release in January 1990. If RagTime 3 can handle color separations adequately, it may go a long way toward meeting all of your table-publishing needs, replacing table-editor utilities with one integrated solution. You can also expect other page-layout programs to address table making in upcoming versions of their products.
database, manipulates and formats that data, and then lets you send the results to a page-layout or presentation program. Version 1.0 sports a simple menu bar, with only File, Edit, Format, Settings, Table, and View menus to worry about. There are no modes or power levels. (A separate palette contains hundreds of dingbats for insertion into tables.) The display shows the table itself, along with title, header, and footnote areas. Tycho tables can have any number of rows and columns. They can be built from the ground up or work with imported SYLK, tabbed-text, or comma-delimited data. Tycho’s Clipboard seems to have unusual intelligence too. It can discern the format of information and may ask if you truly want to convert it from one application format to another. When you finish with a Tycho table, you can export it to another application as tabbed or comma-delimited text or as a PICT image.

Performance and Memory

Table Tools is by far the slowest and the hungriest of the three programs (see “Table Makers: Memory and Speed” tables). Word offers a complete solution in a relatively small space that combines table making with its word-processing and page-layout features. Tycho fits much more easily into memory alongside other applications such as a source (database or spreadsheet) and a destination (a page-layout program) than does Table Tools. But Table Tools’ Shuttle feature facilitates moving tables from source to destination.

We used three sample tables to test the memory demands and speed of the table editors. Table 1 shows the file-size and timing results. Table Tools is clearly much slower in virtually every operation than Word or Tycho. And medium or large files take up an enormous disk space in the Table Tools format. The conclusion is clear: With tables of any significant size, Table Tools is so slow that it’s impractical — and eats up significantly more disk space and RAM than do the other programs.

Handling Graphics within Cells

Tables sometimes require graphics — small charts, pictures, lines, or shading — within cells. Word’s table maker can put graphics into cells just as it can put them anywhere else in a document. Select a cell, paste the graphic in, and resize or crop the imported image if you want. But Word has no commands of its own for shading cells or for creating lines, shapes, or any other graphic.

With the exception of images from its dingbat palette, Tycho 1.0 does not accept graphics within cells (this is supposed to change in version 1.1), nor does it offer a line-drawing command. You can place a Tycho table within the cell of another Tycho table, however. Tycho’s only graphics muscle is in shading cells. You can select from five shades (from white through gray to black) for any cell or area of a table, including headers and footers. Tycho also has an interesting Rule-Based Shading feature that allows you to shade patterns, such as alternate rows or a checkerboard, onto tables. The shades print as half tones on a laser printer.

Table Tools has the most generous graphics ability of the three programs. Any cell can hold a graphic image imported from some other source, but the importation process is confusing. Before you can place graphics in a cell, the cell must be set to “graphic” type. At the beginner power level, this happens automatically, but at the advanced level, you must set it yourself. Once a graphic is placed, you can scale and crop it and position it within the cell — at the center, at any corner, or at any midpoint of a

---

<table>
<thead>
<tr>
<th>Table Makers: Memory and Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table 1</strong> (medium-sized: instrument data)</td>
</tr>
<tr>
<td>Import (seconds)</td>
</tr>
<tr>
<td>Save (seconds)</td>
</tr>
<tr>
<td>Open (seconds)</td>
</tr>
<tr>
<td>Close (seconds)</td>
</tr>
<tr>
<td>Delete column (seconds)</td>
</tr>
<tr>
<td>Redraw screen (seconds)</td>
</tr>
<tr>
<td>File size (K)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Table 2</strong> (small, with graphics*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open (seconds)</td>
</tr>
<tr>
<td>File size (K)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Table 3</strong> (large: accounting info)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open (seconds)</td>
</tr>
<tr>
<td>Save (seconds)</td>
</tr>
<tr>
<td>Redraw screen (seconds)</td>
</tr>
<tr>
<td>Close (seconds)</td>
</tr>
<tr>
<td>File size (K)</td>
</tr>
</tbody>
</table>

*Tycho file doesn’t include graphic element.  
Word table unusable — too many columns for one-page width.

Three different tables were tested for speed and memory use on Table Tools, Tycho, and Word on a Mac II with 5 megabytes of RAM running under MultiFinder. Table 1 had 28 rows and 13 columns of Instrument readings, Table 2 was a financial report with 8 rows and 4 columns that included a 3-D bar chart, and Table 3 was a 72-row-by-21-column table on accounting packages.
Another MacUser Success Story

"MacUser helps us identify and evaluate the product features that are important to our business."

As Director of Product Development Systems, Forrest Jerome helped bring the first microcomputers into Colgate-Palmolive.

"We were one of the earliest companies to adopt the Macintosh," Jerome remembers. "Originally, we bought them just for senior management. Now, almost five years later, the Macintosh is part of Colgate's standard hardware platform."

Jerome views the Mac as an indispensable tool. "It gives people in our company the ability and confidence to make a difference. I call it 'individual innovation.' Individuals throughout the company are discovering that the Mac changes their jobs in many small ways—ways that add up to a substantial competitive advantage for the entire corporation."

There's another tool Forrest Jerome finds indispensable—MacUser magazine. "Our Information Technology Group makes hardware and software recommendations that affect the entire company. But we can't possibly do an in-depth evaluation of every product out there. That's why we depend on MacUser to give us the information we need."

"The comparative product reviews are probably most important to me—though, actually, it's all important, from the features to the advertising. MacUser tests and reviews every available product in a given category, to make sure we don't miss anything. I count on the Lab Reports to tell me what works and what doesn't, and to help me identify the features that would mean the most to Colgate's business. MacUser helps us understand how useful the product will be once it's installed in our offices around the country."

Rigorous, thorough tests from the best lab in the industry. Credible, easy-to-read editorial content. That's why Forrest Jerome—and 300,000 other Macintosh business buyers—make more buying decisions with MacUser than any other Macintosh magazine.

Mr. Forrest Jerome, Director of Product Development Systems, Colgate-Palmolive

Contact: Jeff Miller, Publisher
(415) 378-5601
Are you one of those people who considers tax preparation only slightly less painful than childbirth? Do you wait until the point of no return before doing yours? Or pay a lot of money to an accountant and evade the whole thing? Has form 4868 become an annual ritual? Then you may be startled to learn that there are thousands of people out there—Macintosh users just like you—who actually enjoy preparing their taxes.

No kidding. We've got letters from happy users of MacInTax, the runaway best-selling tax program for the Mac. How did MacInTax become so popular? Because it's so easy. As easy as filling in the blanks on your choice of over 75 forms, schedules, worksheets and statements that pop up on your screen in the exact IRS format. Don't know which forms you need? Don't worry. MacInTax helps you decide.

Aren't sure what belongs on which line? MacInTax fills you in: IRS instructions are on-line for every line. And Softview is always on the end of your telephone line. Can't tell when a form is complete? MacInTax tells you what's done, what isn't and what's left. Afraid of making a mistake? Don't be. MacInTax checks your input, helps prevent illogical, inconsistent or incomplete entries and performs all tax calculations—and recalculations—for you.

When an entry you make on one form, schedule, statement or worksheet affects the entries you've already made on others, MacInTax makes all the necessary changes automatically. When you're finished—which shouldn't take long, even if it's your first time—your laser or dot matrix printer spits out your return as exact replicas of official IRS forms. Of course, you do have to sign, date, stamp and mail the return yourself. But you have to do that even when you use a professional.

Speaking of professionals, hundreds of them secretly use MacInTax to prepare the returns of people just like you. No kidding. We've got letters. Call us at 1-800-622-6829 and we'll read you a few.

**RATING: 10 of a possible 10... simply the best microcomputer program on the market for personal tax preparation. Easier to learn, to use and to print forms than any other tax program we've ever tested.**

—Chicago Sun Times

“MacInTax is so good that it has literally driven the competition from the market.”

—MacUser

**MacInTax**

Excellence in Software '89, '87
Software Publishers' Association World Class Award '89, '88, '87 MacWorld

*1* Tax Product Rating '89, '88

MacUser Award of Distinction '88 BYTE Golden Gavel Award '88 MacGuide

1721 Pacific Avenue, Suite 100, Oxnard, CA 93033 • (805) 384-5000

Also available for DOS/Windows

*Automatic Extension of Time to File*

Please circle 99 on reader service card.

**MacInTax helps you decide.**
PROTECT YOUR COPIES OF MacUser

Make your collection of MacUser a handsome addition to your office or home—and protect them for easy reference!

MacUser Magazine Binders and Cases are made of durable luxury-look leatherette over quality binder board. Custom designed for MacUser, every order receives FREE gold transfer foil to personalize dates and volume numbers.

For Fast Service Call Toll Free, 1-800-972-5858

MAGAZINE BINDERS
Hold your issues on individual snap-on rods. $9.95 each. 3 for $27.95. 6 for $52.95.

OPEN BACK CASES
Store your copies for individual reference. $7.95 each. 3 for $21.95. 6 for $39.95.

Turning the Tables

side. Table Tools also lets you draw diagonal lines across cells (from top left to bottom right) and offers 10 fill shades and 20 fill patterns. Although Table Tools doesn’t have the rule-based shading feature of Tycho, it does let you select multiple, non-adjacent areas for many editing operations, including shading. Finally, the Table Tools shuttle can fetch images from a graphics program.

With its shuttle and line-drawing features and the ability to put graphic images into any cell and crop and position them, Table Tools packs more graphics punch than Word or Tycho, with the exception of Tycho’s rule-based shading ability.

Processing Text within Cells
Word 4.0 applies its full complement of word-processing features—
spelling checker, word counter, sorting, footnotes, and so on — to text in cells. You can apply style, size, and font attributes (Word's style sheets can also be put to use with Word tables); use a ruler to set margins, tabs, decimal tabs, line spacing, and indents; and cut, copy, or paste within or between cells. With one ruler for every cell, finding the right ruler is a little confusing. There are no commands for swapping cells, columns, or rows, however, nor for "turning" the table (transforming rows into columns and vice versa). But you can insert, delete, or merge rows, columns, or selected areas.

Table Tools can boast of some "word-positioning" if not "word-processing" abilities. The standard Cut, Copy, and Paste features can be applied to multiple nonadjacent locations. Table Tools has cut-and-paste text rulers that permit left, right, center, and decimal tabs and justification within cells. Line and paragraph leading, fractional character widths, and custom subscripts and superscripts from 0 to 127 points above the baseline are all available, as is a long menu of formats for numeric or date information. Table Tools' hierarchical style sheets allow you to record such details as whether a cell is locked against change during shuttle to a spreadsheet. However, the style sheets are not easy to understand or modify without referring to the manual. Table Tools lacks a search-and-replace command and a built-in spelling checker. It doesn't have the dingbats palette of Tycho, but it does offer a Key Caps display for putting special characters into cells.

**BetaWatch: Table Tools 2.0**

When we looked at the beta version of Table Tools 2.0 in November 1989, it was still saddled with debugging code (and some obvious bugs). Small changes in version 2.0 include smooth pagination of multipage tables, outline fonts in various views, rotated graphics and text within cells, custom borders, footnote-number formatting, tab leaders, and accented and drop-shadow characters. Also planned were more significant changes, such as table templates, features for editing input data from databases and accounting sources, and 70-percent-smaller files. Preferences — which include the power level (only beginner and advanced — no intermediate as in the current version), numeric separators (American or European), and the use of fractional widths — can be saved with a table as a standard template for all new files. Files auto-scroll as you edit; in earlier versions, they don't. You can save a table in PICT2 format, with color.

Interface changes in 2.0 are significant. Although the modes remain, the menus have been reorganized and are definitely easier to navigate. Some items that were buried in dialog boxes are now in menus.

A scaled-down version of the program, called Table Tools 2.0 Light, is also promised. Light won't work on multipage tables, import PICT or PostScript graphics, export SYLK, scale or rotate graphics in cells, or format numbers, and it won't have text rulers in cells. It will also be missing style sheets, the new database and accounting publishing features, and the Shuttle. But it will cost only $95.

Version 2.0 in beta is a bit faster than version 1.0, and the files are 33 percent smaller, but that still leaves Table Tools files 10 to 20 times larger than Word or Tycho files. The best file-size results come with the Compact Files option of 2.0. Saving the compact files is fast, but opening them is very slow, and even the compact files are still 5 to 10 times larger than Tycho or Word files. Speed improved in some cases with version 2.0, but not much in others. (Because the program was still in beta form, these results are inconclusive.)

Table Tools 2.0 can boast several useful improvements, but the central problems — slow performance, large file size, and a complex interface — remain. The interface is somewhat simpler but is still modal and confusing. The files are a bit smaller on disk, but unless you use the Compact Files option, they're 15 times the size of Tycho files. With Compact Files, they're still 7 times larger on disk and take much too long to open. And the Compact Files option doesn't reduce the amount of RAM the files occupy. Performance is also somewhat better in 2.0 than it was in 1.0 but is still significantly slower than Tycho's or Word's.
The simple truth is, the business of business is to grow. The sad truth is, most accounting software can't handle that. Built-in obsolescence seems to be a standard feature.

Which is the most compelling reason to consider ACCPAC® Simply Accounting® for your Macintosh.

It offers all of the features you need to get up and running quickly today, as well as the more advanced options you'll need tomorrow.

No other package can get you off to such a fast start. "Easy to learn and a snap to use," InfoWorld called Simply Accounting, "simply magnificent."

And unlike other accounting packages which come with just General Ledger, Accounts Payable and Receivable, Simply Accounting gives you more advanced modules as well, like Inventory, Job Costing, and Payroll.

It all adds up to the best all-in-one accounting software you can buy. And it's backed by the world's leading independent software company.

To find out more, call 1-800-531-5236. In Canada, call 1-800-663-6904.
Turning the Tables

Tycho has the shortest list of word-processing features but doesn’t lack the basics, including font, size, and style settings and both horizontal- and vertical-alignment capabilities. The leading and margins (top, right, center, and bottom) can be set for each cell. There are no rulers within Tycho cells and no tabs, but you can place a table within a cell and use the cells of the inset table for spacing. Tycho can work in points, picas, or inches (both Table Tools and Word can also work in centimeters). Tycho has an associative footnote feature that automatically collects and numbers footnotes at the bottom of tables. Tycho’s style sheets can save and set styles for all new entries and for selected cells and areas, row headers, column headers, footnotes, and titles. The format settings for all those features can be logged into a Tycho table with the program’s Report Settings feature. Tycho has no spelling checker or search-and-replace command.

For lots of control — and direct access to a spelling checker, search-and-replace, and other word-processing functions — Word is best. Table Tools is next in line, with more features than Tycho for text control within cells. Tycho does offer alignment and simple margin and leading settings within cells, however. Both Tycho and Table Tools, in this version-1.0 generation, lack some important commands such as search-and-replace and spell checking. All three programs offer style sheets for saving your text formats.

Formatting the Table

You should be able to view and format a table according to its size, position, borders, and shading of rows, columns, titles, headers, footnotes, and so on. Commands should undo changes and swap, sort, and turn two or more cells at once.

Word doesn’t always show a WYSIWYG view of tables as you edit them, although it does have a Page Preview function. Word has a ruler for columns but limits tables to the width of a single page. It lets you set the space between columns, the height of rows (the Automatic setting adjusts rows to fit contents), indentation of rows, and the vertical and horizontal position of the text relative to margins. Word has five styles of borders for cells and a menu to show which sides of the cell to apply them to. The Undo command reverses most other commands. Many of these attributes can be saved in a style sheet. That’s a fair number of formatting options, although they aren’t all that easy to find, tucked into three separate menus and into dialog boxes within dialog boxes.

Tycho starts with a view of the table that you can customize by hiding the footnotes, title, or headers, or by locking the headers (for scrolling through a large table). Column widths and row heights can be set to certain measurements, moved manually with Excel-style cursors, or automatically sized to the text in the cells. (Table Tools and Word automatically size rows but not columns.) Tycho can set margins, alignment, and leading for headers, cell contents, and footnotes. You set the width of grid and frame lines from 0 to 8 points, select from the five shades of gray, and then dictate on a menu where they’ll apply: headers, title, cells, and so on. The Undo command reverses any other editing command. Like Table Tools, Tycho can swap columns or rows, although it can’t work on nonadjacent areas the way Table Tools can. Unlike Word and Table Tools, which can group cells, Tycho can group only headers. But Tycho is the sole program that can fill to the right or down, sort rows and columns (Word can sort rows), and turn a table.

Table Tools follows in the steps of page-layout programs with its formatting style. You can place the table on a pasteboard with its own rulers and alignment guides for viewing in actual size or reduced by percentages. A detailed Hide/Show dialog box lets you toggle the scroll bars as well as the palettes, Clipboard, rulers, and other elements of the display on or off. You can set column widths and row heights or let the program automatically adjust row heights to cell contents. There’s a selection of border widths and styles along with a graphic menu for placement. Cells can be grouped together, and cell, row, and column contents can be exchanged. Special formatting commands, such as numeric and date formats to apply to text, come with the Shuttle feature. The Undo command doesn’t apply to most table manipulations, only to text.

This category is more of a toss-up than are some of the others. Word doesn’t badly, although it doesn’t have as extensive a repertoire of formatting options as the other two programs do. Table Tools has the most extensive ruler control, but I find its multiple modes and rulers confusing and its incomplete Undo command frustrating. Tycho has a simpler set

---

**BetaWatch: Tycho 1.1**

Tycho 1.1, scheduled for release in December 1989, should be out by the time you read this. At press time, it is expected to have pagination for multipage tables, accommodation of bit-mapped graphics within cells, and multilevel Undo and Redo. Version 1.1 will also include on-screen rulers, automatic data saving, table templates, EPSF saving, a Fit In Window view, and a Find-and-Replace command. In addition, it will have a size-seeking feature that attempts to maintain set table sizes or warn you about deviations from them. The aim is to keep a table the proper size for the hole it will fill in a page-layout program. Later versions (1.5 and 2.0) plan to add color and, when System 7 is available, hot links to other programs such as page-layout applications. Macreations has announced a Tycho Table Viewer utility to be available in the first quarter of 1990. It will let you view and print a Tycho table and export the table information as tabbed or comma-delimited text or as a PICT file. On learning of Mansfield’s financial troubles, Macreations also announced a “don’t use an orphan” offer of $50 off Tycho for anyone now using Table Tools.
of menus and some handy commands for sorting and turning tables; Table Tools has to ship its tables to Excel to do such rearranging.

Perhaps someday we’ll see table editors that calculate, sort, check spelling, handle and print color, have hyphenation and kerning, offer built-in drawing and painting tools, and more. But if the next-generation table makers are bug-free, efficient, and have the promised features, they will begin to step free of the shadow of Word, spreadsheets, and other compromise solutions. They will emerge as new, convincing publishing and presentation tools. Until then, I’m watching and waiting.

Phillip Robinson rejects desktop computing because no desk can fit his three computers, stacks of vital papers, and a pair of feet. He’s a dedicated tabletop (with the extra leaf in) writer, editor, and publisher.

Report Cards

Table Tools 1.01

A table editor and publisher that builds tables from scratch or converts text or spreadsheet files into tables. It positions and sizes rows and columns, aligns and formats text within cells, places and sizes graphics within cells, cuts/copies/pastes one or more locations simultaneously, saves formats in style sheets, and “shuttles” tables to Excel or a graphics program for editing and imports them back to Table Tools. Results are saved as a PICT file for use in a page-layout program.

Pro: Good typographic control.
Cons: It has a complex modal interface, is slow, needs several megabytes of RAM to work on medium or large tables, and saves tables as enormous files on-disk.

List Price: $395.
Requires: Mac Plus or later.
Former address: Mansfield Systems, 550 Hamilton Ave., Suite 150, Palo Alto, CA 94301.

Tycho 1.0

A table editor that builds tables from scratch or converts text or spreadsheet files into tables. It aligns and styles text in rows and columns; exchanges and sorts rows and columns; adds footnotes, headers, and titles; shades cells; saves style sheets; and exports results as a text or PICT file.

Pro: It is fast and small.
Cons: Lacks ability to hold graphics within cells and has no spelling checker.

List Price: $149.95.
Requires: Mac 512K or later; supports MultiFinder.
Maculations, 329 Horizon Way, Pacifica, CA 94044; (415) 359-7649.

Grabbed my coat and grabbed my Mac, made the bus in seconds flat...

New! Macintosh Portable

Finally — the Mac Portable has arrived! It includes an Active Matrix LCD display, a 16MHz 68000 processor, 1 meg of memory, the FDHD 1.4 meg disk drive, an optional internal 40 meg hard disk, 4 dedicated expansion slots, 9 external ports, a rechargeable battery (lasts 6-8 hrs), a power adapter/charger, a built-in keyboard and track ball, ADB Mouse, and carrying case.

Mac Portable ....$4995 (Delivery Charge $61)
w/40 Meg Hard Disk....$4995 (Delivery Charge $69)
Mac Portable Internal Modem.....$379
GCC WriteMove Printer.....$569

Shipping Information & Policies

Delivery charge includes shipping, handling & insurance for DHL. Door to Door Express Service to the continental US, Alaska, Hawaii & PR. DHL to Canada add $20 to delivery charge. DHL worldwide: call for rates.

Visa, MC, Amex, and Discover Accepted.

CDA is not an authorized Apple dealer. Apple & Macintosh are registered trademarks of Apple Computer Inc. All prices subject to change.

CDA Computer Sales, 1 CDA Plaza
PO Box 533 Califon, NJ 07830
Outside US/in NJ 201-853-9000; Fax 201-852-9740
Mon-Fri 9am-10pm, Sat. 9am-5pm
Customer Service (201) 853-9007, 9AM-4PM EST
CompuServe’s Electronic Mall GO CDA

MacUser

Please circle 117 on reader service card.
The jury's still out on the dangers of exposure to low-frequency electromagnetic emissions. Are they harmless, or should your computer screen carry a health warning?

Every hobby and occupation has its health hazards, and working with a Mac is no different. Some of the problems associated with Mac use — headaches and eyestrain — are well proven and easy to avoid (take a break frequently to look out the window). But suspicions are rising that desktop-computer systems, including Macs, pose invisible dangers.

Specifically, some scientists now believe low-frequency electromagnetic radiation, long thought to be innocuous, causes several biological effects. It may even increase your risk of cancer.

Computer monitors generate a range of electromagnetic radiation, from extremely low frequency (ELF) emissions to high-frequency X-rays.

By Winn L. Rosch

Federal regulations set emission standards for ionizing radiation, such as X-rays, and the high-powered heating effects of microwaves, but there are no rules governing monitors' low-frequency electromagnetic fields (see the "FCC Does Not Apply Here" sidebar).

Until very recently, researchers considered the low-frequency fields generated by power lines and appliances harmless because they don't disrupt cells' chemical bonds — as ultraviolet or X-rays do — nor are they strong enough to heat tissues significantly, as microwaves do. But accumulating evidence, particularly several disturbing studies linking proximity to power lines with increased incidences of cancer, has led many scientists and public-health officials to question whether these fields are really harmless.

Last year, the Congressional Office of Technology Assessment
The power and performance of big system CADD...MicroStation Mac

Intergraph introduces MicroStation Mac — microCADD software merging the power of 2D/3D engineering design software with the ease of the Macintosh user interface.

Multiple-screen graphics
MicroStation Mac supports a maximum of eight separate views of a design. These are resizable and can be placed on any of up to six graphic screens, the maximum supported by the Macintosh. This allows for better display flexibility, resulting in more productivity and less design time.

Reference files
MicroStation supports 2D and 3D design and reference files so a user can attach up to 32 design files to the current file for reference. Reference files can reside locally or be accessed remotely over a network, thus allowing users working on the same project to view all the files simultaneously.

Fully Intergraph-compatible
Files are maintained in the same binary format on every platform so that MicroStation/IGDS files can be freely transferred between the VAX, PC, Intergraph workstation, and Macintosh with no translation required.

With over 450 commands and features to meet your design needs, MicroStation Mac exemplifies the most complete functionality of any CADD package available for the Macintosh, making MicroStation Mac your best choice for design needs.

For further information on MicroStation and the Intergraph Education Center and Reseller programs: in the U.S., call 800-345-4856; in Alabama only, call 800-345-0218; outside the U.S., contact an Intergraph sales office.

Please circle 125 on reader service card.

Intergraph is a registered trademark of Intergraph Corporation; MicroStation is a trademark of Bentley Systems Inc., an Intergraph affiliate. Macintosh is a registered trademark of Apple Computer, Inc.
Unsafe at Any Frequency?

Figure 1a: Low-frequency fields generated by the Mac Plus, above, and Mac lcx with Apple 13-inch color monitor, below, fall off sharply with distance. Magnetic fields are measured in gauss (1,000 milligauss = 1 gauss). The earth’s magnetic field is considered to be about 500 milligauss.

Figure 1b: Newer models and monitors generate lower-frequency fields.

(OTA) released a report by scientists at Carnegie Mellon University who had surveyed current research on the biological effects of low-frequency electromagnetic fields, and specifically the effects of ELF, which includes normal 60-hertz household current and some of the frequencies that control Mac displays.

The report concluded that there are "legitimate reasons for concern" about biological effects, but it also stated that current research does not provide "a basis for asserting there is a significant risk."

Is There a Cancer Link?

Research into low-frequency fields’ health effects is still in its infancy and, in many cases, inconclusive. However, the OTA report pinpoints two main areas of concern regarding exposure: the promotion of cancer and central-nervous-system effects.

A 1987 epidemiological study funded by New York State utilities found that some children living near overhead power lines had almost twice the chance of developing leukemia as those who lived farther away.

Research performed at the Veterans’ Administration Hospital in Loma Linda, California, indicates that low-frequency fields may promote cancer by stimulating chemical activity associated with cancer growth within cells. There’s no indication that low-frequency fields cause cancer — instead, they are associated with its growth in cases in which there is already a predisposition for cancer development.

In other research, studies on chicken embryos suggest that developing nervous systems are particularly susceptible to low-frequency fields. The OTA report comments that these effects may be latent, showing up only in specific situations or later in life, in the same way that a pregnant mother’s alcohol use can lead to her child’s later learning disabilities.

Another series of studies on chicken embryos, known as the "henhouse project," exposed embryos at six labs in the United States, Canada, and Europe to pulsed 60-hertz fields, similar in some respects to those generated by computer monitors. Two of the labs found increases in embryo abnormalities, but these preliminary animal studies do not necessarily show that humans who are exposed to low-

FCC Does Not Apply Here

Every piece of computer equipment sold in the United States must pass a Federal Communications Commission (FCC) certification procedure that ensures that its radio-frequency emissions are below certain maximum standards, but it’s not your health that interests the FCC.

Because its frequencies fall well below the bottom of the ranges tested, extremely low-frequency radiation is not monitored at all during the FCC certification process, which is intended to protect communications equipment from interference. These rules are designed to prevent the signals inside your Mac from radiating outward and adding noise to (or completely jamming) your neighbor’s televisions and radios as well as your own.

This shortsightedness arises from the FCC’s official mandate to help keep the airwaves from snarling themselves in a confusion of unrestricted signals.

The FCC certification procedure covers only two kinds of emissions within specific frequency bands. Both the Class A (business and industrial equipment) and Class B (residential equipment) standards limit the signals your Mac can radiate into the air to frequencies from 30 to 5,000 megahertz and the signals it can slip onto the power line to between 450 kilohertz and 30 megahertz. These are the only two frequency ranges tested under the FCC certification procedure.

In other words, the FCC sticker on the back of your Mac means your radio doesn’t have to worry about emissions — but you still may.
Unsafe at Any Frequency?

Frequency fields face such risks. They show the possibility of problems, and that further research is necessary.

Low-Frequency Enigmas

Although there is no consensus on how these biological effects are caused, some things are known. Low-frequency magnetic fields, unlike ionizing radiation such as ultraviolet light or X-rays, don't change or destroy the chemical bonds in cells. They seem to interfere with your body's normal electrical behavior instead, says Keith Florig, one of the researchers involved in the OTA survey.

One aspect that complicates research is that some studies show windows, or thresholds, of effect—that is, only certain field intensities and frequencies seem to have any biological effect. Field strengths stronger or weaker than the window values (or signals at different frequencies) show little or no effect.

Another complication is that not all low-frequency waveforms are the same shape, and different shapes seem to have different effects. Most research has examined the effects of exposure to sinusoidal waves that are produced at 60 hertz (the frequency of power lines). But few studies have looked at the impact of other waveforms, such as sawtooth, which are generated at 60 hertz and other low frequencies, says Louis Slesin, editor of VDT News. Computer monitors, for instance, generate sawtooth waveforms at frequencies in the broadcast range.

Measuring Up

MacUser Labs' Tom Green measured the low-frequency emissions of several Mac models as well as several monitors. The results show two general trends: First, the newer the model, the fewer the emissions; second, emissions are lower toward the front of the system or display.

Monitors have higher emissions than CPUs, and they also tend to emit mostly from the sides rather than the front.

Two types of emissions were most prevalent. Most monitor emissions are sharp 60-hertz pulses that probably originate in the flyback transformer when it snaps the electron beam from the bottom of the picture back to the top at the end of each frame. The shapes of these pulsed waveforms approximate those that some studies have found to be the most biologically active. Monitors also radiate substantially at about 20 kilohertz, in the very low frequency (VLF) range, which has received even less study than ELF.

Of the equipment tested, the worst offender proved to be the Mac Plus, closely followed by the 512K. The 60-hertz magnetic field it generated was about as strong as the earth's magnetic field, and although this field could induce biologically active signals in the human body, it was strongest at the side of the system. The field in front of the computer—where you're likely to sit—was only one-fifth as strong. Mac IIs show dramatically weaker fields, and the Ilcx generated the weakest field of all.

Monitors likely to be used with

<table>
<thead>
<tr>
<th>Table 1: Low-Frequency Field Values (in milligauss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macintosh SE</td>
</tr>
<tr>
<td>Sony color monitor</td>
</tr>
<tr>
<td>Household appliances</td>
</tr>
<tr>
<td>High-voltage transmission lines</td>
</tr>
<tr>
<td>Macintosh Plus</td>
</tr>
<tr>
<td>Macintosh 512K</td>
</tr>
<tr>
<td>Zenith 14-inch FTM color monitor</td>
</tr>
<tr>
<td>Office environment</td>
</tr>
<tr>
<td>Radius FPD</td>
</tr>
<tr>
<td>Electric blanket</td>
</tr>
<tr>
<td>Electric power lines</td>
</tr>
<tr>
<td>Apple 13-inch color monitor</td>
</tr>
<tr>
<td>Macintosh II</td>
</tr>
<tr>
<td>Macintosh Ilx</td>
</tr>
<tr>
<td>Radius 2PD</td>
</tr>
<tr>
<td>Macintosh Ilcx</td>
</tr>
</tbody>
</table>

The range of low-frequency electromagnetic fields generated by Macintosh computers, some popular monitors, household appliances, and the environment.

Data courtesy of Tom Green, MacUser Labs, and the Electric Power Research Institute.
these machines showed magnetic fields much stronger than the Macs themselves but still well below the fields generated by older models (see Figure 1).

**Protect Yourself**

If you regularly use an older Macintosh or find the fields generated from more recent models worrisome, there are precautions you can take.

To begin with, distance yourself from your work. The captive magnetic fields associated with low-frequency radiation from displays and computers diminish in intensity with distance. Sitting an arm’s length (2.5 to 3 feet) from the monitor can significantly reduce the strength of the field to which you’re exposed.

If you can’t work that far away from your system, the window nature of ELF fields affords another solution: Change your position occasionally. Two distinctly different working positions could change the field strength enough so that no part of your body will stay in the biologically active window for long.

Avoid the sides of monitors as best you can. For example, if you work in an office with several Macs, try to arrange them so that the sides and backs of each system are at the greatest possible distance from people working elsewhere in the room.

Commercial shielding devices do not seem to offer much protection against ELF magnetic fields, as they are designed to shield electrical radiation (which is rerouted to a direct electrical path to ground) and have no measurable effect on the magnetic component. As yet, there is no commercially available means of shielding ELF fields because the shields are tiny compared with ELF wavelengths (which are measured in miles rather than inches).

And finally, don’t panic. Research is in the preliminary stages, so it’s still too early to say whether low-frequency electromagnetic fields will be the asbestos of the 90s. It will take several years before scientists can determine with any certainty what the specific risks are of using a computer monitor. Future articles in *MacUser* will explore and report on the continuing research in this area. In the meantime, the best advice we can give is to take reasonable measures to control your exposure.

Winn L. Rosch is a computer writer who has worked with frequencies from 0 to 950 megahertz at powers of more than 3 megawatts and survived to write this article.

---

**Fast!**

You know it’s there... somewhere - the exact piece of information you need. But, you can’t spend all day trying to find it. Fortunately, RACET has the answer to your on-line archival requirements. The COSMOS 600 erasable optical drive is the perfect solution for that data which is used less than often, but more than never. And, for which speedy access is a must!

Cosmos provides large capacity optical storage (600MB), uses ISO standard cartridges and is fully MAC O/S, Appleshare, and TOPS compatible. Additionally, it’s shipped with our high performance mass storage sub-systems.

Call today; we’ll help you find what your looking for, fast!
Swivel 3D® is the best-selling, three-dimensional Macintosh program for anyone who needs high-quality graphics for product design, scientific visualization, animation, and graphics for desktop publishing and multimedia presentations.

Easy to learn and use, Swivel 3D comes with an extensive library of 3D art including alphabets, human figures, robots and additional shapes and figures.

By instantly changing the lighting, casting a shadow, or placing 2D art over a 3D surface, Swivel 3D gives you the freedom to explore all kinds of dramatic possibilities. Quickly and easily.

What's more Swivel 3D works with your other graphic programs because it supports all the popular formats: Encapsulated PostScript® for Adobe Illustrator; PICT2 for Studio8; PixelPaint and PageMaker; PICT for MacDraw II; and the animation format — PICS — for MacroMind Director.

Express yourself. Call (415) 543-3848 today.
Demo disks are available for $10.

PARACOMP

Paracomp, Inc.
123 Townsend Street, Suite 310
San Francisco, Ca 94107, 415-543-3848

Swivel 3D is a trademark of Young Harvill/VPL Research, Inc. Other brands and product names are trademarks or registered trademarks of their respective holders. © 1989 Paracomp, Inc.

Please circle 106 on reader service card.
In our most ambitious project to date, MacUser Labs sought out every hard-disk drive with less than 100 megabytes of storage capacity. We found 101 drives sold by 31 vendors, built with mechanisms provided by 11 OEMs. With such a confusing array of drives, it's almost impossible for anyone to separate the winners from the losers. That's why we've done it for you.

The drives were put through a rigorous suite of benchmarks to test read/write speed, raw drive performance, temperature and noise levels, and construction quality. In the end, we selected three top picks for each category of drive capacity. We also assembled a mammoth features table that includes the most important specifications for all 101 drives. So if you want to investigate alternatives to our favorites, you've got all the information you'll ever need at your fingertips.
Tu be chosen the best from a large crop of drives requires more than good looks. We've worked hard to make our drives the best, inside and out, because we know that your reasons for choosing a drive run more than skin deep.

You should know that many other drive manufacturers' concern with quality stops with the case. At La Cie we don't think that's what value is all about. That's why we only use the best drive mechanisms and components — and we can prove it. We offer the fastest, quietest and smallest drives with the only five year manufacturer's warranty in the industry backed for five years by Quantum, Maxtor and Hewlett Packard.

Our attention to details makes us better. Silverlining™ is one more example of that. We wrote it and MacWorld highly recommends it: "La Cie drives include the best software we tested." What does it do? Silverlining performs formatting, interleave setting, programmable SCSI addressing, true partitioning, resizing of partitions without initializing, diagnostics, password protection, defragmentation and much more. We're proud to point out that Silverlining was the first partitioning software available for the Macintosh.

Next time you purchase a drive be sure you experience the difference...experience the cream of the crop — La Cie. That's your right.

Cirrus Drives

<table>
<thead>
<tr>
<th>CAPACITY</th>
<th>EXTERNAL</th>
<th>MECHANISM</th>
</tr>
</thead>
<tbody>
<tr>
<td>42 mb</td>
<td>$659</td>
<td>Quantum</td>
</tr>
<tr>
<td>84 mb</td>
<td>$959</td>
<td>Quantum</td>
</tr>
<tr>
<td>105 mb</td>
<td>$1059</td>
<td>Maxtor</td>
</tr>
<tr>
<td>201 mb</td>
<td>$1599</td>
<td>Quantum</td>
</tr>
<tr>
<td>613 mb</td>
<td>$3099</td>
<td></td>
</tr>
</tbody>
</table>

Includes Silverlining™, Silverserver™, WingZ Test Flight™, 5 mb of public domain software, Cordura carrying case, 30 day money back guarantee and 5 year warranty.

Specials*

20mb—$399 ★ 30mb—$449
70mb—$599

*MacWorld says Cirrus drives include an outstanding set of utilities
Mass storage and productivity solutions for the Mac office.

19" LaCie LaMonz Color Systems: 72dpi, 1024 x 768 resolution, anti-glare screen and tilt/swivel base. 8 or 32 bit for display of 256 or millions of colors.
- 8 bit card with Sony® Trinitron monitor — $3999.95
- 32 bit card with Sony® Trinitron monitor — $5999.95

Cirrus 600MO Magneto-Optical Drive: 600 megabytes of erasable, removable data storage. Includes superior Sony drive mechanism, plus our own Silverlining and Silverserver software.

LaCie Modems:
- 2400 baud Internal data and fax modem for the portable Mac — $249.95
- 2400 baud Internal modem for Mac II — $299.95
- 2400 baud External modem — $169.95
- 9600 baud External modem — $819.95

Introductory offer! All modems include Machknowledge™ LaCie's Silverplatter™ software and cables.

Phone Line Manager: Automatically routes and sends voice, FAX and modem calls over a single line. Answers incoming calls and connects to the correct device automatically or by caller-entered access codes.

Cirrus Removable Cartridge Drive: 45mb cartridges offer limitless storage with floppy convenience and hard disk speed. Includes LaCie's Silverlining and Silverserver software.

Panther PDX PostScript-Compatible Printer: High resolution, 6ppm, 35 resident typefaces and 900dpi for graphics applications and word processing. "Best New Output Device" Que's 1989 Eddy Winner

Call Us Now! 1-800-999-0143

16285 SW 85th, Bldg. 306
Tigard, OR 97224, (503) 684-0143

Please circle 75 on reader service card.
he hardest thing about hard-disk drives is making the right choice from among the hundreds of available models. There are speeds that would make Chuck Yeager pale, capacities that would have overwhelmed Orson Welles, cases that might make a La Croix model appear naked, and prices that could make a sheik shriek.

Yet if you're serious about getting the most from your Mac, you need a hard-disk drive. Their multimegabyte capacities let hard drives store all your favorite applications and related documents in one place, where you can access them much faster than with floppy drives. Once a luxury item, the hard drive has become a necessity in today's world of gargantuan graphics files and seam-bursting System Folders.

Hard drives are available in such an abundance that evaluating them and picking the best ones turned into the most challenging project yet attempted by MacUser Labs. In keeping with the needs and budgets of typical Mac users, we decided to test only external drives with capacities of less than 100 megabytes. Even so, we managed to pile up 101 SCSI drives from 31 vendors, leaving little room for our technicians to squeeze into the labs. (For a look at drives with capacities in excess of 100 megabytes, see "Big Hard Disks," June '88.)

The 101 drives cover a wide range, from disks for which we'd gladly pay list price ($399 for 20 megabytes up to $2,295 for 80 megabytes) to those we'd happily throw into a body bag and bury. In the interest of fairness, we tested them all but established six categories based on capacity — 20, 30, 40, 60, 80, and 90 megabytes — and compared individual
drives only with other drives that had a similar number of megabytes.

Initially, we limited our focus to three measures: megabytes, milliseconds, and manufacturing quality. After all, with any hard drive, you’re buying storage capacity, speed, and hardware that you’re likely to keep as long as you keep your Mac—and possibly longer. We compared megabytes per dollar, ran DiskBasher! to determine speed, and examined the guts of each drive.

Using the information garnered in the first round of tests, we calculated normalized scores for each drive by weighing bytes per buck (50 percent), DiskBasher! (25 percent), construction (12.5 percent), and ease of setup (12.5 percent). To narrow the field down to a select 18, we chose the 2 top-scoring drives in each size category in addition to a third drive that didn’t necessarily rate among the highest (usually because of inflated retail pricing) but that we felt deserved special recognition. In addition, a drive series that won in one category was automatically eliminated from competition in the others. This approach let us highlight as many vendors’ drives as possible. When a drive is recommended in one category (such as the Jasmine DirectDrive 40), however, it usually means we liked the same line of drives in other sizes too.

We then tore into the finalists with a vengeance, benchmarking every aspect of performance, checking safety features, grading workmanship, and even measuring temperature and noise levels. After weeks of intense evaluation, we can confidently recommend the best external drives for your Mac.

Before going any further, we should note that with the exceptions of Rodime and Western Digital, most vendors don’t manufacture the mechanisms that are the heart of any disk drive. Of the 101 drives from 31 vendors, only 11 OEMs (original-equipment manufacturers) are represented. Vendors buy disk mechanisms in bulk from OEMs and then assemble them in a case with a power supply, cables, and other components. More than anything else, the mechanism determines the drive’s performance. Keep this in mind, because some vendors vary the mechanisms they use, depending on market price and availability. If you’re interested in a certain drive because it contains a Seagate ST125N-1 mechanism, for example, make sure that’s the model you get, not the slower ST125N-0. Some vendors openly admit to switching mechanisms; others hide that fact. If a vendor isn’t willing to commit to providing the mechanism you want, you’d best take your business to one that will.
All the Mac hard-disk drives reviewed this month have several read/write heads on a single swinging arm. The faster the heads move to a given data location on the platters, the shorter the wait you perceive during disk access. Actuators move the arms across the surface of the platters, but servos help the drive figure out the exact location of the heads. There are two primary types of actuators — stepper motor and voice coil — for moving the arms, and two types of servos — embedded and dedicated — for determining when the heads are correctly positioned.

Voice-coil actuators, which derive their name from a similarity in design to the voice coil of audio loudspeakers, move as long as current is applied to them. In general, they are much faster than stepper motors.

With embedded servos, there are servo bursts — little magnetic marks — on every platter surface and between all the sectors. The heads determine where they are by reading these embedded bursts of information.

Dedicated servos use one entire disk surface and head exclusively for positioning the other heads on the arm. This dedicated platter surface can't be used to store data, but it allows for faster operation than with embedded systems. Hybrid servos mix embedded and dedicated techniques to provide quick, accurate head positioning.
Bytes and Bucks

Just as a one-size-fits-all wardrobe is likely to leave you with sleeves dangling to your knees, no one hard drive can possibly be the ideal fit for all systems and situations. You must weigh what you want and what you can afford, to reach a compromise.

The first decision to make concerns capacity. How many megabytes of storage do you want? How many do you need? There is a golden rule that simplifies this decision: All else being equal, buy the largest-capacity drive you can afford. No one has ever regretted having an excess of megabytes.

Larger-capacity drives are better buys too. Building a hard-disk drive is a lesson in economics, with both fixed and variable costs. Every external hard drive, no matter what its capacity, requires the same basic ancillaries: a case, a power supply, and minimum-wage labor to screw everything together. Those fixed requirements mean that even before the drive mechanism goes in, the product costs in the vicinity of $200. For a 20-megabyte drive, that may be more than half the retail price. For a 90-megabyte drive, it may be less than a quarter.

To compare the economics of similarly sized drives, divide their formatted capacity by price. If the bytes per buck are relatively close, make your buying decision based on speed or some other factor. We could have presented the megabytes-per-dollar results, but the prices in the "Buyer's Guide to 101 Hard Drives" table are manufacturers' list prices. They don't necessarily reflect actual "street" prices because mail-order vendors rarely discount their drives as much as do vendors that employ dealer channels.

Racing the Interface

Besides price, the most important drive attribute is speed. A hard drive should be an asset to your Mac, not an anchor that slows its performance. Ideally, you need a drive that can spin off its information as fast as your Mac can use it. Drives vary widely in their performance; some are agonizingly slow; others are blazingly fast. It may buck conventional logic, but sometimes it's wiser to buy a slow drive.

You see, external hard-disk drives attach to the DB-25 connector on the back of all Macs since the Plus. This connector is the SCSI port, and it provides a standard way for attaching multiple devices — such as hard-disk drives, scanners, and CD-ROM drives — to the Mac. The problem vis-à-vis hard-drive speed is that the three different series of Macs — the Plus, the SE, and the II family (including the SE/30) — have different maximum limits on their SCSI throughput: about 2,104; 5,248; and 11,200 kilobits per second, respectively. You should buy a drive that closely matches the transfer rate of your Mac's SCSI interface: anything faster may be wasteful because SCSI becomes a bottleneck.

One popular measure of a drive's speed is seek time, the theoretical average time required to move the read/write head from

![Figure 1: Raw Speed](https://example.com/raw-speed.png)

As measured with the shareware utility SCSI Evaluator, under controlled laboratory conditions, all our top picks can spin off data faster than the SCSI port of the Mac Plus can accept it. Only an elite few have throughput faster than an SE, and none can attain the 11,200-kilobit-per-second limit of the Mac SE/30.
Since 1985, PLI has provided powerful storage solutions for data intensive environments.

Selecting proven storage systems that are ideal for your individual requirements is easy. PLI offers a comprehensive range of products that anticipates your storage demands.

More Power To You
PLI delivers more power to you with a wide spectrum of storage solutions. External and internal hard disks from 20 to 650 MB, plus rugged new 45 MB removable cartridge drives. In addition, the new TurboFloppy 1.4 complements the line by offering unequalled flexibility for MS-DOS™ file integration.

Optical Power
PLI redefines optical read/write storage technology. The Infinity Optical™ combines unlimited storage capacity, support for MS-DOS™/MAC/AUX/Novell™, and a PLI exclusive, DOSTransfer™. This powerful utility enables MS-DOS files to be read on the Macintosh™, certifying the Infinity Optical™ as the most powerful optical drive you can buy.

High Performance
With every PLI drive, high performance is a fact, not fable. Exclusive acceleration software delivers exceptional data transfer rates and extraordinarily fast access times. Each drive includes the TurboWare family of high performance software found only with PLI drives.

Reliability
Since it's inception, PLI has been dedicated to one simple principle – reliability. And it is on this foundation that PLI has built a wide range of products that are the finest offered by anyone anywhere. Along with high performance and a significant array of storage solutions, you get what you expect from PLI – reliability.

For the Dealer nearest you call...
(800) 288-8754

Please circle 48 on reader service card.
Capsule Reviews

iDS PRO 20

This low-priced retail drive ($695) has exemplary construction and ease of setup. Its small plastic case matches that of an external floppy drive in size and design, making it the perfect choice for carrying around, but because it draws power from the floppy-disk-drive port, it can quickly drain a Mac Portable's battery. Its Seagate ST125N-0 mechanism is a moderate performer and runs warm because the system lacks a fan.

Pros:
- Compact size. No AC power required.
- Lots of software.
- Automatic head parking.
- Rotary-switch SCSI ID.
- Two-year warranty.

Cons:
- Runs warm. No fan.

Mirror M20

A hard drive for the budget conscious, the Mirror M20 ($447) delivers modest performance, courtesy of its Seagate ST125N-0 mechanism. Its well-built zero-footprint case lacks access to internal SCSI terminators, but it does feature a noise filter, switched outlet, good manual, and good setup software.

Pros:
- Inexpensive.
- Switched outlet.
- Automatic head parking.
- Push-button SCSI ID.
- Zero footprint.
- Two-year warranty.

Cons:
- Marginal workmanship.
- Internal termination.

Western Digital Preference 20

Though slower than the other 20-megabyte top picks, the Preference 20 ($699) makes up for its slow speed with excellent construction. The plastic snap-together case holds a Western Digital 382R mechanism inside its steel subchassis. The rotary SCSI ID switch also selects the termination, and there are indicator lights for power, access, and head park.

Pros:
- Excellent construction.
- Rotary-switch SCSI ID.
- External termination.
- Slow SCSI Evaluator.
- No automatic head parking.

Stock SA6000 30

The Volkswagen of hard drives, the SA6000 30 ($529) offers an excellent price per megabyte. It's built around a Seagate ST138N-0 mechanism packed in an off-the-shelf vertical case that looks used or remanufactured in both the samples we examined. A noise filter and external fuse add quality; spliced wires and Magic Marker blackening of chassis parts shake the faith. Its low price and good performance more than compensate for its aesthetic shortcomings.

Pros:
- Inexpensive.
- Quiet.
- Automatic head parking.
- Rotary-switch SCSI ID.

Cons:
- Noisy.

MicroNet MS30

There's not much to distinguish the MicroNet MS30 ($645) from the rest of the 30-megabyte pack except its marginally lower price and good construction. Its zero-footprint metal case holds a Seagate ST138N-0 mechanism. SCSI ID is set with a DIP switch. The open-frame power supply is internally fused, but the wiring is neat and well laid out.

Pros:
- Good construction.
- Excellent setup software.
- Automatic head parking.
- Zero footprint.

Cons:
- DIP-switch SCSI ID.
- Internal termination.

The top 30-megabyte drives: the MicroNet MS30, GCC UltraDrive 30, and Stock SA6000 30.
one track to another. OEMs usually report this time in milliseconds, with lower seek times indicating faster drives. The primary factor in determining seek time is the mechanical design of the disk drive itself (see the "How It Works" sidebar). The problem with seek times is that they aren’t useful for comparisons between drives, because two drives with the same seek times may perform very differently in real-world situations. Because Mac files tend to be large, data throughput is more important than seek time.

To measure the raw drive speed of our 18 top picks, we used SCSI Evaluator, a shareware utility that writes nonsense blocks (not actual files) to the drives. As Figure 1 shows, even the slowest of our top picks — the Ehman 60 — has an average throughput in excess of the maximum SCSI transfer rate of the Mac Plus. Only an elite few are faster than an SE, and none can attain the 11,200-kilobits-per-second limit of the Mac SE/30, although the MacProducts MagicDrive 91 comes close.

All the drives have the potential to outgun the SCSI port on a Mac Plus, but that doesn’t mean they all perform the same in daily use. To test the real-world speed of all 101 drives, we used DiskBasher!, an exclusive MacUser Labs benchmark. DiskBasher! simulates typical drive performance by reading and writing actual files, unlike SCSI Evaluator, which measures pure throughput.

It’s like the difference between your actual mileage and the EPA ratings for automobiles. The DiskBasher! results (lower times indicate faster drives) listed in the “Buyer’s Guide to 101 Hard Drives” table were generated on a Mac SE/30. Because of their slower SCSI interfaces and less powerful CPUs, a Mac SE takes 60 percent more time, on average, and a Mac Plus requires 200 percent more time (see Figure 2). The MicroNet MS62 was the slowest of all 101 drives, and the Relax Hard 90 Plus was the fastest.

Mixing Sectors

What happens if your hard drive can dish up data faster than it can be transferred to the Mac? Well, believe it or not, you wait a lot. To understand why, you need to know how data is stored on and retrieved from a hard disk.

Before any data can be written to a hard disk, the disk needs to be formatted. During a low-level format, a formatting utility lays out a pattern of concentric circles (called tracks) on the disk. Each track contains many sectors. After the tracks and sectors are in place, data can be written to the disk. Later, when an application requests data from the disk, the drive moves its read/write head to the appropriate track and sector and begins reading the data that was written before.

It sends the data back to the Mac, one sector at a time, waiting for the go-ahead from the SCSI interface before sending the next sector.

If the requested data is in contiguous sectors and the SCSI interface gives the go-ahead fast enough, the drive can efficiently transfer all the necessary data in
Buyer beware. There are those that would have you believe that all external hard drives are essentially the same. But smart consumers know that looks can be deceiving. Everywhere there are companies touting products with the Jasmine look. Yet, while it's relatively easy to make a drive that "looks like a Jasmine," no one has come close to matching the superior design and value of the award-winning DirectDrive series.

Below The Surface.

The real difference begins under the cover. Jasmine uses only the best drive mechanisms available. We've spent countless engineering hours working with the top manufacturers around the world to bring you high-quality, high-reliability drives. In fact, Jasmine co-engineered the industry's first 70,000-hour MTBF (mean time between failure) mechanisms, which are fast becoming an industry reliability standard.

Superb mechanisms are just the beginning. Stringent incoming inspections and testing, a ten-point quality control procedure during assembly, 24-hour burn-in and post-assembly testing all add up to high reliability.
The Side You Never See.
Take a look at the back of our drives and you'll see some of our exclusive design advantages. Like two switched surge protected AC outlets. Plus a push-button SCSI selector for fast, easy configuration. And our easy-access fuse is as simple to replace as a light bulb.

Environmental Control.
Heat and airborne dust are the enemy of every piece of electronic equipment you own. If dust particles infiltrate your hard drive, failure is almost certain. That's why we incorporate a fan with a removable, washable filter for the ultimate in environmental control.

The Brains Behind The Beauty.
Hardware is only part of the story behind Jasmine's superiority. Our exclusive DriveWare™ Optimization Software provides improved drive performance, disk partitioning, password protection, automatic diagnostics and error correction, and A/UX compatibility.

A Different Profile.
Our unique BackPac™ is an excellent example of Jasmine's innovative engineering. It attaches to the back of your Macintosh® Plus or SE series, adding high-capacity storage without clumping your workspace. And your system will still fit in most Mac carrying bags.

Inner Beauty.
Installing your own internal drive is easy with Jasmine's universal InnerDrive™. It comes with brackets for every Macintosh CPU, so as you upgrade your system, you can take your Jasmine drive with you.

Introducing Platinum Flower Service.
Jasmine built its reputation on providing a high level of service and support. And now we're setting a new standard of excellence with our exciting Platinum Flower Service Program. Every drive we produce is accompanied by our unique Platinum Flower Package. Inside the package, you'll find tools and programs designed to keep your drive where it belongs, working with your Macintosh.

And To Top It Off...
To make your Jasmine drive a complete storage system, we include some free extras. Like the acclaimed SUM II disk management software (a $149 retail value). SUM II provides data recovery, file encryption, disk optimization, and backup utilities.

Plus your drive comes loaded with 5MB of the latest ShareWare compiled from the library of the prestigious Berkeley Macintosh Users Group (FMUG). And a Hard Disk Encyclopedia, a complete set of cables and connectors, and an easy access termination panel.

All at no extra cost.

It All Adds Up To Unmatched Value.
Add it all up: Superior features, Platinum Flower Service, SUM II, DriveWare, 30 day money-back guarantee, two year parts and labor warranty, and best of all, great pricing. It all adds up to the best hard drive value in the business.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>DirectDrive</th>
<th>InnerDrive</th>
<th>BackPac</th>
</tr>
</thead>
<tbody>
<tr>
<td>20MB</td>
<td>$499</td>
<td>$599</td>
<td>$699</td>
</tr>
<tr>
<td>40MB</td>
<td>$599</td>
<td>$999</td>
<td>$1,099</td>
</tr>
<tr>
<td>80MB</td>
<td>$849</td>
<td>$1,199</td>
<td>$1,299</td>
</tr>
<tr>
<td>160MB</td>
<td>$1,199</td>
<td>$1,499</td>
<td>$1,599</td>
</tr>
</tbody>
</table>

Jasmine

To Order, Call
1-800-347-3228
Visa, MasterCard, American Express and corporate purchase orders accepted.

Please circle 60 on reader service card.
Capsule Reviews

Heart HD 1040 1/2
One of the less expensive 40-megabyte retail drives, the Heart HD 1040 ($839) consists of a speedy Quantum ProDrive 40S mechanism inside a thin steel shell. Overall construction is excellent. The case’s footprint is a bit bigger than that of a Plus or SE, and the system’s power supply is internally fused.


Cons: Wire work could be better.

Microtech Nova 40
Price and performance make the Nova 40 ($649) a good choice. The plastic zero-footprint case packs a Quantum ProDrive 40S mechanism and is doubly fused. The Nova series comes with excellent manuals, software, and a plastic case.


Cons: Internal termination.

Jasmine DirectDrive 40
The DirectDrive 40 ($599) has it all: excellent performance, which it gets from a Quantum ProDrive-40S mechanism; great construction with attention to detail (including a filtered air supply, two fused and switched outlets, surge protection, and SCSI-termination access); and a generous supply of software. Only loose wiring and unkeyed internal connectors downgrade the overall impression.


Cons: Wire work could be better.

40-MB Drives
Recommended 40-megabyte hard drives: the Jasmine DirectDrive 40, Microtech Nova 40, and Heart HD 1040.

On the Horizon
As the data-transfer rates in Figure 1 indicate, many hard-disk drives exceed the maximum throughput speeds of the SCSI port on the Mac Plus and SE. Fortunately, an ANSI (American National Standards Institute) subcommittee is hammering out an enhanced SCSI standard that’s expected to be ratified later this year. Called SCSI-2, it promises to increase data-transfer speed by a factor of 8 and add several convenience features to the SCSI connection.

The current SCSI standard transfers data 8 bits at a time, whereas your Mac prefers to deal with information in 32-bit chunks. SCSI-2 matches the Mac’s demands by adding an extra 68-pin connector for carrying the additional 24 bits of data. The new connector complements the 50-pin Centronics-type plug that’s used on today’s SCSI equipment. Although that means you need an extra cable to link SCSI equipment, it keeps “wide bus” SCSI devices compatible with the earlier standard.

SCSI-2 also adds speed by doubling the bit rate across the bus under certain conditions. They include the use of special high-quality cables and differential signals, in which two wires are used for each bit of data. You won’t be able to use DB-25 SCSI connectors for such high-speed transfers, because they provide too few pins for all the necessary signals.

In addition to the speed enhancements, SCSI-2 calls for a Common Command Set, which makes certain commands mandatory for all SCSI devices. As it stands, developers pick and choose which commands they want to implement in their SCSI devices, which causes compatibility chaos. Although SCSI is usually pronounced “scuzzy,” Apple’s quirky implementation is jokingly referred to as “scummy,” for small computer Macintosh interface.

Because these SCSI-2 enhancements require hardware revisions, they won’t help existing Macs unless third-party developers introduce SCSI-2 NoBus cards. We can only hope future Macs will have SCSI-2 built in.
Because SCSI is slower on earlier Macs, drives must be properly interleaved for best performance. For example, a 2:1 interleave, where every other physical sector is the next logical one as far as the drive is concerned, is recommended for the Mac SE. While the drive is waiting for SCSI to give the go-ahead to read the next sector, only one "wasted" sector passes beneath the read/write head—the disk doesn't have to make an entire revolution. For this and other reasons, it's best if you have the option of setting the interleave manually.

Installation
Before you worry about setting the proper interleave—in fact, before you can do anything with a hard drive—you must resolve two SCSI issues: identification and termination.

The SCSI protocol lets you connect up to seven devices (even multiple hard drives, for increased storage) in a daisy chain—a single device plugged into the back of another—but each device in the chain requires a unique identifying number. Some installation utilities detect the type of Mac being used and automatically set the optimum interleave. But if an accelerator is present, the chosen interleave may be inappropriate. For this and other reasons, it's best if you have the option of setting the interleave manually.

Capsule Reviews

Crate MacCrate 60
Although the MacCrate 60's construction and workmanship rank among the best, the cooling of the MacCrate 60 ($839) proved among the worst because its fan hides inside the modular power supply. The MacCrate's performance was average because of its Seagate ST277N-0 mechanism, but the system nevertheless scores high on attention to detail.
Cons: Runs warm. Internal termination.

Ehman 60
Price is the best reason for buying the Ehman 60 ($579); performance is the reason to avoid it. Its Seagate ST277N-0 mechanism proved among the slowest of all tested. On the other hand, design and workmanship are generally good—it features filtering and an access door to internal terminators.
Cons: Noisy. Slow SCSI Evaluator.

SuperMac DataFrame XP60
The vertical metal case of the DataFrame XP60 ($1,199) contains a Seagate ST277N-1 mechanism. Inside, the wiring is neat and well insulated. Setup is a breeze. Bundled software is extensive, including SuperSpool, SuperLaserSpool, and DiskFit.

60-MB Drives
Our favorite 60-megabyte drives: the Ehman 60, Crate MacCrate 60, and SuperMac DataFrame XP60.
You No Longer Have To Sacrifice Quality & Service For A Great Price!

If you've narrowed your next drive purchase down to a SyQuest-based removable, you're halfway there. This Eddy award winning technology has become the standard for Macintosh removable media drives. Fast access, large 42Mb volumes, and cross-vendor hardware compatibility make it the right choice.

But which SyQuest-based drive do you buy?

There is a difference; and no one knows better than Mirror Technologies. Our DriveCare™ technicians repair everyone else's drives, and get to see what makes them tick (or not tick).

Compare! Look for features like external SCSI address selection. An international power supply that works anywhere in the world. Solid steel construction. An AC convenience outlet. Whisper quiet cooling fan. Gold plated contacts. Protective EMI/RFI filters. And great software that includes formatting, diagnostics, and disk backup utilities. All in a sleek, low profile package that fits neatly under the Mac.

And don't be deceived by "extended" warranties that don't even cover the SyQuest mechanism! You deserve better than that.

Discover the benefits of dealing with the Original Direct Merchant of Macintosh Peripherals! We've been setting the pace for Macintosh mail order peripherals since 1985. Our customers have long enjoyed the savings of our factory direct price strategy. And the security of our risk-free 30 day Love-It-Or-Return-It™ policy. And our 24 Hour/7 Day a week Order Hotline. And our MirrorLoaner™ downtime minimization program. And immediate delivery (96% of our orders ship within 24 hours). And our DriveCare™ drive repair program.

Call today and let us show you a better way to buy Macintosh peripheral products!

TO ORDER CALL TOLL FREE
1 800 654-5294
M Series Externals $447
Steek, fast, and quiet. No compromises. International power supply, SCSI switching, fan, and cables are standard equipment. Shipped formatted, tested and loaded with over 20Mb of software, backed by a 2-year warranty.

M Plus Externals $597
These are the drives that reviewers rave about. Similar to the M series, except our Plus drives contain the fastest mechanisms in the industry.

MI Internal Drives $377
Save space and money. We've got drives for all SE and Mac II computers. Custom mounting for the SE allows you to keep both original drives!

Combination Drives $1287
C series drives combine our finest drives (Quantum & Imprimis, the slowest being 17ms) and a choice of removable or tape backup.

600Mb Erasable Optical $3497
600Mb of low-cost optical storage. Second generation speed and full industry-wide compatibility. Buy from the company with more removable solutions than anyone!

20MB Removable $927
Our RM20 is as fast as many hard drives but with the integrity of a floppy. Utilizing Kodak technology, the shock resistant media is guaranteed for life, making it perfect for archiving and backups.

80MB Removable $1247
Our RD-series drives allows you to choose fixed hard drives from 30 to 200Mb, mounted in a slide out "drawer". Combines the convenience and security of a removable with the speed and large capacity of a fixed hard drive. Look that file server up at night.

.3Mb Floppy Drive $147
The original 800K; reviewers have loved for years. In addition to continually improving it, the price has dropped to $147.

FREE OFFER
$499 Value
MirrorImage Printer $2997
Look familiar? It's based around the popular Eddy Award winning Quine design. 39 built-in fonts, 5 page/minute RISC technology and a 300ppi liquid crystal shutter, it can out perform Apple's best printers. At this price, why would you buy from anyone else?

Flattened Scanner $597
Crisp line art, and dithered halftones at a fraction of the cost of most scanners. Complete with full function scanning software, DeskPaint and, for a limited time, we're including FREE Optical Character Recognition (OCR) software from Olduvai ($495 Value).

150MB Tape Backup $897
Don't settle for a tape backup system that's designed around a cheap audio cassette derivative! Our T150 is a European engineered drive (Siemens of Germany) that packs 150Mb of your precious data onto solid 3M DC600 type data cartridges, at 3 times the speed of most competing solutions. And it's painless! Our custom software facilitates automated (unattended) backups, mirror-image, file by file, or incremental backups.

DriveCare
Dead Ematron or Apple Drive?
Our experts can breathe new life into almost any fixed or removable hard drive. And we recover data too! SuperMac, Jasmine, Rodime, CMS, MacBottom, and others. 20-500Mb. They're all welcome! (ie: 40Mb start at $277). Call our Technical Support Hotline today for details! 812-833-2105.

TO ORDER CALL TOLL FREE
1 800 654-5294

TECHNICAL SUPPORT HOTLINE: (612) 633-2105 Hours: Mon-Fri 8am-5pm CST

Please circle 83 on reader service card.
All prices specifications subject to change without notice. Call for current pricing, warranty, and promotional details. Mirror and MirrorImage are trademarks of Mirror Technologies, Inc. All other brand and product names are trademarks or registered trade names of their respective holders. No surcharge for Visa, MasterCard, Discover, and Telecheck.
101 Hard Drives

number. As the host (interrogator in SCSI terms), the Mac comes from the factory set as device 7. Your hard drive can be given any other SCSI ID from 0 to 6, with one important caveat: No other SCSI device can have that same number.

You can set SCSI ID numbers in several ways. The choices include mechanical settings using DIP (dual in-line) switches, push buttons, jumpers, and special software that alters nonvolatile memory on the drive. An example of a drive that has the latter is the MagicDrive 91 from MacProducts USA, which includes a setup utility for selecting its SCSI ID. In general, external switches are preferable to internal ones, because they don't require you to open the case. And recessed switches are preferable, because you're less apt to inadvertently change them when blindly groping around for the power switch on the back of a drive. Rotary switches and push buttons are best because they — unlike DIP switches and jumpers — instantly show the SCSI ID settings. Software-based solutions mean you must keep the software disk around (or clutter your hard disk with little-used utilities).

SCSI systems also require that the devices at either end of the daisy chain be terminated. This stipulation ensures that all signal voltages reliably fall within the right range and prevents unwanted signal reflections from appearing on the SCSI lines. Ordinarily, the SCSI protocol calls for the host to include one terminator in its circuitry, but for reasons known only to Apple and God, the Mac lacks one. Consequently, the Mac SCSI connection requires two terminators: one each on the first and last devices in the daisy chain.

Vendors have differing approaches to termination. Most disk mechanisms come from the OEM with removable terminating resistors installed in the drive. Some vendors — such as LaCie, MacLand, and Mirror — leave these in place and require you to disassemble the case to get at them if required with your hardware configuration. The kinder and gentler vendors provide an access door on the bottom of the case that lets you pop off the resistors without disassembling the unit.

A better approach is for the vendor to remove the drive’s resistors and provide an external terminator plug instead. If you need termination, you slide the supplied plug into the last connection in the SCSI chain. Although it’s one more thing to lose or have fall off, the termination plug is a simple, effective method that gives a visual confirmation of whether it is installed or not. Apple, Deltac, EMAC, GCC, and others have chosen this termination scheme for their drives.

Western Digital takes a unique approach with its Preference drives, using an external SCSI identification switch that also enables termination. The lower seven selections of the switch terminate the SCSI lines, and the upper seven leave them unterminated.

**Projecting Longevity**

Once you have these SCSI issues solved and your hard drive running, you hope it...
A drive such as the SuperMac DataFrame XP60 can be a screamer — literally. Its 54-decibel fan is as loud as conversational speech. Noise has nothing to do with speed, but it can be just as important if you’re going to be cloistered with a drive for hours at a time.

will stay that way. Reliability is a multifaceted issue because hard drives can suffer the indignity of magnetic, mechanical, and electronic failures.

Included among the mechanical problems are head crashes. These occur when the drive’s read/write head, which normally flies only microinches above the disk surface on a cushion of air, touches the disk itself. If the disk surface is soft or the head movement is violent (say, for instance, the disk drive is dropped), the disk can be damaged. Worse, material kicked up in the crash can cause further damage later on. To guard against head crashes, be sure your drive is able to automatically park the read/write heads away from the data portion of the disk whenever it’s switched off.

Whereas a head crash can take out your hard disk in one fell swoop, drives face another menace that slowly drains their life away — heat. The hotter the temperature at which the drive and its electronics operate, the shorter their lives will be. Most vendors include a cooling fan of some sort, but hard drives differ wildly in how well their cooling systems work. Airflow is the deciding factor. Most fans are designed primarily to cool the power supplies; only incidentally do they cool the hard disk. But a properly designed system circulates air throughout all components of the drive system, keeping everything cool. The Aristotle HARD-PAC, IDS PRO, Liberty, Relax Sierra, and Tallgrass TravelPac drives lack fans altogether.

To evaluate the cooling abilities of the drives and give some prediction of drive life, we used a Fluke 51 K/J Digital Thermometer to measure the temperature inside our 18 top picks after they had been running overnight in our air-conditioned labs, which have an average ambient temperature of 72 degrees Fahrenheit. Our measurements showed a wide range of temperatures. The warmest drive, the Crate MacCrate 60, ran a full 28 degrees hotter than the coolest drive, the Storage Dimensions MacinStor 90 (see Figure 4). Although none of the drives reviewed operated outside the manufacturers’ recommended temperature range, cooler operation should give you more confidence in a product.

Note, however, that cooling must be weighed against other factors. The Ehman 60, for instance, ran at a cool 90 degrees but could wake someone from a deep sleep with its 51-decibel fan, which is almost as loud as conversational speech. We measured all the drives’ noise levels in a controlled environment with a handheld Cel Instruments CEL-254 Digital Impulse Sound Survey Meter (see Figure 5). The average ambient noise in the lab was 35 decibels.

Construction Deduction

In picking a reliable drive, also consider the care with which it is put together. MacUser Labs disassembled every drive tested to evaluate construction care and overall quality. Our final judgments were based on factors including design and layout, workmanship, component
The portable computing world isn't very forgiving. The moment you grab your portable computer and walk out the door, your data is at risk. One bump. One wrong step. One clever thief. And your valuable data could be gone forever. But thanks to the rugged, removable design of the new Bernoulli Portable 44 for Macintosh, you'll never have to face that prospect.

Engineered for the new Apple Macintosh Portable, the lightweight, battery-powered Bernoulli Portable protects data from the shakes and jolts inherent in travel. Unlike hard disks, patented Bernoulli Technology makes the Bernoulli Portable virtually head-crash free. And 44MB removable Bernoulli Disks can withstand shocks of 1000Gs without data loss.
PORTABLE 44 MEANS NO IFS, ANDS, OR PLUGS.

Bernoulli Disks also allow you to remove your data from the drive and carry it separately and safely, in case your hardware is stolen or damaged. Beyond that, Bernoulli provides unlimited storage and backup capacity, with 22msec effective access time, and Reed-Solomon data protection that's 15 times more effective than that used on a typical hard disk.

As the leader in removable mass storage, Iomega also has a complete line of single- and dual-drive 44MB Bernoulli products that offer the same benefits for Macintosh as well as IBM* users in desktop environments.*

So make sure your data arrives with you. Contact an Iomega representative or call 1-800-777-6649 for complete specifications on the Bernoulli Portable 44 for Macintosh. And discover what it means to have secure data. No matter where you go.

* Bernoulli File Exchange software allows data migration between IBM and Macintosh. Bernoulli and Bernoulli Technology are registered trademarks and Bernoulli Means Security For Your Data is a trademark of Iomega Corporation. Apple and Macintosh are registered trademarks of Apple Computer, Inc. IBM is a registered trademark of International Business Machines.
choice, and wiring. For instance, loose wiring can work its way into dangerous positions. Wires lying atop power-supply heat sinks may short out. We believe that care taken in the manufacture of a hard-disk system pays off in longer, more reliable life, so we formed our conclusions about quality accordingly. For example, the Liberty 40 and 80 are the smallest external drives available. The vendor has managed to squeeze a 3.5-inch-disk mechanism into a tiny case with a small powersupply. Unfortunately, with two of the units we tested, some electronic components were poorly positioned and eventually arced to the metal case, blowing up the power supply of one unit and tripping the circuits on our lab bench with the other. We were about to issue these drives a bomb in our mouse ratings when the manufacturer brought us a revised model designed to eliminate this hazard. After roughhousing with the new Liberty drives, we’re pleased to report that the problem appears to be fixed and that the drives merit a 3.5-mouse rating.

Because many vendors use the same mechanisms, we also tested the other major component in a hard drive: the power supply. Power supplies are designed to deliver specific voltages within a narrow range. Too much fluctuation, and the electronic equipment on the receiving end— in this case, the disk mechanism— can be in for trouble. We used a Fluke 87 True RMS Multimeter to measure the actual output of the power supply in our top picks and found that all of them operate within specification.

**Big Bad Bundles**

As mentioned previously, most vendors buy the same basic off-the-shelf components, screw them together, put them in a case, and slap their logo on the front. In an effort to differentiate their offerings from the competitors, many vendors sweeten the deal with free software.

Bundled software runs the gamut from scraps of freeware thrown in seemingly for sheer volume alone to well-chosen commercial applications that normally retail for hundreds of dollars. Dolphin, iDS, Jasmine, LaCie, and MacProducts fill up their drives with megabytes of shareware, public-domain, and "demo" software. If you’re just getting started and need to build a library of software, such loaded drives are a good idea.

More-discriminating buyers may be interested in specific commercial programs such as DiskFit, DiskTop, FastBack II, PC Tools Deluxe, QuicKeys, Silverlining, SUM II, and SuperSpool, to name a few. These packages, in different combinations, are available from Ehman, GCC, Jasmine, LaCie, Maxcess, Rodime, SuperMac, and Storage Dimensions. Although we didn’t have the resources to evaluate all the bundled software, the Software heading in the “Buyer’s Guide to 101 Hard Drives” table contains a checklist of the types of programs bundled with specific hard drives. Some of the more useful utilities handle spooling,
Capsule Reviews

Deltaic Server 90

The Server 90 ($1,595) is the least expensive retail 90-megabyte drive. It's got a screaming mechanism—an Imprimis Wren III 94211-991—in a well-done case with the right details, including an external fuse and a noise filter. The scant documentation leaves you pretty much on your own.

Cons: Scant documentation. Noisy.

MacProducts MagicDrive 91

A fast drive and a power center with three switched outlets bring the magic. The Imprimis Wren III 94211-991M mechanism makes the MagicDrive 91 ($950) the fastest unit tested. The solid 14 wire, noise filter, and 10-ampere circuit breaker make it the gutsiest. Limited surge protection (between the hot and neutral leads only) and a mere 15 pages of documentation mar the package.


Storage Dimensions MacinStor 90

The zero-footprint case of the MacinStor 90 ($1,749) holds an ambling Maxtor LXT-100 mechanism. It's a bit expensive, but the case is prewired—including LEDs, SCSI ID, and power—for an additional 3.5-inch drive, in case you ever need more capacity in the same box. The system includes good software (PC Tools Deluxe) and documentation.

Cons: Slow SCSI Evaluator. Slowest 90-megabyte drive.

The Bottom Line

We can't recommend any one hard-disk drive as the ultimate in mass storage, but we can offer one piece of very good advice: Always buy a drive with the largest capacity you are able to afford. Keep in mind, however, that you'll often have to trade off price for performance. The Ehnman drives, for example, are almost always the least expensive—and slowest—in each size category. Worth knowing about if you're on a budget, worth avoiding if you have a real need for speed.

After testing, disassembly, and full evaluation, two leaders emerged—the Jasmine DirectDrive 40 ($599) and the Microtech Nova 40 ($499)—both from the hottest contested 40-megabyte category. These mail-order products use the same high-performance Quantum ProDrive 40S mechanism to deliver speed enough to outrun any Mac except an SE/30. And both can continue to work. Partitioning software can divide one large physical drive into several smaller logical drives that appear on the desktop individually.

Backup software copies files from the hard disk to another medium for safekeeping. Password protection prevents others from accessing your hard disk without the appropriate password, and data encryption scrambles the contents so that even if they break the password, the information they get is gibberish. File-recovery utilities can rescue deleted or damaged files. Finally, disk optimizers reorganize disk contents into contiguous blocks, thereby improving performance.

The Hard Part

As we said at the outset, with 101 hard drives, making the right choice is a difficult decision. You must balance your needs against your means; trade off value for speed; and consider intangibles such as reputation of the vendor, construction quality, and case aesthetics. There is no one “best” drive, but see the “Bottom Line” sidebar for our suggestions.

Computer author Winn L. Rosch thought he had a remarkable hard-disk-drive collection until he saw the stack in MacUser Labs. Thoroughly disheartened, he's gone back to work on a sequel to his book The Winn Rosch Hardware Bible.
Low Cost, Easy to Store, Easy to Carry

**MicroPak Transportable SCSI Hard Disk Drives**

20, 30, 40, 46, 80, 100, 105, 130, 172 and 200 MB

Fast as 15 ms Average Access!

For The Macintosh Plus, SE, SE/30, IIcx and IICi
And The Macintosh Portable

Reliable, fast, cool, quiet, affordable, light weight design that does not require a fan or an internal power supply. The MicroPak obtains its power from the Macintosh's floppy port and data from the SCSI port and they weigh less than 3 pounds and measure 2 x 5 x 9 inches.

The MicroPak design is revolutionary in size, speed, price and performance. Excellent for those who need to transport data from home to office or need to lock their data in a vault for security reasons. Uses the floppy port of the Plus, SE, SE/30, IIcx and IICi for power with fast data access through the SCSI port. MicroNet offers the PowerPak, a universal power supply for use with the II and the IIx or if the floppy port is being used.

A BatteryPak option allows any MicroPak drive to be used with a Macintosh Portable for long periods of time, supplementing or backing up the Portable's internal hard drive. Each system is tested and shipped complete with all cables, one year factory warranty, disk activity LED, external SCSI ID select switch and two 50 pin connectors for daisy chaining to other devices. Optional custom designed carrying bag available.

"QUALITY YOU CAN COUNT ON"

Call for data sheets and the name of your nearest dealer. Dealer inquiries invited.

MicroNet Technology, Inc.

20 Mason  •  Irvine, California 92718  •  Telephone: (714) 837-6033
FAX: (714) 837-1164  •  Connect: Micronet  •  AppleLink: D1656  •  CompuServe: 76004,1611

Please circle 182 on reader service card.
Macintosh Data Storage
Fast as 5.4 ms Access
Using MicroNet's Overlapping Seek Algorithms and Spliced
Imprimis MacWren Full-Height Hard Disk Drives

642, 1174 and 2011 MB
Especially Suited For Use With The SE/30, II, IIx, IIcx and Ilci

Micro/Spliced Rapid Access Storage Systems are excellent for disk intensive applications, such as, sound, desktop presentation, file servers, CAD and computer-aided-publishing systems. These subsystems seek half as far, half as often and increase transfers up to 60%.

Micro/Spliced systems use two identical MacWren hard disk drives that are daisy chained with their SCSI ID's set in sequential order. Two hard disk drives are spliced into one logical volume by use of a device driver developed by MicroNet. An Overlapping seek system appears as one volume on the desktop or it can be partitioned with up to 36 partitions with password protection. The system occupies two SCSI ID positions and are compatible with Mac/OS only. Each system is fully tested and includes a one year warranty and is rated at 40,000 hours MTBF. Our SCSI software is maintained by our own engineers to be fully compatible with the latest system releases from Apple Computer. Other features include verify, bad block spare, SCSI bus status, disk cache enable and are developed around reliable MacWren hard drives.

"QUALITY YOU CAN COUNT ON"
Call for data sheets and the name of your nearest dealer. Dealer inquiries invited.

MicroNet Technology, Inc.
20 Mason • Irvine, California 92718 • Telephone: (714) 837-6033
FAX: (714) 837-1164 • Connect: Micronet • AppleLink: D1656 • CompuServe: 76004,1611

Please circle 183 on reader service card.
# A Buyer's Guide to 101 Hard Drives

The following table contains everything you'll ever need to know about the 101 hard drives examined for this lab report. Drives are grouped according to size and listed alphabetically by manufacturer.

<table>
<thead>
<tr>
<th>Capacity (MB)</th>
<th>The Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>20MB</td>
<td><strong>List price</strong> — The manufacturer's suggested retail price. Actual &quot;street&quot; price may be considerably lower. Drives sold mail-order aren't discounted as heavily as drives sold through retail channels.</td>
</tr>
<tr>
<td>30MB</td>
<td><strong>Capacity</strong> — The advertised capacity of a drive typically represents unformatted capacity. Actual formatted capacity — useful storage space — is usually somewhat lower.</td>
</tr>
<tr>
<td>40MB</td>
<td><strong>Seek time</strong> — The theoretical average time required to move the read/write head from one track to another, as reported by the manufacturer. Lower times indicate faster drives.</td>
</tr>
<tr>
<td>60MB</td>
<td><strong>DiskBasher! results</strong> — DiskBasher! is an exclusive <em>MacUser</em> benchmark test that simulates real-world drive performance during typical read/write operations. Lower times indicate faster drives.</td>
</tr>
<tr>
<td>80MB</td>
<td><strong>OEM mechanism</strong> — Most drive vendors buy disk mechanisms from OEMs (original-equipment manufacturers) and package them in a case with a power supply and cables. More than anything else, this mechanism determines the performance of the drive. Some vendors vary their mechanisms, based on price and availability.</td>
</tr>
<tr>
<td>90MB</td>
<td><strong>Platters</strong> — The number and size of the magnetic media inside the drive.</td>
</tr>
<tr>
<td></td>
<td><strong>Head positioning</strong> — The method of moving the read/write head over the data on the platter. Voice-coil actuators are faster than stepper motors.</td>
</tr>
<tr>
<td></td>
<td><strong>Automatic parking</strong> — If a drive's read/write head is automatically parked over a safe area of the platter during shutdown, the disk surface is less likely to be damaged in the event of jarring.</td>
</tr>
<tr>
<td></td>
<td><strong>ID selector</strong> — Each device on the SCSI bus needs a unique identification number. Externally accessible selectors are best, DIP switches are a little awkward, and software-based &quot;solutions&quot; are the most inconvenient.</td>
</tr>
<tr>
<td></td>
<td><strong>Termination</strong> — The SCSI bus requires termination for proper operation. Externally accessible terminators such as plugs and switches are best, whereas internal terminators are less desirable.</td>
</tr>
<tr>
<td></td>
<td><strong>Cable</strong> — The length of the SCSI cable determines where you can position the drive on your desk. The cable must have one 25-pin connector to attach to the Mac's SCSI port, and the connector at the other end can be either 25- or 50-pin (the latter is preferred).</td>
</tr>
<tr>
<td></td>
<td><strong>Print spooler</strong> — Does the drive have a utility that takes care of printing in the background so that you can continue with your work?</td>
</tr>
<tr>
<td></td>
<td><strong>High-speed copy</strong> — Does the drive come with a utility that bypasses the Finder to copy large amounts of data faster than the Finder can?</td>
</tr>
<tr>
<td></td>
<td><strong>Low-level formatting</strong> — Does the drive come with a utility to reformat the drive and map out bad blocks?</td>
</tr>
<tr>
<td></td>
<td><strong>Interleave selector</strong> — A drive's performance depends on matching its interleave with the type of Mac used. Automatic interleave selection during formatting is convenient, but user selection is necessary under some circumstances, such as for Macs with accelerators.</td>
</tr>
<tr>
<td></td>
<td><strong>Partitioning</strong> — Does the drive have the ability to divide one large physical drive into several smaller logical drives, with each one appearing on the desktop individually?</td>
</tr>
<tr>
<td></td>
<td><strong>Backup</strong> — Does the drive come with software that copies files from the hard disk to another medium for safekeeping?</td>
</tr>
<tr>
<td></td>
<td><strong>Password protection</strong> — Does the drive come with a method of preventing others without the appropriate password from accessing your drive?</td>
</tr>
<tr>
<td></td>
<td><strong>Data encryption</strong> — Does the drive have a method of scrambling its contents to prevent others without the appropriate password from accessing data?</td>
</tr>
<tr>
<td></td>
<td><strong>File recovery</strong> — Does the drive come with a utility to recover deleted or damaged files?</td>
</tr>
<tr>
<td></td>
<td><strong>Disk optimizer</strong> — Does the drive come with a utility for reorganizing its contents into contiguous blocks, which improves performance?</td>
</tr>
<tr>
<td></td>
<td><strong>Indicator lights</strong> — Indicators on the front of the case can tell you if the power is on and if the drive is being accessed, among other things.</td>
</tr>
<tr>
<td></td>
<td><strong>Fan</strong> — Electronic components and mechanical devices run best when properly cooled. Drives without fans tend to overheat and malfunction sooner than ones with fans.</td>
</tr>
<tr>
<td></td>
<td><strong>Size</strong> — The size of the case determines where you can position the drive on your desk. So-called zero-footprint drives fit neatly under one-piece Macs such as the Plus and SE.</td>
</tr>
<tr>
<td>Category</td>
<td>20 MB</td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
</tr>
<tr>
<td>Product</td>
<td>Apple Hard Disk 20SC</td>
</tr>
<tr>
<td>Mouse rating</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Comments**
- Most expensive 20 MB. Excellent snap-together case and manuals; Utilitarian software.
- Case is well laid out on inside but lacks ventilation holes. Outdated manual.
- Variations in component assembly and improper SCSI-ID selector wiring indicate poor quality control.
- Least expensive under 100 MB. Slows 20 MB. Generic metal case with 25-pin SCSI inputs. Utilitarian software.

**List price**
- $899* | $725* | $545 | $795 | $399

**Capacity (advertised/actual)**

**Seek time (milliseconds)**
- 65 ms | 49 ms | 68 ms | 28 ms | 65 ms

**Disk Benchmark results (seconds)**
- 73.1 sec | 41.1 sec | 62.4 sec | 67.2 sec | 149.4 sec

**Technology**

### OEM mechanism
- Seagate ST225N | Seagate ST125N-0 | MiniScribe M8225S* | Seagate ST125N-1 | Seagate ST225N*

### Platters (number & size [in.])
- two 5.25-in. | two 3.5-in. | one 3.5-in. | two 3.5-in. | two 5.25-in.

### Head positioning
- Embedded stepper | Embedded stepper | Embedded stepper | Embedded stepper | Embedded stepper

### Automatic parking
- No | Yes | Yes | Yes | No

### SCSI

#### ID selector
- Recessed push button | DIP switch | Push button | Push button | Push button

#### Termination plug
- Internal | Internal | Internal | Internal | Access door

#### Cable (length, type)
- 2 feet, 50/25-pin | 3 feet, 25/25-pin | 5 feet, 50/25-pin | 4 feet, 50/25-pin | 3 feet, 25/25-pin

**Software**

### Bundled
- HD Setup, HD Backup, Disk 1st Aid, Find Filer | CMS SCSI Utility, HD Backup | Crate Utility | Mac Installer 3.09, 7 MB public-domain and shareware | Ehman System Utilities, PC Tools Deluxe

### Print spooler
- No | No | No | Yes | Yes

### High-speed copy
- No | No | No | No | Yes

### Low-level formatting
- No | Yes | Yes | Yes | Yes

### Interleave selector
- Automatic | Automatic & user | Automatic & user | Automatic & user | Automatic & user

### Partitioning
- Yes | Yes | Yes | Yes | No

### Backup
- Yes | Yes | No | No | Yes

### Password protection
- No | No | No | No | Yes

### Date encryption
- No | No | No | No | Yes

### File recovery
- No | No | No | No | Yes

### Disk optimizer
- No | No | No | Yes | Yes

**Case**

### Indicator lights
- Access | Access | Power, access | Access | Power, access

### Fan
- Yes | Yes | Yes | Yes | Yes

### Size (L x W x H [in.])
- 10.5 x 9.75 x 3" | 10.5 x 10 x 3.5" | 11 x 9.75 x 3" | 10.5 x 10 x 3" | 10 x 10 x 2.5"

### Weight (pounds)
- 8 lb | 8 lb | 8 lb | 9 lb | 6 lb

**Other**

### Warranty
- 90 days | 1 year | 2 years, 30-day guarantee | 1 year | 2 years

### Manufacturer
- Apple Computer, Inc. 20525 Mariani Ave., Cupertino, CA 95014 (408) 996-1010 | CMS Enhancements 1372 Valencia Ave., Santa Ana, CA 92706 (714) 554-3825 | Crate Technology, Inc. 6850 Vineyard Ave., N. Hollywood, CA 91606 (818) 766-4001 | Dolphin Systems 1701 Edinger, Bldg. G Santa Ana, CA 92705 (714) 554-3800 | Ehman Engineering P.O. Box 2125, Fresno, WA 99101 (800) 237-1665 (307) 789-3630

*This suggested retail price is usually discounted.

Matches footprint of one-piece Mac.

Manufacturer may use different mechanism.

Should be included by press time.

**Access indicator on-screen.
## 101 Hard Drives

### Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>20 MB</th>
<th>20 MB</th>
<th>20 MB</th>
<th>20 MB</th>
<th>20 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td>EMAC Impact 20</td>
<td>GCC UltraDrive 20</td>
<td>IDS20</td>
<td>IDS PRO 20</td>
<td>Jasmine DirectDrive 20</td>
</tr>
<tr>
<td><strong>Mouse rating</strong></td>
<td>3.5</td>
<td>4.0</td>
<td>4.0</td>
<td>3.5</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>List price</strong></td>
<td>$799*</td>
<td>$549</td>
<td>$695*</td>
<td>$695*</td>
<td>$399</td>
</tr>
<tr>
<td><strong>Capacity (advertised/actual)</strong></td>
<td>20.0 / 20.1 MB</td>
<td>21.5 / 20.0 MB</td>
<td>22.0 / 20.0 MB</td>
<td>21.5 / 20.0 MB</td>
<td>20.0 / 19.6 MB</td>
</tr>
<tr>
<td><strong>Seek time (milliseconds)</strong></td>
<td>40 ms</td>
<td>65 ms</td>
<td>40 ms</td>
<td>40 ms</td>
<td>68 ms</td>
</tr>
<tr>
<td><strong>DiskBasher results (seconds)</strong></td>
<td>41.0 sec</td>
<td>70.7 sec</td>
<td>40.3 sec</td>
<td>40.1 sec</td>
<td>99.7 sec</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>OEM mechanism: Seagate ST125N-O</td>
<td>Seagate ST225N</td>
<td>Seagate ST125N-O</td>
<td>Seagate ST125N-O</td>
<td>MiniScribe MB425SS</td>
</tr>
<tr>
<td><strong>Platters (number &amp; size [in.])</strong></td>
<td>two 3.5-in.</td>
<td>two 5.25-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
</tr>
<tr>
<td><strong>Head positioning</strong></td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
</tr>
<tr>
<td><strong>Automatic parking</strong></td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>SCSI</strong></td>
<td><strong>ID selector</strong></td>
<td>rotary switch</td>
<td>push button</td>
<td>DIP switch</td>
<td>rotary switch</td>
</tr>
<tr>
<td><strong>Termination</strong></td>
<td>plug</td>
<td>plug</td>
<td>internal</td>
<td>access door</td>
<td>access door</td>
</tr>
<tr>
<td><strong>Cable (length, type)</strong></td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2.5 feet, 50/25-pin</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>Bundled: EMAC Disk Management, HD Backup</td>
<td>GCC Disk Manager, QuickSpool, SUM II, 3.5 MB shareware</td>
<td>IDS Express 1.0, Password, PackIt III, RapidUp²</td>
<td>IDS Express 1.0, Password, PackIt III, RapidUp²</td>
<td>DriveTools, DriveWare, SUM II, 10 MB shareware and demoware</td>
</tr>
<tr>
<td><strong>Print spooler</strong></td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td><strong>High-speed copy</strong></td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Low-level formatting</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Interleave selector</strong></td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
</tr>
<tr>
<td><strong>Partitioning</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Backup</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Password protection</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Data encryption</strong></td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>File recovery</strong></td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Disk optimizer</strong></td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td><strong>Indicator lights</strong></td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
<td>access</td>
</tr>
<tr>
<td><strong>Fan</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Size (L x W x H [in.])</strong></td>
<td>10.5 x 6 x 2.5</td>
<td>10.75 x 9.5 x 2.75*</td>
<td>11 x 10 x 3*</td>
<td>8 x 5 x 2</td>
<td>10.5 x 9.5 x 2.5*</td>
</tr>
<tr>
<td><strong>Weight (pounds)</strong></td>
<td>5 lb</td>
<td>6 lb</td>
<td>8 lb</td>
<td>3 lb</td>
<td>4 lb</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td><strong>Warranty</strong></td>
<td>1 year</td>
<td>2 years, 30-day guarantee</td>
<td>2 years, 30-day guarantee</td>
<td>2 years, 30-day guarantee</td>
</tr>
<tr>
<td><strong>Manufacturer</strong></td>
<td>EMAC - Everex, 49431 Milpomd Drive, Fremont, CA 94539 (600) 982-0360 ext. 2222 (415) 683-2222</td>
<td>GCCs Technologies, 580 Winter St, Waltham, MA 02154 (617) 422-7777 (617) 890-0860</td>
<td>IDS Systems, Inc., 2107 N. First St., #280 San Jose, CA 95131 (408) 733-0078 (408) 441-0500</td>
<td>IDS Systems, Inc., 2107 N. First St., #280 San Jose, CA 95131 (800) 733-0078 (408) 441-0500</td>
<td>Jasmine Technologies, 1740 Army St, San Francisco, CA 94124 (800) 347-3228 (415) 292-1111</td>
</tr>
</tbody>
</table>

*This suggested retail price is usually discounted.
*Matches footprint of one-piece Mac.
*Manufacturer may use different mechanism.
*Should be included by press time.
**Access indicator on-screen.
Practically all hard disks perform well under ideal conditions. UltraDrive™ hard disks are designed to perform well in a far less hospitable environment. A world we've duplicated at the industry's most grueling proving ground for hard disks.

The GCC School Of Hard Knocks.

In the design stage, we shock components and assembled hard disks in both operating and non-operating states. Next, vibration tests mimic the jostling of car, truck and air transport.

Then, we drop our disks over 20 times from varying heights in varying operating and non-operating states on every face and edge. They're exposed to a wide range of humidity and temperatures—from 122° to −40°F. And finally, every hard disk is burned-in for 14 hours before shipment.

All of these proven hard disks come with a generous software library which normally retails for several hundred dollars. Including Symantec's® SUM II, a utilities package featuring data recovery, deleted file recovery, DES security, and backup.

You also get UltraWare™, including a disk management program featuring true SCSI partitioning (DiskManager™), a rapid print spooler (QuickSpool™), and over 3 MB of selected shareware software.

But UltraDrive hard disks don't just work longer and smarter than others, they also cost less. In fact, the UltraDrive series is priced up to 50% less than Apple's®

Toll-Free, Hassle-Free, Risk-Free.

To order your internal or external UltraDrive, call 800-422-7777 from 9 to 9 on weekdays, or 10 to 4 on Saturdays. Our expertly trained staff is glad to answer questions, provide technical support, and offer advice on choosing any of our products. Ask for our free catalog.

When your order is received by 8 PM (EST), it will be shipped the same day via overnight delivery for only $9.

UltraDrive comes with a 30 day money-back guarantee. Just return your hard disk for a full refund, no questions asked.

Please circle 100 on reader service card.
## 101 Hard Drives

### Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>20 MB</th>
<th>20 MB</th>
<th>20 MB</th>
<th>20 MB</th>
<th>20 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>MicroNet MS20</td>
<td>Mirror M20</td>
<td>PLI 20e Turbo</td>
<td>Procom MD 20</td>
<td>Stock SAG6000 20</td>
</tr>
<tr>
<td>Mouse rating</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>3.0</td>
<td>2.5</td>
</tr>
<tr>
<td>List price</td>
<td>$745*</td>
<td>$447</td>
<td>$795*</td>
<td>$790*</td>
<td>$489</td>
</tr>
<tr>
<td>Capacity (advertised/actual)</td>
<td>21.5 / 20.0 MB</td>
<td>21.3 / 20.1 MB</td>
<td>20.0 / 20.1 MB</td>
<td>21.0 / 20.1 MB</td>
<td>22.0 / 20.1 MB</td>
</tr>
<tr>
<td>Seek time (milliseconds)</td>
<td>40 ms</td>
<td>40 ms</td>
<td>40 ms</td>
<td>28 ms</td>
<td>40 ms</td>
</tr>
<tr>
<td>DiskBasher! results (seconds)</td>
<td>41.5 sec</td>
<td>41.0 sec</td>
<td>41.5 sec</td>
<td>41.2 sec</td>
<td>41.1 sec</td>
</tr>
<tr>
<td>Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OEM mechanism</td>
<td>Seagate ST125N-0</td>
<td>Seagate ST125N-0</td>
<td>Seagate ST125N-0</td>
<td>Seagate ST125N-0</td>
<td>Seagate ST125N-0</td>
</tr>
<tr>
<td>Platters (number &amp; size [in.])</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
</tr>
<tr>
<td>Head positioning</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
</tr>
<tr>
<td>Automatic parking</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>SCSi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ID selector</td>
<td>DIP switch</td>
<td>push button</td>
<td>rotary switch</td>
<td>rotary switch</td>
<td>rotary switch</td>
</tr>
<tr>
<td>Termination</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
<td>external switch</td>
<td>internal</td>
</tr>
<tr>
<td>Cable (length, type)</td>
<td>3 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>3 feet, 50/25-pin</td>
<td>2.5 feet, 25/25-pin</td>
<td>2 feet, 50/25-pin</td>
</tr>
<tr>
<td>Software</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bundled software</td>
<td>MicroNet Utilities 4.0g</td>
<td>Hard Driver</td>
<td>TurboWare</td>
<td>Procom Installer</td>
<td>Data Cell, HD Backup</td>
</tr>
<tr>
<td>Print spooler</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>High-speed copy</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Low-level formatting</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Interleave selector</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
</tr>
<tr>
<td>Partitioning</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no*</td>
<td>yes</td>
</tr>
<tr>
<td>Backup</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Password protection</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Data encryption</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>File recovery</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Disk optimizer</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Case</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator lights</td>
<td>power, access</td>
<td>power, access</td>
<td>access</td>
<td>power, access</td>
<td>power, access</td>
</tr>
<tr>
<td>Fan</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Size (L x W x H [in.])</td>
<td>10.5 x 10 x 3.22*</td>
<td>11 x 9.75 x 2.5*</td>
<td>10 x 9.75 x 2.5*</td>
<td>10.5 x 9.5 x 2.5*</td>
<td>8.5 x 3 x 6.5</td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>8 lb</td>
<td>7 lb</td>
<td>8 lb</td>
<td>5 lb</td>
<td>6 lb</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>2 years, 30-day guarantee</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>MicroNet Technology</td>
<td>Mirror Technologies</td>
<td>Seagate</td>
<td>Procom Technology</td>
<td>Stock Drives</td>
</tr>
<tr>
<td>20 Mason Irvine, CA 2178</td>
<td>2644 Patton Road</td>
<td>47421 Bayside Pkwy.</td>
<td>200 McCormack Ave.</td>
<td>1977 O'Toole Ave., B206</td>
<td></td>
</tr>
<tr>
<td>(714) 837-6033</td>
<td>Roseville, NV 95663</td>
<td>Fremont, CA 94538</td>
<td>Costa Mesa, CA 92626</td>
<td>San Jose, CA 95131</td>
<td></td>
</tr>
<tr>
<td>(800) 654-5294</td>
<td>(800) 288-8754</td>
<td>(800) 954-1227</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*This suggested retail price is usually discounted.

*Matches footprint of one-piece Mac.

*Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.
Now Your Network Can Go Wherever You Can Go.

No matter where in the world you go, now you can take your office network with you. Because Dial-In Network Access™ from Shiva lets you access your office PhoneNet® or AppleTalk® network from anyplace you happen to be. Dial in from home, a customer's office, a motel room or the middle of nowhere. Use Microsoft Mail™, TOPS™, AppleShare™, a LaserWriter®, or any other network resource just as if you were right there in front of your office Mac. All you need is a phone line, a Macintosh® or IBM-compatible PC and a modem. If you have an IBM-compatible laptop, you don't even need a power outlet! Your office network will need a NetModem™ or a TeleBridge™ with an ordinary modem. Dialing in is easy – just click on a control panel icon and select the remote network you want. It's just as simple on a PC. And you can list different names and communication settings for each network. Wherever you go, now you can take your network along – with Dial-In Network Access.

Call 1-800-458-3550, or write Shiva, 155 Second Street, Cambridge, MA 02141.

Shiva

We're Putting Networks To Work.®
# 101 Hard Drives

## Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>20 MB</th>
<th>20 MB</th>
<th>30 MB</th>
<th>30 MB</th>
<th>30 MB</th>
<th>30 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td><strong>SuperMac DataFrame 20</strong></td>
<td><strong>Western Digital Preference 20</strong></td>
<td><strong>CMS MacStack SD30</strong></td>
<td><strong>Dolphin Integra 30</strong></td>
<td><strong>Uhman 30</strong></td>
<td><strong>Uhman 30</strong></td>
</tr>
<tr>
<td><strong>Mouse rating</strong></td>
<td>4.0</td>
<td>4.0</td>
<td>3.5</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>List price</strong></td>
<td>$749*</td>
<td>$699*</td>
<td>$799*</td>
<td>$869*</td>
<td>$449</td>
<td>$449</td>
</tr>
<tr>
<td><strong>Capacity (advertised/actual)</strong></td>
<td>20.0 / 19.6 MB</td>
<td>20.0 / 18.6 MB</td>
<td>32.2 / 30.2 MB</td>
<td>32.2 / 30.2 MB</td>
<td>32.2 / 30.2 MB</td>
<td>32.2 / 30.2 MB</td>
</tr>
<tr>
<td><strong>Seek time (milliseconds)</strong></td>
<td>40 ms</td>
<td>90 ms</td>
<td>40 ms</td>
<td>28 ms</td>
<td>40 ms</td>
<td>40 ms</td>
</tr>
<tr>
<td><strong>DiskBasher! results (seconds)</strong></td>
<td>101.0 sec</td>
<td>57.5 sec</td>
<td>41.6 sec</td>
<td>146.6 sec</td>
<td>94.2 sec</td>
<td>94.2 sec</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td><strong>OEM mechanism</strong></td>
<td><strong>Western Digital 382R</strong></td>
<td><strong>Western Digital 382R</strong></td>
<td><strong>Seagate ST138N-0</strong></td>
<td><strong>Seagate ST138N-0</strong></td>
<td><strong>Seagate ST138N-0</strong></td>
</tr>
<tr>
<td><strong>Platters (number &amp; size [in.])</strong></td>
<td>two 3.5-in.</td>
<td>one 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
</tr>
<tr>
<td><strong>Head positioning</strong></td>
<td>embedded stepper</td>
<td>hybrid stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
</tr>
<tr>
<td><strong>Automatic parking</strong></td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>SCSI</strong></td>
<td><strong>ID selector</strong></td>
<td>software</td>
<td>rotary switch</td>
<td>DIP switch</td>
<td>push button</td>
<td>push button</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Termination</strong></td>
<td>internal</td>
<td>external switch</td>
<td>internal</td>
<td>internal</td>
<td>access door</td>
</tr>
<tr>
<td></td>
<td><strong>Cable (length, type)</strong></td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 25/25-pin</td>
<td>3 feet, 25/25-pin</td>
<td>4 feet, 50/25-pin</td>
<td>3 feet, 25/25-pin</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td><strong>Bundled</strong></td>
<td>Dataframe Utilities, DiskFit, SuperLaserSpool</td>
<td>Preference Formatter, HD Backup</td>
<td>CMS SCSI Utility, HD Backup</td>
<td>Mac Installer 3.09, 7 MB public-domain and shareware</td>
<td>Ehman System Utilities, PC Tools Deluxe</td>
</tr>
<tr>
<td></td>
<td><strong>Print spooler</strong></td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>High-speed copy</strong></td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>Low-level formatting</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>Interleave selector</strong></td>
<td>automatic</td>
<td>automatic</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
</tr>
<tr>
<td></td>
<td><strong>Partitioning</strong></td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>Backup</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>Password protection</strong></td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>Date encryption</strong></td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>File recovery</strong></td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>Disk optimizer</strong></td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td><strong>Indicator lights</strong></td>
<td>power, access</td>
<td>power, access, head park</td>
<td>access</td>
<td>access</td>
<td>power, access</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Fan</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>Size (L x W x H [in.])</strong></td>
<td>9.5 x 3 x 8</td>
<td>8 x 6.75 x 3</td>
<td>10.5 x 10 x 3.5'</td>
<td>10.5 x 10 x 3'</td>
<td>10 x 10 x 2.5'</td>
</tr>
<tr>
<td></td>
<td><strong>Weight (pounds)</strong></td>
<td>5 lb</td>
<td>7 lb</td>
<td>8 lb</td>
<td>9 lb</td>
<td>7 lb</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td><strong>Warranty</strong></td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>2 years</td>
</tr>
<tr>
<td></td>
<td><strong>Manufacturer</strong></td>
<td>SuperMac Technology</td>
<td>Western Digital Corp</td>
<td>CMS Enhancements</td>
<td>Dolphin Systems</td>
<td>Ehman Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>465 Portero Ave.</td>
<td>2445 McCabe Way</td>
<td>1372 Valencia Ave.</td>
<td>1701 Edinger, Bldg. G</td>
<td>P.O. Box 2129</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sunnyvale, CA 94086</td>
<td>Irvine, CA 92744</td>
<td>Tucson, AZ 85710</td>
<td>Santa Ana, CA 92705</td>
<td>Evansville, IN 47721</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(408) 245-2202</td>
<td>(800) 333-5127</td>
<td>(714) 259-5555</td>
<td>(714) 559-3220</td>
<td>(800) 257-1666</td>
</tr>
</tbody>
</table>

*This suggested retail price is usually discounted.

*Matches footprint of one-piece Mac.

*Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.
World Class Solutions.

If you’re looking for world class solutions to all your peripheral needs, ask for Microtech International products. Superior quality and reliability put them in a class by themselves.

MICROTECH INTERNATIONAL INC.
158 Commerce St. East Haven, CT USA 06512
1-800-325-1895 in CT 203-468-6223
Please circle 134 on reader service card.
## Buyer's Guide

### 30 MB

<table>
<thead>
<tr>
<th>Category</th>
<th>GCC</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td>UltraDrive 30</td>
<td>IDS30</td>
<td>IDS PRO 30</td>
<td>MicroNet MS30</td>
<td>PLI 30e Turbo</td>
</tr>
</tbody>
</table>

### Mouse Rating

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5</td>
<td>4.0</td>
<td>3.5</td>
<td>4.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

### Comments

- GCC: Excellent plastic case, informative manuals, easy-to-use formatting software.
- IDS PRO 30: Case the size of 3.5-inch floppy drive, uses power from floppy port, same software as IDS 30.
- PLI 30e Turbo: Most expensive 30 MB, excellent case and setup software, inadequate manuals.

### List Price

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>$629</td>
<td>$795*</td>
<td>$795*</td>
<td>$845*</td>
<td>$995*</td>
</tr>
</tbody>
</table>

### Capacity (advertised/actual)

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.2/30.1 MB</td>
<td>32.0/30.1 MB</td>
<td>32.2/30.1 MB</td>
<td>32.2/30.2 MB</td>
<td>32.2/30.2 MB</td>
</tr>
</tbody>
</table>

### Seek time (milliseconds)

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 ms</td>
<td>40 ms</td>
<td>40 ms</td>
<td>40 ms</td>
<td>40 ms</td>
</tr>
</tbody>
</table>

### Disk Basher! Results (seconds)

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.9 sec</td>
<td>40.0 sec</td>
<td>40.2 sec</td>
<td>41.3 sec</td>
<td>41.0 sec</td>
</tr>
</tbody>
</table>

### Technology

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seagate ST138N-1</td>
<td>Seagate ST138N-0</td>
<td>Seagate ST138N-0</td>
<td>Seagate ST138N-0</td>
<td>Seagate ST138N-0</td>
</tr>
</tbody>
</table>

### Platters (number & size [in.])

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
</tr>
</tbody>
</table>

### Head positioning

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embedded stepper</td>
<td>Embedded stepper</td>
<td>Embedded stepper</td>
<td>Embedded stepper</td>
<td>Embedded stepper</td>
</tr>
</tbody>
</table>

### Automatic Parking

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### SCSI

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push button</td>
<td>DIP switch</td>
<td>Rotary switch</td>
<td>DIP switch</td>
<td>Rotary switch</td>
</tr>
</tbody>
</table>

### Cable (length, type)

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>3 feet, 50/25-pin</td>
<td>3 feet, 50/25-pin</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCC Disk Manager, QuickSpool, SUM II</td>
<td>IDS Express 1.0, Password, PackIt III', RapidUp!</td>
<td>IDS Express 1.0, Password, PackIt III', RapidUp!</td>
<td>MicroNet Utilities 4.0g</td>
<td>TurboWare</td>
</tr>
</tbody>
</table>

### Bundled

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Print spooler

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### High-speed copy

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Low-level formatting

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Interleave selector

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
</table>

### Partitioning

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Backup

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Password protection

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Data encryption

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### File recovery

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Disk Optimizer

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Case

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
</table>

### Indicator lights

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Weight (pounds)

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 lb</td>
<td>8 lb</td>
<td>3 lb</td>
<td>8 lb</td>
<td>8 lb</td>
</tr>
</tbody>
</table>

### Other

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warranty</td>
<td>2 years, 30-day guarantee</td>
<td>2 years, 30-day guarantee</td>
<td>2 years, 30-day guarantee</td>
<td>1 year</td>
</tr>
</tbody>
</table>

### Manufacturer

<table>
<thead>
<tr>
<th>GCC UltraDrive 30</th>
<th>IDS30</th>
<th>IDS PRO 30</th>
<th>MicroNet MS30</th>
<th>PLI 30e Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCC Technologies 580 Winter St. Wallingford, MA 06492 (860) 622-7777 (617) 890-9880</td>
<td>IDS Systems, Inc. 2107 N. First St., #280 San Jose, CA 95131 (800) 723-0078 (408) 411-0500</td>
<td>IDS Systems, Inc. 2107 N. First St., #280 San Jose, CA 95131 (800) 723-0078 (408) 411-0500</td>
<td>MicroNet Technology 20 Mason Irvine, CA 92718 (714) 657-6033</td>
<td>Peripheral Land, Inc. 47421 Bayshore Pkwy. Fremont, CA 94538 (510) 298-6764 (415) 657-2211</td>
</tr>
</tbody>
</table>

---

*This suggested retail price is usually discounted.

*Matches footprint of one-piece Mac.

*Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.

---

34 Buyer's Guide February 1990 MacUser
iDSPRO Series

Integrated Data Storage Systems presents the iDSPRO Series™ 20-200 megabyte portable hard drives. The iDSPRO Series features high performance Quantum, Seagate, Conner, and Maxtor mechanisms with average access time ranging from 12-35 milliseconds. It comes in a transportable package of 2x5x8 inches, and weighs less than 3 pounds.

This is the ultimate in portable, modular, unit expandable storage subsystems.

To find an iDS Systems' Authorized Dealer Near You, CALL 1-800-733-0078.
# 101 Hard Drives

## Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>30 MB</th>
<th>30 MB</th>
<th>30 MB</th>
<th>40 MB</th>
<th>40 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Procom MD 30</td>
<td>Stock SA6000 30</td>
<td>SuperMac DataFrame XP30</td>
<td>Apple Hard Disk 40SC</td>
<td>Aristotle HARDPAC 40</td>
</tr>
<tr>
<td>Mouse rating</td>
<td>3.0</td>
<td>3.0</td>
<td>4.5</td>
<td>4.5</td>
<td>3.5</td>
</tr>
<tr>
<td>List price</td>
<td>$890*</td>
<td>$529</td>
<td>$899*</td>
<td>$1,299*</td>
<td>$1,095*</td>
</tr>
<tr>
<td>Capacity (advertised/actual)</td>
<td>32.2 / 30.2 MB</td>
<td>32.0 / 30.2 MB</td>
<td>32.2 / 30.2 MB</td>
<td>40 / 38.4 MB</td>
<td>42.3 / 39.3 MB</td>
</tr>
<tr>
<td>Seek time (milliseconds)</td>
<td>40 ms</td>
<td>40 ms</td>
<td>28 ms</td>
<td>28 ms</td>
<td>19 ms</td>
</tr>
<tr>
<td>DiskBasher! results (seconds)</td>
<td>41.6 sec</td>
<td>41.5 sec</td>
<td>67.3 sec</td>
<td>39.3 sec</td>
<td>29.9 sec</td>
</tr>
<tr>
<td>Technology</td>
<td>OEM mechanism</td>
<td>Seagate ST138H-0</td>
<td>Seagate ST138H-1</td>
<td>Quantum Q-250</td>
<td>Quantum ProDrive 40S</td>
</tr>
<tr>
<td>Platters (number &amp; size [in.])</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 5.25-in.</td>
<td>two 5.25-in.</td>
</tr>
<tr>
<td>Head positioning</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded stepper</td>
<td>embedded voice coil</td>
<td>hybrid voice coil</td>
</tr>
<tr>
<td>Automatic parking</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>SCSI</td>
<td>ID selector</td>
<td>rotary switch</td>
<td>rotary switch</td>
<td>software</td>
<td>recessed push button</td>
</tr>
<tr>
<td>Termination</td>
<td>external switch</td>
<td>internal</td>
<td>internal</td>
<td>plug</td>
<td>internal</td>
</tr>
<tr>
<td>Cable (length, type)</td>
<td>2.5 feet, 25/25-pin</td>
<td>2 feet, 50/50-pin</td>
<td>2 feet, 5/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>3 feet, 25/25-pin</td>
</tr>
<tr>
<td>Software</td>
<td>Bundled</td>
<td>Procom Installer</td>
<td>Data Cell, HD Backup</td>
<td>Dataframe Utilities, DiskFit, SuperSpool, SuperLaserSpool</td>
<td>HD Setup, HD Backup, Disk 1st Aid, Find File</td>
</tr>
<tr>
<td>Print spooler</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>High-speed copy</td>
<td>no¹</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Low-level formatting</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Interleave selector</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic</td>
<td>automatic</td>
<td>automatic</td>
</tr>
<tr>
<td>Partitioning</td>
<td>no²</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Backup</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Password protection</td>
<td>no³</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Data encryption</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>File recovery</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Disk optimizer</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Case</td>
<td>Indicator lights</td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
</tr>
<tr>
<td>Fan</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Size (L x W x H [in.])</td>
<td>10.5 x 9.5 x 2.5¹</td>
<td>8.5 x 3.6 x 6.5</td>
<td>9.5 x 3 x 4</td>
<td>10.5 x 0.75 x 3¹</td>
<td>7.5 x 4.5 x 2</td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>5 lb</td>
<td>6 lb</td>
<td>5 lb</td>
<td>9 lb</td>
<td>2.5 lb</td>
</tr>
<tr>
<td>Other</td>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>90 days</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Procom Technology</td>
<td>Stock Drives</td>
<td>SuperMac Technology</td>
<td>Apple Computer, Inc.</td>
<td>Aristotle Industries</td>
</tr>
<tr>
<td>Stock</td>
<td>209 McCormick Ave.</td>
<td>90100 Manhasset Ave.</td>
<td>485 Polverio Ave.</td>
<td>20525 Manhasset Ave.</td>
<td>7033 Antrim Ave.</td>
</tr>
<tr>
<td>City, State, Zip</td>
<td>Costa Mesa, CA 92626</td>
<td>San Jose, CA 95131</td>
<td>Sunnyvale, CA 94086</td>
<td>Cupertino, CA 95014</td>
<td>Burnaby, BC</td>
</tr>
<tr>
<td>Phone</td>
<td>(714) 549-9449</td>
<td>(408) 954-1227</td>
<td>(408) 285-2202</td>
<td>(408) 996-1010</td>
<td>(604) 434-7274</td>
</tr>
</tbody>
</table>

¹This suggested retail price is usually discounted.
²Matches footprint of one-piece Mac.
³Manufacturer may use different mechanism.
⁴Should be included by press time.
**Access indicator on-screen.
NEW SUM II PROTECTS YOUR DATA, INSIDE AND OUT.

- Protects your data against hard disk crashes and file deletions with an automatically updated hard disk “map.”
- Recover lost data on floppies and crashed hard disks. Repairs crashed hard disks in minutes with new SUM Quick Fix.
- Speeds up hard disks. Optimizes, defragments, erases free space, verifies data, and locks out bad sectors to keep disks fast and safe.
- Provides complete data security. Creates hard disk partitions which you can encrypt and password protect. Encrypt files, folders, and entire volumes. Secure data with two forms of DES encryption.
- No learning required. Easy user interface makes repair, recovery and hard disk tune-up a snap. Just tell SUM II what you want to do, and its new Disk Clinic automatically launches the utility you need.

Backs up hard disk data fast, and allows incremental backups, from one file to entire hard disks. Back up to floppies, other hard disks, and tape drives.

For its unparalleled data protection, SUM™ won MacUser's 1989 Editor's Choice, Macworld's 1989 Reader's World Class Award, and MacUser's Highest Rating, Five Mice. New SUM II is even better. Inside, SUM II features an improved Shield, the automatic data protection and recovery utility that has won over critics and Fortune 500 users alike.

Outside, SUM II extends its data recovery power by adding SUM Backup, a complete Mac backup utility which backs up selected files or entire hard disk volumes to floppies in minutes.

With SUM Shield for protection and backup disks for insurance, your data survives virtually any disaster. Because it's protected quite literally, inside and out.

See your dealer or order today:
(800) 228-4122 Ext. 685F

Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014. 408/253-9600. Current SUM Users, or MacZip users upgrade now to new SUM II. Call Symantec Customer Service at 408/253-3570. SUM II is a trademark of Symantec Corporation. © 1989 Symantec Corporation.

Please circle 93 on reader service card.
# Buyer's Guide

## Category

<table>
<thead>
<tr>
<th>Product</th>
<th>CMS Platinum 40</th>
<th>Deltaic DS 40</th>
<th>Dolphin Integra 40</th>
<th>Ehman 45</th>
<th>EMAC Impact 40 Plus</th>
</tr>
</thead>
</table>

## Mouse rating

- 4.0
- 3.0
- 3.0
- 3.0
- 4.0

## Comments

- Expensive. Good design and software. Manual needs improvement.
- Slow. Variations in component assembly indicate poor quality control.
- Least expensive and slowest 40 MB. Generic metal case with 25-pin SCSI connectors. Utilitarian software.
- Small plastic case with wires running over power supply. Preformatted parallel emulates setup.

## List price

- $1,245
- $599
- $995
- $499
- $3,195

## Capacity

- 38.5 / 39.3 MB
- 40.0 / 38.7 MB
- 43.2 / 40.5 MB
- 43.2 / 45.5 MB
- 42.0 / 39.4 MB

## Seek time (milliseconds)

- 26 ms
- 33 ms
- 28 ms
- 40 ms
- 19 ms

## Disk Baser results (seconds)

- 42.6 sec
- 35.7 sec
- 52.4 sec
- 90.4 sec
- 31.0 sec

## Technology

### OEM mechanism

- Conner CP-340
- Kalko KL-341
- Seagate ST251N-1
- Seagate ST157N-1
- Quantum ProDrive 40S

### Platters (number and size [in.])

- two 3.5-in.
- two 3.5-in.
- two 3.5-in.
- two 3.5-in.
- two 3.5-in.

### Head positioning

- Embedded voice coil
- Open-loop stepper
- Embedded stepper
- Embedded stepper
- Hybrid voice coil

### Automatic parking

- Yes
- Yes
- Yes
- Yes
- Yes

### SCSI

#### ID selector

- Push button
- Push button
- Push button
- Push button
- Rotary switch

#### Termination

- Internal
- Push button
- Internal
- Access door
- Plug

#### Cable (length, type)

- 3 feet, 50/25-pin
- 2 feet, 50/25-pin
- 4 feet, 50/25-pin
- 3 feet, 25/25-pin
- 2 feet, 50/25-pin

### Software

#### Bundled

- CMS SCSI Utility, HD Backup
- Deltic Utilities, HD Backup
- Mac Installer 3.08, 7 MB public-domain shareware
- Ehman System Utilities, PC Tools Deluxe
- EMAC Disk Management, HD Backup

#### Print spooler

- No
- No
- No
- No
- No

#### High-speed copy

- No
- No
- Yes
- Yes
- Yes

#### Low-level formatting

- Yes
- Yes
- Yes
- Yes
- Yes

#### Interface selector

- Automatic & user
- Automatic & user
- Automatic & user
- Automatic & user
- Automatic & user

#### Partitioning

- No
- Yes
- Yes
- Yes
- Yes

#### Backup

- Yes
- Yes
- Yes
- Yes
- Yes

#### Password protection

- No
- Yes
- Yes
- Yes
- Yes

#### Date encryption

- No
- No
- No
- No
- No

#### File recovery

- No
- No
- Yes
- Yes
- Yes

#### Disk optimizer

- No
- No
- No
- No
- No

### Case

#### Indicator lights

- Access
- Power, access
- Access
- Power, access
- Power, access

#### Fan

- Yes
- Yes
- Yes
- Yes
- Yes

#### Size (l x w x h [in.])

- 10.5 x 10 x 2.25
- 10 x 9.75 x 2.5
- 10.5 x 10 x 2.5
- 10 x 10 x 2.5
- 10.5 x 6 x 2.5

#### Weight (pounds)

- 7 lb
- 6 lb
- 10 lb
- 7 lb
- 5 lb

### Other

#### Warranty

- 1 year
- 1 year
- 1 year
- 2 years
- 1 year

#### Manufacturer

- CMS Enhancements
- Deltaic Systems
- Ehman Engineering
- EMAC - Europe
- Dolphi Systems
- 1372 Valencia Ave.
- 1977 O’Toole Ave., B206
- 1701 Edinger, Bldg. B
- 46431 Milmont Drive
- Tustin, CA 92680
- San Jose, CA 95131
- Santa Ana, CA 92705
- Fremont, CA 94538
- Santa Ana, CA
- (714) 558-3220
- (408) 954-1055
- (714) 259-9555
- (800) 257-1666
- (507) 769-3630
- (415) 683-2222

---

*This suggested retail price is usually discounted.

*No matching footprint of one-piece Mac.

*Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.
A crashed hard disk can instantly destroy years of work. And a hardware warranty won't help you. Because if your hard drive fails, you don't want a new drive, you want your data back.

That's why Maxcess offers a 2-year money-back, data-protection guarantee. If you lose files because of a mechanical failure, your hard drive will go through a comprehensive data recovery sequence. Within 48 hours we will return your data.

Order by phone for factory-direct pricing!

<table>
<thead>
<tr>
<th>CAPACITY</th>
<th>INTERNAL</th>
<th>EXTERNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 MB</td>
<td>549.00</td>
<td>699.00</td>
</tr>
<tr>
<td>80 MB</td>
<td>849.00</td>
<td>999.00</td>
</tr>
<tr>
<td>100 MB</td>
<td>949.00</td>
<td>1099.00</td>
</tr>
<tr>
<td>175 MB</td>
<td>1449.00</td>
<td>1599.00</td>
</tr>
<tr>
<td>300 MB</td>
<td>2199.00</td>
<td>2299.00</td>
</tr>
<tr>
<td>600 MB</td>
<td>2899.00</td>
<td>2999.00</td>
</tr>
<tr>
<td>42 MB REMOVABLE</td>
<td>849.00</td>
<td></td>
</tr>
</tbody>
</table>

TOLL-FREE 1-800-356-2892

Only Maxcess is this confident in the reliability of its products. We have our reasons. First, we use the finest drive and power components available—ultra-reliable disk mechanisms and auto-switching power supplies. Second, we protect the disk assembly with molded aluminum cabinetry, shock mounts, line filters, fusing and efficient cooling fans. Third, an assembled Maxcess drive is torture-tested through 72 hours of burn-in, power-cycling and media-testing.

Your data is further protected with disk software including partitioning, encryption, compression, backup, anti-virus utilities and powerful recovery programs. And just to be safe, our factory is equipped with the latest in data recovery technology.

So if your data is valuable, make sure it's stored on a Maxcess hard drive. Call now and take advantage of this important guarantee:

1-800-356-2892

Maxcess and the Maxcess design marks are trademarks of Maxcess, Inc. Prices and the 2-year money-back, data-protection guarantee are offered on hard disk drives sold and delivered by Maxcess in the U.S. or Canada. Certain restrictions and exclusions apply. Terms and conditions of the 2-year money-back data-protection guarantee are available upon request. Price and specifications subject to change without notice. Mastercard, Visa and American Express accepted. Prices shown reflect a cash discount.

Please circle 53 on reader service card.
# Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>Product</th>
<th>Mouse rating</th>
<th>Comments</th>
<th>List price</th>
<th>Capacity (advertised/actual)</th>
<th>Seek time (milliseconds)</th>
<th>DiskBasher results (seconds)</th>
<th>Technology</th>
<th>Software</th>
<th>Case</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>40MB</td>
<td>FWB PocketHammer 40</td>
<td>4.0</td>
<td>Small, generic metal case. Useful software and manuals.</td>
<td>$1,095*</td>
<td>42.0 / 39.4 MB</td>
<td>19 ms</td>
<td>31.5 sec</td>
<td>Quantum ProDrive 40S</td>
<td>yes</td>
<td>access</td>
<td>FWB, Inc.</td>
</tr>
<tr>
<td>40MB</td>
<td>GCC FX/45</td>
<td>4.0</td>
<td>Informative manuals. Easy-to-use formatting software. Large plastic case prevents intended use as a floppy. Excellent case. Manual skims on setup.</td>
<td>$799</td>
<td>48.6 / 45.5 MB</td>
<td>28 ms</td>
<td>37.5 sec</td>
<td>Quantum ProDrive 40S</td>
<td>yes</td>
<td>yes</td>
<td>GCC Technologies</td>
</tr>
<tr>
<td>40MB</td>
<td>Heart HD 1040</td>
<td>4.5</td>
<td>Quiet, variable-speed fan keeps drive very cool. No-frills zero-footprint case. Utilitarian software and manuals. Public-domain bundle.</td>
<td>$835*</td>
<td>42.0 / 39.3 MB</td>
<td>19 ms</td>
<td>30.5 sec</td>
<td>Seagate ST157N-1</td>
<td>yes</td>
<td>yes</td>
<td>Heart Data Corp.</td>
</tr>
<tr>
<td>40MB</td>
<td>ID550</td>
<td>4.0</td>
<td>Case the size of 3.5-inch floppy drive. Uses power from floppy port. Same software as IDS 50.</td>
<td>$945*</td>
<td>49.0 / 45.5 MB</td>
<td>28 ms</td>
<td>37.2 sec</td>
<td>Seagate ST157N-1</td>
<td>yes</td>
<td>yes</td>
<td>IDS Systems, Inc.</td>
</tr>
<tr>
<td>40MB</td>
<td>IDS PRO 50</td>
<td>3.5</td>
<td></td>
<td>$945*</td>
<td>48.6 / 45.5 MB</td>
<td>28 ms</td>
<td>37.5 sec</td>
<td>Seagate ST157N-1</td>
<td>yes</td>
<td>yes</td>
<td>IDS Systems, Inc.</td>
</tr>
</tbody>
</table>

---

*This suggested retail price is usually discounted.

**Matches footprint of one-piece Mac.

*Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.
And then... Maxell created the RD Series.

Today’s lesson: strike “conventional” from your floppy disk vocabulary. The RD Series from Maxell is ten times more reliable than conventional floppy disks. It delivers twice the durability. Twice the resistance to dust and dirt. The Gold Standard always means maximum safety for your data. With the RD Series it means even more.

Please circle 39 on reader service card.
<table>
<thead>
<tr>
<th>Category</th>
<th>40 MB</th>
<th>40 MB</th>
<th>40 MB</th>
<th>40 MB</th>
<th>40 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Jasmine DirectDrive 40</td>
<td>LaCie Cirrus 42</td>
<td>Liberty 40</td>
<td>Mac Land Quantum 40</td>
<td>Maxcess 40E</td>
</tr>
</tbody>
</table>

### Comments
- **Jasmine DirectDrive 40**: Inexpensive. Excellent manuals, case, and software. Two outlets. Surge protection.
- **LaCie Cirrus 42**: Inexpensive. Stylish plastic case with no indication. Lacks FCC stamp. Excellent but complex software.
- **Liberty 40**: Smallest external drive. Redesigned case seems to fix power-supply problems of original model.
- **Mac Land Quantum 40**: Inexpensive. Minimal software and manuals. Good, concise manual.
- **Maxcess 40E**: Generic metal case. Excellent software. Good, concise manual.

### List price
- **Jasmine DirectDrive 40**: $599
- **LaCie Cirrus 42**: $695
- **Liberty 40**: $699
- **Mac Land Quantum 40**: $599
- **Maxcess 40E**: $699

### Capacity (advertised/actual)
- **Jasmine DirectDrive 40**: 43.0/39.4 MB
- **LaCie Cirrus 42**: 41.0/38.7 MB
- **Liberty 40**: 42.0/39.4 MB
- **Mac Land Quantum 40**: 40.0/39.4 MB
- **Maxcess 40E**: 40.0/39.4 MB

### Seek time (milliseconds)
- **Jasmine DirectDrive 40**: 19 ms
- **LaCie Cirrus 42**: 19 ms
- **Liberty 40**: 19 ms
- **Mac Land Quantum 40**: 19 ms
- **Maxcess 40E**: 19 ms

### DiskBasher! results (seconds)
- **Jasmine DirectDrive 40**: 30.1 sec
- **LaCie Cirrus 42**: 30.5 sec
- **Liberty 40**: 30.5 sec
- **Mac Land Quantum 40**: 30.6 sec
- **Maxcess 40E**: 31.2 sec

### Technology

#### OEM mechanism
- **Jasmine DirectDrive 40**: Quantum ProDrive 40S
- **LaCie Cirrus 42**: Quantum ProDrive 40S
- **Liberty 40**: Quantum ProDrive 40S
- **Mac Land Quantum 40**: Quantum ProDrive 40S
- **Maxcess 40E**: Quantum ProDrive 40S

#### Platters (number & size [in.])
- **Jasmine DirectDrive 40**: two 3.5-in.
- **LaCie Cirrus 42**: two 3.5-in.
- **Liberty 40**: two 3.5-in.
- **Mac Land Quantum 40**: two 3.5-in.
- **Maxcess 40E**: two 3.5-in.

#### Head positioning
- **Jasmine DirectDrive 40**: hybrid voice coil
- **LaCie Cirrus 42**: hybrid voice coil
- **Liberty 40**: hybrid voice coil
- **Mac Land Quantum 40**: hybrid voice coil
- **Maxcess 40E**: hybrid voice coil

#### Automatic parking
- **Jasmine DirectDrive 40**: yes
- **LaCie Cirrus 42**: yes
- **Liberty 40**: yes
- **Mac Land Quantum 40**: yes
- **Maxcess 40E**: yes

#### SCSI
- **Jasmine DirectDrive 40**: push button
- **LaCie Cirrus 42**: software
- **Liberty 40**: thumb wheel
- **Mac Land Quantum 40**: push button
- **Maxcess 40E**: push button

#### Termination
- **Jasmine DirectDrive 40**: access door
- **LaCie Cirrus 42**: internal
- **Liberty 40**: internal
- **Mac Land Quantum 40**: internal
- **Maxcess 40E**: internal

#### Cable (length, type)
- **Jasmine DirectDrive 40**: 2.5 feet, 50/25-pin
- **LaCie Cirrus 42**: 2 feet, 25/25-pin
- **Liberty 40**: 2.5 feet, 50/25-pin
- **Mac Land Quantum 40**: 1.5 feet, 50/25-pin
- **Maxcess 40E**: 1.5 feet, 50/25-pin

### Software

#### Bundled
- **Jasmine DirectDrive 40**: DriveTools, DriveWare, SUM II, 10 MB shareware and demoware
- **LaCie Cirrus 42**: DS Backup, Cirrus Utilities, Silverstone, Silverlining, 5 MB public-domain
- **Liberty 40**: Library Utilities, FileLot, HD Backup
- **Mac Land Quantum 40**: CRU Installer
- **Maxcess 40E**: Maxcess Utilities, DiskTop, Hard Disk Deadbolt, MockPackage, QuickKeys

#### Print spooler
- **Jasmine DirectDrive 40**: yes
- **LaCie Cirrus 42**: yes
- **Liberty 40**: no
- **Mac Land Quantum 40**: none
- **Maxcess 40E**: none

#### High-speed copy
- **Jasmine DirectDrive 40**: yes
- **LaCie Cirrus 42**: yes
- **Liberty 40**: no
- **Mac Land Quantum 40**: no
- **Maxcess 40E**: no

#### Low-level formatting
- **Jasmine DirectDrive 40**: yes
- **LaCie Cirrus 42**: yes
- **Liberty 40**: yes
- **Mac Land Quantum 40**: yes
- **Maxcess 40E**: yes

#### Interleave selector
- **Jasmine DirectDrive 40**: automatic
- **LaCie Cirrus 42**: automatic
- **Liberty 40**: automatic & user
- **Mac Land Quantum 40**: automatic & user
- **Maxcess 40E**: automatic & user

#### Partitioning
- **Jasmine DirectDrive 40**: yes
- **LaCie Cirrus 42**: yes
- **Liberty 40**: yes
- **Mac Land Quantum 40**: yes
- **Maxcess 40E**: yes

#### Backup
- **Jasmine DirectDrive 40**: yes
- **LaCie Cirrus 42**: yes
- **Liberty 40**: yes
- **Mac Land Quantum 40**: yes
- **Maxcess 40E**: yes

#### Password protection
- **Jasmine DirectDrive 40**: yes
- **LaCie Cirrus 42**: yes
- **Liberty 40**: yes
- **Mac Land Quantum 40**: yes
- **Maxcess 40E**: yes

#### Data encryption
- **Jasmine DirectDrive 40**: no
- **LaCie Cirrus 42**: no
- **Liberty 40**: no
- **Mac Land Quantum 40**: no
- **Maxcess 40E**: no

#### File recovery
- **Jasmine DirectDrive 40**: no
- **LaCie Cirrus 42**: no
- **Liberty 40**: no
- **Mac Land Quantum 40**: no
- **Maxcess 40E**: no

#### Disk optimizer
- **Jasmine DirectDrive 40**: no
- **LaCie Cirrus 42**: no
- **Liberty 40**: no
- **Mac Land Quantum 40**: no
- **Maxcess 40E**: no

### Case

#### Indicator lights
- **Jasmine DirectDrive 40**: access
- **LaCie Cirrus 42**: none
- **Liberty 40**: power, access
- **Mac Land Quantum 40**: power, access
- **Maxcess 40E**: power, access

#### Fan
- **Jasmine DirectDrive 40**: yes
- **LaCie Cirrus 42**: yes
- **Liberty 40**: no
- **Mac Land Quantum 40**: yes
- **Maxcess 40E**: yes

#### Size (L x W x H [in.])
- **Jasmine DirectDrive 40**: 10.5 x 9.5 x 2.5
- **LaCie Cirrus 42**: 10.5 x 9.5 x 2.5
- **Liberty 40**: 7 x 5 x 2
- **Mac Land Quantum 40**: 10 x 9.5 x 2.5
- **Maxcess 40E**: 10 x 9.5 x 2.5

#### Weight (pounds)
- **Jasmine DirectDrive 40**: 4 lb
- **LaCie Cirrus 42**: 5 lb
- **Liberty 40**: 3 lb
- **Mac Land Quantum 40**: 7 lb
- **Maxcess 40E**: 5 lb

### Other

#### Warranty
- **Jasmine DirectDrive 40**: 2 years, 30-day guarantee
- **LaCie Cirrus 42**: 5 years, 30-day guarantee
- **Liberty 40**: 1 year, 30-day guarantee
- **Mac Land Quantum 40**: 2 years
- **Maxcess 40E**: 2 years

#### Manufacturer
- **Jasmine Technologies**: 1740 Army St., San Francisco, CA 94124 (800) 347-3228 (415) 282-1111
- **LaCie Ltd.**: 16265 S.W, 68th St., #308 Tigard, OR 97224 (800) 999-0143 (503) 684-0143
- **Liberty Systems**: 129 Saratoga Ave., #82, Santa Clara, CA 95051 (408) 483-1127
- **Mac Land**: 5006 S. Ash Ave., Tempe, AZ 85282 (602) 333-3353 (602) 820-5802
- **Maxcess**: 314 North 13th St., #606 Philadelphia, PA 19107 (215) 928-1213

---

*This suggested retail price is usually discounted.
*Matches footprint of one-piece Mac.
*Manufacturer may use different mechanism.
*Should be included by press time.
**Access indicator on-screen.

---

42 Buyer's Guide  February 1990 MacUser
Sink your teeth into our high-performance family of reliable hard and optical disk subsystems.

Choosing the best subsystem for your storage-intensive, high-end Macintosh applications just got easier. Storage Dimensions' new MacinStor family comes with everything power-hungry Mac users want in a total mass storage solution.

We have something for every taste.

MacinStor gives you a wide range of storage solutions—from 45 to 650 MB, internal or external hard disk. Plus, exciting optical products including our 732 MB WORM drive and our ultra-fast 1 GB erasable optical drive. All are fully tested and ready to run. And because they're designed specifically for the Macintosh environment, MacinStor subsystems have the look, feel and user-friendly interface you expect.

You get more crunch per byte.

MacinStor won't leave you hungry for performance, serving up some of the industry's highest data transfer rates and fastest seek times.

And each MacinStor unit comes preformatted with our complete package of disk management software including formatter, partitioning and diagnostics. You also get our latest software advancements, like automatic reallocation of bad blocks, password protected partitions, A/UX support, backup, disk optimization, data encryption and data recovery.

Here's more food for thought.

One of the best reasons to buy MacinStor is the company behind it. Storage Dimensions has always been known for delivering innovative, high-quality products at prices that won't ruin your appetite.

For More Information, Call (408) 879-0300

Please circle 41 on reader service card.
## 101 Hard Drives

### Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>20 MB</th>
<th>30 MB</th>
<th>40 MB</th>
<th>60 MB</th>
<th>80 MB</th>
<th>90 MB</th>
<th>120 MB</th>
<th>140 MB</th>
<th>180 MB</th>
<th>280 MB</th>
<th>360 MB</th>
<th>480 MB</th>
<th>540 MB</th>
<th>660 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>MicroNet M546</td>
<td>Microtech Nova 40</td>
<td>MicroNet M40</td>
<td>Mirror MP40</td>
<td>Optimal Optima 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouse rating</td>
<td>4.0</td>
<td>5.0</td>
<td>4.0</td>
<td>4.5</td>
<td>4.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>List price</td>
<td>$945*</td>
<td>$649</td>
<td>$597</td>
<td>$647</td>
<td>$649</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity (advertised/actual)</td>
<td>48.6 / 45.5 MB</td>
<td>40.3 / 39.3 MB</td>
<td>40.0 / 39.3 MB</td>
<td>42.0 / 39.4 MB</td>
<td>42.0 / 39.4 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seek time (milliseconds)</td>
<td>40 ms</td>
<td>19 ms</td>
<td>26 ms</td>
<td>19 ms</td>
<td>19 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk seek results (seconds)</td>
<td>38.3 sec</td>
<td>30.7 sec</td>
<td>45.4 sec</td>
<td>30.7 sec</td>
<td>30.5 sec</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>OEM mechanism</td>
<td>Seagate ST157N-0</td>
<td>Quantum ProDrive 40S</td>
<td>Quantum ProDrive 40S</td>
<td>Quantum ProDrive 40S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platters (number &amp; size [in.])</td>
<td>three 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td>two 3.5-in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head positioning</td>
<td>embedded stepper</td>
<td>hybrid voice coil</td>
<td>embedded voice coil</td>
<td>hybrid voice coil</td>
<td>hybrid voice coil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic parking</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ID selector</td>
<td>DIP switch</td>
<td>push button</td>
<td>push button</td>
<td>push button</td>
<td>rotary switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Termination</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable (length, type)</td>
<td>3 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>1.5 feet, 50/25-pin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bundled</td>
<td>MicroNet Utilities 4.0g</td>
<td>Microtech Formatter, D9 Backup</td>
<td>Hard Driver</td>
<td>Hard Driver</td>
<td>Optima Utilities, HD Backup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Print spooler</td>
<td>no</td>
<td>no</td>
<td>none</td>
<td>none</td>
<td>no</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-speed copy</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-level formatting</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interleave selector</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic</td>
<td>automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partitioning</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Password protection</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data encryption</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>File recovery</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk optimizer</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator lights</td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
<td>access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size (L x W x H [in.])</td>
<td>10.5 x 10 x 3.25&quot;</td>
<td>10.5 x 9.75 x 2.5&quot;</td>
<td>11 x 9.75 x 2.5&quot;</td>
<td>11 x 9.75 x 2.5&quot;</td>
<td>9.5 x 9.5 x 2.5&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>8 lb</td>
<td>7 lb</td>
<td>7 lb</td>
<td>7 lb</td>
<td>8 lb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>5 years</td>
<td>2 years, 30-day guarantee</td>
<td>2 years, 30-day guarantee</td>
<td>2 years, 30-day guarantee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td>MicroNet Technology</td>
<td>Microtech International</td>
<td>Minor Technologies</td>
<td>Minor Technologies</td>
<td>Optimal Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 Mason Irvine, CA 92718</td>
<td>158 Commerce St. East Haven, CT 06512</td>
<td>264 Patton Road Roseville, MN 55113</td>
<td>264 Patton Road Roseville, MN 55113</td>
<td>650 Main St. Amherst, MA 01002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(714) 837-0035</td>
<td>(800) 325-1995 (203) 468-5223</td>
<td>(650) 654-5294 (612) 633-2105</td>
<td>(650) 654-5294 (612) 633-2105</td>
<td>(800) 637-0069 (413) 256-1258</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*This suggested retail price is usually discounted.

*Matches footprint of one-piece Mac.

*Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.
PC prices for Mac users.
An idea whose time has come.

Introducing the ATASI 128MB MacServer. $799. Our factory direct price.

Right about now, we can imagine you wrinkling your forehead and saying to yourself, “Hey, this price is incredible. But who are these guys anyway? And how can they sell a fully warranted, 128MB hard disk for only $799? What’s the catch?”

We’re Atasi Technology. And while we’re new to the Mac world, we’ve been a leader in IBM PC compatible hard drives for years. In fact, Atasi pioneered the 5 1/4” high speed, high capacity Winchester disk drive in 1984. Since then several million drives have been manufactured using Atasi technology, including the Atasi 3051 and 3085 and the Seagate 4053 and 4000 Series.

And the catch? You mean, how are we able to offer our top-of-the-line MacServer at the unprecedented low price of $799? It’s simple. We make it ourselves.

That’s right, we are the only company selling hard disc drives for the Macintosh that actually manufactures our own drive. This means you get a factory-direct price — with no distributor or integrator mark-ups. And it means we can assure the highest quality control standards, plus back them up with a 30-day money back guarantee and a full two year warranty. The MacServer is ready to plug ‘n’ play. With complete Mac SCSI compatibility, sub 30 ms access time and a zero footprint.

That’s a lot of hard drive for $799. In fact, we’ve never seen a lower price. If you haven’t either — then give us a call. 1-800-726-8872.

Please circle 80 on reader service card.

Visa, MasterCard, American Express welcome. Overnight delivery via Federal Express available for only $9 additional.
## 101 Hard Drives

### Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>40 MB</th>
<th>40 MB</th>
<th>40 MB</th>
<th>40 MB</th>
<th>40 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>PLI 500 Turbo</td>
<td>Procom MD 45</td>
<td>Relax Hard 46 Plus</td>
<td>Relax Sierra 46</td>
<td>Rodime Cobra 45c</td>
</tr>
<tr>
<td>Mouse rating</td>
<td>4.0</td>
<td>3.0</td>
<td>2.0</td>
<td>2.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

### Comments

- **PLI 500 Turbo**
  - Excellent case and setup software, adequate manuals.
  - Externally switchable termination good, but feet easily fall off case, blocking airflow.
- **Procom MD 45**
  - Poor case construction and shoddy components.
- **Relax Hard 46 Plus**
  - Expensive. Clunky-looking case with obvious hand soldering. Good software.
- **Relax Sierra 46**
  - Expensive. Clunky-looking case with obvious hand soldering. Good software.
- **Rodime Cobra 45c**
  - Expensive. Clunky-looking case with obvious hand soldering. Good software.

### List price

- **PLI 500 Turbo**
  - $995.00

### Technology

- **OEM mechanism**
  - Seagate ST157N-0
- **Platters (number & size [in.])**
  - three 3.5-in.
- **Head positioning**
  - embedded stepper
- **Automatic parking**
  - yes
- **SCSI**
  - rotate switch
  - internal switch
  - 2.5 feet, 50/25-pin
- **Software**
  - TurboWare
  - Procom Installer

### Performance

- **Seek time (milliseconds)**
  - 40 ms
- **DiskBasher results (seconds)**
  - 38.2 sec
- **List price**
  - $1,095.00
- **Capacity (advertised/actual)**
  - 48.6 / 45.5 MB
- **Seek time (milliseconds)**
  - 40 ms
- **DiskBasher results (seconds)**
  - 38.2 sec
- **List price**
  - $1,095.00
- **Capacity (advertised/actual)**
  - 48.6 / 45.5 MB
- **Seek time (milliseconds)**
  - 40 ms
- **DiskBasher results (seconds)**
  - 38.2 sec
- **List price**
  - $1,095.00
- **Capacity (advertised/actual)**
  - 48.6 / 45.5 MB
- **Seek time (milliseconds)**
  - 40 ms
- **DiskBasher results (seconds)**
  - 38.2 sec
- **List price**
  - $1,095.00
- **Capacity (advertised/actual)**
  - 48.6 / 45.5 MB
- **Seek time (milliseconds)**
  - 40 ms
- **DiskBasher results (seconds)**
  - 38.2 sec
- **List price**
  - $1,095.00

### Case

- **Indicator lights**
  - access

### Manufacturer

- **Peripheral Land, Inc.**
  - 47421 Bayside Pkwy, Fremont, CA 94538
  - (800) 288-8754 (415) 657-2211
- **Procom Technology**
  - 200 McDormick Ave, Costa Mesa, CA 92626
  - (714) 549-9449
  - (800) 848-1313 (415) 471-5112
- **Relax Technology**
  - 3101 Whipple Road, #22
  - Union City, CA 94587
  - (800) 801-0000 (415) 471-5112
  - Rodime
  - 901 Broken Sound Pkwy, N.W.
  - Boca Raton, FL 33487
  - (407) 994-5585

---

*This suggested retail price is usually discounted.

*Fits footprint of one-piece Mac.

*Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.
Featuring a complete line of mass storage solutions, CMS hard disk drives are designed to optimize the performance of today's wide variety of Apple systems.

Whatever your capacity or performance needs, CMS has the disk drive that's right for you. And all of our models are engineered and manufactured to the highest standards of quality and reliability.

At CMS, we complement our state-of-the-art products with instant availability, competitive pricing, and the finest in service and support. No wonder we're the industry's leading supplier of complete storage solutions— with over one million hard disk drives sold, worldwide.

So contact your nearest CMS Enhancements dealer, today. And let CMS provide the perfect formula to solve your storage problems.

For the name and telephone number of your local CMS Enhancements dealer, call us at 714-259-9555.
# Buyer's Guide

## Category 40 MB

### Storage Dimensions
- MacinStor 45 ZFP
- Tallgrass TG 40 SDe
- Tallgrass TravelPac 40
- Western Digital Preference 40

### Product
- Tallgrass TG 40 SDe
- MacinStor 45 ZFP

### Comments
- Most expensive 40 MB. Slow. Case wired for other internal 3.5-inch drive. Excellent manuals, software.
- Case is well designed on inside but lacks ventilation holes. Outdated manual.

### List price
- $1,449
- $1,395
- $1,195
- $999
- $839

### Capacity (advertised/actual)
- 45.0/43.5 MB
- 40.0/42.4 MB
- 42.0/39.4 MB
- 40.0/37.4 MB

### Seek time (milliseconds)
- 27 ms
- 45 ms
- 19 ms
- 29 ms

### DiskRead/Write results (seconds)
- 55.2 sec
- 68.7 sec
- 30.9 sec
- 49.5 sec

### Technology
- OEM mechanism: Maxtor LXT SOS
- Platter: 2.5 in.
- Head positioning: Embedded stepper
- Automatic parking: Yes
- SCSI ID selector: Rotary switch
- Termination: Plug
- Software: MacinStor Installer, TG Disk Utilities

### Other
- Warranty: 1 year, 30-day guarantee
- Manufacturer: Storage Dimensions

---

*This suggested retail price is usually discounted.
*Matches footprint of one-piece Mac.
*Manufacturer may use different mechanism.
*Should be included by press time.
**Access indicator on-screen.
Even to the experienced observer, a disc drive is a technological marvel. With discs spinning at 60 revolutions per second, the mechanics involved are astounding. It takes a company with a unique level of skill and experience to produce drives in volume that perform reliably year after year. A company like Seagate.

Our 3.5" ST1096 family is a great example of Seagate craftsmanship. Featuring a choice of 42, 60 or 83 formatted megabytes, these high performance (24 msec average access time) drives are ready for demanding PC and Apple® applications. The family offers ST412/MFM and SCSI interfaces for application flexibility. And they all feature a 50,000 hour mean-time-between-failure rate.

Like the artist who spends years perfecting his craft, Seagate has spent the past decade mastering the fine art of disc drives. For more information on our multi-faceted product line, contact your authorized Seagate distributor, or call Seagate directly at 800-468-DISC, or 408-438-6550.
## 101 Hard Drives

### Buyer’s Guide

| Category                                      | Mouse rating | Comments                                                                 | List price | Capacity (advertised/actual) | Seek time (milliseconds) | DiskBlaster! results (seconds) | Technology                                      | OEM mechanism                        | Platters (number & size [in.]) | Head positioning | Automatic parking | SCSI                      | ID selector | Termination | Cable (length, type) | Software                                      | Bundled                        |
|-----------------------------------------------|--------------|--------------------------------------------------------------------------|------------|-----------------------------|-------------------------|------------------------------|----------------------------------|----------------------------------|-----------------|-----------------|----------------|----------------|-----------------|------------|-------------|-------------------|----------------------------------|-----------------|
| 60 MB                                         | 3.0          | Least expensive 60 MB. Generic metal case with wires running over power supply. Preformatted partition complicates setup. | $579       | 64.9 / 60.9 MB              | 40 ms                   | 90.6 sec                     | Seagate ST277N-0                | Epson HMD-976 Q           | three 5.25-in. | embedded stepper | yes            | push button     | 3 feet, 25/25-pin     | Ehman System Utilities, PC Tools Deluxe | yes               |
| Ehman 60                                      | 3.5          | Quiet, variable-speed fan keeps drive very cool. Excellent case. Manual skims on setup instructions. | $1,299*     | 67.0 / 63.2 MB              | 29 ms                   | 45.4 sec                     | Seagate ST177N                  | Seagate ST177N-1         | three 3.5-in. | embedded voice coil | yes            | rotary switch    | 2 feet, 50/25-pin     | EMAC Disk Management, HD Backup | no               |
| EMAC Impact 60                                | 4.0          | No-frills zero-footprint case. Utilitarian software and manuals. Public-domain bundle. | $950*       | 60.0 / 57.0 MB              | 24 ms                   | 39.1 sec                     | Seagate ST177N-1               | Seagate ST177N-1         | three 5.25-in. | dedicated voice coil | yes            | thumb wheel      | 3 feet, 50/25-pin     | Heart Data Utility | yes              |
| Heart DCX 60                                   | 4.0          | Slowest under 100 MB. Generic zero-footprint case. Excellent setup software. Short, concise manual. | $1,045*     | 62.0 / 60.9 MB              | 28 ms                   | 47.0 sec                     | Seagate ST177N-0               | Seagate ST177N-0         | three 5.25-in. | embedded stepper | yes            | DIP switch       | 3 feet, 50/25-pin     | IDS Express 1.0, Password, Packet III, RapidUp | yes              |
| IDS60                                         | 4.0          | Least expensive 60 MB. Generic metal case with wires running over power supply. Preformatted partition complicates setup. | $1,095*     | 64.9 / 60.9 MB              | 40 ms                   | 188.7 sec                    | Seagate ST177N-0               | Seagate ST177N-0         | three 5.25-in. | embedded stepper | yes            | DIP switch       | 3 feet, 50/25-pin     | MicroNet Utilities 4.0g | yes              |
| MicroNet M562                                  | 4.0          | Quiet, variable-speed fan keeps drive very cool. Excellent case. Manual skims on setup instructions. | $579       | 64.9 / 60.9 MB              | 40 ms                   | 188.7 sec                    | Seagate ST177N-0               | Seagate ST177N-0         | three 5.25-in. | embedded stepper | yes            | push button     | 3 feet, 50/25-pin     | EHMM System Utilities, HD Backup | yes               |

### Notes
- *This suggested retail price is usually discounted.
- *Matches footprint of one-piece Mac.
- *Manufacturer may use different mechanism.
- *Should be included by press time.
- **Access indicator on screen.
With this interactive brochure, anyone can design a custom pair of sunglasses on screen and order automatically. This multimedia standalone uses color, digitized music and voice, animation and custom menus.

**Oakley® Sunglass Selector**

SuperAnimator is a toolkit for creating animated “agents” with synchronized sound. A commercial product created in SuperCard, it incorporates the elements of a traditional Macintosh® application.

**SuperAnimator**

This multimedia composition environment was created as an Apple Classroom of Tomorrow project to allow 12-year-olds to create their own educational applications by combining information from a variety of sources.

**MediaWorks**

SuperCard is a personal software toolkit.

**SUPERCARD**

NOAA and the U.S. Coast Guard monitored the Exxon Valdez oil spill cleanup and conducted daily briefings using this interactive information system that combines maps, graphs and databases.

**CAMEO Valdez**

This stunning graphical interface is the interactive front end to a multimedia database related to Picasso’s famous painting. Starting from Guernica, users can explore nearly any path of association imaginable.

**The “Guernica” Project**

This interactive medical education project makes use of color graphics, interactive video, digitized sound and images created in Super 3D™ to teach residents and clinical staff at Yale University School of Medicine.

**Cardiac Imaging**

This hypermedia information system was designed for boardroom presentations and strategic analysis. By clicking on the graphics, speakers can pull up relevant data and analyze it quickly in response to questions.

**Marketing Strategy Planner**

This stunning graphical interface is the interactive front end to a multimedia database related to Picasso’s famous painting. Starting from Guernica, users can explore nearly any path of association imaginable.

**Context Information System**

Steelcase Furniture uses this interactive multimedia presentation and electronic catalog to present their new line of modular office furniture, “Context.” It incorporates Super 3D™ models and animations.

**Inigo At Home**

Inigo achieved fame in the HyperCard® story stack entitled, “Inigo Gets Out.” Author Amanda Goodenough easily converted her charming character to SuperCard and colored his world.

**Inigo Valdez**

Available Now Through Your Local Dealer

**Suggested Retail Price $199**

System requirements: Macintosh Plus, SE, SE/30, II, Ix or IIcx, System 6.0.2 or later.

SuperCard, Super 3D and the Silicon Beach Software logo are trademarks of Silicon Beach Software, Inc. All other trademarks are the property of their respective owners.

Please circle 170 on reader service card.
## Buyer’s Guide

### 101 Hard Drives

| Category | Product | Mouse rating | Comments | List price | Capacity (advertised/actual) | Seek time (milliseconds) | DiskBench results (seconds) | OEM mechanism | Platters (number & size [in.]) | Head positioning | Automatic parking | SCSI | Technology | Software | Print spooler | High-speed copy | Low-level formatting | Interleave selector | Partitioning | Backup | Password protection | Data encryption | File recovery | Disk optimizer | Case | Warranty
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60 MB</td>
<td></td>
<td></td>
<td></td>
<td>$867</td>
<td>66.9 / 60.4 MB</td>
<td>40 ms</td>
<td>Seagate ST277N-0</td>
<td>three 5.25-in.</td>
<td>embedded stepper</td>
<td>yes</td>
<td>push button</td>
<td>push button</td>
<td>power, access</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 MB</td>
<td></td>
<td></td>
<td></td>
<td>$1,345*</td>
<td>63.9 / 62.2 MB</td>
<td>35 ms</td>
<td>Epson HMD-976C</td>
<td>three 5.25-in.</td>
<td>embedded voice coil</td>
<td>yes</td>
<td>DIP switch</td>
<td>rotary switch</td>
<td>power, access</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 MB</td>
<td></td>
<td></td>
<td></td>
<td>$1,499*</td>
<td>65.0 / 65.5 MB</td>
<td>28 ms</td>
<td>Relx Hard</td>
<td>four 3.5-in.</td>
<td>dedicated voice coil</td>
<td>yes</td>
<td>push button</td>
<td>push button</td>
<td>power, access</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 MB</td>
<td></td>
<td></td>
<td></td>
<td>$1,599*</td>
<td>70.0 / 70.8 MB</td>
<td>18 ms</td>
<td>Rodime 60 Plus</td>
<td>three 5.25-in.</td>
<td>hybrid voice coil</td>
<td>yes</td>
<td>push button</td>
<td>push button</td>
<td>power, access</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 MB</td>
<td></td>
<td></td>
<td></td>
<td>$749</td>
<td>65.0 / 60.9 MB</td>
<td>40 ms</td>
<td>Rodime Cobra 70e</td>
<td>three 5.25-in.</td>
<td>embedded stepper</td>
<td>yes</td>
<td>push button</td>
<td>push button</td>
<td>power, access</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 MB</td>
<td></td>
<td></td>
<td></td>
<td>$497</td>
<td>64.9 / 60.9 MB</td>
<td>56.1 sec</td>
<td>Stock ST8100 60</td>
<td>three 5.25-in.</td>
<td>embedded stepper</td>
<td>yes</td>
<td>push button</td>
<td>push button</td>
<td>power, access</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Technical Specifications

#### Performance
- **Seek time**:
  - Mirror M60: 40 ms
  - Relax Hard: 35 ms
  - Rodime 60 Plus: 28 ms
  - Rodime Cobra 70e: 18 ms

#### Capacity
- **Advertised/Actual**:
  - Mirror M60: 66.9/60.4 MB
  - Relax Hard: 63.9/62.2 MB
  - Rodime 60 Plus: 65.0/65.5 MB
  - Rodime Cobra 70e: 70.0/70.8 MB

#### Other Features
- **Automatic parking**: Yes, yes, yes, yes, yes
- **Softcopy**: no, no, yes, yes, yes
- **High-speed copy**: no, yes, no, no, no
- **Low-level formatting**: yes, yes, yes, yes, yes
- **Interleave selector**: automatic & user, automatic & user, automatic & user, automatic & user, automatic & user
- **Partitioning**: no, yes, yes, yes, yes
- **Backup**: no, yes, no, no, yes
- **Password protection**: no, no, no, no, yes
- **Data encryption**: no, no, no, no, yes
- **File recovery**: no, no, no, no, no
- **Disk optimizer**: no, no, no, no, no

#### Case
- **Indicator lights**: power, access, power, access, power, access, power, access, power, access, power, access, power, access
- **Fan**: yes, yes, yes, yes, yes
- **Size (L x W x H [in.])**: 11 x 9.75 x 2.5", 13 x 10.25 x 2.5", 10.5 x 9.75 x 3", 10.5 x 9.75 x 2.5", 10 x 9.75 x 2.5"
- **Weight (pounds)**: 7 lb, 8 lb, 6 lb, 6 lb, 7 lb

#### Other
- **Warranty**: 2 years, 30-day guarantee, 1 year, 30-day guarantee, 1 year, 1 year, 1 year
- **Manufacturer**: Mirror Technologies, Relax Technology, Rodime, Stock Drives

### Additional Notes
- This suggested retail price is usually discounted.
- Matches footprint of one-piece Mac.
- Manufacturer may use different mechanism.
- Should be included by press time.
- Access indicator is on-screen.
Come in and take a closer look at EMAC.

If you bought a Macintosh to improve productivity, then take a look at the new EMAC. We offer the most extensive range of quality Macintosh peripherals for one reason. To help you do more with less effort.

You don't have to worry about saving large desktop-publishing, graphics, or multimedia files — or any other files — with our fast and reliable hard disk and tape backup products. We can also help you tap into the information sharing capabilities of existing Ethernet networks. Our Ethernet controllers let you exchange information with computers of all sizes and makes. And we can get you in touch with more of the world through EMAC modems that offer top performance at a great price.

Doing more with less effort requires quality products. The kind you never have to worry about. We have a rigorous burn-in process to eliminate component problems. And all EMAC products must pass our final AQL tests — the toughest in the industry. That way we make sure EMAC products work right the first time and every time.

Discover more of what you can do with your Mac by by taking a closer look at EMAC. Call 1-800-821-0806, extension 2222 to find out where you can get more for your Mac today.

Please circle 151 on reader service card.
## 101 Hard Drives

### Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>Product</th>
<th>60 MB</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse rating</td>
<td>SuperMac DataFrame XP60</td>
<td>4.5</td>
<td>4.5</td>
<td>3.5</td>
<td>4.0</td>
<td>3.5</td>
</tr>
<tr>
<td>List price</td>
<td>$1,199*</td>
<td>$1,799*</td>
<td>$1,795*</td>
<td>$2,295*</td>
<td>$949*</td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>60.0 / 60.9 MB</td>
<td>80.0 / 75.1 MB</td>
<td>84.0 / 78.8 MB</td>
<td>76.9 / 78.8 MB</td>
<td>84.9 / 79.6 MB</td>
<td></td>
</tr>
<tr>
<td>Seek time (milliseconds)</td>
<td>28 ms</td>
<td>28 ms</td>
<td>19 ms</td>
<td>19 ms</td>
<td>28 ms</td>
<td></td>
</tr>
<tr>
<td>DiskBash! results (seconds)</td>
<td>50.6 sec</td>
<td>37.8 sec</td>
<td>29.3 sec</td>
<td>29.7 sec</td>
<td>29.4 sec</td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>OEM mechanism</td>
<td>Seagate ST277N-1</td>
<td>Quantum 0-200</td>
<td>Quantum ProDrive 80s</td>
<td>Quantum ProDrive 80s</td>
<td>Seagate ST295N</td>
</tr>
<tr>
<td>Platters (number &amp; size (in.))</td>
<td>three 5.25-in.</td>
<td>three 5.25-in.</td>
<td>three 3.5-in.</td>
<td>three 3.5-in.</td>
<td>three 5.25-in.</td>
<td></td>
</tr>
<tr>
<td>Head positioning</td>
<td>embedded stepper</td>
<td>embedded voice coil</td>
<td>hybrid voice coil</td>
<td>hybrid voice coil</td>
<td>embedded stepper</td>
<td></td>
</tr>
<tr>
<td>Automatic parking</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>SCSI</td>
<td>ID selector</td>
<td>software</td>
<td>recessed push button</td>
<td>rotary switch</td>
<td>push button</td>
<td>push button</td>
</tr>
<tr>
<td>Termination</td>
<td>internal</td>
<td>plug</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
<td></td>
</tr>
<tr>
<td>Cable (length, type)</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>3.5 feet, 25/25-pin</td>
<td>3 feet, 25/25-pin</td>
<td>6 feet, 50/25-pin</td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>Bundled</td>
<td>DataFrame Utilities, DiskFit, SuperSpool, SuperUser/Spool</td>
<td>HD Setup, HD Backup, Disk 1st Aid, Find File</td>
<td>Disk Manager Mac 1.12</td>
<td>CMS SCsi Utility, HD Backup</td>
<td>Crate Utility</td>
</tr>
<tr>
<td>Print spooler</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>High-speed copy</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Low-level formatting</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Interleave selector</td>
<td>automatic</td>
<td>automatic</td>
<td>automatic</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td></td>
</tr>
<tr>
<td>Partitioning</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Backup</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Password protection</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Data encryption</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>File recovery</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Disk optimizer</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Case</td>
<td>Indicator lights</td>
<td>power, access</td>
<td>access</td>
<td>access</td>
<td>access</td>
<td>power, access</td>
</tr>
<tr>
<td>Fan</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Size (L x W x H [in.])</td>
<td>9.5 x 3 x 8</td>
<td>10.5 x 3.75 x 3&quot;</td>
<td>7.5 x 4.5 x 2</td>
<td>10.5 x 10 x 2.25&quot;</td>
<td>11 x 5.75 x 3&quot;</td>
<td></td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>5 lb</td>
<td>9 lb</td>
<td>2.5 lb</td>
<td>7 lb</td>
<td>8 lb</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Warranty</td>
<td>1 year</td>
<td>90 days</td>
<td>1 year</td>
<td>1 year</td>
<td>2 years, 30-day guarantee</td>
</tr>
</tbody>
</table>

*This suggested retail price is usually discounted.

*Matches footprint of one-piece Mac.

*Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.
HARDPAC
YOU CAN TAKE IT WITH YOU!

NEVER BE WITHOUT YOUR PROGRAMS

The HARDPAC is a fast, quiet portable hard drive available in 20, 30, 40, 80, and 105MB capacities. The HARDPAC gives you the freedom to take your data and programs with you and use them on most computers.

EXTREMELY RUGGED

The HARDPAC is a self-contained portable hard drive. Housed in an injection moulded casing, all HARDPAC portable hard drives feature proprietary shock mounting, and automatic self-parking read/write heads.

INCREDIBLE SPEED

The HARDPAC boasts lightning quick access speeds of 19ms, data transfer of 4MB/sec, and a 64K programmable disk cache. Now that's performance.

PERFECT BLEND OF TECHNOLOGY AND COMMON SENSE

The HARDPAC weighs about 2 lbs and is the size of a large pocket novel. It can easily be carried in a brief case, mailed in a courier envelope or packed in the same case as a portable computer. It's simple and hassle free. Nothing compares with HARDPAC for performance, convenience, portability and security.

DataStor Internal and external drives for the Macintosh Plus

finally, internal hard drives for the Macintosh Plus

see the difference.

1-800-733-0078

Please circle 140 on reader service card.

We’ve got the drive it takes to run the Mac® world.

And you can get it at an out-of-this world price.

With DataStor Internal and external drives for the Macintosh®, you can make your world bigger. Faster. And more powerful. In fact with our high-quality drives, you can run your world any way you want — at affordable prices you won’t get from anyone else.

You can choose from a variety of storage capacities and access speeds (from 20 MB and 65 msec through 1.2 GB and 17 msec) to match any application. We also combine our DataStor removable media kits with the industry standard Syggest™ for great performance and unlimited capacity.

If there’s a drive missing from your Mac world, take a look at affordable DataStor drives. Call us today for the name of a dealer near you.

1-800-543-6098 1-800-654-6311

5541 Central Avenue 4386 Sunbelt Drive
Boulder, CO 80301 Dallas, TX 75248
FAX (303) 442-7985 FAX (214) 407-9732

Data Storage Marketing, Inc.

Please circle 27 on reader service card.
#Buyer's Guide

##Category 80 MB

<table>
<thead>
<tr>
<th>Product</th>
<th>List price</th>
<th>Capacity (advertised/actual)</th>
<th>Seek time (milliseconds)</th>
<th>DiskBash! results (seconds)</th>
<th>Technology</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolphin Integra 80Q</td>
<td>$2,295</td>
<td>84.0 / 78.8 MB</td>
<td>19 ms</td>
<td>29.6 sec</td>
<td>OEM mechanism: Quantum ProDrive BOS</td>
<td>Bundled Mac Installer 3.09, 7 MB public-domain and shareware</td>
</tr>
<tr>
<td>Ehman 80</td>
<td>$649</td>
<td>81.7 / 79.7 MB</td>
<td>28 ms</td>
<td>70.2 sec</td>
<td>Platters: three 3.5-in.</td>
<td>Print spooler: no</td>
</tr>
<tr>
<td>EMAC Impact 80</td>
<td>$1,749</td>
<td>84.0 / 78.8 MB</td>
<td>19 ms</td>
<td>29.6 sec</td>
<td>Head positioning: embedded stepper</td>
<td>High-speed copy: no</td>
</tr>
<tr>
<td>FWB PocketHammer 80</td>
<td>$1,549</td>
<td>84.0 / 78.8 MB</td>
<td>19 ms</td>
<td>30.4 sec</td>
<td>Automatic parking: yes</td>
<td>Low-level formatting: yes</td>
</tr>
<tr>
<td>Heart HD 1085</td>
<td>$1,259</td>
<td>84.0 / 78.8 MB</td>
<td>19 ms</td>
<td>29.7 sec</td>
<td>SCSI ID selector: push button</td>
<td>Interleave selector: automatic &amp; user</td>
</tr>
</tbody>
</table>

##Comments

- Most expensive under 100 MB. Variations in assembly indicate poor quality control.
- Least expensive and slowest 80 MB. Metal case with 25-pin SCSI connectors. Utilitarian software.
- Small plastic case with wires running over power supply. Preformat ted partition complicates setup.
- Small, generic metal case. Useful software and manuals.

##List price

- $2,295
- $649
- $1,749
- $1,549
- $1,259

##Capacity (advertised/actual)

- 84.0 / 78.8 MB
- 81.7 / 79.7 MB
- 84.0 / 78.8 MB
- 84.0 / 78.8 MB
- 84.0 / 78.8 MB

##Seek time (milliseconds)

- 19 ms
- 28 ms
- 19 ms
- 19 ms
- 19 ms

##DiskBash! results (seconds)

- 29.6 sec
- 70.2 sec
- 29.6 sec
- 30.4 sec
- 29.7 sec

##Technology

- OEM mechanism: Quantum ProDrive BOS
- Platters: three 3.5-in.
- Head positioning: embedded stepper
- Automatic parking: yes
- SCSI ID selector: push button
- Cable (length, type): 4 feet, 50/25-pin

##Software

- Bundled Mac Installer 3.09, 7 MB public-domain and shareware
- Ehman System Utilities, EMAC Disk Management, HD Backup
- FWB Utilities, Hard Disk Deadbolt, HD Backup
- Heart Data Utility

##Case

- Indicator lights: access, power, access
- Fan: yes
- Size (L x W x H [in.]): 10.5 x 10 x 3.5"
- Weight (pounds): 9 lb

##Other

- Warranty: 1 year
- Manufacturer: Dolphin Systems

---

*This suggested retail price is usually discounted.
*Matches footprint of one-piece Mac.
*Manufacturer may use different mechanism.
*Should be included by press time.
**Access indicator on-screen.
You Have a Lot Invested in Savings. Ensure Your Investment With a Mitsubishi Optical Storage Subsystem.

You've invested time and money in your business records, documents and drawings. Many are irreplaceable.

The Mitsubishi® MW-SU1 optical storage subsystem ensures the safety of your files with indelible WORM optical recording. With Mitsubishi, they're safe from overwrite, inadvertent erase and other hazards that plague traditional storage media.

The optical disk is removable. And removable media means economical, unlimited capacity and easy archiving. Each inexpensive 5¼" optical disk holds an additional 600 megabytes.

Best of all, the MW-SU1 is available as a turnkey subsystem that includes everything you need... Drive. Controller. Cables. Power supply. All in a compact desktop enclosure. With software and user's manual.

You expect more from Mitsubishi Electronics, the industry leader in optical storage technology, and you get it. The MW-SU1 has the highest performance of any 5¼" optical disk system available. To ensure unparalleled quality and reliability, Mitsubishi manufactures virtually all components of the MW-SU1, including the media itself.

So protect your investment. Just plug the MW-SU1 into your Apple® computer and start saving.

For the nearest Mitsubishi reseller call 1-800-556-1234, ext. 54 in the U.S. and Canada (in California, 1-800-441-2345, ext. 54).
## Buyer's Guide

### Category

<table>
<thead>
<tr>
<th>Product</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse rating</td>
<td>4.5</td>
<td>4.0</td>
<td>5.0</td>
<td>4.5</td>
<td>3.5</td>
<td></td>
</tr>
</tbody>
</table>

### Comments


### List price

|                        | $1,295* | $1,295* | $849 | $859 | $949 | $949 |

### Capacity (advertised/actual)

|                        | 84.0 / 79.6 MB | 84.9 / 78.7 MB | 80.0 / 78.8 MB | 82.0 / 77.8 MB | 81.0 / 78.8 MB |      |

### Seek time (milliseconds)

|                        | 28 ms | 19 ms | 19 ms | 19 ms | 19 ms |      |

### DiskBasher results (seconds)

|                        | 31.4 sec | 28.6 sec | 29.2 sec | 26.4 sec | 29.6 sec |      |

### Technology

|                        | Seagate ST129WN | Quantum ProDrive 80S | Quantum ProDrive 80S | Quantum ProDrive 80S | Quantum ProDrive 80S |      |

### Platters (number & size [in.])

|                        | three 5.25-in. | three 3.5-in. | three 3.5-in. | three 3.5-in. | three 3.5-in. |      |

### Head positioning

|                        | Embedded stepper | Hybrid voice coil | Hybrid voice coil | Hybrid voice coil | Hybrid voice coil |      |

### Automatic parking

|                        | yes | yes | yes | yes | yes | yes |

### SCSI

|                        | DIP switch | rotary switch | push button | software | thumb wheel |      |

### ID selector

|                        | Internal | Internal | Internal | Internal | Internal |      |

### Termination

|                        | Access door | Access door | Access door | Access door | Access door |      |

### Cable (length, type)


### Software

| Bundled                  | IDS Express 1.0, Password, PackIt, RapidUp | IDS Express 1.0, Password, PackIt, RapidUp | DriveTools, DriveWare, SUM II, 10 MB shareware and dongleware | DS Backup, Cirrus Volume Manager, SilverServer, Silverlining, 5 MB public-domain | Liberty Utilities, FileCollector, HD Backup |      |

| Print spooler            | no | no | no | no | no | yes |

| High-speed copy          | yes | yes | yes | yes | yes | yes |

| Low-level formatting     | yes | yes | yes | yes | yes | yes |

| Interleave selector      | automatic & user | automatic & user | automatic | automatic & user | user |      |

| Partitioning             | no | no | yes | yes | yes | yes |

| Backup                   | yes | yes | yes | yes | yes | yes |

| Password protection      | yes | yes | yes | yes | yes | yes |

| Data encryption          | yes | yes | yes | yes | yes | yes |

| File recovery            | yes | yes | yes | yes | yes | yes |

| Disk optimizer           | no | no | no | no | no | no |

### Case

| Indicator lights         | power, access | access | access | none** | power, access |      |

| Fan                      | yes | yes | yes | yes | yes | no |

| Size (L x W x H [in.])   | 11 x 10 x 3 1/2 | 8 x 5 x 2 | 10.5 x 9.5 x 2 1/2 | 10.5 x 9.5 x 2.5 | 7 x 5 x 2 |      |

| Weight (pounds)          | 8 lb | 3 lb | 5 lb | 5 lb | 3 lb |      |

### Other

| Warranty                 | 2 years, 30-day guarantee | 2 years, 30-day guarantee | 2 years, 30-day guarantee | 5 years, 30-day guarantee | 1 year, 30-day guarantee |      |

| Manufacturer             | IDS Systems, Inc. | IDS Systems, Inc. | Jasmine Technologies | LaCie, Ltd. | Liberty Systems |      |

|                        | 2107 N. First St., #280 | 2107 N. First St., #280 | 1740 Army St. | 1626 S.W. 85th St., #306 | 120 Saratoga Ave., #2 |      |

|                        | San Jose, CA 95131 | San Jose, CA 95131 | San Francisco, CA 94124 | Tigard, OR 97224 | Santa Clara, CA 95051 |      |

|                        | (408) 733-0078 | (408) 733-0078 | (650) 347-5239 | (503) 347-5239 | (408) 499-0143 | (408) 499-0143 |      |
THE BEST 45MB REMOVABLE ON THE MARKET

IS ALSO YOUR BEST VALUE IN A HARD DRIVE.

DataPak—voted by you and industry experts as the hands down winner for the best new storage system for the Macintosh. With today’s large applications and massive data files you need a system that grows with you, and megabyte for megabyte DataPak is your best value.

◆ Low-Cost Expandability
45 Megabytes on a removable cartridge. Just pop in another cartridge whenever you need more storage.

◆ High Performance
The DataPak is actually faster than many fixed drives with its 25ms access time and 1:1 interleave.

◆ Portability and Security
Padlok software provides password protection and volume partitioning. And because DataPak cartridges are removable you can take them with you, or lock them up for ultimate security.

◆ Easy Backups
Our KopyKat software makes the DataPak ideal for backing up all your files.

◆ Selection
Choose a DataPak, DataPak II or the new DataPak IIcx to match your system. All are available in single drive, dual drive, or combined with a fixed hard drive.

◆ Award-Winning Quality
With all these features it’s no wonder that DataPak is the only product of its kind to win three awards for outstanding quality and performance.

“Best New Storage System” - MacUser
“Best Alternative Storage System” - MacWorld
“Best New Hardware Peripheral” - MacUser Europe

The DataPak family—all the convenience of a floppy, all the performance of a hard drive.
Call 1-800-522-7979 for the dealer nearest you.
101 Hard Drives

## Buyer’s Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td>MacLand Quantum 80</td>
<td>MagicDrive 80</td>
<td>Maxcess 60E</td>
<td>MicroNet MS80</td>
<td>MicroNet MS80Q</td>
</tr>
<tr>
<td><strong>Mouse rating</strong></td>
<td>4.0</td>
<td>3.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>List price</strong></td>
<td>$849</td>
<td>$799</td>
<td>$999</td>
<td>$1,345*</td>
<td>$1,495*</td>
</tr>
<tr>
<td><strong>Capacity (advertised/actual)</strong></td>
<td>80.0 / 78.8 MB</td>
<td>80.0 / 79.6 MB</td>
<td>84.9 / 79.6 MB</td>
<td>84.0 / 78.6 MB</td>
<td>84.0 / 78.8 MB</td>
</tr>
<tr>
<td><strong>Seek time (milliseconds)</strong></td>
<td>19 ms</td>
<td>19 ms</td>
<td>19 ms</td>
<td>19 ms</td>
<td>19 ms</td>
</tr>
<tr>
<td><strong>DiskBasher! results (seconds)</strong></td>
<td>29.6 sec</td>
<td>30.2 sec</td>
<td>30.1 sec</td>
<td>29.7 sec</td>
<td>29.7 sec</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>OEM mechanism: Quantum ProDriveBOS</td>
<td>Seagate ST296N</td>
<td>Quantum ProDrive 80S</td>
<td>Seagate ST296N</td>
<td>Quantum ProDrive 80S</td>
</tr>
<tr>
<td></td>
<td>Platters (number &amp; size [in.])</td>
<td>three 3.5-in.</td>
<td>three 3.5-in.</td>
<td>three 5.25-in.</td>
<td>three 5.25-in.</td>
</tr>
<tr>
<td></td>
<td>Head positioning</td>
<td>hybrid voice coil</td>
<td>embedded stepper</td>
<td>hybrid voice coil</td>
<td>embedded stepper</td>
</tr>
<tr>
<td></td>
<td>Automatic parking</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>SCSI</strong></td>
<td>ID selector</td>
<td>push button</td>
<td>software</td>
<td>push button</td>
<td>DIP switch</td>
</tr>
<tr>
<td></td>
<td>Termination</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
</tr>
<tr>
<td></td>
<td>Cable (length, type)</td>
<td>1.5 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>3 feet, 50/25-pin</td>
<td>3 feet, 50/25-pin</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>Bundled</td>
<td>CRU Installer, MagicDrive, 10 MB public-domain</td>
<td>Maxcess Utilities, DiskTop. Hard Disk Deadbolt, MockPackage, QuikKeys</td>
<td>MicroNet Utilities 4.0g</td>
<td>MicroNet Utilities 4.0g</td>
</tr>
<tr>
<td></td>
<td>Print spooler</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>High-speed copy</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Low-level formatting</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Interleave selector</td>
<td>automatic &amp; user</td>
<td>user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
</tr>
<tr>
<td></td>
<td>Partitioning</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Backup</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Password protection</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Date encryption</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>File recovery</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Disk optimizer</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td>Indicator lights</td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
</tr>
<tr>
<td></td>
<td>Fan</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Size (L x W x H [in.])</td>
<td>10 x 9.5 x 2.5&quot;</td>
<td>11 x 10 x 2.5&quot;</td>
<td>10 x 9.75 x 2.5&quot;</td>
<td>10.5 x 10 x 3.25&quot;</td>
</tr>
<tr>
<td></td>
<td>Weight (pounds)</td>
<td>7 lb</td>
<td>7 lb</td>
<td>5 lb</td>
<td>8 lb</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>Warranty</td>
<td>2 years</td>
<td>1 year, 30 day guarantee</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manufacturer</td>
<td>MacLand</td>
<td>MacProducts USA</td>
<td>Maxcess</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5006 S. Ash Ave</td>
<td>8303 Maple Ave, #218</td>
<td>314 North 13th St, #906</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tempe, AZ 85282</td>
<td>Acacia, TX 75599-6369</td>
<td>Philadelphia, PA 19107</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(500) 333-3363</td>
<td>(900) 652-3476</td>
<td>(501) 356-2802</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(602) 820-5802</td>
<td>(512) 343-9441</td>
<td>(215) 923-1213</td>
</tr>
</tbody>
</table>

* This suggested retail price is usually discounted.
* Matches footprint of one-piece Mac.
* Manufacturer may use different mechanism.
* Should be included by press time.
* Access indicator on-screen.
Now available!
New Kao 25-packs.
25 3.5" color-coded disks in storage case as shown.
Call your local dealer today.

Here's a simple tip to help keep your business in the black: color code your diskette data storage. With Kao color-coded professional quality diskettes, Kao color coding brings order to diskette storage chaos. Makes it simpler and faster to find the right diskette. So you save valuable time—and reduce costly mistakes.

You can buy Kao color-coded diskettes in 10-packs of red, orange, yellow, green or blue. Or in rainbow packs containing two diskettes of each color. Choose from 5 1/4" MD-2HD, MD-2D, or 3 1/2" MF-2DD formats. They're all backed by our lifetime guarantee: if a Kao diskette ever fails, we'll replace it free.

Ask for Kao brand where you purchase diskettes. And keep your business in the green, red, orange, yellow and blue of Kao color-coded diskettes.
## 101 Hard Drives

### Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
<th>80 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Microtech</td>
<td>Mirror M80</td>
<td>Mirror MP80</td>
<td>Procom MD 80</td>
<td>Stock ST8100 80</td>
</tr>
<tr>
<td>Mouse rating</td>
<td>5.0</td>
<td>4.5</td>
<td>4.5</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Comments</td>
<td>Excellent plastic case, manuals, and software. Inexpensive. Low-profile case has switched outlet. Good manual and setup software.</td>
<td>Like Mirror M80 but faster. Low-profile case has switched outlet. Good manual and software.</td>
<td>Slow. Externally switchable termination good, but feet easily fall off case, blocking airflow.</td>
<td></td>
<td>Generic case looks used or remanufactured. Photocopied manuals. Little value added to basic drive.</td>
</tr>
<tr>
<td>List price</td>
<td>$1,019</td>
<td>$727</td>
<td>$997</td>
<td>$1,595*</td>
<td>$949</td>
</tr>
<tr>
<td>Capacity (advertised/actual)</td>
<td>80.7 / 78.7 MB</td>
<td>84.9 / 79.7 MB</td>
<td>80.1 / 78.8 MB</td>
<td>80.0 / 81.6 MB</td>
<td>84.0 / 79.7 MB</td>
</tr>
<tr>
<td>Seek time (milliseconds)</td>
<td>19 ms</td>
<td>28 ms</td>
<td>19 ms</td>
<td>25 ms</td>
<td>28 ms</td>
</tr>
<tr>
<td>DiskBasher! results (seconds)</td>
<td>29.8 sec</td>
<td>29.9 sec</td>
<td>29.7 sec</td>
<td>54.1 sec</td>
<td>30.6 sec</td>
</tr>
<tr>
<td>Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OEM mechanism</td>
<td>Quantum ProDrive 80S</td>
<td>Seagate ST296N</td>
<td>Quantum ProDrive 80S</td>
<td>Y-E Data Y03082-01</td>
<td>Seagate ST296N</td>
</tr>
<tr>
<td>Platters (number &amp; size [in.])</td>
<td>three 3.5-in.</td>
<td>three 5.25-in.</td>
<td>three 3.5-in.</td>
<td>three 5.25-in.</td>
<td>three 5.25-in.</td>
</tr>
<tr>
<td>Head positioning</td>
<td>hybrid voice coil embedded stepper</td>
<td>hybrid voice coil embedded stepper</td>
<td>hybrid voice coil embedded stepper</td>
<td>hybrid voice coil embedded stepper</td>
<td>hybrid voice coil embedded stepper</td>
</tr>
<tr>
<td>Automatic parking</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>SCSI ID selector</td>
<td>push button</td>
<td>push button</td>
<td>push button</td>
<td>rotary switch</td>
<td>push button</td>
</tr>
<tr>
<td>Termination</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
<td>external switch</td>
<td>internal</td>
</tr>
<tr>
<td>Cable (length, type)</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2.5 feet, 25-pin</td>
<td>2 feet, 50/25-pin</td>
</tr>
<tr>
<td>Software</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bundled</td>
<td>Microtech Formatter, Hard Driver</td>
<td>Hard Driver</td>
<td>Hard Driver</td>
<td>Precom Installer</td>
<td>Data Cell, HD Backup</td>
</tr>
<tr>
<td>Print spooler</td>
<td>no *</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>High-speed copy</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Low-level formatting</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Interleave selector</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
<td>automatic &amp; user</td>
</tr>
<tr>
<td>Partitioning</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Backup</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Password protection</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Data encryption</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>File recovery</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Disk optimizer</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Case</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator lights</td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
<td>power, access</td>
</tr>
<tr>
<td>Fan</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Size (L x W x H [in.])</td>
<td>10.5 x 9.75 x 2.5&quot;</td>
<td>11 x 9.75 x 2.5&quot;</td>
<td>11 x 9.75 x 2.5&quot;</td>
<td>10.5 x 9.5 x 2.5&quot;</td>
<td>10 x 9.75 x 2.5&quot;</td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>7 lb</td>
<td>7 lb</td>
<td>7 lb</td>
<td>5 lb</td>
<td>7 lb</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warranty</td>
<td>5 years</td>
<td>2 years, 30-day guarantee</td>
<td>2 years, 30-day guarantee</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Microtech International</td>
<td>Mirror Technologies</td>
<td>Seagate</td>
<td>Precom Technology</td>
<td>Stock Drives</td>
</tr>
<tr>
<td></td>
<td>158 Commerce St.</td>
<td>2644 Patton Road</td>
<td>200 McCormick Ave.</td>
<td>1977 O'Toole Ave., B205</td>
<td>1977 O'Toole Ave., B205</td>
</tr>
<tr>
<td></td>
<td>East Haven, CT 06512</td>
<td>Roseville, MN 55113</td>
<td>Costa Mesa, CA 92626</td>
<td>San Jose, CA 95131</td>
<td>San Jose, CA 95131</td>
</tr>
<tr>
<td></td>
<td>(800) 325-1896</td>
<td>(866) 654-5294</td>
<td>(714) 549-9449</td>
<td>(408) 354-1227</td>
<td>(408) 354-1227</td>
</tr>
</tbody>
</table>

---

*This suggested retail price is usually discounted.

*Matches footprint of one-piece Mac.

*Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.

---

February 1990 MacUser
How the other half lives.

It's a world of rich, saturated 300dpi color. Where you get high resolution, high quality, consistent color output in the first print or the thousandth. In sizes up to a full 11"x17" bleed.

With its 32-bit QuickDraw Chooser-level driver, the QD5500 gives you 300dpi text in any size or orientation. Best of all, your documents will be compatible with the LaserWriter's Page Setup command so there's no need for repagination when using both a QD5500 and a LaserWriter.

So see how the other half lives. Call us at (800) 873-4561.
## 101 Hard Drives

### Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>80 MB</th>
<th>90 MB</th>
<th>90 MB</th>
<th>90 MB</th>
<th>90 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse rating</td>
<td>Tallgrass TravelPac 80</td>
<td>Deltaic Server 90</td>
<td>MacProducts MagicDrive 91</td>
<td>PLI 90e Turbo</td>
<td>Relax Hard 90 Plus</td>
</tr>
<tr>
<td>List price</td>
<td>$1,595*</td>
<td>$1,595*</td>
<td>$950</td>
<td>$1,795*</td>
<td>$1,595*</td>
</tr>
<tr>
<td>Capacity (advertised/actual)</td>
<td>84.0 / 78.8 MB</td>
<td>90.0 / 85.9 MB</td>
<td>91.0 / 85.9 MB</td>
<td>91.0 / 85.9 MB</td>
<td>89.2 / 85.9 MB</td>
</tr>
<tr>
<td>Seek time (milliseconds)</td>
<td>19 ms</td>
<td>18 ms</td>
<td>18 ms</td>
<td>18 ms</td>
<td>18 ms</td>
</tr>
<tr>
<td>DiskRush results (seconds)</td>
<td>30.3 sec</td>
<td>29.0 sec</td>
<td>28.0 sec</td>
<td>28.9 sec</td>
<td>27.9 sec</td>
</tr>
<tr>
<td>Technology</td>
<td>OEM mechanism</td>
<td>Quantum ProDrive 80S</td>
<td>Imprimis Wren III 94211-091M</td>
<td>Imprimis Wren III 94211-091M</td>
<td>Imprimis Wren III 94211-091M</td>
</tr>
<tr>
<td>Platters (number &amp; size [in.])</td>
<td>three 3.5-in.</td>
<td>three 5.25-in.</td>
<td>three 5.25-in.</td>
<td>three 5.25-in.</td>
<td>three 5.25-in.</td>
</tr>
<tr>
<td>Head positioning</td>
<td>hybrid voice coil dedicated voice coil embedded voice coil embedded voice coil embedded voice coil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic parking</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>SCSI</td>
<td>ID selector</td>
<td>rotary switch</td>
<td>push button</td>
<td>software</td>
<td>rotary switch</td>
</tr>
<tr>
<td></td>
<td>Termination</td>
<td>internal</td>
<td>plug</td>
<td>internal</td>
<td>internal</td>
</tr>
<tr>
<td></td>
<td>Cable (length, type)</td>
<td>3 feet, 25/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>3 feet, 50/25-pin</td>
</tr>
<tr>
<td></td>
<td>Software</td>
<td>Bundled TG Disk Utilities, DiskFacts</td>
<td>Deltaic Utilities, HD Backup</td>
<td>MagicDrive, 10 MB public-domain</td>
<td>TurboWare</td>
</tr>
<tr>
<td></td>
<td>Print spooler</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>High-speed copy</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Low-level formatting</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Interleave selector</td>
<td>automatic</td>
<td>automatic &amp; user</td>
<td>user</td>
<td>automatic &amp; user</td>
</tr>
<tr>
<td></td>
<td>Partitioning</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Backup</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Password protection</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Data encryption</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>File recovery</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Disk optimizer</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Case</td>
<td>Indicator lights</td>
<td>access</td>
<td>power, access</td>
<td>power, access</td>
<td>access</td>
</tr>
<tr>
<td></td>
<td>Fan</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Size (L x W x H [in.])</td>
<td>7.5 x 5.75 x 2</td>
<td>10 x 3.75 x 2.5</td>
<td>11 x 10 x 2.5</td>
<td>10 x 9.75 x 2.5</td>
</tr>
<tr>
<td></td>
<td>Weight (pounds)</td>
<td>3 lb</td>
<td>6 lb</td>
<td>8 lb</td>
<td>8 lb</td>
</tr>
<tr>
<td>Other</td>
<td>Warranty</td>
<td>2 years</td>
<td>1 year</td>
<td>1 year, 30-day guarantee</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Tallgrass Technologies</td>
<td>Deltaic Systems</td>
<td>MacProducts USA</td>
<td>Peripheral Land, Inc.</td>
<td>Relax Technology</td>
</tr>
<tr>
<td></td>
<td>11100 W. 82nd St.</td>
<td>1977 Cutevo Ave., 8206</td>
<td>8355 Mopac Expwy. #216</td>
<td>47421 Bayside Pkwy.</td>
<td>3101 Whipple Road, #22</td>
</tr>
<tr>
<td></td>
<td>Lenexa, KS 66214</td>
<td>San Jose, CA 95131</td>
<td>Austin, TX 78756-8369</td>
<td>Fremont, CA 94538</td>
<td>Union City, CA 94587</td>
</tr>
<tr>
<td></td>
<td>(903) 854-1525</td>
<td>(408) 554-1025</td>
<td>(303) 422-3475</td>
<td>(512) 334-9411</td>
<td>(908) 845-1313</td>
</tr>
</tbody>
</table>

*This suggested retail price is usually discounted.

# Matches form of one-piece Mac.

# Manufacturer may use different mechanism.

*Should be included by press time.

**Access indicator on-screen.
Turbo Mouse. Wins again and again and again.

That's right. For the third year running, the readers of Macworld magazine have voted the Kensington Turbo Mouse® "Best Input Device" for Macintosh® computers.

Who were the contenders? Every other track-ball and mouse on the market. (Not to mention joysticks, keyboards and graphics tablets.) The winning secret? Simple.

Turbo Mouse is quicker, quieter, and easier to use. It delivers the winning combination of speed, precision, two buttons with extra features, and a comfortable, space-saving design—all for just $169.95.

For a free brochure, or a dealer near you, call (800) 535-4242. Outside the U.S. or in New York, call (212) 475-5200.

Please circle 152 on reader service card.
NEW DISKEXPRESS II

How to Automatically Eliminate Pesky Fragmentation Holes in Your Hard Disk Forever

DiskExpress II is the first revolutionary disk optimization system software. Its Disk Optimatic™ technology is designed to automatically optimize your hard drive forever. Eat your heart out ordinary disk optimizers. Nothing else can compare when it comes to improving hard disk performance and speeding file access times. Only DiskExpress II has the intelligence to work intuitively around the rat-race schedules of today's busy Mac users, too. In fact, DiskExpress II not only runs transparently in the background mode, it constantly logs file activity so it can prioritize and group your frequently used files for maximum disk performance. And because DiskExpress II optimizes one file at a time, you'll virtually never be trapped by a sudden power interruption. There's no safer or faster way to optimize...whether you're in a big network or you're working with one Mac and a mouse. To order your DiskExpress II, send $89.95 plus shipping to ALSof today.

ALSoft, Inc.
P. O. Box 927 • Spring TX 77383-0927
713/353-4090 SALES • 713/353-9868 FAX

101 Hard Drives

Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>Product</th>
<th>Storage Dimensions</th>
<th>Mouse rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 MB</td>
<td>Storage Dimensions</td>
<td>MacinStor 90 ZFP</td>
<td>4.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comments</th>
<th>90 MB comes prewired for second 3.5-inch drive. Excellent manuals and software.</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$1,749*</td>
</tr>
<tr>
<td>Capacity (advertised/actual)</td>
<td>90.0 / 87.2 MB</td>
</tr>
<tr>
<td>Seek time (milliseconds)</td>
<td>27 ms</td>
</tr>
<tr>
<td>DiskBasher results (seconds)</td>
<td>54.5 sec</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM mechanism</td>
</tr>
<tr>
<td>Platters (number &amp; size in.)</td>
</tr>
<tr>
<td>Head positioning</td>
</tr>
<tr>
<td>Automatic parking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID selector</td>
</tr>
<tr>
<td>Termination</td>
</tr>
<tr>
<td>Cable (length, type)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bundled</td>
</tr>
<tr>
<td>Print spooler</td>
</tr>
<tr>
<td>High-speed copy</td>
</tr>
<tr>
<td>Low-level formatting</td>
</tr>
<tr>
<td>Interleave selector</td>
</tr>
<tr>
<td>Partitioning</td>
</tr>
<tr>
<td>Backup</td>
</tr>
<tr>
<td>Password protection</td>
</tr>
<tr>
<td>Data encryption</td>
</tr>
<tr>
<td>File recovery</td>
</tr>
<tr>
<td>Disk optimizer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator lights</td>
</tr>
<tr>
<td>Fan</td>
</tr>
<tr>
<td>Size (L x W x H in.)</td>
</tr>
<tr>
<td>Weight (pounds)</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Warranty</td>
</tr>
<tr>
<td>Manufacturer</td>
</tr>
</tbody>
</table>

*This suggested retail price is usually discounted.
*Matches footprint of one-piece Mac.
Manufacturer may use different mechanism.
Should be included by press lime.
**Access indicator on-screen.

101 Hard Drives

Category: 90 MB
Product: Storage Dimensions MacinStor 90 ZFP
Mouse rating: 4.5

Buyer's Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>Product</th>
<th>Storage Dimensions</th>
<th>Mouse rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 MB</td>
<td>Storage Dimensions</td>
<td>MacinStor 90 ZFP</td>
<td>4.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comments</th>
<th>90 MB comes prewired for second 3.5-inch drive. Excellent manuals and software.</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$1,749*</td>
</tr>
<tr>
<td>Capacity (advertised/actual)</td>
<td>90.0 / 87.2 MB</td>
</tr>
<tr>
<td>Seek time (milliseconds)</td>
<td>27 ms</td>
</tr>
<tr>
<td>DiskBasher results (seconds)</td>
<td>54.5 sec</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM mechanism</td>
</tr>
<tr>
<td>Platters (number &amp; size in.)</td>
</tr>
<tr>
<td>Head positioning</td>
</tr>
<tr>
<td>Automatic parking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID selector</td>
</tr>
<tr>
<td>Termination</td>
</tr>
<tr>
<td>Cable (length, type)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bundled</td>
</tr>
<tr>
<td>Print spooler</td>
</tr>
<tr>
<td>High-speed copy</td>
</tr>
<tr>
<td>Low-level formatting</td>
</tr>
<tr>
<td>Interleave selector</td>
</tr>
<tr>
<td>Partitioning</td>
</tr>
<tr>
<td>Backup</td>
</tr>
<tr>
<td>Password protection</td>
</tr>
<tr>
<td>Data encryption</td>
</tr>
<tr>
<td>File recovery</td>
</tr>
<tr>
<td>Disk optimizer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator lights</td>
</tr>
<tr>
<td>Fan</td>
</tr>
<tr>
<td>Size (L x W x H in.)</td>
</tr>
<tr>
<td>Weight (pounds)</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Warranty</td>
</tr>
<tr>
<td>Manufacturer</td>
</tr>
</tbody>
</table>

*This suggested retail price is usually discounted.
*Matches footprint of one-piece Mac.
Manufacturer may use different mechanism.
Should be included by press lime.
**Access indicator on-screen.
Users Won’t Know
The Difference.

But Buyers Will.

According to a recent article in *MacWorld Magazine*,
“There is very little to distinguish one hard drive from another,
other than speed, software, and price.” We agree.

Only a very few milliseconds of access speed separate
the Jasmine and the Ehman hard disk drives, and both include
utility software programs free. Both come with two year
warranties and a 30-day money back
guarantee. And both companies
enjoy a reputation for manufacturing
high-quality products.
That brings us to price.
As you can see, the Ehman 45 MB hard
drive is $200 less than the Jasmine 40 MB.
That’s a difference users may not notice,
but buyers certainly will. Ehman’s low
Rocky Mountain overhead always means lower prices.

With all Ehman products, you get a 30-day money
back guarantee, a lengthy warranty, and our optional 24-hour
express service replacement service policy.

The Ehman drive is a better buy. But don’t take
our word for it. *MacWorld Magazine* called the Ehman drive
“a real bargain.” Call us today and see the difference for yourself.

Visa, MasterCard, American Express welcome.

**Hard Drive Prices**

<table>
<thead>
<tr>
<th>Size (MB)</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$299</td>
<td>$349</td>
</tr>
<tr>
<td>30+</td>
<td>$379</td>
<td>$449</td>
</tr>
<tr>
<td>35</td>
<td>$449</td>
<td>$499</td>
</tr>
<tr>
<td>60+</td>
<td>$599</td>
<td>$699</td>
</tr>
<tr>
<td>105</td>
<td>$799</td>
<td>$899</td>
</tr>
<tr>
<td>155</td>
<td>$899</td>
<td>$999</td>
</tr>
<tr>
<td>180</td>
<td>$1,099</td>
<td>$1,199</td>
</tr>
<tr>
<td>35 Removable</td>
<td>$749</td>
<td></td>
</tr>
</tbody>
</table>

*Good only on Macintosh II models. SE drives also available. Utility software not available on 20 MB. All product names mentioned are trademarks of their respective holders. Prices subject to change without notice and may not reflect limited time pricing. 3% surcharge on American Express.*
FOR THOSE OBSESSED WITH PERFORMANCE, A HARD DISK THAT MATCHES YOUR OBSESSION.

Today there are any number of peripherals designed to push the performance envelope of the Macintosh. But none pushes harder than an ingenious new series of hard disks from GCC Technologies: Its name is UltraDrive™ S: a complete family of 40 to 175 MB hard disks that relegates all others to the status of underachievers.

No Hard Disk Works Faster.

Simply stated, UltraDrive S is the fastest hard disk in its class. A distinction made possible by an on-board RAM cache that speeds access to recent or sequential data requests. By a capability called 'one-to-one interleaving' that feeds you data as fast as your Macintosh can take it. And by amazing average access times as low as 12 ms.

All of which is good news indeed for anyone who works with large spreadsheets, sophisticated graphics or other data-intensive applications.

No Hard Disk Works Smarter.

Each UltraDrive S hard disk comes with an extensive software library ordinarily retailing for several hundred dollars. Including Symanec's™ SUM II, a comprehensive management program featuring true SCSI partitioning (Disk Manager™), a rapid print spooler (QuickSpool™), and over 3 MB of selected shareware software.

In sum, to anyone obsessed with performance, UltraDrive S provides an ideal vehicle for self-expression. And at a price over 35% less than Apple's® hard disks, it even performs better as an investment.

Toll-Free, Hassle-Free, Risk-Free.

To order, call 800-422-7777 from 9 to 9 on weekdays, or 10 to 4 Saturdays. Our expertly trained staff will be glad to answer questions, provide technical support, and offer advice on choosing and getting the most out of any of our products. Ask for our free catalog. When your order is received by 8:00 PM (EST), it will be shipped the same day via overnight delivery for only $9.

What's more, we guarantee satisfaction. If after trying UltraDrive S for up to 30 days you aren't completely satisfied, just return it and we'll cheerfully refund your money, no questions asked.

Finally, UltraDrive S carries a full two year warranty covering both parts and labor (ask for details). But that's not the only way we ensure your peace of mind. We also offer repair service at any one of hundreds of GCC Technologies dealers.

The UltraDrive S Series.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>EXTERNAL</th>
<th>INTERNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>UltraDrive 40 S</td>
<td>$799</td>
<td>$649</td>
</tr>
<tr>
<td>UltraDrive 80 S</td>
<td>$1099</td>
<td>$949</td>
</tr>
<tr>
<td>UltraDrive 100 S</td>
<td>$1299</td>
<td>$1149</td>
</tr>
<tr>
<td>UltraDrive 175 S</td>
<td>$1799</td>
<td>$1699</td>
</tr>
</tbody>
</table>

For the name and location of the GCC Technologies dealer nearest you, or to order, call 800-422-7777.

We are glad to accept MasterCard, Visa, American Express, or your company's corporate purchase order.

Please circle 104 on reader service card.
High-Density-Floppy Drives

All high-density-floppy drives offer IBM connectivity and 1.4 megabytes of storage, but MacUser Labs reveals that they’re not created equal.

O bsolete. Whisper the word and watch your computer-minded friends scramble to the nearest dealer with checkbook in hand. Each new Mac is faster, each new printer more precise, each new microprocessor more powerful than the one before. And now the threat of obsolescence darkens even the disk drives of older Macs.

Since the Mac IIfx was introduced in February 1989, every new computer from Cupertino has come with a snazzy Apple FDHD SuperDrive. The “fudd-hudd” (floppy disk, high-density) also became standard for all new SEs in August 1989. The Plus is now the only Mac sold without SuperDrive power.

And powerful SuperDrive is. It can store 1.4 megabytes on a single high-density (HD) 3.5-inch floppy. It reads and writes all Mac and Apple II disk formats as well as DOS and OS/2 floppy disks created by IBM and its PC clones. Faced with this formidable contender, you might wonder if the beloved 800K disk will go the way of the 8-inch floppy.

We at MacUser Labs wondered too, so we tested four HD-floppy drives — the Apple FDHD SuperDrive, DaynaFILE, Kennect Drive 2.4 (with Kennect’s Rapport, a drive controller that plugs into the Mac’s disk-drive port), and PLI TurboFloppy 1.4. We found that although they all offer basically the same benefits — increased storage and compatibility with PC disks — they have markedly different performance, features, and capabilities. We timed the drives as they formatted blank disks, transferred PC files, and copied Mac documents (see Figure 1). We also spent some quality time with them to see how they responded to the demands of everyday use.

As it happens, the fastest performers — the Apple FDHD SuperDrive and Kennect Drive 2.4 — also turned out to be our top picks, but not because of their speed alone. So before you dash to your dealer, arm yourself with the facts — not just your checkbook.

Why Buy?

First, don’t panic. If your Mac lacks a FDHD SuperDrive, you’re not about to lose connection with the rest of the Mac world. Software publishers are unlikely to begin shipping their wares exclusively on HD disks any time soon. There are just too many 800K drives out there. Though their increased capacity is attractive, HD-floppy drives aren’t economical for backup — some 80-megabyte hard-disk drives cost less than 1.4-megabyte HD-floppy drives (see “101 Hard Drives” in this issue). However, a SuperDrive is a great method for backing up enormous files — or mailing them across the country — especially when these files are

By Owen W. Linzmayer and the MacUser Labs staff
High-Density-Floppy Drives

compressed with a utility such as StuffIt from Aladdin Systems.

The simple fact is that you may not need an HD-floppy drive. If your Mac comes standard with one, great. If not, a good reason to buy one is to swap files between your Mac and a PC.

You can take a plain ol' 3.5-inch PC disk (either 720K or 1.4-megabyte) and insert it into an HD-floppy drive on the Mac. Then run AFE (Apple File Exchange), which is provided with every Mac's System software, to physically transfer files from the PC disk to a Mac volume. With the necessary translation files, AFE can convert foreign files into something your Mac applications can understand. (For an in-depth look at DataViz's MacLinkPlus translators, see "PC to Mac and Back," October '89). But you can't get this performance from just any 3.5-inch disk—a high-density drive must be fed the new (and more expensive) HD disks.

Floppy but Dense

From the outside, an HD 3.5-inch disk looks just like the 800K double-density (DD) disks you're familiar with. You—and an HD drive—can tell these near-identical twins apart by the small square hole opposite the write-protect tab on HD disks. Inside the plastic shell, though, a more fundamental difference exists: the magnetic medium itself.

HD disks have double the rated maximum magnetic density of DD disks and thus can store considerably more information. Because HD disks have an extremely thin magnetic coating on a mylar base, the drive head can write to them with a relatively weak current. So don't try to use an HD disk in a standard DD drive—the older drive's stronger write current can make adjoining data unreadable and the disk unusable. Conversely, DD disks should never be modified and formatted as HD disks—although you may be able to get away with it in the short run, you will eventually lose data. If your data is worth keeping, it's worth storing on certified HD disks.

Driving Lessons

Although both the Mac and some PCs use 3.5-inch disks, differences in recording techniques and drive mechanics make it impossible to swap disks between them without an HD-floppy drive. All PC drives spin disks at a constant speed, much like a phonograph turntable spins record albums at 33 rpm. Before the FDHD, all Apple drives were designed to speed up as the read/write head approached the center of the disk, much as a compact-disc player does. But don't extend the low-tech LP versus high-tech CD analogy any further. The PC method, called MFM (modified-frequency modulation), and Apple's method, called GCR (group-coded recording), are two different ways of solving the same problem: how to get data onto and off a DD disk.

In the PC world, both 720K DD and 1.4-megabyte HD drives use MFM. Because they spin at a constant speed, bits of data are spaced farther and farther apart as the read/write head moves from the center of the disk to the longer outside tracks. Very little control information needs to be mixed in with the data, however, so MFM efficiency remains high.

Apple's 400K and 800K GCR drives use five different rotational speeds to write at a nearly uniform density over the entire disk. An IWM (Integrated Wozniak Machine) chip inside the Mac slows the drive down as the read/write head moves out from the disk's center, fitting more and more data onto progressively longer tracks. However, the extra storage gained through increased density is offset by the large amount of control information that must share disk space with data.

For DD disks, the differences in top storage capacity are minimal: 800K for GCR and 720K for MFM. For HD disks, the storage differences disappear completely because each of the four drives we reviewed uses MFM for 1.4-megabyte Mac and PC disks. Additionally, the Apple FDHD SuperDrive and Kennect Drive 2.4 are smart enough to switch to GCR when fed standard 400K and 800K Mac and ProDOS disks.

Unfortunately, the DaynaFILE and PLI TurboFloppy 1.4 are incapable of GCR operation, so they can't read, write, or format DD Mac disks. Although this limitation has no effect on their performance with PC and Apple HD disks, it's
<table>
<thead>
<tr>
<th>Features of High-Density-Floppy Drives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Apple</strong></td>
</tr>
<tr>
<td><strong>FDHD SuperDrive</strong></td>
</tr>
<tr>
<td><strong>List price</strong></td>
</tr>
<tr>
<td>external, $699</td>
</tr>
<tr>
<td>upgrade kit, $599</td>
</tr>
<tr>
<td>internal, $499</td>
</tr>
<tr>
<td><strong>Identifies PC disks</strong></td>
</tr>
<tr>
<td>no</td>
</tr>
<tr>
<td><strong>Mounts PC disks</strong></td>
</tr>
<tr>
<td>no*</td>
</tr>
<tr>
<td><strong>Encoding</strong></td>
</tr>
<tr>
<td><strong>Compatibility</strong></td>
</tr>
<tr>
<td><strong>Mac 512KE</strong></td>
</tr>
<tr>
<td><strong>Mac Plus</strong></td>
</tr>
<tr>
<td><strong>Mac SE</strong></td>
</tr>
<tr>
<td><strong>Mac SE/30</strong></td>
</tr>
<tr>
<td><strong>Mac II family</strong></td>
</tr>
<tr>
<td><strong>Mac Portable</strong></td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
</tr>
<tr>
<td><strong>PC 720K</strong></td>
</tr>
<tr>
<td><strong>PC 1.4 MB</strong></td>
</tr>
<tr>
<td><strong>Mac 400K</strong></td>
</tr>
<tr>
<td><strong>Mac 800K</strong></td>
</tr>
<tr>
<td><strong>Mac 1.4 MB</strong></td>
</tr>
<tr>
<td><strong>ProDOS 800K</strong></td>
</tr>
<tr>
<td><strong>Other formats</strong></td>
</tr>
<tr>
<td><strong>Software</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Disk eject</strong></td>
</tr>
<tr>
<td><strong>Daisy chaining</strong></td>
</tr>
<tr>
<td><strong>Connectors</strong></td>
</tr>
<tr>
<td><strong>Weight (pounds)</strong></td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
</tr>
<tr>
<td><strong>Warranty</strong></td>
</tr>
<tr>
<td><strong>Manufacturer</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

*PC disks can be mounted with DOS Mounter ($89) from Dayna Communications.

*SEs and Mac IIs shipped before August 1989 require a $599 FDHD upgrade kit from Apple.

An extended warranty is available.

*An optional 5.25-inch IBM drive is required ($185 for 360K drive, $275 for 1.2-megabyte drive).

**Requires a $69 cable kit. Not compatible with the Mac IIf.
something to think about when choosing a drive to meet all your floppy needs.

Arm yourself with the facts — not just your checkbook.

SWIMming to Compatibility

Because they communicate with the Mac through the floppy port, the Apple FDHD SuperDrive and Kennecl Drive 2.4 can take advantage of the SWIM (Super Wozniak Integrated Machine) chip, standard in all Macs since the Mac IIx, including the enhanced SE. The SWIM chip controls the speed of the drive so that it can use both MFM (constant speed) and GCR (varying speed) disks. But what if your Mac doesn’t have a SWIM chip?

One option is to buy Kennecl Technologies’ Rapport, a midget drive controller that plugs into the disk-drive port on the back of all Macs (except the II and IIx, which require a $69 cable). In turn, an external drive (Apple 3.5 Drive, Apple FDHD SuperDrive, or Kennecl Drive 2.4) plugs into the DB-19 connector on the back of the Rapport. With this configuration, you can read and write all normal Mac and PC formats (if you’re using an Apple 3.5 Drive or compatible, you can’t use HD disks). If your Mac already has a SWIM chip, Rapport’s unique high-capacity formats (up to 2.4 megabytes with the Kennecl Drive 2.4) still make it an attractive choice. What’s more, with a Rapport, even your internal drive can read 720K PC disks.

Alternatively, you can buy a DaynaFILE or PLI TurboFloppy 1.4. They don’t need the SWIM chip because they don’t attach to the disk-drive port; instead, they use the SCSI bus found on all Macs since the Plus.

Finally, if you bought your Mac II or SE before August 1989, an easy route to HD-floppy-disk compatibility is to have your dealer upgrade your system with a $599 kit from Apple, which means replacing the IWM with a SWIM chip, changing the system ROMs, and swapping the internal 800K disk for a new Apple FDHD SuperDrive.

Installation

Of all HD-floppy drives, the external version of the Apple FDHD SuperDrive is by far the easiest to install. Simply attach it to the disk-drive connector on the rear of a Mac SE/30, enhanced SE, IIci, IIcx, or Portable, and away you go. The Kennecl Drive 2.4, with its Rapport controller, is a bit more complicated. By the time you read this, however, Kennecl should have introduced a software update that lets you skip the Rapport and attach its Drive 2.4 directly to SWIM-equipped machines. In either case, a Control Panel device (cdev) must be dropped into the System Folder for the Kennecl Drive 2.4 to be recognized by

---

IF YOU CAN DREAM IT, YOU CAN DRAW IT.

First, you start with ideas. And they change as you continue to refine them. You need tools that work with you. To help you realize your visions and bring them to life.

It all began with MacDraft. Now we bring you Dreams.

With Dreams, we give you all the precision tools you’d expect like scales, zoom, rotation, area calculation, associative dimensioning and layers. But we don’t stop there. Merge objects together or subtract them from each other. Use Bezier or spline curve tools to create smooth shapes. Select from an array of line editing tools and custom color patterns for infinite varieties of personal expression. Store commonly-used images in on-line libraries and easily output your drawings to Postscript* devices.

Dreams. From precision drawing and drafting to general-purpose graphics.

Of course, the best way to experience Dreams is to try it yourself.

Just see your local Macintosh* dealer. Or call us at (415) 680-6818, and we’ll send you a demo disk for $9.95. Then you’ll see how easy it is to get started on your dreams.

Innovative Data Design, Inc., 2280 Bates Avenue, Suite A, Concord, CA 94520
Telephone: (415) 680-6818, Fax: (415) 680-1065.
On top (appropriately) is the Apple FDHD SuperDrive; to the right are the PL! TurboFloppy 1.4, DaynaFILE, and Kennect Drive 2.4 with Rapport controller.

Two additional 3.5-inch drives (either HD or not) may be daisy-chained through the DB-15 connector on the back of the Kennect drive.

Daisy-chaining is also an option with the DaynaFILE and PL! TurboFloppy 1.4 because they are SCSI devices. The PL! TurboFloppy 1.4 comes with the necessary SCSI cable and has a rotary ID selector and termination switch on the back of the unit. It includes a small wall transformer but lacks a power switch.

The DaynaFILE has a push-button SCSI ID selector, and it includes a large external power supply designed to rest on the floor. The DaynaFILE lacks the necessary SCSI cable or termination block, an omission you can correct for an extra $85. A driver file must be dropped into the System Folder for the DaynaFILE to function.

**Bring on the Benchmarks**

*Formatting footnote.* Before you can take advantage of the high capacities offered by these HD-floppy drives, you

---

**TimeOut**

*Vol. 1 No. 3*  
Swiss Time

*Test and line art tools are easily accessed in the most fluid, free-flowing interface available anywhere. Perfect for technical illustration in desktop publishing.*

Charles Wyke-Smith  
Printz Electronic Design Services

With Dreams' strength in color, your business graphics and general designs never looked better.

James A. Collins  
Illustrator

---

**DREAMS Modules**

**IDD SYMBOL LIBRARIES**  
To make drawing easier, we've developed a series of Architectural Symbol Libraries. There's Residential Construction, Light Commercial Construction and Preliminary Design. Each sold separately with more on the way.

**IDD PLOTTERT DRIVER**  
With our optional plotter driver, you can plot directly from Dreams for better resolution and faster output. From A to E size. It works with most of the popular plotters including Hewlett Packard, Houston Instruments and Calcomp.

---

Please circle 148 on reader service card.

---

*their logos and Dreams are registered trademarks of Innovative Data Design, Inc. Other brand and product names are used for identification purposes only and may be trademarks or registered trademarks of their respective holders.*
need to format a few disks. To test the relative formatting speed of each drive attached to a 1-megabyte Mac SE/30, we booted AFE version 1.1.1 and selected Erase Disk from the File menu. Then we specified a Mac 1.4-megabyte format and timed the formatting process. This sequence was repeated three times to arrive at a consistent average. We also performed this test by specifying a 1.4-megabyte IBM format and found that although times vary among drives, each drive performs equally well—or poorly—when formatting an HD disk for either operating system.

The Apple FDHD SuperDrive was the best performer.

The Apple FDHD SuperDrive and Kennect Drive 2.4 were neck and neck in the formatting footrace, both taking less than 1.5 minutes to complete the operation (see Figure 1). Next was the PLI TurboFloppy 1.4 at almost 2 minutes. Huffing and puffing, the DaynaFILE dragged itself across the finish line after 2 minutes and 26 seconds—80 percent slower than the fastest drive.

Tackling transfer times. Many external HD-floppy drives will be purchased solely for transferring files between Mac and PC disks. To test each drive’s transfer capabilities, we again used AFE, this time to transfer a 45K file from the MS-DOS Microsoft Excel demonstration disk to a Mac hard drive. Again, this test was repeated three times on each drive to ensure reliable results.

The Apple FDHD SuperDrive was the best performer, requiring just 7 seconds to complete the PC-to-Mac transfer. Close on its heels were the DaynaFILE and Kennect Drive 2.4, both at 9 seconds. The PLI TurboFloppy 1.4 was way behind the pack at 23 seconds—taking more than three times as long as the Apple FDHD SuperDrive.

Dueling backups. Our third and final test reveals how these drives handle backups. After all, even if you buy the drive primarily for its PC-transfer capability, why not use its high capacity to make backups less painful? We timed how long it took the Finder to copy version 1.2.1 of the HyperCard application (389K) from a hard drive to each HD-floppy drive.
In the beginning, there was an Apple. & a lot of software. Great stuff to use. Great stuff for pirates to copy free.

Then came a bigger, more powerful Apple called the Mac. The temptation for free software rose once more. & piracy again had its way.

Then Eve arrived. To quickly end the free-loaders' rule. & the rest is history.

Introducing EVE for the Apple—the software developer's key to a secure return on development investment.

EVE protects Macintosh software from piracy—with a simple but virtually foolproof concept: The software won't run unless the EVE hardware key is plugged in. And only those who purchased the software have a key that works with the program.

To developers, EVE's implementation is simple. Key codes are imbedded in the software which require a correct response from EVE any time the program is accessed. Without EVE, the software doesn't run.

And to users, EVE is totally transparent. The software runs as if EVE wasn't even there. It's that simple.

KEY FEATURES:
- For the Macintosh SE and II
- Developer implemented
- Completely transparent to the user
- Permits unlimited backup copies
- Seven programmable security locks
- Up to seven programs per key
- Multi-level password-based access
- Installs via any Mac ADB connector
- Compact and easy to install

EVE. The perfect companion to Mac software. For additional information, call Rainbow Technologies. European inquiries can be conveniently made to Rainbow Technologies Ltd, United Kingdom.

Rainbow Technologies also provides the SentinelPro and Sentinel-C hardware keys to protect software developed for IBM PCs, PS/2s and compatibles, and the Atari ST. And the DataSentry software for PC users who want to protect data files.

©1989 Rainbow Technologies. All product names are trademarks of their respective manufacturers.

Please circle 72 on reader service card.
Can Your Data Modem Do This?

Ours Can...

Data+Fax... At Data Modem Prices

The ProModem® Data/Fax Series from Prometheus® adds Group III fax capabilities to a 2400 BPS data modem for a low cost solution to your data and fax needs. Thanks to Sendfax™ technology, you can now get Group III originate-only fax capability for the price you’d expect to pay for a data modem alone. The Data/Fax modems allow you to send faxes or data anywhere in the world.

The ProModem Data/Fax modems provide you the convenience and flexibility of your own personal data and fax modem whether you’re at the office, home or on the road. Every computer can now afford to be a personal information center. These modems allow you to easily send documents by E-Mail or fax and also retrieve business information through on-line services, all for a suggested retail price of $299.

Includes MAcKNOWLEDGE

MAcKNOWLEDGE™ is the first communications software package that makes using modems easy! MAcKNOWLEDGE automatically configures your modem, allows you to send, receive and reply to electronic mail and access current business and financial information at the click of an icon. You’ll be using your modem in minutes with MAcKNOWLEDGE.

Effortless Faxes With BackFAX

Sending a fax with a Data/Fax modem is as easy as printing. Simply select the fax icon from the Chooser and print as you normally would from any Mac application. BackFAX™ will send it in the background, while you go back to work, with or without MultiFinder™! BackFAX supports automatic scheduled calling, customized cover sheets, and distribution lists.

The ProModem Data/Fax external works with any Macintosh®, or if you have a Mac Portable try our new internal TravelModem™. The ProModem Data/Fax Series is another reason why Prometheus is the leader in communication products.

Please circle 188 on reader service card.

7225 SW Bonita Road • Tigard, OR 97223
(800) 477-3473 • (503) 624-0571 • (503) 624-0843 (Fax)

Proudly Distributed By Ingram Micro D and MacAmerica

MACKNOWLEDGE™ is a trademark of Sierra Semiconductor Corp.
All other trademarks are acknowledged.
High-Density-Floppy Drives

Once again, the Apple FDHD SuperDrive lived up to its name, beating the others to the finish line with a time of 24 seconds. The PLI TurboFloppy 1.4 was next with 34 seconds. The DaynaFILE and Kennect Drive 2.4 took almost twice as long as the Apple FDHD SuperDrive, with times of 44 and 48 seconds, respectively. By way of comparison, copying the same file to a DD disk in an 800K drive takes 42 seconds.

Irreconcilable Differences

These test results aside, what is it like to actually use these drives? If you think there isn’t much difference between the drives, you’re dead wrong.

The Apple FDHD SuperDrive is by far the most solid and cleanly designed. It’s the only drive that automatically “injects” disks that are partially inserted into the slot. With the other drives, you must push the disk all the way in. The Apple FDHD SuperDrive and Kennect Drive 2.4 are also capable of automatically ejecting disks via software. That is, if you drag a disk’s icon to the Trash, the disk is immediately kicked out of the drive. With the DaynaFILE and PLI TurboFloppy 1.4, you must drag the icon to the Trash and then manually press an eject button on the drive — a needless complication. Both the Apple and Kennect drives have manual eject mechanisms for extracting disks when something goes wrong.

One area in which the Apple FDHD SuperDrive stumbles is in dealing with PC disks. If you stick a PC disk into a SuperDrive, the Finder explains that it isn’t a Mac disk and gives you the option of initializing or ejecting it. Be careful: You could easily wipe out an entire disk with one errant mouse click. You need to eject the disk, launch AFE, and then insert the PC disk. With the Kennect Drive 2.4 and PLI TurboFloppy 1.4, you are protected from making catastrophic mistakes because the Finder identifies PC disks as such and explicitly tells you to use AFE.

Best of all in this respect is the DaynaFILE, which recognizes PC disks and mounts them on the desktop as if they were Mac volumes. PC files appear as documents, and directories look like folders. You can perform standard file/volume maintenance directly from the Finder instead of by launching AFE.

Dayna Communications offers an $89.95 utility called DOS Mounter that gives owners of the Apple FDHD SuperDrive and Kennect Drive 2.4 the ability to mount PC disks on the desktop, just as they do the DaynaFILE. The need for this may be short-lived, however, System 7.0 will probably expand on the existing External File System, which lets you access other disk-operating-system files — such as IBM or Apple II documents on a Mac AppleShare server — without having to launch a separate translation application such as AFE. The Apple IIs currently use similar File System Translators (FSTs) to access both High Sierra CD-ROMs and ProDOS volumes under its native GS/OS operating system.

The Disk-Drive Dilemma

Clearly, Apple intends to establish the 3.5-inch HD-floppy drive as a new standard — all Macs except the Plus now offer it as standard equipment. But that shouldn’t invoke a knee-jerk buying panic in the Mac community. The reliable 800K drives have been around for years and comprise a huge installed base. Nobody is going to abandon them in the foreseeable future.

Right now, the most legitimate excuse for coveting an HD-floppy drive is to ease the transfer of files between the Mac and PC world. But if you have an irrational fear of obsolescence or suffer from floppy envy, you can anecdotally your feelings of inadequacy with any one of the four HD-floppy drives currently on the market. Some drives are more potent than others, so check out the “Bottom Line” sidebar for our favorites.

Owen W. Linzmayer is an associate editor at MacUser.

The Bottom Line

Apple bashing seems to be in vogue, but MacUser Labs isn’t afraid to give credit to the folks in Cupertino for a job well done, especially when our benchmark results show the superiority of one of their products. The Apple FDHD SuperDrive gets our nod as the best high-density-floppy drive currently on the market. It’s got that warm Apple “feel” of a solid device that works exactly as expected. Installation is a breeze. It has all the capabilities of a standard 800K drive — complete with automatic “inject” and eject — with increased speed, 1.4-megabyte capacity, and IBM compatibility. On the negative side, IBM disks don’t mount on the desktop and it comes with a skimpy 30-day warranty. And remember, without help from a Kennect Rapport controller, SuperDrives can be attached only to SWIM-equipped Macs — that is, Macs that already have one SuperDrive.

Feature for feature (except for automatic inject), the Kennect Drive 2.4 is a worthwhile alternative to the Apple SuperDrive. Additionally, it comes bundled with Fastback II (a $199 value — see StuntUp, October ‘89) and has proprietary formats that squeeze 1.2 and 2.4 megabytes onto DD and HD disks, respectively. Unlike the SuperDrive, it can be used on Macs lacking a SWIM chip. Its biggest drawback is that it requires the $295 Rapport controller. A software upgrade is planned to eliminate this requirement for SWIM-equipped Macs; it also will make the button on the front of the drive eject the disk. (For more information on the Kennect Drive 2.4 and Rapport, see Bridges, July ’89.)

The best feature of the DaynaFILE is its ability to access IBM disks directly from the Finder. (This feature can be added to the Apple and Kennect drives by using Dayna’s $89.95 DOS Mounter software.) One unique feature is that it can be configured with optional 5.25-inch 360K ($180) or 1.2-megabyte ($275) PC drives. Aside from being the most expensive of all HD-floppy drives, its biggest drawback is that it can’t use 400K and 800K Mac disks. Also, we were turned off by the large case and power supply, lack of SCSI cable and terminator, and 90-day warranty.

The PLI TurboFloppy 1.4 is the least-expensive HD-floppy drive, which is only fitting because it’s also the least desirable. Like the DaynaFILE, it can’t use 400K and 800K Mac disks, although PLI plans to add that feature, as well as auto-eject, in the near future. No price or upgrade path has been specified. Most annoying is that if a disk isn’t in the drive, the drive makes a slight clicking noise as the SCSI bus is polled every few seconds. On the positive side, the drive is bundled with TurboCache (a $129 disk accelerator) and TurboBack (a $99 backup program), has external SCSI termination, and comes with a one-year warranty.

Apple bashing seems to be in vogue, but MacUser Labs isn’t afraid to give credit to the folks in Cupertino for a job well done, especially when our benchmark results show the superiority of one of their products. The Apple FDHD SuperDrive gets our nod as the best high-density-floppy drive currently on the market. It’s got that warm Apple “feel” of a solid device that works exactly as expected. Installation is a breeze. It has all the capabilities of a standard 800K drive — complete with automatic “inject” and eject — with increased speed, 1.4-megabyte capacity, and IBM compatibility. On the negative side, IBM disks don’t mount on the desktop and it comes with a skimpy 30-day warranty. And remember, without help from a Kennect Rapport controller, SuperDrives can be attached only to SWIM-equipped Macs — that is, Macs that already have one SuperDrive.

Feature for feature (except for automatic inject), the Kennect Drive 2.4 is a worthwhile alternative to the Apple SuperDrive. Additionally, it comes bundled with Fastback II (a $199 value — see StuntUp, October ‘89) and has proprietary formats that squeeze 1.2 and 2.4 megabytes onto DD and HD disks, respectively. Unlike the SuperDrive, it can be used on Macs lacking a SWIM chip. Its biggest drawback is that it requires the $295 Rapport controller. A software upgrade is planned to eliminate this requirement for SWIM-equipped Macs; it also will make the button on the front of the drive eject the disk. (For more information on the Kennect Drive 2.4 and Rapport, see Bridges, July ’89.)

The best feature of the DaynaFILE is its ability to access IBM disks directly from the Finder. (This feature can be added to the Apple and Kennect drives by using Dayna’s $89.95 DOS Mounter software.) One unique feature is that it can be configured with optional 5.25-inch 360K ($180) or 1.2-megabyte ($275) PC drives. Aside from being the most expensive of all HD-floppy drives, its biggest drawback is that it can’t use 400K and 800K Mac disks. Also, we were turned off by the large case and power supply, lack of SCSI cable and terminator, and 90-day warranty.

The PLI TurboFloppy 1.4 is the least-expensive HD-floppy drive, which is only fitting because it’s also the least desirable. Like the DaynaFILE, it can’t use 400K and 800K Mac disks, although PLI plans to add that feature, as well as auto-eject, in the near future. No price or upgrade path has been specified. Most annoying is that if a disk isn’t in the drive, the drive makes a slight clicking noise as the SCSI bus is polled every few seconds. On the positive side, the drive is bundled with TurboCache (a $129 disk accelerator) and TurboBack (a $99 backup program), has external SCSI termination, and comes with a one-year warranty.
For years, LCDs came in only two types: monochrome and gray scale. Now color LCDs have arrived, and desktop presentations may never be the same.

A couple of years ago, LCD (liquid-crystal display) projection panels that made it possible to project your computer's screen from an overhead projector onto a wall or large screen were introduced (see "Through the Liquid Glass," January '89). Their introduction held great promise for the world of desktop presentations. For a fairly reasonable price (from $1,000 to $3,000), it became possible to create and display presentations from your Macintosh.

Not only were LCD panels cheaper and more portable than large-screen video projectors, but they were also more convenient than creating slide presentations and more exciting than color transparencies. What these panels lacked was the ability to project the colors you saw on your screen in anything other than black and white (or green on yellow or blue on white) or gray scale.

That scenario has changed. By shading, adding colors together, or subtracting them from the spectrum, color technology has made its way to the LCD and has opened up a rainbow of possibilities for the Mac in the process. This Labs Brief is a first look at the different strategies for bringing color to LCD panels.

**Simulated Color**

The first foray into colorful LCD representations was pseudocolor, or color simulation, which basically involves a gray-scale LCD panel with special filters that can create various shades of related colors. As is the case with current gray-scale panels, these systems assign a shade to each color on the computer screen.

The new Proxima DataDisplay Multi-Mode MacPac from Computer Accessories/Proxima exemplifies this technology. Simulated colors on the MultiMode appear as 16 hues in a gradient from light yellow to magenta; all hues in between show up as oranges and browns. Although it's not real color, simulated color can produce a more striking effect than can a similar 16-level gray scale. The panel takes some getting used to, however. Colors on the screen don't necessarily match those displayed on the panel, and displaying multiple images created with different color palettes may require you to adjust the color control on the panel constantly.

Furthermore, picking optimal colors for your screen and the panel can be a...
It’s possible to create a “colorful” image on-screen whose contrast is poor and that uses fewer than the panel’s available 16 hues. To achieve optimum use of the MultiMode unit, you need to experiment with real and simulated color. Standardizing on one common palette for each presentation is helpful once you’ve found which colors appear to best effect.

Additive Color

The move to bring real color to LCD panels has been hampered by problems with the technology used to create color.

In the additive color process, for example, combinations of red, green, and blue pixels are turned on and off to trick the eye into seeing a particular color, which is similar to the way a color-TV screen works. With this technology, known as RGB or thin-film color stripe, color is created by very thin red, green, and blue stripes laid next to each other.

Creating color this way presents two problems when you’re using liquid crystals: lack of brightness and color fringing. Brightness problems arise when, for example, to produce solid red, the blue and green pixels are turned off. With only one-third of the available pixels transmitting light, solid primary colors — red, green, and blue — are very dim.

With color fringing, the edges of solid-color areas constructed from two or more primary colors are tinted by the color of the leftmost and rightmost color stripe, because only three color subpixels are used for each addressable pixel. Fringing doesn’t occur on a TV set or computer monitor because pixel placement on a CRT (cathode-ray tube) isn’t nearly as precise as on an LCD panel, and many more phosphor dots are used on a CRT to form each addressable pixel.

Because additive-color panels have pixel-density problems (they require three times as many pixels as do monochrome, gray-scale, and pseudocolor panels), they are difficult and costly to manufacture in large quantities.

TFT, or Active Matrix, Technology

Another way to achieve color on LCD panels is with TFT (thin-film-transistor) technology, which is used in the Macintosh Portable and some small-screen LCD TVs. Although this technology has solved some of the speed and contrast problems of conventional LCD panels, manufacturing problems have prevented its use in mass production.

In conventional (passive-matrix) LCD technology, electrical charges applied to the intersection of horizontal and vertical wires within the LCD panel’s substrate form a grid of square pixels. On TFT panels, by contrast, a lower voltage is applied across the horizontal and vertical wires, and a small transistor inside each pixel amplifies the voltage. Since the voltage that drives each pixel is generated within the pixel itself, TFT panels can be scanned at higher speeds than passive-matrix systems can, without exhibiting passive-matrix panels’ “bleeding” problems.

Although Proxima’s MultiMode panel doesn’t project true color, it does offer 16 shades of “simulated” color — from light yellow to magenta — that are assigned to the colors on the Mac screen. It comes with a remote control (left).
Color LCD Technology

The In Focus Systems 480C PC Viewer is the first true color LCD projection panel displaying eight colors. It requires a special adapter box to work with the Mac.

The In Focus Systems 480C PC Viewer is the first true color LCD projection panel displaying eight colors. It requires a special adapter box to work with the Mac.

decimal point in a sales presentation. As a result, every data display manufactured with defective pixels must go back into the smelter. That means final production yields are very low and the cost of each working panel is very high. To offset the inevitable failure of some transistors, TFT displays used for data are constructed with extra transistors at each pixel. That strategy translates into higher yields in the long run and a lower per-panel cost.

Subtractive Color

Despite the difficulty of producing accurate, high-resolution LCD color, color has indeed made it to LCD projection panels. To overcome the manufacturing and resolution problems we've enumerated, In Focus Systems of Tualatin, Oregon, has developed a subtractive system of creating colors.

In Focus' 480C PC Viewer uses three layered LCD panels that act as subtractive filters; each passes white light when it's not activated and colored light when it's activated. Cyan, magenta, and yellow panels are used to "subtract" red, green, and blue light — respectively — from the spectrum. The only complicated production task is sandwiching the panels together in perfect alignment. Special lenses inside the panel keep light passing through the three layers in alignment, producing clean, square color pixels. Because each panel requires no more pixels than does a monochrome system, the pixel-density-related manufacturing problems are eased. Since each pixel is one large square that changes in color rather than a trio of smaller colored rectangles that switch on and off, more light passes through the display and color fringing is eliminated.

MEGABYTES of Image Club's famous 15 volume Night-Art EPS clip art library permanently delivered to you on 33 compressed diskettes (equivalent to 65 BOOK disks) or on CD-ROM (Anson 3.0) for only $599. Valued over $1,240, this is the opportunity you've been waiting for to start or expand your clip art library. Clip art 2200 is complete with over 2200 PostScript images ranging from page borders and symbols to outline letter sets and headlines. Do it now, call our toll free line to order.

This offer is only available once and will expire on Feb 28, 1990

Clip Art Night-Art clip art is compatible with any PostScript or EPS2 compatible printer. Clip art is also compatible with Best from the Image Source Library. Images from 2-Bit Art clip art library, text art in Pagemaker and formats in either RGB or CMYK.
Table 1: Color LCD Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Proxima Data Display</th>
<th>MultiMode MacPac</th>
<th>In Focus 480 PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>$2,299</td>
<td>$4,995</td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>simulated color</td>
<td></td>
<td>subtractive color</td>
</tr>
<tr>
<td>Display color</td>
<td>16 shades of yellow – magenta</td>
<td></td>
<td>white, black, red, blue, green, magenta, cyan, yellow</td>
</tr>
<tr>
<td>Resolution</td>
<td>720 x 480 pixels</td>
<td></td>
<td>640 x 480 pixels</td>
</tr>
<tr>
<td>Display area (inches)</td>
<td>7.9 x 5.3 in.</td>
<td></td>
<td>8.2 x 6.2 in.</td>
</tr>
<tr>
<td>Compatibility/interfaces</td>
<td>Macintosh Portable (with Apple external video interface), Mac II modular line, Mac SE, Mac Plus, 512K, 128K</td>
<td>Mac II (requires $249.95 adapter) or Mac SE/Plus (requires $199.95 monochrome adapter)</td>
<td></td>
</tr>
<tr>
<td>Size (inches)</td>
<td>12.5 x 12 x 1.125 in.</td>
<td></td>
<td>13.25 x 14.25 x 3 in.</td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>3 lb</td>
<td></td>
<td>8.1 lb</td>
</tr>
<tr>
<td>Power supply</td>
<td>AC adapter</td>
<td></td>
<td>AC adapter</td>
</tr>
<tr>
<td>Remote control</td>
<td>infrared</td>
<td></td>
<td>not available</td>
</tr>
<tr>
<td>Carrying case</td>
<td>$79.95</td>
<td></td>
<td>not available</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year parts/labor</td>
<td></td>
<td>1 year parts/labor</td>
</tr>
</tbody>
</table>

A Face With Great Features

Just look at that face. It's the face of the first 2400 baud external modem designed specifically for the Macintosh. DataLink Express™ You won't be shopping for special adapters and cables because the Mini-8 port you need is built in. You won't be shopping for communications software either, because it's included.

The first Line Engaged indicator
You won't have to play phone line roulette. Wondering if your transmission will make it through in one piece before someone jumps on the line and interrupts. We added a status light indicator to show when the line is in use.

The first upgradeable design
You won't have to sweat obsolescence because DataLink Express is upgradeable. You can choose to later add send-fax capability (available soon) and even MNP error correction. Best of all, DataLink Express was designed by Applied Engineering, long the leader in Apple enhancement products. AE brings ten years experience to producing feature-laden peripherals that set the standard for quality and reliability.

More features:
- 100% Hayes compatible, plus more
- Non-volatile configuration memory (no dip switches)
- Synchronous and asynchronous communication
- Compatible with all Macs, Apple IIs and PCs
- Comprehensive software included
- Separate line and phone connectors for line sharing
- Non-volatile memory for phone number storage
- Mac-platinum case

DataLink Express modem........................................... $249
MNP option......................................................... $89

Order today!
To order or for more information, see your dealer or call (214) 241-6060 today, 9 am to 11 pm, 7 days. Or send check or money order to Applied Engineering, MasterCard, VISA and C.O.D. welcome. Texas residents add 7% sales tax. Add $10 outside U.S.A.

Applied Engineering®
The Apple enhancement experts.
A Division of AE Research Corporation
(214) 241-6060
P. O. Box 5100, Carrollton, TX 75011
Prices subject to change without notice. Brand and product names are registered trademarks of their respective holders.

Please circle 64 on reader service card.

MacUser February 1990 233
**Color LCD Technology**

**LCD Technology**

LCD (liquid-crystal display) panels have liquid crystals sandwiched between electrodes and polarizers. The electrodes form a grid of pixels, and the polarizers allow only light with correct polarization to pass through them. Each liquid crystal responds to electrical current and twists the light so that it can pass through the polarizers.

Liquid crystals contain twisted nematic (rodlike) molecules that control how light passes through them. They are rotated 90 degrees from the electrode plane, allowing light to pass through the polarizing filters when the power is off. Providing power to the electrode at a given cell untwists the light so that it cannot pass through that cell, which makes that pixel visible, thus creating a dot. Other schemes rotate molecules 270 degrees and provide better contrast between the on and off cells.

**Report Cards**

**Proxima Data Display MultiMode MacPac** ★★☆☆½

This LCD panel is not marketed as a true-color panel but rather as one that simulates color by filtering light so that 16 hues are assigned in a gradient from light yellow to magenta, resulting in hues of orange and brown.

**Pros:** Projects bright image; full array of interface kits for Mac Plus, SE, II family.

**Cons:** Not real color; striping hard to eliminate; slow response.

**Computer Accessories/Proxima**

6610 Nancy Ridge Drive
San Diego, CA 92121
(800) 582-2580 or
(800) 582-0852 (in CA)
$2,299

**480C PC Viewer** ★★★☆☆

This LCD color panel is a good example of a subtractive color strategy, in which three panels — cyan, magenta, and yellow — are used to subtract red, green, and blue light from the spectrum. Eight colors can be displayed simultaneously, although various hues are mapped to a common color.

**Pros:** Real color displayed, with solid hues.

**Cons:** Projects a dark image; somewhat expensive; slow response; requires special video-adapter box.

**In Focus Systems**

7649 S.W. Mohawk St.
Tualatin, OR 97062
(800) 327-7231 or
(800) 692-4968 (in OR)
$4,995

**The Bottom Line**

Color LCDs have a way to go before they can approximate a wider range of the colors you see on your Mac. The Proxima DataDisplay MultiMode MacPac, a pseudocolor display panel, can display a range of hues between yellow and magenta, but the colors you see on your wall or screen don't really match those you see on your Mac. The hues you do see often have the sepia quality you find in old photos; charming, an enhancement over gray scale, but not true color.

The In Focus 480C PC Viewer is the only panel to date to bring true color to the world of Mac-compatible LCDs, although only eight colors can be displayed through the panel simultaneously. The 480C PC Viewer maps hues to their nearest basic equivalent, so a range of reds becomes one red, a range of greens, one green, and so on. In Focus Systems is working to increase the number of colors that can be displayed.

Although In Focus’ technology creates true colors, at the moment only eight (red, green, blue, cyan, magenta, yellow, black, and white) can be displayed. Color subtleties are impossible without dithering (simulating colors by placing two different colors next to each other). Shades of yellow on your Mac screen are translated into one yellow, various reds become one red, and so on. Obviously, this can be a problem when related colors, such as red and orange, are in proximity.

With In Focus’ subtractive system, you do have some control of the color palette, so you can achieve subtle color shades by manipulating the palette so that, for example, orange appears yellow to contrast with red. You can’t make changes to individual colors, however. It’s also possible to rotate the palette to better match the panel’s colors to the screen’s.

Another problem is speed. Like their conventional monochrome counterparts, passive-matrix color LCD panels are slow to respond, and the In Focus system is no exception. The screen refreshes itself only four to five times per second, so the cursor’s path is not always visible. Animation programs, therefore, aren’t a real option unless you want a slow-motion effect. Paradoxically, as the unit heats up, its response time improves, but in the long run, excessive heat will damage it as well as adversely affect the quality of the projected image. The In Focus panel includes a fan, which keeps the colors consistent and prevents the unit from overheating.

**The Future of Color LCDs**

It’s likely that there will eventually be a marriage of subtractive-color and TFT technology to create an easily manufactured LCD projection panel that is fast enough to allow animation and that provides good contrast, a wider range of viewing angles, and color. Similarly, the thin-stripe panels may become easier to produce as manufacturing techniques improve. That, however, is at least a couple of years down the line. In the meantime, manufacturers are working on increasing the number of available colors and speeding up the response time.

Victoria von Biel is an associate editor for departments at MacUser. Jeff Pittelka is an associate project leader at MacUser Labs.
More Choice . . .

A Complete Family of Monochrome, Gray Scale and Color Display Systems

Find out where to buy
Call (800) 34-GRAPHIC

E-MACHINES
Power to See Your Best

9305 SW Gemini Drive, Beaverton OR, 97005 (503) 646-6699
©1989 E-Machines. E-Machines and ColorPage are trademarks of E-Machines, Inc.
HOW DO YOU EXPECT YOUR KID TO KEEP HIS NOSE CLEAN IF YOU DON'T?

They're the worst kind of hypocrite. Parents who warn their children about using drugs while they themselves are abusing drugs. What parents don't seem to realize is that it takes more than a good sermon to keep kids on the straight and narrow. It takes a good example. Without it, kids are likely to wind up abusing drugs just like Mom and Dad.

If you want your son to be strong. If you want your daughter to have the willpower to walk the other way; practice what you preach.

Because you can't control your children if you can't control yourself.

IF PARENTS STOP, KIDS WON'T START.

Partnership for a Drug-Free America.
The GENIUS of Albert Einstein
...the VISION of Leonardo DaVinci
...the ARTISTRY of Michelangelo
...the EAR of Spike Jones
...the SMARTS of Malcolm Forbes
...the SPEED of Mario Andretti

Tap into your talents—with MacUser!

At MacUser, we're dedicated to helping you discover and use all of your Mac talents. Whether you're involved in graphics, DTP, networking, music, engineering—you name it—every issue brings you the hands-on tips and techniques you need to complete your project to perfection! And, of course, you'll find hundreds of in-depth, reliable product reports from our own Mac Labs.

YOUR FREE! Join us today, and you'll receive our exclusive Stack Magic Disk—an exciting collection of "Super-Stacker" utilities, custom fonts, sound effects, animated buttons and more! Yours free with your paid subscription!

☐ One year (12 issues) only $19.97—SAVE 44%!
☐ Two years (24 issues) only $35.40—SAVE 50%!

For fast service call
1-800-627-2247
Don’t panic! A crashed hard disk doesn’t have to spell disaster if you know what to do first. Here are some simple steps to save your data.

By Steve Costa

Soon or later, it’s bound to happen: As you attempt to mount a floppy or hard disk, your Mac informs you that the disk is unrecognizable or damaged and asks if you want to initialize the disk. You swallow hard. What do you do?

Keep a cool head. All is not lost. Although hard-disk crashes can destroy your data, the chances of that happening are small, thanks to improved disk- and file-recovery software. If you understand why a disk crashes and know the steps necessary to recover it, a disk crash becomes merely a minor annoyance.

Hard-disk crashes are different from the more common CPU (central-processing unit) crashes. When the CPU crashes, a dialog box appears, stating that a System error has occurred, and gives you a choice between the two buttons Restart and Resume. The worst thing that can happen to you at this point is the loss of all or part of the document that was open at the time of the crash. An easy way to guard against such a large loss is to frequently save the active document. The best way to avoid disk losses in general is to regularly back up the contents of your hard disk (see the “Ounce of Prevention” sidebar for other safeguards).

When your hard disk crashes, you’re given the option of initializing the disk. Don’t do this until you’ve tried every other option. Initializing a disk is one way to remedy a crash, but it’s a drastic measure—it wipes out your directory —and should be your last resort.

When your hard disk crashes, you’re given the option of initializing the disk. Don’t do this until you’ve tried every other option. Initializing a disk is one way to remedy a crash, but it’s a drastic measure—it wipes out your directory —and should be your last resort.

A rule of thumb in computing is that if something happens more than once, you can be sure it’s not a random event. If the hard disk doesn’t mount or the same dialog box appears, try restarting. If you get the same result on the second try, you know something’s wrong.

When a disk crashes, you’re left with at least two problems: damaged disks that can’t mount on the desktop, and corrupted documents. In
the case of damaged disks, a simple remedy is to check to see that the SCSI cable is snug in the Mac and hard-disk ports.

Some users may care more about recovering their important files than recovering and repairing the hard disk's directory. You can often recover files from a disk, even if it doesn't mount, but it's better to recover and repair the directory. In the case of corrupted files, you'll need to use a file- or disk-recovery program.

You should also check that the SCSI chain is properly terminated. If the termination is OK, the cables are properly connected, and the disk still won't mount, you can try booting from a floppy and mounting the hard disk with a drive-mounting device such as Robert Polic's SCSI Probe or SCSI Tools from Paul Mercer (for more on SCSI-related problems, see "SCSI Solutions," December '89). As you'll see, a damaged Desktop file can also prevent a disk from mounting.

Another way to try mounting a hard disk is to zap your PRAM (parameter RAM). The PRAM is the RAM that keeps the time and date current when you turn off your Mac. It also tells your Mac which hard-disk drive is going to mount. Zapping it returns these parameters to their defaults. You can zap the PRAM on a Plus by shutting down the Mac and all the peripherals first, removing and replacing the battery (this compartment is on the back of the Mac), and then powering everything on again.

For SEs and later models, the battery is soldered to the motherboard, so you can't replace it — you have to zap the PRAM from the keyboard. Hold down all the modifier keys (Command, Option, Control, and Shift) while selecting the Control Panel from the Apple menu. Instead of the Control Panel, you should see an alert box telling you that you're about to zap the PRAM. Click on Yes and restart. Be warned: When you zap the PRAM, you also lose all the comments you've entered into the Get Info boxes for your files.

Once you've successfully mounted the disk, you should use a search utility such as Find File to see if there's more than one System or Finder on the hard disk. Having more than one System and Finder on a hard disk can cause enough directory damage to eventually prevent the drive from mounting correctly. Using Find File's Move to Desktop command, move the System Folders to the desktop one at a time, and then throw the extra ones away.

If you're operating from a floppy, you can either copy fresh System and Finder files from the System Folder on your floppy to the hard disk, or use the System Installer on Apple's System Tools disks. The latter approach is recommended, because it preserves System resources such as fonts and DAs.

If the drive mounts but you get a message telling you that the disk is damaged, try Disk First Aid. Disk First Aid, which is included on Apple's System Tools disks, can repair certain kinds of directory damage and should always be the first program you try. Although its chances of successfully repairing your hard drive are slim, it's fast and free and does give you some information about what kind of damage is causing the disk problem. Pressing Command-S after you've opened a volume within Disk First Aid adds a new window that shows the different directories the program is trying to repair. If Disk First Aid can't repair any of these directories, it might mean...
Those beautiful ideas in your head need to go on the overhead just as beautifully, but your artistic ability or the guy in graphics just won't cooperate.

But the 4693DX Color Image Printer will. It uses a 300-dpi thermal-wax process in 16.7 million colors so images and type are bright, glossy, and very impressive. And it prints on paper or transparencies for presentations, overheads and comps, with infinitely more fiscal responsibility than pricey outside services.

The Tektronix 4693DX. It's the perfect printer to have up your sleeve. Call for more information, 1-800-835-6100 Dept. 1A, or fax to (503) 682-2980.

Magic without the markers.
that the problem is more than a damaged directory.

Your hard disk could be so damaged that it won’t let Disk First Aid launch, even if it’s on a floppy. If that’s the case and you’re dealing with an external hard disk, you’ll need to make Disk First Aid your startup application. Shut everything down, disconnect the hard disk, and reboot the Mac from the floppy. Double-click on the floppy icon, select the Disk First Aid icon, and then select Set Startup from the Special menu. In the resulting dialog box, click on the button next to Disk First Aid, click on OK, and then shut down again. Plug in the hard disk and power everything up, which lets Disk First Aid look at your disk without any interruptions.

If Disk First Aid doesn’t work, try updating the SCSI device drivers with the hard-disk-utility program that came with your hard disk. The SCSI code that travels between the peripherals and your Mac may be corrupted. You update this code when you update the drivers. One program that does this is DriveWare, the software that Jasmine bundles with its hard disks. DriveWare updates the drivers when you click on the Update button. It is possible, however, that a hard-disk utility program like Sumantec’s Utilities for Macintosh (SUM) can often recover important files even if the disk’s directory can’t be repaired.

Figure 4: Tools such as Sumantec’s Utilities for Macintosh (SUM) can often recover important files even if the disk’s directory can’t be repaired.

<table>
<thead>
<tr>
<th>Glossary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>bad sector</strong>: An unreadable area of a hard disk that contains bad bits that render the sector unreadable. Leaving these bits unmarked in accessible areas of your hard disk can cause a crash. You can look out bad sectors and prevent a crash by regularly formatting a disk or using an optimizer on your hard disk.</td>
</tr>
<tr>
<td><strong>checksum</strong>: An error-detection procedure that identifies data losses by using a simple mathematical trick. The procedure checks the sum of the bytes in a file against a precalculated value. If the sum of the bytes on a sector doesn’t match what the precalculated checksum says it should be, an error has occurred.</td>
</tr>
<tr>
<td><strong>conflict</strong>: An incompatibility between two programs contained in the Mac’s memory simultaneously. Conflicts between different cdevs and INITs can sometimes be resolved by changing their loading order.</td>
</tr>
<tr>
<td><strong>corrupted file</strong>: A file that contains bad sectors or bad bits. Any file, including applications and the System file, is susceptible to corruption. You should suspect there’s a corrupted System file when your Mac won’t boot up, when there’s a hang-up in the startup procedure, or when you have problems with your directory. Other files and applications may be corrupted if you can’t open them or if they crash your Mac when you open or launch them.</td>
</tr>
<tr>
<td><strong>defragmenting</strong>: The process of rewriting files to contiguous sectors on a hard disk. A hard disk becomes fragmented when pieces of files are written to any free space on-disk — even though this space may not be contiguous. This forces the heads to relocate many times to read all the scattered file pieces. It slows down a hard disk’s overall access time and adds wear and tear on the head mechanism.</td>
</tr>
<tr>
<td><strong>Desktop file</strong>: The resource file in which the Finder stores the version data, icons, and file references for all the applications on a hard disk.</td>
</tr>
<tr>
<td><strong>directory</strong>: The section of a hard disk that contains information about what files and folders are stored on that disk.</td>
</tr>
<tr>
<td><strong>formatting a disk</strong>: A process in which utility software goes through a hard-disk drive sector by sector and erases all data. This procedure also maps out all the bad sectors on a disk, updates the drivers, and creates a new directory.</td>
</tr>
<tr>
<td><strong>initializing a disk</strong>: The process of locating a hard-disk drive’s directory and erasing the directory’s contents. The data on the hard disk prior to initialization remains, although the new directory may overwrite some data. Although most of the old data remains, you can’t access it through normal methods — the files aren’t listed in the new directory — so you’ll have to resort to using file-recovery software.</td>
</tr>
<tr>
<td><strong>mounted drive</strong>: A disk drive that has been recognized by the Mac’s File Manager. A disk drive won’t appear on the desktop unless it has been successfully mounted.</td>
</tr>
<tr>
<td><strong>optimizing</strong>: This process rewrites files to contiguous sectors of a hard disk, ridding the disk of fragments. Optimizing differs from defragmenting in that it rewrites the disk’s entire contents, not just individual files.</td>
</tr>
</tbody>
</table>
utility program can be rigged to reformat the disk when it updates the drivers. Check your hard disk’s manual before updating to see what your disk’s software is designed to do — you don’t want to reformat your disk accidentally.

A Powerhouse Tool

If none of these techniques repair and recover your hard disk, you need a more powerful program such as SUM II (Symantec Utilities for the Macintosh). SUM II is the best utility for recovering data from damaged hard-disk drives and floppies, and it has different levels of file recovery.

If you didn’t get SUM II until after your hard disk crashed, you will need SUM’s Disk Clinic utility and the emergency procedures outlined in the beginning of the manual. The manual describes three procedures you’ll need to use:

1. Recovering the most important files from the crashed disk, using SUM Disk Clinic and SUM File Recover.
2. Repairing the damaged disk with Disk Clinic’s Quick Fix procedure.
3. Recovering the remaining files by using Disk Clinic’s Recover Volume procedure.

SUM Recover does a pretty good job of recovering files from a damaged disk, but there are times that a hard-disk drive or floppy disk is so damaged that SUM Recover can’t read it the first time.

Also good on the file- and disk-recovery front are the utilities in 1stAid HFS from 1st Aid Software. Like SUM’s Disk Clinic, 1stAid HFS goes through a series of steps to recover and repair damaged files. A feature similar to SUM Recover lets 1stAid HFS create files that can tell 1stAid HFS what kind of drive it is trying to recover. 1stAid HFS isn’t as good at file recovery and repair as SUM is, because it can’t fix a hard disk with a damaged directory. SUM can repair a disk even if its directory is damaged.

Sometimes a drive is so corrupted that you need to go to extremes to attempt a recovery. This can mean launching a disk-recovery program with the damaged drive turned off but still connected to the Mac. Now you can turn on the drive and use the disk-recovery program. This procedure is very risky and should be done only as a last resort — and then only if you’ve had prior experience with crashed hard disks. You run the risk of damaging not only your hard disk but also your Mac if you make a mistake in this procedure.

Repairing the Damage

Sometimes the files that won’t open really aren’t damaged — directly anyway. They are damaged indirectly, how-

Reformatting hard disk

1. Recovering the most important files from the crashed disk, using SUM Disk Clinic and SUM File Recover.
2. Repairing the damaged disk with Disk Clinic’s Quick Fix procedure.
3. Recovering the remaining files by using Disk Clinic’s Recover Volume procedure.

SUM Recover does a pretty good job of recovering files from a damaged disk, but there are times that a hard-disk drive or floppy disk is so damaged that SUM Recover can’t read it the first time.

Also good on the file- and disk-recovery front are the utilities in 1stAid HFS from 1st Aid Software. Like SUM’s Disk Clinic, 1stAid HFS goes through a series of steps to recover and repair damaged files. A feature similar to SUM Recover lets 1stAid HFS create files that can tell 1stAid HFS what kind of drive it is trying to recover. 1stAid HFS isn’t as good at ever, thanks to a damaged Desktop file, an invisible file on your hard disk that keeps track of which documents belong to which applications. When the Desktop file is damaged, you sometimes get the message “The file ’X’ could not be opened (the application is busy or missing).” When the Desktop file is severely damaged, it can even prevent a disk from mounting. To repair the Desktop file, make sure you’re running under the Finder (not MultiFinder) and restart. During the startup routine, hold down the Option and Command keys, thereby rebuilding the desktop.

There may be times when the Desktop file is so damaged that it refuses to be repaired. This requires you to perform a more difficult trick. You will need to delete the Desktop file with a file editor such as Fedit or MacSnoop. From within these utilities, select the Desktop file and
Help from Unexpected Sources

You may already have the tools you need to diagnose and even cure your hard-disk problems. Several widely used applications that are designed primarily to perform other functions can double as great utilities for repairing and opening damaged files. Some of these applications are available commercially, and a few are public-domain or shareware.

Abbott Systems' Can Opener is a utility for opening nearly any type of text, graphics, or sound file. It does a great job of recovering data files, although this is not its main function. Can Opener can extract data saved in standard formats such as MacPaint, PICT, and text. It even extracts data from PageMaker files and does so with little data loss. Open a document in Can Opener, and extract the data by saving the file. The program saves sound, graphics, and text files in general formats that various applications can read.

Popular applications also work with damaged word-processing documents. Microsoft Word, for instance, can be used to open a damaged MacWrite file. MacWrite, in turn, can open damaged Works files. You won't be able to retain the formatting information, but you can change the formatted file into a text file. If you want to change the file type, you will need a program such as DiskTop from CE Software or Disk Tools Plus from Electronic Arts.

PageMaker is a great program for recovering damaged MacWrite and Word files. Both Word and MacWrite are sensitive to end-of-file errors. By using the Place command in PageMaker, you can retain all the formatting information. Once the file is in PageMaker, use the Export command to save it as a Word or MacWrite file. There are a few programs, such as Floppy Fixer and FastCopy, that can attempt to repair damaged documents. Floppy Fixer extracts files from disks and can repair contiguous files. It can't handle segmented files, however. FastCopy is part of the PC Tools Deluxe program. With its built-in Track Editor, FastCopy is the only program that repairs files with checksum errors. Such errors occur when the number of bytes on a sector doesn't match the number indicated by the standard checksum. Spreadsheet documents are particularly sensitive to this kind of error, and using FastCopy is usually the only way to recover the damaged files. You can make a copy of the disk with FastCopy, go to the Track Editor, and follow the menus. The program automatically calculates the correct checksum and if there are no other problems, you'll be able to open the file.

Damaged graphic documents have different problems that make them difficult to open. Most on-screen pictures aren't really images that you can open and look at with a file editor. They are a set of instructions that tell the Mac what to draw on the screen. Graphics programs are often create documents that other programs can't open. Can Opener adequately meets the challenge of deciphering multiple formats. Giffer or Vision Lab, available on CompuServe, can open damaged files in formats such as PICT and MacPaint.

Directory

Can Opener — $125
Abbott Systems, Inc.
62 Mountain Road
Pleasantville, NY 10570
(500) 652-9157

Disk Tools Plus — $49.95
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(503) 646-9699

DiskTop — $99.95
CE Software
1554 Fuller Road, P.O. Box 65880
West Des Moines, IA 50265
(515) 224-1995

FastCopy (PC Tools Deluxe) — $79.95
Central Point Software
15220 N. Greenbrier Parkway
Beaverton, OR 97006
(503) 690-8090

Floppy Fixer — Shareware. $25
Frank Beatrous, Lupus Foundation
1717 Massachusetts Ave., N.W.
Suite 203
Washington, DC 20036

Giffer — Shareware. $20
Steve Blackstock
available on CompuServe's
MacDesign forum, Library 9

Vision Lab — demo version
John Raymonds
available on CompuServe's
MacDesign forum, Library 9
For dealer inquiries please circle 62 on reader service card.

POWER TOOLS

FTNFM • 16 Mhz 68000 doubles SE's speed

Sic/one Accelerator $329.95
For Mac II or SE. Includes card
Math co-processor
Taxan 2 pg monitor
For Mac II or SE. Includes card
Siclone Accelerator $329.95
16 Mhz 68000 doubles SE's speed

LOGITECH
ScanMan $349.95
400 DPI hand-held scanner

Call for free JDR catalog
BBS 408-559-0253
FAX 408-559-0250

Call Toll-free
800-538-5000
Sales and Technical support

An Ounce of Prevention

Thanks to improved disk-backup- and-maintenance software that safeguards your hard disk, a crash no longer has to mean a catastrophic loss of data. By following the procedures outlined here, you'll not only minimize your losses but you'll decrease the chances of another crash.

1. Back up your hard disk often. There's no excuse not to do so with all the backup software available, as well as the convenience of the floppy disk as an inexpensive backup medium. If a few of your files are especially important to you, make at least two copies of them and store each copy on a separate disk (for more on disk-backup programs and backup strategies, see "Hard-Disk Backup: Moving and Storing," July '89). You can make backing up even easier by organizing your hard disk so that you keep all your new or frequently changed files in only a few folders (see "Hard Disk Sanity," October '89 for some suggestions on efficient desktop organization).

2. If you haven't done so already, buy SUM II and install it on your hard disk. SUM Shield protects your hard disk against crashes, accidental initializations, and accidental file deletions. Shield also monitors the current disk directory — an essential part of disk and file recovery.

3. Keep only one copy of the System file and the Finder on your disk. Multiple copies of these files can confuse your hard disk because it can't distinguish the current disk directory — an essential part of disk and file recovery. Before you copy the entire contents of a new floppy onto your hard disk, make sure the new floppy doesn't contain an unwanted Finder or System file.

4. Keep your hard disk (or Mac, if the hard disk is internal) on a flat, sturdy surface.

Steve Costa started out with a 128K Mac in 1984 and has since graduated to a 1IcI. When he's not playing with his Mac, he serves as technical coordinator for BMUG (Berkeley Macintosh User's Group).

For general inquiries please circle 63 on reader service card.

Seagate SCSI drives
Seagate drives with embedded SCSI controllers plug right in to your Mac SE or II. Unimac kits include driver software.

3-1/2" Drives
30Mb $399
48Mb $499

5-1/4" Drives
43Mb $449
65Mb $549
85Mb $699

UNIMAC-3.5 $89.00
5-1/4" mounting kit/software UNIMAC-5.25 $79.00
5-1/4" mounting kit/software

TERMS: Minimum order $12.00. For shipping and handling include $2.50 for UPS Ground and $3.50 for UPS Air. Orders over 1 lb. and foreign orders may require additional shipping charges — please contact the sales department for the amount. CA. residents must include applicable sales tax. Prices are subject to change without notice. We are not responsible for typographical errors. We reserve the right to limit quantities and to substitute manufacturer. All merchandise subject to prior sale. A full copy of sale terms is available upon request. Items pictured may only be representative.
surface. This keeps the disk stationary, preventing the disk’s head from crashing into the recording platter.

Try to orient the disk in its intended position. If you set a disk upside down, for example, you run the risk of scratching the heads. Avoid jarring the disk when you move it, and never, ever drop it.

5. In the case of an external hard disk, make sure the disk’s SCSI ID is unique to the SCSI chain. If you set up a chain of peripherals and you have more than one hard disk with the same ID, one disk may write garbage to the other. At the very least, conflicting SCSI IDs will prevent the devices from working. Also make sure you have proper termination at the end of your chain.

6. Always use the Shut Down procedure to turn off your Mac. Turning the Mac and any external hard disks off without first selecting Shut Down from the Special menu can damage a hard disk’s data. For the same reasons, you should use the Restart procedure instead of just turning the Mac off and on again. Shut Down also parks a disk’s heads, which removes the heads from the recording platter and keeps them from getting scratched. You should do this before moving the disk.

7. Don’t turn off, restart, or unplug your Mac and hard disk while they’re in the middle of an operation — you run the risk of losing data. If you find that your office or home power supply isn’t reliable, you should plug your Mac and hard disk into a surge protector. The surge protector safeguards your Mac and the disk against damaging power surges. Make sure the surge strip’s on/off switch is out of the reach of your feet and legs so you won’t accidentally turn off your whole system.

8. Regularly rebuild your Desktop file. This should be part of a hard-disk-maintenance routine. Over time, your hard disk’s Desktop file gets bogged down with information on files that have been deleted, added, renamed, and moved. Rebuilding the desktop updates the Desktop file, clearing out the old filenames and locations. Be forewarned, though. It also clears out any comments you may have added in a file’s Get Info box.

9. Use diagnostic and repair utilities such as Sector Collector from 1stAid Software or SUM’s Disk TuneUp utility on your disk regularly. These utilities can weed out a disk’s bad sectors and take them out of circulation. If bad sectors are found and marked, you’ll lose a little storage capacity on your hard disk, but you’ll also be free of one element that can cause a crash.

10. Optimize your hard disk regularly. Writing and rewriting files to a hard disk eventually fragments it. Regularly defragmenting your hard disk ensures that files remain contiguous. DiskExpress is an optimizing utility that works well, and some hard disks, such as LaCie’s, come with their own optimizing software.

— Kristi Coale

**SINCE YOU ALREADY HAVE MACPROJECT™...**

**GREAT GANTT!**

- It’s here! Finally, you can produce your own custom, presentation quality Gantt charts directly from your MacProject™ files. Or, build your own bar charts from scratch using our rich symbol set and on-screen editing tools. You get both these powerful options for only $195.

**FEATURES**

- **AUTOMATIC MACPROJECT READER** (Just three clicks of the mouse does it!)
- Variety of symbols built-in, or create your own
- Frozen frame keeps side text and calendars always on-screen
- Text and graphics positioned anywhere on the chart
- Up to 20 built-in text information columns
- Variable top and bottom calendars
- Critical path, status line, and progress symbology
- Custom chart templates

**SPECIAL OFFER!** Buy your copy of Great Gantt! in December/January and receive a FREE 4-color ribbon for your ImageWriter II so you can produce color Great Gantt! charts! See your local dealer or call Varcon Systems, Inc. at (619) 563-6700, FAX (619) 563-1986.

Varcon Systems, Inc.
10500 San Diego Mission Road, Suite K, San Diego, CA 92120; Phone (619) 563-6700; FAX (619) 563-1986

Please circle 1 on reader service card.
Your old Macintosh can learn new tricks if given half a chance.

half a chance.
Rapport
• Lowest cost 720K MS-DOS data exchange
• Upgrades 512e, Plus & SE to SWIM™ capability
• Use with Drive 2.4, Apple 800K & Super Drive™
• Cuts number of back-up diskettes by \(\frac{1}{3}\)

Don't be left behind by Apple's new Mac disk standard. Rapport provides the processing power to connect "super" 3.5" floppy drives and more.

The Rapport module also enables Mac to read 720K MS-DOS, OS/2, and 800K ProDOS disks with the internal 800K drive. Rapport with an external Apple 800K drive can read and write those alien formats. For back-up, Rapport can increase disk capacity to 1.2Mbytes using 800K diskettes.

"...transferring files between PCs and Macs? ...Kennenck has come out with a brilliant addition to the genre – Rapport. It's small, but packs a big punch...Rapport is a dynamic package."—Mac User Magazine, July ‘89

For the dealer nearest you, call: 1-800/552-1232 or Inside California 408/370-2866
120-A Albright Way, Los Gatos, CA 95030 FAX: 408/370-0484 Link: D2997

Please circle 161 on reader service card.

the other half.
Drive 2.4
• Supports all Apple & IBM 3.5" Formats
• Lowest Cost/Highest Performance HD Drive
• Fastback II Backup Software Included
• Back-up 20Mbyte with 5 or 6 HD diskettes

Rapport's other half, Drive 2.4 takes you beyond Apple's "state of the art" High Density floppy drive. In addition to supporting all current 3.5" disk formats by Apple and IBM, Kennect's Drive 2.4 supports two new Very High Density formats which furnish 1.2Mbyte user space on standard density media and 2.4Mbyte on High Density diskettes – up to 4Mbyte using the included FASTBACK II utility.

One Drive does it all – Quite a trick.

KENNECT TECHNOLOGY

KENNECT and RAPPORT are trademarks of KENNECT TECHNOLOGY. Apple, Macintosh, 512e, Plus, SE, Super Drive, SWIM and ProDOS are trademarks of Apple Computer, Inc. MS-DOS is a trademark of Microsoft Corp. FASTBACK II is a trademark of Fifth Generation Systems, Inc. IBM is a trademark of IBM Corp.

Please circle 161 on reader service card.
When Time Is Color

I can show you a dozen ways to shave seconds off the time it takes you to do common System tasks: booting the system, starting applications, opening documents, backing up disks, shutting down. I can teach you a score of tricks that will add up to whole days saved over the course of a year at the keyboard, and we can start as soon as you’ve got a week free that you can devote to learning the tricks.

Doesn’t sound like a good deal? I guess not, but the tricks are useful and would save you time, if only you already knew them. Not having the time to devote to saving time is a paradox that philosophers don’t talk about much.

This month’s discussion is mostly about color and what it costs—in time—to use it, but the lessons learned aren’t just for users of color machines. Although I’ve included some benchmarks, they are more illustrative than definitive: There are too many variables to pin down costs exactly. I’ve tried to give you good advice, but I’ve also given some hints on how to examine this gift horse for cavities. All too often, advice is not placed in a real-world context and as a result is useless. Along with the advice about when and how to use color, I’ll discuss the costs involved in actually using the advice.

Two other ways you can speed up operations—turning off and adjusting the RAM cache in the Control Panel and rebuilding the desktop—are among the issues I’ll take up in next month’s column. I’ve decided to take up color as a separate issue because of the complex problems it presents.

The first issue is that of color modes: The

By Michael Swaine

Three of the easiest ways to instantly accelerate your Macintosh require no expensive boards or software. Turning color off, turning your RAM cache on, and rebuilding your desktop can all increase performance—but is the time you save worth the effort?

Monitor’s cdev, accessed via the Control Panel, lets you adjust the number of colors your monitor shows. If you have 256 colors, your choices will typically be 2, 4, 16, or 256 colors. Some monitors, however, have cards that don’t give you all these options—many will give you only the extremes of color display, such as a choice between 2 colors or 256, and leave out the middle selections. You can also choose between gray scale and color, but this has no performance consequence.

Should you turn off color (select two colors) whenever you’re working with monochromatic images or text? Table 1 illustrates the effects of selecting various color modes. The answer isn’t as clear as you’d expect.

Table 1 shows the results of performing the same task with three different applications for four different levels of display color—mostly to test screen-update time. The applications used were HyperCard and two HyperCard alternatives or extensions, Silicon Beach’s SuperCard and Plus from Spinaker. The tasks was to display 495 black-and-white bit-mapped images as quickly as possible. The images were HyperCard clip-art cards that I imported into SuperCard and Plus. The tests were run on a Macintosh II outfitted with an Apple color monitor and 2 megabytes of RAM, and the Mac was not running under MultiFinder. Mac SE times are included for comparison.

I should begin by stating what these results do not address. They should not be taken as a comparison of the three applications; in fact, they are really biased toward HyperCard. Also, the test is designed to magnify effects so that differences are obvious. In everyday use of the applications, the differences will be smaller.

The first thing to notice is that the different modes all produced different times. Turning off color or even cutting down to four colors does make a speed difference.

Look at the figures for HyperCard. Two-color mode on the Mac II is four times as fast as it is on an SE, but this advantage practically disappears in 16-color mode. The result for 256 colors seems bizarre: Turning on more colors actually speeds up the program by almost 50 percent! Apparently, HyperCard and
Put your best font forward.

With TypeStyler™ and your Macintosh® you can turn type into an exciting tour de force.

It lets you create dramatic designs that once were possible only with custom illustrations and the most expensive typesetting facilities.


It's powerful, yes. But it's not overpowering. TypeStyler is amazingly easy to learn and use.

You can even import and export PICT, Paint and EPS file formats. And export Adobe Illustrator outlines. Which means TypeStyler is fully compatible with most popular desktop publishing applications.

In addition, TypeStyler comes with 10 AGFA Compugraphic® typefaces. And you can also work with thousands of other commercially available fonts. All for an introductory price of $199.95.

Broderbund is making desktop publishing easier to do. Easier to afford. And definitely easier on the eye.

Available for Macintosh Plus/SE/II/IIX. Two 800K floppy disk drives or hard disk. System 4.2 or later version.

SEE YOUR LOCAL RETAILER OR CALL 800-521-6263.

Macintosh is a registered trademark of Apple Computer, Inc. AGFA Compugraphic is a registered trademark of the AGFA Corporation. Broderbund is a registered trademark, and TypeStyler is a trademark of Broderbund Software, Inc. Adobe Illustrator is a trademark of Adobe Systems, Inc.
SuperCard (which also performed faster under 256 colors) are actually using 256-color circuitry, and Plus is not.

What this says, unfortunately, is that the effect on speed of turning off color varies from application to application. But there is some practical advice that you can derive from these benchmarks: You will gain significant speed if color is turned off completely when you’re moving a lot of monochrome images, or when you’re moving color images and don’t care about the color (this latter advice is based on the results in Table 2). With applications such as HyperCard and SuperCard, if you have 256 colors, you should use either full color or no color: 256 color or 2, never 4 or 16. With other programs, such as Plus, 16 colors perform better than 256.

But all this assumes that you are moving the images as fast as you can. When you’re actually using a program such as HyperCard, you are likely to spend only a fraction of your time in operations that do this much screen updating. In practice, the differences shown in Table 1 are likely to be reduced by an order of magnitude or more. Very approximately, you can expect the Color mode to cost you from one to five minutes per hour of work.

### Using Color

The preceding results have nothing to do with the number of colors in the file itself; all three programs are manipulating the same black-and-white images. What happens when you’re actually using a color in a document and not simply changing the display mode?

Two broad questions are involved: How much time does it cost you to use a color document as compared with using a monochrome document, and what does it cost in time to put color into a document? I’ll give one example of the cost of color in an existing document, and I’ll suggest what you might consider in putting color into documents.

Table 2 shows that limited use of color with adequate memory need not degrade performance noticeably. For this test, I used Word 4.0 and three variations on one large text file. In one case, I used the default black characters; in the second case, I colored all text green; and in the third case, I switched among six different colors with each word. I also ran tests using two different allocations of memory in Word. Out of the box, Word 4.0 runs in 1 megabyte of memory, but you can change it to the suggested size of 512K by going into the Get Info box (highlight Word’s icon on the desktop and press Command-I).

The test was the same in each case, merely scrolling to the bottom of the file. Many other kinds of benchmarks could be run that would show costs associated with, say, moving 3-D object-oriented images, but scrolling is a more common operation among users. In this test, as the file gets larger relative to allocated memory, performance degrades because of the increasing number of disk accesses. (Of course, disk space becomes an issue, but I assume that time is the real critical issue as files get large. Your time is worth more than your disks cost.) This effect is empirically independent of the monitor-mode effect.

The cost of creating color files is a different matter, and not as susceptible to benchmarking. For every aesthetic or informational advantage color brings, there is an associated aesthetic or informational cost. Colors add to the appeal or to the information content of the document only if they are deliberately and carefully chosen for their appeal or informative value. If it takes you three tries to get each color right, then you need to put that factor of three into your calculations. That’s why the advantage of being able to use well-chosen default colors in such programs as PowerPoint is not to be underestimated.

When should you put color into documents? Here’s my rule: When the informational and/or aesthetic value of doing so is greater than the cost.
“Smoking grass is cool.”

“Coke’s even better than pot.”

“One joint can’t hurt.”

YOUR CHILD COULD USE ANOTHER POINT OF VIEW.

It’s not because there’s a lack of information out there. Your child is getting plenty—from the kids at school, from friends in the neighborhood, from older kids, and from countless other sources.

The problem lies in the kind of information your child is getting. What kids hear too often is that drugs are OK. What they need to hear is the truth.

This is where you, as a parent, can help. By talking frankly with your child, you can, first of all, learn where your child stands on drugs—what he thinks about them, what he knows, and what he doesn’t know.

Then, once you understand your child’s perspective, you’ll be in a better position to offer your own. You’ll be able to talk about the dangers of various drugs. And what your child can do to avoid them.

Of course, speaking to your child like this takes a lot of courage. And to do it effectively takes a lot of homework—like reading articles, attending meetings, and talking to other parents. This way, your child will see you as a well informed source.

Your child is going to talk to someone about drugs. Who’s it going to be?

To make sure you have the right answers, contact your local agency on drug abuse.

PARTNERSHIP FOR A DRUG-FREE AMERICA
sum of (1) the cost in time required to put the color in, including the time needed to make appropriate color choices that achieve your informative or aesthetic goals, and (2) the cost incurred in using the color file, which will take up more disk space and time than a monochromatic document.

The Cost of Good Advice

I’ve given some suggestions about when you might want to turn off color and when you might not want to put color into a document. But environmental and real-world considerations may override this advice. These include the time required to turn off color, MultiFinder side effects, and the regret factor.

The most direct way to change your monitor’s color mode is through the Control Panel. Toggling color on and off again in this way can take 30 seconds to a minute. If you average less than an hour per session with an application, the time saved by turning off color is likely to be minimal. If you regularly use MultiFinder, you probably average less than an hour at a time in any application.

What about using a utility program, an INIT, or a macro to toggle color on or off? These will save you little time over accessing the Control Panel directly, but there is one approach that has some appeal: launch macros. If you know that you want color turned off when using one program and turned on with another, you can create a macro for each program that sets the color mode and launches the application, possibly opening some standard-document template as well. The advantage of creating this sort of macro is that the macro bunches several operations together at launch time, so you don’t have so many steps to think about.

Turning color off affects the whole display, not just the current application window. If MultiFinder is active and if you use color in informative ways on your desktop, you may want to keep color on except in unusual cases, even if this costs you minutes per hour in the applications. It’s a matter of weighing speed against ready access to information.

Finally, there is an argument that I can’t defend logically, but that I can’t refute, either. If you’ve spent thousands of dollars on a color computer, the regret you’ll experience in not using what you paid for may outweigh any benefits. If so, use the color. This is not logical thinking — it’s just human nature.
**BETTER OF EVERYTHING USER SOFTWARE**

Easy to use software for all Macintosh systems

**$4.50 per disk**
- 10 or more

**$5.00 per disk**
- less than 10

Unconditional money-back guarantee • Free catalog of over 200 programs with every order or by request • All orders shipped same day • Airborne Express overnight service only $5.00*

---

**BUSINESS/PRODUCTIVITY**
- **Form It! (5020)** — An excellent form making package. Includes a collection of MacPaint Business Form Templates.
- **Smallview/Scheduler (5010)** — Everything you need to organize your time, and keep track of information.

**CLIP ART/FONTS/DESKTOP PUBLISHING**
- **MacBillboard/MacPaint Utilities (5800)** — The MacPaint clone. Includes lots of paint and graphic utilities.
- **MacPaint ClipArt Disks (3 disks) (5501)** — Quality MacPaint format clip art. Comes with a viewing program.
- **PostScript Fonts (3 disks) (5701)** — Many different EPS Fonts.

**EDUCATION**
- **Natalia's Dots/Word Match (6020)** — Programs to entertain and educate the young child.
- **Typing Teacher/Spelling Tutor (6015)** — Improve your typing skills and learn to spell (digitized sound) with these two fine programs.

**GAMES**
- **Arcade Games 1 (6501)** — Three addictive games! Space Station Pheta, Adventures of Snake, and Gunshy 1.1.
- **Arcade Games 2 (6502)** — Two Centipede games, Tron-Cycles, and more.
- **Board Games (6550)** — Monopoly, Risk, and Stratego. Great graphics!
- **Golf/Football/Billiards (6580)** — Three exciting games on one disk!

**ADVENTURE GAMES**
- **Karth (6755)** — You become Karth of the Jungle. Unique digitized sounds and graphics!
- **On Call (6750)** — Be the doctor "on call" in the hospital emergency ward.
- **Radical Castle (6760)** — An adventure game with digitized sounds and graphics.

**UTILITIES**
- **Custom Utilities (7525)** — Customize your Mac with Startup inits, wraparound pointer, password protection and more.
- **Font Utilities (7515)** — Font tester, font finder, sorters, and many more.
- **Hard Disk Utilities (7500)** — Everything needed to maintain and improve your hard disk!
- **Init Resources (7535)** — An entire collection of inits for your Mac.
- **Mac. Utilities (7530)** — Ramdisk, reverse screen, print spoolers, and more.
- **Vacines & Disinfectants (7505)** — Fid your Mac of pesky viruses! Includes Vaccine, Disinfectant, and Gatekeeper.

**MISCELLANEOUS**
- **Banner & Calendar Makers (7005)** — Create banners and graphic calendars easily.
- **Desk Accessories (7545)** — Over thirty of the best DAS around!!!
- **Soundmaster (7010)** — Alter the personality of your machine with new sounds.

**HYPERCARD**
Note: Hypercard Stacks require Hypercard, an 800K drive, and 1M of RAM.
- **Business Help Stacks (8500)** — Includes a ticker (appointment reminders), rolodex, phone book/auto dialer, and more!
- **Kids' Stacks 1 (8601)** — Macintalk story tellers and great primers for preschoolers.
- **Kids' Stacks 2 (8602)** — Macintalk story tellers and other great primers for grades K-6.

**SPECIALS FOR DTP**
- **EPS Fonts Package 1 — 45+ fonts, over 3 Megs of EPS fonts. $19.95**
- **EPS Clipart Package I — Hundreds of quality EPS images, over 4 Megs of art! $24.95**
- **EPS Clipart Package II — Includes all art in EPS Clipart Package I over 9 Megs of EPS art. $44.95**

Order: 800-876-3475 Information: 503-776-5777 Fax: 503-773-7803
Get with the Program

Curious Mac users sense a wall around the User Interface Toolbox. We’re here to tear down that wall.

Starting next month, you’ll see something quite unusual within the confines of these covers: programming code. That’s right — this column will teach you how to make the Mac do what you want it to.

“Why programming?” you ask. Well, we see several key trends that make familiarity with programming the Mac helpful, if not downright necessary:

- Mac users are becoming more sophisticated and are demanding more from their machines.

- Exposure to HyperCard has given Mac users a taste of programming, but they’ve often had to resort to XCMDs to accomplish meaningful work.

- The way programs are built dictates the way they are used — if you’re familiar with the programming restrictions of the Macintosh, you won’t be surprised by the actions of the applications that have been written for it.

- More corporate Mac purchasing means more custom applications and more need to tie the Mac into existing database and data-entry applications being run on other machines.

- More to the point: One thing has proven consistent during the Mac’s six-year history (in fact, even during its gestation, when we first started working with it). Eventually, all Mac users express an interest in learning how the Mac does what it does.

Unfortunately, Apple’s documentation (notably the Inside Macintosh series), although informative, is not very instructive, nor does Apple always take the time to explain concepts and interactions. Thus, curious Mac users sense a wall between them and the User Interface Toolbox that’s built into the Mac ROM. We’re here to tear down that wall.

No Degree Necessary

We need to warn you about a few things before we get started. Although you won’t need a B.S. in Computer Science to follow our columns, programming is not something you just jump into without some previous background or exposure. Teaching a novice computer user to program is like trying to teach an alien how to play guitar; before that alien can even begin to fiddle with the instrument, you need to explain a few basic concepts, such as what music is, what a note is, how groups of notes are organized, and what a pitch is.

Similarly, before you start programming, you need to know a bit about the Mac environment. Since you’re
A summary of your monthly charges:

<table>
<thead>
<tr>
<th>Description</th>
<th>Time</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Download 3 files</td>
<td>1:00</td>
<td>$6.00</td>
</tr>
<tr>
<td>Read messages on 2 boards</td>
<td>0:15</td>
<td>$1.50</td>
</tr>
<tr>
<td>Check 10 stock quotes</td>
<td>0:05</td>
<td>$0.42</td>
</tr>
<tr>
<td>Read today's news</td>
<td>0:10</td>
<td>$1.00</td>
</tr>
<tr>
<td>Play Stellar Emperor</td>
<td>0:30</td>
<td>$3.00</td>
</tr>
<tr>
<td><strong>Total hrs. non-prime</strong></td>
<td>2:00</td>
<td></td>
</tr>
<tr>
<td>1200 baud</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>$12.42</td>
<td></td>
</tr>
</tbody>
</table>

It doesn't take a computer to figure out the difference.

The difference between the GEnie® service and CompuServe® could make a big difference to you. Here's why. GEnie's rate for 1200 baud access is just $6 per non-prime hour. That's more than twice as much. Which means that with GEnie you can stay online longer for a whole lot less.

And that means more time to enjoy more of GEnie's services. Like a computer Round Tables, multi-player games, financial information and more. At hourly rates that let you spend more time online. Not more money.

To sign up on GEnie today just:
1. Set your modem for local echo (half duplex), 300 or 1200 baud.
2. Dial 1-800-638-9636. When connected, you just enter HHH.
3. At the U#= prompt simply enter XTX99594. GEnie then RETURN. And have a major credit card or your checking account number ready. For information in the U.S. or Canada, call 1-800-638-9636. Or write GE Information Services, 401 N. Washington, Rockville, MD 20850.

Sign up now for free and save $29.95.

We bring good things to life.
POWER TOOLS

reading MacUser, we assume that you know what a menu, dialog box, button, and window are. (Consider yourself fortunate: when we started programming microcomputers, these concepts were just being invented.) One of the nicest advantages of programming the Mac rather than other machines is that these useful interface devices are well defined and supported by the operating system — in other words, we don’t have to reinvent them every time we want to use them. Two good sources of detailed information on the Macintosh user interface and the proper usage of these wonderful inventions (as defined by Apple) are Programmer’s Introduction to the Macintosh Family (1988) and Human Interface Guidelines: The Apple Desktop Interface (1987), both of which are published by Addison-Wesley (Reading, Massachusetts).

You also need to know something about how Apple divided the Mac’s resident software into Toolbox routines. Many of these routines apply to the interface goodies, whereas others apply to operating-system routines such as file handling. The five-volume Inside Macintosh, also from Addison-Wesley, is the definitive source for Mac-specific information. If you plan to do any Macintosh programming, you’ll need a copy of this basic reference to look up specific function-call syntax and data structures.

Of course, we’d be doing you a disservice if we didn’t also mention Thom’s book The Programmer’s Apple Mac Sourcebook (Redmond, Washington: Microsoft Press, 1989). It summarizes virtually all the information in Inside Macintosh and the other Apple-logo books — Thom calls it “the poor man’s CD-ROM” because it was designed to act as a low-cost desk reference.

A utility Kurt finds extremely useful is the Inside Mac DA, which contains most of the Toolbox calls and data structures of Inside Macintosh. You can purchase it directly from its author by sending $20 to Bernard Gallet, 660 Miller Ave., Cupertino, CA 95014 (or you can download a demo-only version from CompuServe’s MAUG forum). If you want to go the commercial route, you can get a similar DA from Addison-Wesley.

Learning the Language

You also need to become familiar with the syntax and semantics of the C programming language. We’ll be supplying you with working code, but you’ll need to understand the language to get maximum benefit from this column. We’re expecting you to do your homework by learning about such fundamentals of the C language as variable declarations, assignments, function definitions, and function calls. But don’t worry if you don’t have any experience with the language — we’ll meet you halfway. With his years of classroom experience in teaching C, Kurt is aware of some of the common pitfalls lurking out there for you new C programmers. We’ll help you along with the more advanced features of the language, such as data structures, pointers, and dynamic-memory allocation.

We also know that the best way to learn a language is by example. Every month’s complete source code will be posted on CompuServe’s MAUG forum. If you don’t have access to CompuServe, disks will be available directly from MacUser for a nominal charge.

Now, let’s get back to your first homework assignment: Kurt’s favorite C-language reference is Kernighan and Ritchie’s The C Programming Language (Englewood Cliffs, New Jersey: Prentice-Hall, 1988), which addresses the needs of novice and experienced programmers alike. Unfortunately, Kernighan and Ritchie’s examples are based in a UNIX environment, so there aren’t any Macintosh-specific details. Never fear, an upcoming column will guide you through the famous “hello world” program in their first chapter — just study the types, operators, and expressions.

Kelley and Fohl’s A Book on C (Redwood City, California: Benjamin/Cummings; second edition, 1990) is used in a lot of community colleges as an introductory text, and you might find it useful if you’re just starting out. It contains a decent discussion of the fundamental concepts of structured programming, such as data typing, assignments, loops, conditionals, and functions. We also recommend Macintosh Programming Primer by Dave Mark and Cartwright Reed (Reading, Massachusetts: Addison-Wesley, 1989) for its excellent use of THINK C examples.
Enhance™ image processing software for the Macintosh II™. The second generation has arrived, and it's fast, intuitive and powerful.

Only Enhance™ gives you the performance of real-time brightness, contrast and gamma filters. Only Enhance™ immediately updates your entire image as you retouch gray scale balance and tone. Only Enhance™ gives you the power of over 75 different high-speed image filters. These filters can be added, subtracted or blended with the original image in one percent increments. Only Enhance allows you to create special purpose masks for filtering and paste operations. Only Enhance has the power to create, save or apply custom color palettes. Enhance™ also has the flexibility to add (or subtract) two or more selected regions and support transparent cut and paste (ghosting) operations. Enhance™ even has on-line help!

Of course, Enhance™ includes all of the standard features you've come to expect from other first generation image enhancement software. Like gradient fills, paint brush, air brush, pencil, line, magnification, rotation, distortion, text, smudging tool, and magic wand—to name just a few.

Get all this—and more—for only $495.

CALL NOW (800) 388-8109

SPECIAL $375 OFFER:

Order Enhance™ now and pay only $375. That's right—save $120. And, we guarantee you'll love it—if you don't, simply return it within 30 days for a full, courteous refund.

Order now—this is a limited time introductory offer. Please have your VISA or MasterCard ready.

We reserve the right to limit quantities.

Definitions on disk

Language Master gives you instant access to more than 80,000 dictionary definitions plus 470,000 synonyms from Merriam-Webster—the English language authority.

The dictionary contains definitions, usage notes and hyphenation points. The thesaurus contains synonyms, meanings for each synonym group and properly inflects all responses.

Language Master, formerly Choice Words for the IBM PC, works with most popular MS-DOS word processors and is now available for the Apple Macintosh.

Whether you're writing, reading, or simply want to explore the English language in a new and exciting way, Language Master is for you.

NEW! Macintosh Version

Language Master gives you instant access to more than 80,000 dictionary definitions plus 470,000 synonyms from Merriam-Webster—the English language authority.

Language Master gives you instant access to more than 80,000 dictionary definitions plus 470,000 synonyms from Merriam-Webster—the English language authority.

Whether you're writing, reading, or simply want to explore the English language in a new and exciting way, Language Master is for you.

Haven't You Heard the News?

You don't have to buy the whole newsstand to get copies of your latest article or review. Order customized reprints from Ziff-Davis Publishing Co. and let potential clients read all about it.

To find out how you can have your article or review reprinted, contact Jennifer Leckie—Reprints Manager, Ziff-Davis Publishing Company, One Park Ave., New York, NY 10016, 212-503-5447.

Minimum quantity: 500 reprints.
This column’s charter is to help casual programmers explore the wealth of system software that’s in every Macintosh. Seeing your first program running on the Macintosh’s desktop is a most satisfying experience, especially if you’ve previously had the pleasure of programming with a command-line, text-oriented system. We know that the main hurdle to overcome in writing your first Macintosh application is the volume of code it takes just to put up your first window.

Here’s where we can help. Each project we present will be a complete working application. Over the next couple of months, we’ll present a generic application that will form the basis for all future programming projects (until we get to object-oriented techniques, where the rules all change).

Later on, we’ll return to this generic application to explore the file system, demonstrate how the Macintosh handles text, and give a host of other useful examples of using the Toolbox.

The Programming Process

All of which brings us to the actual act of programming the Mac: We’ll start with an oversimplification (don’t worry about the details at this point — many of these will be explained in expanded form in future columns — we’re after the big picture here). Programming usually starts as an idea for a computer-based tool, which you then break into smaller, logically oriented pieces. Until you’ve figured out what it is you’re trying to accomplish, don’t even go near a computer. The first steps often take the form of notes, diagrams, and samples of screens or printouts. The more you refine your ideas before you sit down at the computer, the more likely you’ll be to produce a useful program.

Case in point: We spent two man-years designing and sketching out our ideas before we started the programming that eventually became Tycho, a table-editing program. We spent much of that time looking at examples of tables and extrapolating the basic concepts that our program had to understand.

Our planning resulted in several paper designs for specific pieces of Tycho. In particular, we spent a great deal of time designing the underlying database that the program uses. We wouldn’t even have realized that a table editor needed an underlying database if we hadn’t done the preplanning. Had we just jumped in

Why THINK C?

Picking a language with which to program a computer is an emotionally charged decision. We all have our own ideas of what’s best. We considered five candidates: HyperTalk, BASIC, Pascal, C, and assembly language.

We ruled out HyperTalk for many reasons. Although it does come free with every Mac, it doesn’t have the power to control all aspects of the Mac by itself (XCMDs are available but must be programmed [none of the other languages]). Moreover, the disorganized nature of HyperTalk scripts (they’re scattered all over the place within any HyperCard application) makes it difficult to present finished solutions. HyperTalk also carries a large overhead (it’s interpreted by HyperCard, which dominates the available memory in a 1-megabyte Mac).

BASIC has many appealing features. It can be run interactively (so you don’t have to wait until compile time to see if a statement is going to execute the way you think it should). It’s easy to understand. It’s inexpensive and readily available. Unfortunately, BASIC was designed in the old sequential days of computing (when instructions were always executed in a particular order). The event-driven Mac interface isn’t well suited to that kind of control. Moreover, the Macintosh ROM expects to deal with special groupings of data, called data structures, and BASIC has no way to deal with them directly, which makes programs become unnecessarily complicated.

Pascal has a reputation as a fine teaching language. Better still, it was the language of choice at Apple when the Mac was developed, so many of the data structures that the Mac’s ROM and operating system deal with contain information in forms that Pascal directly understands. Two problems made us avoid Pascal, though. First, coding pointers and handles — two types of basic Mac data — is somewhat cumbersome in Pascal. Second, we don’t think the available Pascals are as full-featured or as easy to use as the available Cs.

We ruled out assembly language because simple concepts tend to get quite complex — assembly language has no structured loops or data structures, so you generally have to invent them yourself. Moreover, good assembly-language code is difficult to read quickly.

That left us with C, the language we’ve used for most of our own programming projects during the past five years. We feel strongly that C programs do a better job than those in any other language of showing the control and manipulation of data structures for Mac programming. C has only two real drawbacks: The Mac doesn’t understand the C string data type directly, and there’s no way to “test” a line of C code prior to compiling it.

But why THINK C? Why not Apple’s own Macintosh Programmer’s Workshop (MPW) C? The answer’s easy: MPW C is definitely a big-league compiler, but its roots are in UNIX, which means that it isn’t exactly the interactive, event-driven product that Mac owners are used to. MPW C comes with all kinds of special tools, but they are all invoked with cryptic command-line instructions. THINK C follows the Mac Interface Guidelines; is easy to learn; is as full-featured as MPW C; produces code that is as small, reliable, and fast as MPW C, and costs less to boot.
Dayna Communications now provides one-stop network shopping for Macintosh® and PC users.

DaynaNET™
For high-performance network connectivity, DaynaNET is a local area network operating system for Macintosh and PC workgroups. A unique version of top-selling NetWare®, DaynaNET uses an IBM® AT or compatible as a dedicated file server. It offers many of the features of a high-end network at a price entry-level network users can afford. And with the ease of use Macintosh users expect.

DaynaTALK™
To improve network performance over LocalTalk® cables, add DaynaTALK Macintosh and PC products. A cost effective alternative to Ethernet, DaynaTALK increases the capacity of LocalTalk and compatible cable systems such as PhoneNET® to handle heavy network usage without degrading performance. And with proprietary SpeedGuard™ collision avoidance, DaynaTALK guarantees that high speed communications will travel through the network error free.

DaynaMAIL™
Improve workgroup communications with DaynaMAIL. For electronic mail in mixed Macintosh and PC workgroups, DaynaMAIL provides seamless connectivity over DaynaNET and NetWare networks. As well as all the features you'd expect from a professional mail system.

So when you're looking for network solutions, get them from Dayna. And keep it all in the family.
and started programming, we'd probably have spent a lot of time arriving at the need for a database by trial and error — not the way to design software.

Once you fully understand the product you're trying to create, you can take your ideas and paper design and begin typing source code, a set of computer-specific instructions, into an editor of some sort. All a computer ever does is process a sequence of instructions in a tightly controlled fashion. The tricks to successful programming, therefore, are to make sure you've identified the right process to encode, to think of every potential exception to that process that your program might encounter, and to keep the sequence of execution in the correct order.

A good computer language helps you with these tasks. We intend to use Symantec's THINK C almost exclusively in this column (though we'll also explore some other tools you might use with it, such as ResEdit and Prototyper). Not only is THINK C a structured language (meaning that it imposes a particular structure on the source code, making it more difficult to write illogical sequences), but version 4 is object-oriented as well. Essentially, good object-oriented programming (OOP for short) deals with data and interface components in a very structured manner. We'll be discussing this topic at length in future columns, so stay tuned if this is an area that intrigues you.

THINK C includes an adequate editor (for typing in and organizing your source code), a compiler, a linker, and a debugger (in versions 3 and 4) for examining your program in detail as it executes within the computer. First, you use the editor (and its associated project library) to enter your "first pass" source code. Next, you use the compiler to parse through the source-code instructions you've entered to create machine code (usually called object code) that the computer can understand directly. A compiler can flag any obvious syntax or typing errors, but it can't spot flaws in the design of the code — what the program actually does.

That's up to you, in the often agonizing, largely manual process of debugging. On some machines (including the Mac), the object code must be linked into a file that the operating system can understand and execute (see Figure 1). We'll show you in the next column how to do this step by step with THINK C — for now, Compilers can flag obvious syntax or typing errors, but they can't spot flaws in the design — that's up to you.

Don't Sweat the Small Stuff

If you didn't have to think about all the nit-picky little details of writing XCMDs for HyperCard, you could be creating the next great HyperCard extension. Well we've just changed all that. HyperBASIC handles the small stuff for you, so you can get on with it. Invent and create XCMDs faster than you thought possible. In minutes or hours instead of days.

While we can't guarantee that HyperBASIC will turn you into the next Macintosh programming star, everything about writing XCMDs is quicker AND EASIER using HyperBASIC.

This is the kind of development environment composed of an editor, compiler, linker, and resource mover all rolled into one easy to use tool.

HyperBASIC includes 30 XCMDs with source code to get you started. These XCMDs are very useful just as they are (they're even more useful than the ones you get in some XCMD packages), but you can use them as the basis for creating your own XCMDs.

And, HyperBASIC adds features which don't exist in HyperTalk, such as: multway branching, case statements, arrays, and a variety of numeric data types, just to list a few.

HyperBASIC makes it easy for your XCMDs to communicate with your HyperCard application. A feature of HyperCard named CALLBACKS lets you send and receive information with the greatest of ease.

There are advanced features that enable you to make use of the Macintosh ROM routines. And for those who feel comfortable using a Debugger (like MacsBug), HyperBASIC will generate an assembler listing of your XCMD as well as insert MacsBug symbols to ease the task of debugging those big, complex XCMDs.

So, if you've been looking for the right XCMD, and you've come to the conclusion that you have to do it yourself, get HyperBASIC. At $99.00, you won't sweat over the price either.

Teknosys, Inc.
3823 Coconut Palm Drive, Suite 111
Tampa, Florida 33619
800-873-3494
813-620-4039 FAX
She's 5 years old. She's already had 7 names, 16 identities and 21 homes.

Every year thousands of children are kidnapped by their own parents.

Beginning the lonely ordeal of life on the run. Moving from town to town. From state to state and from school to school. Using false names. And for the parent, living with the constant fear of being discovered.

Child Find offers an end to running. With our special toll-free number and our mediation program, we offer a way out for the parents. And for the kids.

For us, it's a labor of love. But unfortunately, love doesn't pay our operating costs. We need your help. Please give what you can to help Child Find.

Send a check or money order to Child Find, P.O. Box 277, New Paltz, NY 12561-9277. And help another child find a more peaceful future. 1-800-A-WAY-OUT.
we’re interested in describing the general steps you take.)

Finally, you’ve got a “runnable” application. Of course, if you didn’t do a good job of designing it or if you included illogical or nonsensical instructions, it won’t run too well, if at all. That’s where the debugger comes in. It’s rare that a first pass at a program even comes close to working (although you’ll have an advantage here, since we’ll provide source-code listings that are known to work). In real life, therefore, you often find yourself returning to step 2 (entering/modifying source code) or even to step 1 (isolating and designing key modules of the program on paper). And so it goes. You edit, compile, link, and run your program; find the errors; and go back through the sequence again (see Figure 2).

Cynics (such as Thom) believe that programs are never complete. There’s always another bug (read: programmer or design error) to fix and another feature to add. Optimists (such as Kurt) believe that it’s possible to complete a programming project in a final, bug-free form. So don’t be surprised if we vacillate between these two philosophies in future columns.

Before Next Month
To summarize, if you’re interested in programming the Mac and want to follow this series of columns, you need to get yourself ready:

• If you’re a newcomer to programming, you need exposure to the concepts and terminology of programming — we’ll explain advanced concepts, but you’d better know what a bit and byte, assignment, loop, and conditional expression are.

• Even if you’re a programmer, you’ll need some familiarity with the C language — we’ve mentioned several good books that will help you here. Start reading them now.

• You should have some idea of why you want to program the Mac. Are you just curious about what it takes? Do you have specific needs that aren’t met by existing programs? Are you looking for shortcuts? Or do you want to be the next Andy Hertzfeld? If you understand what you want to know about programming, you’ll get more use out of our columns. So, get ready to start up those editors and come prepared next session with your thinking caps in place and turned on. You’re about to tackle your first Macintosh program.

Even if you’re a programmer, you’ll need to have some familiarity with the C language. We have noted several good books that will help you. Start reading them now.

THE POWER TOOL FOR RESELLERS

MacUser magazine and Ingram Micro D have joined forces to offer resellers the Macintosh Pocket Selling Guide. It’s a pocket-sized reference tool packed with everything a salesperson needs to better explain today’s advanced Mac Products. Some of the Guide’s features include a complete listing of MacUser’s highly respected Mini-Finders, and an industry directory that lists support information for Macintosh vendors.

Exclusively MacUser!

Dealers—to order your copy call:
Ingram Micro D
800-555-1212
Please circle 176 on reader service card.

Protects while you type!

MacUser February 1990 263
If your data storage vendor can't do this for you, call us.

At Summus Computer Systems, we do it every day. For clients like Lockheed, NASA, Chevron, GE, and others. Clients who demand exceptional service with their high-capacity data storage products. Why do they choose Summus? Because we offer more.

**MORE STORAGE SOLUTIONS**

**UNATTENDED BACKUP** - The GigaTape™, our 8mm helical-scan tape drive, gives you 2,000 megabytes of capacity. A single compact 8mm data cartridge can replace fifteen 150-megabyte tapes for less than two cents per megabyte.

**REAL UNATTENDED BACKUP AND ARCHIVING** - No matter how large your system or network, our JukeBox™ Library provides the most cost-effective solution available today. Using the same 8mm helical-scan technology as our GigaTape™ and our own advanced autoloading carousel, you can have on-line access to 125 to 1,000 gigabytes of data in a compact 19" rack-mount.

**ERASABLE OPTICAL** - The LightDisk™ magneto-optical drive delivers 600 megabytes in a rugged, removable cartridge. It also features ISO standard data formatting for easy media interchangeability between similar magneto-optical drives.

**HIGH-CAPACITY HARD DISKS** - In our GigaBox™ series you can have from 170 to 2,000+ megabytes of fast disk storage.

**MORE CONNECTIONS**

Summus is your single source of compatible data storage subsystems for DEC, Macintosh, PC, and Sun computers. Our GigaSafe™ backup software for PCs is compatible with Novell Netware; the Mac version works with AppleShare. Both feature optional ANSI standard data formatting, allowing you to read and write data between all of these systems.

**MORE SUPPORT**

You want answers. Now, not later. That's why we provide toll-free technical support. And our award-winning National Support Group offers on-site service for our products, or entire computer systems, in most U.S. metropolitan areas.

**MORE RELIABILITY**

Our well-tested drives are backed by a 30-day money-back guarantee and a one-year warranty. Extended warranties, 24-hour replacements, and our exclusive upgrade programs are also available to protect your investment.

**MORE OPTIONS**

With our ten years of experience in systems integration, we can custom integrate just about any data storage system you can imagine.

**MORE VALUE**

Even with all of these services, our prices are very competitive. Both purchase and lease options are available. Need the right solutions to your data storage needs? Just ask us to perform. Call us today.

1-800-255-9638.

**SUMMUS COMPUTER SYSTEMS**

YOUR STORAGE SOLUTIONS COMPANY

17171 PARK ROW • HOUSTON, TX 77084 • 713/492-6611 • FAX: 713/492-0092

Please circle 19 on reader service card.
Tip Sheet

Readers Share Their Tips and Tricks

Illustrator 88

Illustrator 88 has problems creating text elements such as tabs or leaders. You can type in a row of periods, but trying to create leaders for a simple list of products and prices, for instance, is time-consuming. Stretching or shrinking the row to fit a specific width distorts it (see Figure 1). One solution is to create a dashed line:

1. Draw a line with the pen tool.
2. Press Command-I to bring up the Paint dialog box.
3. Choose None for the Fill and Black 100 percent for the Stroke. Enter a line weight (the default is 1 point), select the second choice for Caps, click on the Dashed button, and enter 0 in the first Dash Pattern box (constraining your dashes to be perfect circles or dots) and a number to specify the space (in points) between your dots (see Figure 2).
4. To see your changes on-screen, go to the Preview Illustration view. (Clicking on OK takes you back to the Artwork Only view, but you won’t see the dashed line you just created.)
5. To modify the line, go back to the Artwork Only view. You can resize this line with the Scale tool so that it fits in any width without distortion, as shown in Figure 3.

Kathy McCord
Capitola, CA

The Desktop Tip for extracting Illustrator 88 graphics from PageMaker files in the September '89 issue is an arduous approach to this task. Here’s an easier way to do it:

1. Open the PageMaker document, choose Print from the File menu, hold down the Option key, and click on the OK button in the Print dialog box to bring up the PostScript Options dialog box.
2. Turn off the Download bit-map fonts, Download PostScript fonts, and Include Aldus Preps options. Name the file to make finding the PostScript file easier; otherwise it will be called PostScript0 (1, 2, 3, and so on). Save the file either as EPSF or as Normal. Click on the Print button, and close PageMaker.
3. Open the resulting PostScript file with Illustrator 88. Illustrator recognizes only the PostScript code that corresponds to its file, and when the PostScript file is explicitly saved from within Illustrator, only that code is saved.

Brian Ablaza
Cherry Hill, NJ

Thunder II

Most people assume that you have to wait for Thunder II to finish searching through its voluminous dictionaries before you can choose the correction — but you don’t. As soon as the word you want appears in the list, type the number beside it to make the correction. If you’re certain that the word flagged will not be in the dictionary (as is the case with names, for example), click on the Add to Dict button. Thunder II immediately lets you append the word.

Evan Gross
Toronto, Ontario
Canada

Figure 1: Creating leaders in Illustrator 88 can be frustrating. If you stretch or shrink a line of periods to fit a specific space, the results are distorted.

People’s Market Specials

Beets .................................. $0.59/lb
Basmati rice .......................... $1.79/lb
Turnips .................................. $0.29/lb
Brussel sprouts ......................... $0.89/lb
Japanese eggplant .................... $0.59/lb
Eggs .................................. $0.99/dz
Organic vegetarian cat food .......... $1.59/lb

Figure 2: The trick to creating distortion-free leaders in Illustrator 88 is to create a dashed line, using the Paint dialog box. The settings shown here result in a standard leader of dots.

Figure 3: Using Illustrator 88’s dashed-lines feature, you can easily size a leader to fit any width, as evident in this mock ad.

Compiled by Gregory Wasson
PageMaker 3.02

PageMaker has difficulty printing through the manual-feed tray of the Varityper VT-600 Imageresetter. The problem isn't with the VT-600 but with the VT-600.apd (Aldus Printer Description) file that PageMaker uses to print. You can alter the apd with Word so that the file will work with the manual-feed function. Open the VT-600.apd in Word, find this line:

@ManualFeed: "none"
and replace it with these lines:

@ManualFeed true: "statuadict begin /manualfeed true def end"
@ManualFeed false: "statuadict begin /manualfeed false def end"

Patrick S. Baker
Somerset, PA

Word 4.0

The Insert Table command in Word 4.0 only lets you create tables with columns of equal width. Ordinarily, you have to struggle with the column markers across the ruler to vary the column widths, but I've devised a shortcut that makes it easy:

1. Say you're creating a three-column table with one narrow column on the left for labels and two wide columns to the right for entries. As you create the table, enter 5 in the Number of Columns box.
2. Select all the cells in the second and third columns by holding down the Option key while dragging the mouse over these columns.
3. Choose Table from the Edit menu and select the option for merging the two columns. Repeat this procedure with columns 4 and 5 (see Figure 4).

You now have a three-column table. To get a narrower first column and wider entry columns, just increase the number of columns in the table by a factor of 2.

Greg Raven
Los Angeles, CA

Word users have been inundated with documentation, help files, and third-party books discussing all the program's intricate features. Trying to keep track of all this information in its present state is mind-boggling but worth the effort.

To have this information literally at your fingertips, create a file named Hints in which you store a personalized set of commands, shortcuts, and tricks that you want to keep at your fingertips. Give this Hints file menu-bar status by adding it to the Work menu. Press Command-Option+- (plus symbol). When the cursor turns into the plus symbol, click on your Hints document, either in the Open dialog box or in its title bar (if it is the active document).

Word will create a Work menu on the right-hand side of your menu bar or add your Hints document to an existing Work menu.

Timothy B. Peters
New York, NY

PageMaker 3.02

A common operation in PageMaker is dividing an amount of space (horizontal or vertical) evenly among a number of increments. But when this amount of space is not a round whole number, the division and spacing can be problematic. Here's an easy way to get the proper space allocations:

1. Draw a rectangle that is, for example, five inches in length, and divide it into five increments. The rectangle should be divided into five-inch segments.
2. Copy this segmented rectangle to the Scrapbook and use the Place command on the File menu to place the most recent Scrapbook file as a grouped PICT graphic.
3. To resize this rectangle to fit into a longer area, grab one of the handles of the rectangle and stretch it. Now you'll have five equally divided spaces without the tedium of trial-and-error measurement.

Caleb Coleman
Flagstaff, AZ

Figure 4: When you insert a table in Word 4.0, you don't have the option of creating it with columns of different widths. The top window shows the standard three-column table that Word creates. Changing the widths of the columns would mean struggling with the column markers across the ruler. By starting with a table that has five columns, though, you can merge adjoining columns (middle window) to quickly create the wide columns that you want. In this example, the wide columns will automatically be exactly twice as wide as the short ones.
Tip of the Month

LaserWriter Driver

Pressing Command-F after clicking on OK in the LaserWriter dialog box writes the PostScript output, minus the LaserPrep file, to a file. But some applications intercept this Command-F event, preventing the file from reaching the LaserWriter driver. If you have ResEdit 1.2, you can get around this snag. As with any ResEdit procedure, work on a copy of the LaserWriter driver.

1. In ResEdit, open the copy of the LaserWriter driver, version 5.2 or 6.0, and select DITL from the list of resources.
2. Using the Open as Template option (labeled Open As in earlier versions of ResEdit), select DITL ID = -8191 to open it as a DITL resource.
3. Find the Item for Disk File with a Display rect (display rectangle) of 0 0 0 0. Change the Display rect to 49 320 65 400 (see Figure 5). Save your changes, and exit from ResEdit.
4. When the LaserWriter Print dialog box appears, you should see a new option called Disk File. Clicking on it results in the creation of a PostScript file of the output called PostScript0 (or 1, 2, 3, and so on) This file will appear in your System Folder.
5. To avoid confusion with other LaserWriter driver files on your hard disk, rename this altered driver. You’ll have to select this driver from the Chooser to access it after you’ve changed its name.

Figure 5: By using ResEdit and entering the four coordinates shown in the Display rect line of the item called Disk File, you can add a button to the LaserWriter Print dialog box that causes a PostScript version of the current file to be printed to disk rather than sent to the printer.

HandOff eliminates “Application Not Found!” If the Finder can’t find an application to open your documents, you can select a compatible substitute application. You can assign all documents created by that missing application to any application that can open them. Have MacWrite II open all MacWrite files directly from the Finder! You can also assign files from PCs, or other computers, to Macintosh applications. Have Excel open all “.wkl” files, automatically! If you use the Finder, you shouldn’t be without HandOff!

“a nice, unobtrusive and very much needed extension to my Macintosh”
—Jean-Louis Gassée, President, Apple Products

Software Innovations

HandOff retails for $49.95. HandOff is a trademark of Software Innovations, Inc., P.O. Box 811, Allen, Texas 75002, 214/727-2323. All product names are trademarks or registered trademarks of their manufacturers.

Free Mac Arm!

Order an Agio workstation and receive a FREE Mac Arm (available separately at $119). If you are using a desk designed for a blotter instead of a keyboard, you are getting less than maximum performance from your Mac (and your spine)! Mobile. Compact. Strong. Ask customers like Hughes Aircraft and Cogent Research.

Please call... the catalog is FREE. 503-690-1400

MacUser February 1990 267
INTRODUCING THE ZIFF-DAVIS MacNETWORK.
Two great publications unleash the total power of the Mac market.

It's the fusion of the Macintosh industry's two leading publications: MacUser and MacWEEK. Ziff-Davis has brought them together to create the most efficient and effective marketing system in the Mac market. The MacNetwork offers the power and flexibility you need to succeed.

The Ziff-Davis MacNetwork gives you the opportunity to reach the full spectrum of Mac buyers: From the product champion who makes specific brand recommendations to the volume buyer who sets standards, no one publication can deliver them all. The MacNetwork delivers this spectacular coverage while giving you the efficiency to maximize your reach.

The Ziff-Davis MacNetwork. We deliver all the buyers, with all the frequency you need in the environment best suited to sell your products. Call (415) 378-5681 today and see what the power of E = mac^2 can do for your business.
Help Folder

Answers to Readers’ Questions

First, a couple of matters dating from last November. Allen Ray Moody was looking for an oversized Geneva font that he could use with an ImageWriter LQ. Turns out that such a font is available, in 9-, 10-, 27-, and 30-point sizes, from Dubl-Click Software (9316 Deering Ave., Chatsworth, CA 91311; [818] 700-9525). It offers the giant Geneva, along with other bitmapted fonts such as Cupertino and New York, as part of a package of big fonts called The Triples.

Several readers wrote to take issue with the explanation of why Stepping Out II seemed to operate too slowly to be a practical alternative to a full-page-display system. Andy Baird, of Hightstown, New Jersey, was one of those who commented at length. "You said that Stepping Out ‘can produce a noticeable lag’ because it spends time moving information from its off-screen buffer to the actual video screen whenever a user moves the mouse to the edge of the screen. Although it’s true that Stepping Out copies information as you state, there’s no perceptible lag during auto-scrolling.

“You other point, that Stepping Out’s use of System memory may lead to more disk activity and consequent delays, is true only if you’re already close to the limit of memory. I have 2 megabytes of RAM on my Mac at home, and I routinely use Stepping Out in a generous 12.5-x-18.5-inch virtual screen size with PageMaker or Illustrator 88 with no problems and no disk thrashing — it takes up a little more than 200K of RAM, which I can easily spare.

“Stepping Out — or any large screen device — does indeed slow down the Mac, simply because when you’re working with five or ten times as many pixels, it takes proportionally longer to redraw the screen when an update is required. In using Stepping Out as well as a Radius Two Page Display on a variety of machines, my experience has been that there’s no perceptible difference between a Mac SE running Stepping Out at 1,152 x 864 pixels of virtual screen and the same Mac SE connected to a Two Page Display with a 1,152-x-864-pixel actual screen. But both are noticeably slower than the same SE using its built-in 512-x-342-pixel display — a difference that’s entirely due to longer screen-redraw times.”

Floppy-Disk Death Knells

Q. I have a Macintosh Plus with a 45-megabyte hard-disk drive and one internal floppy-disk drive. Although the drive usually reads and writes just fine, lately I’ve been getting a lot of “This disk needs minor repairs” messages.

This scenario has been happening a lot lately. It seems as if the disk drive is messing up my disks. Is this a problem with the drive, or is it just my imagination?

Tom Asimos
Texarkana, TX

A. You could be having two different problems: Your drive could have problems writing to floppy, or it could be having problems reading floppies. If the problem is intermittent and the drive isn’t damaging every disk you insert, there’s no way to confirm that your trouble is with writing. You can, however, establish whether the drive is reading floppies properly. The next time you get the “minor repairs” message, don’t repair the disk. Instead, eject it and insert it into a different Mac, if it works on another Mac without giving you an error message, it’s likely that the floppy drive on your Macintosh is not reading disks properly. In any case, you should see a qualified technician as soon as possible to get your drive inspected.

Much To Do about DAs

Q. I’ve been searching in vain for two years for a DA that would let me keep my “To Do” list. When I complete a task, I’d like to be able to click on it to save it to another list of completed tasks. I’ve seen programs that almost do this, but not as a DA.

Also, I’d like to know if it’s possible to use a spare...
Customizing the Desktop

Q. I've recently been playing around with customizing my Mac SE. I've added some sounds and replaced the startup screen. Next I plan to change the trash and folder icons by using ResEdit (as Michael Swaine described in Beating the System, November '89). So far, no problem, but I also want to change the desktop pattern to a picture. Is this possible?

Also, I want to change the rectangular hard-disk icon that my internal Apple hard-disk drive leaves on the desktop to something more interesting. I remember reading in a past MacUser that this was impossible. But knowing how Mac people always seem to overcome the impossible, I was wondering if someone had figured out how to do it by now.

Finally, I want to change the name of my hard disk. It seems simple enough, but something tells me that I'm going to have to go through a lot of programs - such as SUM Guardian and my backup applications - to let them know of the change. Am I creating a lot of work for myself if I change the name?

William Reed
Tokyo, Japan

A. First, several shareware programs let you replace the desktop pattern with a picture. StartupDesk is an INIT that replaces the gray desktop with whatever you've selected as your startup screen. Backdrop is another INIT that lets you select a MacPaint document to replace the gray desktop pattern. It comes with a DA that allows you to switch and/or reposition your pictures. (Both are available through the usual shareware outlets: CompuServe, user-group libraries, bulletin-board systems, and so on.)

Second, as you recall, the November '88 Help Folder explained why you can't easily edit hard-disk icons. In March '89 we passed on information about Façade, an INIT by Greg Marriott that lets you use ResEdit to change the icon for your hard disk. It even comes with a few icons - Calvin, Hobbes, Godzilla, and Moof (Figure 2).

Finally, changing your hard disk's name will not only confuse your backup program but will also make it impossible for certain programs (such as QuickKeys and HyperCard) to locate files. That's because these programs use a full pathname, which includes the old name of the hard disk, to locate files on your hard disk. If you do decide to change its name, be prepared to spend some time teaching programs where files are, even though you haven't actually moved them.

Figure 2: Façade, a freeware program from Greg Marriott, lets you replace the hard-disk boxes on your desktop with fanciful icons.

Q. I have a Mac Plus and a Cirrus 70-megabyte hard-disk drive. Recently I have been looking for a 10-foot, 25/25 SCSI extension cable. My local authorized Apple dealer had absolutely no idea what I was after. They told me that the 25/25 cable was "not standard" and that they would check and get back to me (I have not heard a word since).

I went to the other authorized dealer in town. They sold me what was reputedly a 10-foot, 25/25 SCSI cable. I took it home and connected it, but all I got was an icon requesting a startup disk. When I took it back, a different clerk sold me the same cable, swearing up and down that "yes, it would work." After I took it home, I encountered exactly the same problem.

I just want a 25/25, 10-foot SCSI cable. Not a fan belt for a Fokker. Why can't I buy one?

C. It
Cambria, CA

A. About the only thing your Apple dealers appear to have done right is tell you that the cable you're looking for is nonstandard. It is. According to Joel Kammerman at LaCie (manufacturer of the Cirrus drives), the cable you need is not only a 25/25, but it must also be a "25/25 straight-through." This means that pin 1 is connected to pin 1, pin 2 to pin 2, and so on. The problem is that many dealers stock 25/25-pin cables designed for other computers, most of which are not straight-through and cannot function as Macintosh SCSI cables.

Find a dealer or cable fabricator who understands the meaning of "25/25 straight-through," and you and your hard-disk drive will be up and running in no time.

Craig A. Marin
Brookline, MA

A. Acta, an outline-pro­

Q. I have a Mac Plus and a Cirrus 70-megabyte hard-disk drive. Recently I have been looking for a 10-foot, 25/25 SCSI extension cable. My local authorized Apple dealer had absolutely no idea what I was after. They told me that the 25/25 cable was "not standard" and that they would check and get back to me (I have not heard a word since).

I went to the other authorized dealer in town. They sold me what was reputedly a 10-foot, 25/25 SCSI cable. I took it home and connected it, but all I got was an icon requesting a startup disk. When I took it back, a different clerk sold me the same cable, swearing up and down that "yes, it would work." After I took it home, I encountered exactly the same problem.

I just want a 25/25, 10-foot SCSI cable. Not a fan belt for a Fokker. Why can't I buy one?

C. It
Cambria, CA

A. About the only thing your Apple dealers appear to have done right is tell you that the cable you're looking for is nonstandard. It is. According to Joel Kammerman at LaCie (manufacturer of the Cirrus drives), the cable you need is not only a 25/25, but it must also be a "25/25 straight-through." This means that pin 1 is connected to pin 1, pin 2 to pin 2, and so on. The problem is that many dealers stock 25/25-pin cables designed for other computers, most of which are not straight-through and cannot function as Macintosh SCSI cables.

Find a dealer or cable fabricator who understands the meaning of "25/25 straight-through," and you and your hard-disk drive will be up and running in no time.
Shareware has never been this good before.

All shareware and public domain software is not created equal. Somak Software has set new standards for affordable Macintosh software.

Each disk is critically evaluated for content, is packed full of usable software, comes on high quality media, and is certifiably virus free. And at just $8.99 per disk there is no better value anywhere.

Customers who order $60 or more will receive a free mousepad with their order. For orders over $100, a free t-shirt will be included.

105 Stars and Planets
Learning about the universe has never been this much fun! Includes the Orion Space Simulator, Orbit, Earth Plot, and four more.

250 Chemistry 2
A brand new collection of software for the chemistry student, including ChemEdit, ChemDraw Demo, Periodic Table DA, and a wacky stack of chemistry riddles! Some items require HyperCard.

213 Arcade Games 2
Ten exciting games, including Lunar Lander (with digitized sound recorded during actual Apollo missions!), Shuttle 88, Star Troads, & Cargo Shootout! Lunar Lander requires HyperCard.

162 Casino Games
Capture the excitement of Las Vegas with ten casino games like Blackjack, Roulette, Slots, Craps, and Video Poker!

153 Word Games 1
Education and entertainment come together in seven word puzzles and games, including CrossWord, Word Search, Hangman Plus, Wheel, CrossMaster, and two more!

249 Word Games 2
Includes CrossWise, Word-Smith and LembraSS, three challenging word games that will ever use your mind! Also included are two game TAH's, Apples and Guess.

169 Card Games
Eight classic card games for the whole family, including Hearts, Cribbage, Euchre, Klondike, and Talking Solitaire!

251 LaserFonts 5
Never before offered, our latest collection of high-resolution downloadable PostScript fonts includes Elwood and Cardiff, two great new original fonts by Somak Software!

252 Virus Utilities 3
The most up-to-date, low-cost protection against computer viruses available! Includes the latest versions of Distinctant, Virus Detective, and VirusBlockade, which will detect, remove and block all known virus types!

206 MandelZot v2.0
Explore the fascinating world of fractals! MandelZot creates an infinite variety of beautiful mandelbrot fractals, and works on both b/w and color Macs. Sample images and a detailed 27-page instruction manual are included.

184 B/W Fractals
More fractal magic with a collection of programs for black and white Macs. Includes Julia Set, Mandelbrot, "fractal mountain" applications, and an informative HyperCard stack that teaches about the theories behind fractal mathematics.

S1020 LaserFonts Set (5 disks)
All five of our high-quality downloadable PostScript font disks, with bit-mapped screen fonts, for only $39!

S1082 Clip Art Set (5 disks)
A collection of over 100 useful XCMDs, XFCS and scripts that will help you create more professional HyperCard stacks. Only $39!

S1010 HyperCard Set (5 disks)
A collection of over 100 useful XCMDs, XFCS and scripts that will help you create more professional HyperCard stacks. Only $39!

New! LaserArt CD-ROM
A complete collection of almost 500 EPS (PostScript) clip art images for real estate, sports, weddings, restaurants, office, and more! Also includes 39 Laser Fonts, all for only $95! Also available on forty 3 1/2 disks for only $199!

S1083 Games Set (5 disks)
This set features some of the finest games available for the Macintosh, like MegaMinx, Time Star, Stratego, Air Traffic Controller, 1000 Miles, and 27 more! Only $39!

S1081 Games Set (5 disks)
This set features some of the finest games available for the Macintosh, like MegaMinx, Time Star, Stratego, Air Traffic Controller, 1000 Miles, and 27 more! Only $39!

S1085 Games Set (5 disks)
This set features some of the finest games available for the Macintosh, like MegaMinx, Time Star, Stratego, Air Traffic Controller, 1000 Miles, and 27 more! Only $39!
Ethernet Interface, $495.

Now you can make your AppleTalk network rip along at the speed of Ethernet. A red-hot 10 Megabaud. Because we've developed a SCSI to Ethernet interface for Mac users. NuvoLink SC.

It doesn't matter if you have thick or thin cable. Or twisted pair wiring. NuvoLink SC installs with the push of a plug and a click of the mouse. And it doesn't take up a slot in your Mac like other Ethernet options do. Just plug it into any SCSI equipped Mac and watch your E-mail zip. Your files fly.

We've made NuvoLink SC completely transparent to the user. With no buttons or switches to operate. There's even a display that lets you know exactly when traffic is incoming. And when outgoing messages are being sent.

And because of our advanced VLSI design, you get the highest possible technology. At the lowest price. Which makes a hot idea even hotter. If you'd like to know more, call 800/232-9922, or in California 415/331-7815. And call us soon. Because it's definitely time to rethink your link.
File Fetching

In the past, if all you wanted to do was move a file from one Mac to another, SneakerNet was often the only viable option — unless, of course, you wanted to spend money on commercial networking products. Now there's a better solution, aptly named Public Folder. This handy network file-transfer utility was written by Michael Peirce, a programmer at Claris, and Claris is distributing it free to registered owners of its products. Public Folder is also available from most on-line services.

Public Folder is a Chooser document that allows you to designate a folder on your hard disk as public. You can't send a file anywhere, but any file you put into your public folder can be retrieved by anyone else on your network who is using Public Folder.

When people are moving a file from your Mac to theirs, you will feel a performance hit — your mouse may become twitchy and your Mac may not react to your input quite as quickly as it normally does. However, Public Folder rapidly moves the file's data from one Mac to the other, although the speed depends on the amount of network traffic present. This speediness helps make the file transfer as painless as possible for the user of the Mac whose public folder is being accessed.

As with TOPS, Public Folder gives you point-to-point (serverless) file transfer over your network. It isn't suitable as a replacement for TOPS or AppleShare, however, nor is it meant to be. The only way you can get at someone's public folder is through the Chooser; it doesn't appear as a volume the way a TOPS or AppleShare volume does. But for those who do occasionally want to move a file from there to here quickly, Public Folder provides an elegant answer.

— Stephan Somogyi

Mac on the Run

Affectionately known as the "shaving kit," Farallon's Portable Pack is the ultimate yuppie accessory for jet-set Macintosh Portable users. The Portable Pack contains an awesome assortment of PhoneNET connectors, cables and adapters, a screwdriver, and a Swiss army knife clone. It also comes with two copies each of Farallon's Timbuktu and Timbuktu Remote.

Portable Pack has everything you need (except, of course, a modem) to unscrew the wall plate in your hotel room, wire up your Macintosh, and connect to your computer back home. It's very handy for network managers too. $495.

Farallon Computing
2201 Dwight Way
Berkeley, CA 94704
(415) 849-2331

Still Waiting . . .
Apple disappointed users at DEXPO West by not shipping VMS server software for its CL/1 database connectivity language, but said it would meet its 4Q target date.
Face to Face with Your Mainframe

MitemView challenges Apple's MacWorkStation as an easy-to-use tool for putting a Mac interface onto your host application.

By Bill Meyer

**Figure 1: How MacWorkStation Works**

Special MacWorkStation messages sent from the host application are passed to the MacWorkStation main module, which hands them off either to your MacWorkStation document (in the case of CCL or exec-module events) or to MacWorkStation Directors, which invoke Mac Toolbox routines.
The MacWorkStation messages on the left are issued as a series of text strings by a host application and create the Mac dialog box shown on the right. The first message (0001) creates an empty dialog box, complete with a close box, entitled Please Log on. The BUTTON messages create the OK and Cancel buttons. The last four EDIT and TEXT messages create the text fields and their prompts.

The MacWorkStation messages...
Kinetics is your ticket to these exotic ports.

There's no telling where your Macintosh can take you. Assuming you make the right connections.

Kinetics® products from Novell turn your LocalTalk network into more than just an efficient way to connect a few Macs. They expand your networking capabilities so your Mac can reach its full potential. Without changing the way you work.

Novell's Kinetics solutions open a world of possibilities through a wide range of Ethernet hardware and software. Kinetics FastPath® joins LocalTalk networks to Ethernet networks. It accelerates the performance of large Macintosh networks by allowing them to communicate over a high-speed Ethernet backbone.

FastPath gives your LocalTalk network direct access to computing environments like DOS, UNIX, VAX, NetWare® and OS/2 systems using AppleTalk, TCP/IP and DECnet routing. And the Kinetics EtherPort® line provides Ethernet connectivity to individual Macintosh workstations.

Only Novell's Kinetics line of products deliver this much experience in connecting Macs to other environments, with an impressive reputation for support. And only Novell provides such high levels of reliability and performance.

Learn how the Novell Kinetics connection can meet your network computing needs today and tomorrow. Call 1-800-LANKIND.

For network solutions, you should be seeing red.
host. If the log-on is successful, the host application starts up and the message-passing sequence begins (see Figure 1).

With MacWorkStation, Apple has gone to great lengths to streamline the code required to access the Toolbox routines that are the heart and soul of the Mac interface. The MacWorkStation server — the kernel that runs on the Mac — contains a set of Directors that lets the host programmer invoke one or more Toolbox routines with a single compact text string. Using Directors helps reduce the learning curve for developers new to the Mac programming environment.

**MacWorkStation in Action**

Let's look at how you would replace a command-line prompt for Username and Password on an existing mainframe application with a Mac dialog box containing text fields and buttons (see Figure 2). The host application's source code is revised to issue MacWorkStation Director commands to create the dialog box. When the user fills in the text fields and clicks on the OK button, the Username and Password are retrieved by the host application and control returns to the host application.

For a host application to appear truly Mac-like, however, users must be able to choose their next action — whether that is pulling down a menu, entering text, or scrolling a window — at will. This requires that a program be designed around a central event loop, which constantly checks for mouse actions and keystrokes, and so necessitates a major rethinking of program design. In the case of an already existing mainframe program revised to work with MacWorkStation, it can mean a massive rewrite.

If this all seems complicated, that's because it is. MacWorkStation lets you do something amazing things to craft a new look on a mainframe application, but it comes at a high price. The construction of a MacWorkStation application is easier than creating a complete Mac application from scratch, but it still demands a great deal of background knowledge and painstaking effort.

Another difficulty in using MacWorkStation is the sad state of its documentation and support. A Programmer's Guide and Programmer's Reference come with MacWorkStation, but you get the feeling something is missing. The two documents don't really work well together, and most MacWorkStation users require additional assistance. That extra help can be difficult to obtain. My attempts to get information through the Apple Regional Technical Support Center and the local Apple Systems Engineer — recommended support channels for universities — were completely unsuccessful.

[An Apple spokesperson assured MacUser that this isn’t typical of the company’s response to support requests from licensed MacWorkStation customers and cited several university and corporate sites that have been very successful in building MacWorkStation applications. Apple also offers a Developer University class on writing MacWorkStation applications. — Ed.]

**The MitemView Approach**

MitemView takes a hands-off approach to the host application, meaning that the programmer doesn't need to modify a single line of the host application's source code. Therefore you can use MitemView to create Mac front ends for any host application, even if you have no access to the host.

MitemView uses HyperCard as an interface, working its magic by providing a set of 38 specialized XCMDs and XFCNs. You do all your programming in HyperTalk. Alongside your HyperCard stack runs the MitemView application, which contains a virtual screen and something MITEM calls the WHOOP (Watch Host Patterns). The virtual screen is a terminal-emulation window. Normally you keep it closed, but during program development you can display it to monitor the data exchange between MitemView and the host application.

MITEM provides three terminal emulations with the basic MitemView product: TTY, VT32, and VT100. (By the time you read this, Tandem will offer an additional terminal-emulation module for its 6530 terminals.) Currently, MitemView supports only asynchronous serial communications via the Macintosh modem and printer ports. MITEM plans to add other protocols in future releases. Among the first to be released will be Telnet, for TCP/IP connections, and Tripdata's Netway, for 3270 connections.

All communications between your Mac and the host application take place through the virtual screen (see Figure 3). The WHOOP constantly checks the virtual screen for patterns from the host that have been defined by the MitemView programmer. When it finds a match, it invokes the specified HyperTalk handler. These pattern triggers and the resulting HyperTalk actions on the Mac are the
Unleash your creative genius. Audiomedia packs the power of a professional recording studio onto a single card.

Audiomedia pleases even the most discriminating ear with its compact disc quality digital recording and playback.

For the first time in the history of Macintosh, you can now record and playback stereo sound with compact disc fidelity. Introducing Audiomedia™: The first stereo digital audio recording & editing system for the Macintosh™ II family. Your Macintosh never sounded so good.

Audiomedia is based on Digidesign's highly acclaimed professional digital recording system. Now Audiomedia brings you the same tools the music pros have used on countless hit records — at a fraction of the cost!

If you're working with multimedia, you'll want sound that's as impressive as your visuals.

Sound Access™, an XCMD/XFCN, lets you add a high-fidelity soundtrack to any HyperCard™ stack or Director Interactive™ movie. Best of all, Audiomedia plays directly from your hard disk—a CD quality soundtrack uses only 50K of RAM and loads instantly, saving precious memory for your graphics.

Music editing & multimedia are just the beginning — applications for high-quality sound and digital signal processing are virtually limitless. Whether you are an artist, educator or professional communicator, Audiomedia will inspire you to sit up and listen.

So, demonstrate some sound thinking and call us today at 1-800-333-2137 for the name of your local Digidesign Authorized Dealer and a free brochure. Hear it and believe.

For the logically minded, Audiomedia offers 16-bit, 44.1 kHz audio and a blazing 10 MIPS digital signal processor. Fascinating.

- CD-quality stereo digital recording & playback
- Includes NuBus card, audio editing software and Sound Access (for HyperCard, Director, etc. support)
- Sophisticated, yet easy-to-use editing tools
- Powerful real-time digital signal processing
- Recording length based on hard disk space, only 50K RAM needed

Before Audiomedia, sound on the Mac was about as hi-fi as an AM radio.

It's a sound board and a co-processor too! With its Motorola 56001, Audiomedia introduces your Mac to a new world of digital signal processing applications.

Think Sound.
essence of a MitemView application. Your HyperTalk scripts also tell the WHOOP when to activate (watch for) and deactivate (stop watching for) specific patterns. The WHOOP searches only for patterns that are currently active (see Figure 4).

Using the Pattern editor, you can achieve a fine-grained control of the matching action. For example, the MitemView programmer can specify that a match for a particular pattern occur only when it appears in columns 5 through 10 of the virtual screen and the cursor stops next to it for at least five seconds. This control allows the recognition of virtually any screen event the host application can produce.

**MitemView in Action**

To implement Figure 2’s dialog box in MitemView, you begin by creating a Logon card and drawing the equivalent of the dialog box’s frame with HyperCard painting tools. You then identify the Username: prompt issued by the mainframe host application as a pattern. If you name the pattern LogonPrompt, you then need to create a HyperTalk handler that begins with "on LogonPrompt" in, say, the stack script. This handler is triggered when the WHOOP finds a match for the LogonPrompt pattern. When you run your stack/application, it first issues HyperTalk commands to activate the LogonPrompt pattern in the WHOOP, to connect the Mac to the host computer, and to start the host application program. Then when the host program sends the Username: prompt to the Macintosh, the LogonPrompt pattern is matched and the associated LogonPrompt HyperTalk script displays the Logon card.

MitemView puts the power of HyperCard and the ease with which powerful applications can be created to good use. But HyperCard itself does not take full advantage of the Mac user interface. It is full of little HyperBlinkSpots, such as lack of support for color, variable-size cards, and multiple cards. Fortunately, collections of XCMDs and XFCNs are available (many of them free) that provide some of the pieces missing from HyperCard — for example, the ability to create custom menus. And, although not formally supported in this release, most SuperCard stacks can work with MitemView. MITEM is working hard to ensure complete SuperCard compatibility in a future release, which may be available by the time you read this.

Compared with the structure of a MacWorkStation application, MitemView applications are the picture of simplicity. All the development is performed on the Mac, with the mainframe host application serving simply as the source of text strings to be checked for pattern matches. If you have access to the host application, you can modify it to send more-compact text strings designed specifically to trigger pattern matches in MitemView. However, even with XCMDs and XFCNs or the advantages of SuperCard, and even if you modify your host program to send more-compact text strings, MitemView by itself can only put
POWER TOOLS

REVSERVATION PLAN ON IT

Planning on restoring a house, saving a landmark, reviving your neighborhood? Gain a wealth of experience and help preserve our historic and architectural heritage. Join the National Trust for Historic Preservation. Make preservation a blueprint for the future.

Write:
National Trust
for Historic Preservation
Department PA
1785 Massachusetts Ave., N.W.
Washington, D.C. 20036

a friendlier front end on your host application: it can’t change its fundamental nature. If your host program is not structured around a central event loop, the resulting MitemView application will still be limited in its Mac-likeness. You can overcome this limitation to some extent with clever HyperTalk scripting, but even the cleverest stack is not a full-blown Macintosh application.

Both the documentation and support for MitemView are clear and well thought out. The manual provides complete instructions for planning and developing an application and includes a tutorial. A clear assumption is that the reader is familiar with the Mac and fluent in HyperTalk — several texts are recommended for those who aren’t. Samples of HyperTalk code appear throughout the manual: they provide a feeling for the structure of MitemView applications as well as concrete solutions to problems every MitemView programmer will face. In addition, samples of complete MitemView applications are included on the distribution disks for your experimentation.

Support for MitemView is equally accessible. MITEM has several support programs, ranging from unlimited free technical support via the GEnie network to direct telephone support (available at an extra cost). MitemCompass, a MitemView front end for GEnie, is provided with the product. MitemCompass is a great example of a MitemView application, and it makes using GEnie for MitemView support as painless as possible. I found the MITEM staff helpful and effective; in each instance, my phone call resulted in a quick answer to the problem at hand.

Recommendations

MacWorkStation provides complete control of the Mac user interface, but it requires you to have access to the host program’s source code. MitemView, on the other hand, lets you build interfaces for virtually any host application, but you are limited to the functionality provided by HyperCard and HyperCard add-ons. MitemView unquestionably requires less development time. The lead time for an experienced programmer to become comfortable with MacWorkStation is on the order of a month. Using MitemView, on the other hand, I was able to get a prototype running after one day of study. In a little more than a week, I constructed a fully functional MitemView front end for VMS Mail on a VAX host.

MitemView is more expensive than MacWorkStation, but that is partially offset by the increased cost of a longer MacWorkStation development cycle. MacWorkStation costs $100 for a single development license, $2,500 for a site development license, and $5,000 for a commercial license. MitemView has a more complex pricing structure, which depends both on the number of developers and on the number of end users. A single-developer license costs $995; a site license, $10,000; and a corporate license, $25,000. In addition, run-time licenses cost anywhere from $100 to $200 each, depending on the quantity purchased. Run-time licenses that work with only a single MitemView application cost less, from $10 to $50 per copy, again based on quantity. Some university discounting is available.

MitemView comes with better documentation, and in my experience, MITEM provided much better support than Apple did. On the other hand, MITEM is a new company. If your application has a long life expectancy, you can be virtually assured that Apple will be around for a while: MITEM’s future is not as certain.

In deciding which program is best for you, first decide on what kind of application to build and how much effort you are willing to put into the project. For a quick HyperCard front end to a mainframe application, pick MitemView. For a full-fledged host-based Mac application, go with MacWorkStation.

Bill Meyer has more than 11 years of experience providing technical and computer services in seagoing environments. He is now the Chief Seagoing System Manager for the Ocean Drilling Program at Texas A&M University.
Direct Line

For many of you, mail order is your primary means of purchasing Macintosh products and services. That's why MacUser has put together the following special section.

It's what you've been demanding—a convenient place to quickly find the products you need from the vendors you want to buy from. MacUser's Direct Line to products is just one more reason to turn to MacUser for relevant information aimed at servicing you.

Never buy another ribbon with MacInker™

Each MacInker shipped complete with free ink bottle, reservoir cover and ink dispenser.

MacInker™, the original, automatic ribbon re-inker. Model 234IM™ re-inks Imagewriter I/II black & single color cartridges. The Universal MacInker re-inks hundreds of cartridge types (including the Imagewriter LQ, one color and multicolor) with suitable adapters. Extra dark dot matrix, lubricant ink yields better than new print quality and extends printhead life. New reservoir for precise ink metering. Average number of re-inkings/cartridge is 60-100. With the optional Multicolor Adapter (mod M422, $40.00) your MacInker re-inks 4-color Imagewriter II cartridges. Full range of accessories available, inks & cartridges, heat transfer etc. Colors: red, green, blue, yellow, purple, brown, orange, silver, gold, white.

Imagewriter I/II MacInker (mod 234IM)..........................42.00
Universal MacInker (includes one adapter)..................68.50
Multicolor Adapter (mod M422)..................40.00
Heat Transfer Adapter........................25.00 ea HT cartridge........8.00
Imagew. cartr. black..................12.15 ea 4-color..............................10.00 ea
Imagew. LQ cartr. black..............14.00 ea 4-color..............................20.00 ea
Extra ink bottle black...............3.00 ea pint black..............18.50 ea

Data Switches, manual or automatic

| 4 port 8 pin manual | 4.00 ea |
| 4 port automatic | 149.00 |
| 4 port 9 pin manual | 50.00 |
| cables | 16.00 |

Special Offer: Order for $40.00 or more and say "I saw it in MacUser" and get a free MacUser bobbin. Order for $100.00 or more and get a free key chain, bumper and flash light combined (a $15.00 value) or get an accurate electronic pedometer, jog and step meter with included calculator for $12.62.

Try then buy! Why take a chance?

MacUser

You pay a low trial fee for new, the balance only after you decide it's right. For over four years we've been helping people like you make intelligent buying decisions.

Ask about our new HyperCatalog with free bonus programs!

We have hundreds of other titles available for the Mac. If you don't see what you want... call us!

Data Switches, manual or automatic

| 16 port 8 pin manual | 149.00 |
| 16 port 9 pin manual | 149.00 |
| 16 port 8 pin plug chain | 4.00 ea |
| 16 port 9 pin plug chain | 4.00 ea |
| cables | 16.00 |

LightFax 9624

9600 b fax, 2400 b modem

High Speed Fax and 2400 baud modem in one compact unit. 9600 baud fax (fully Group 3 compatible) for fast transmission and lower telephone bills. Fax directly from your application or from text/graphic editors. Powerful software includes File Queuing, Scheduled Sending, Broadcasting, NameCard Data Management and much more. Free "Facts on Faxes" bulletin. LightFax 9624 includes Fax & Modem Software & cable. $399.00 LightFax 9624S (upgradable send-only version).............399.00

LightSpeed 9624E - 9600 b Modem

V.32 - MNP class 5

- 9600/4800/2400/1200 bps full duplex data transfer
- Fully Hayes compatible
- V.32/V.22bis/V22, Bell 212A
- Bell 103J compliant
- MNP class 5 error correction and data compression
- 4G proprietary protocols
- Throughput up to 19.2bps
- Auto speed detection
- Cable and software included

LightSpeed 9624E 9600 baud modem..............799.00 LightSpeed 2400 baud modem..............128.00

Order Toll Free 800-547-3303

In Oregon (503)626-2291

Computer Friends, Inc., 14250 NW Science Park Dr., Portland OR 97229
fax (503)637-7097 - telex 499599 CF - AppleLink DO 438

Please circle 32 on reader service card.
Unbelievable Quality
Unbeatable Price

Ricoh Laser 6000/PS
Postscript Laser Printer

• Adobe Postscript Version 50.5
• 35 Resident Fonts
• Letter, Legal, Envelopes, and European
• One Year Warranty with first 90 days on site

• Incredible Blacks and Clear Fine Lines
• Two Megabytes of RAM Expandable to Four Megabytes
• Optional Two Bin Automatic Paper Tray Available

Retail Price
$3,499:
Introductory Price
$2,495.
The Reasons You Should Buy From MacLand...

1. Price
Because of our multi-million dollar buying power, we purchase large volumes of quality hardware at low prices and pass the savings on to our customers.

2. Delivery
We offer Same Day Shipping on all in stock items if we receive your order by 3pm Mountain Standard Time. All credit card orders are shipped by FEDERAL EXPRESS STANDARD AIR service which means you get your merchandise fast!

3. Technical Support
MacLand has the best technical support, period. We provide you with technical support BEFORE AND AFTER your purchase. Best of all, to assure you the highest quality, our trained technicians test ALL hard disk drives for quality and viruses before we ship them to you.

---

## Externals

<table>
<thead>
<tr>
<th>Retail Price</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Megabyte</td>
<td></td>
</tr>
<tr>
<td>Cache Systems 20 40ms</td>
<td>$799</td>
</tr>
<tr>
<td>CMS Enhancements 20 32ms</td>
<td>$799</td>
</tr>
<tr>
<td>30 Megabyte</td>
<td></td>
</tr>
<tr>
<td>Cache Systems 30 28ms</td>
<td>$799</td>
</tr>
<tr>
<td>CMS Enhancements 30 32ms</td>
<td>$799</td>
</tr>
<tr>
<td>PowerDrive 30 40ms</td>
<td>$699</td>
</tr>
</tbody>
</table>

Quantum Hard Disk Drives
Industry leading Quantum quality, dependability and fast access speeds at affordable prices. Backed by our Two Year Warranty, all Quantum drives come complete with cables and software.

| 40 Megabyte |            |
| Cache Systems 45 28ms | $699 | $549 |
| CMS Enhancements 45 32ms | $999 | $568 |
| PowerDrive 45 40ms | $799 | $449 |
| Quantum 40 19ms (2 Year Warranty) | $999 | $579 |

| 60 Megabyte |            |
| Cache Systems 60 28ms | $999 | $579 |
| CMS Enhancements 60 40ms | $1,665 | $648 |
| PowerDrive 60 28ms | $699 | $539 |

| 80 Megabyte |            |
| Cache Systems 80 28ms | $1,499 | $679 |
| CMS Enhancements 61 28ms | $1,699 | $779 |
| PowerDrive 80 28ms | $1,699 | $568 |
| Quantum 80 19ms (2 Year Warranty) | $1,699 | $779 |

| 100-200 Megabyte |            |
| Cache Systems 150 150 | $2,499 | $1,299 |
| Cache Systems 150 150 | $2,499 | $1,299 |
| Tape 16ms | $3,299 | $1,599 |
| CMS Enhancements 170 18ms | $3,299 | $1,599 |
| Imprimis - MacWren 170 18ms | $2,699 | $1,499 |
| Quantum 105 19ms (2 Year Warranty) | $1,999 | $899 |
| Quantum 120 15ms (2 Year Warranty) | $2,499 | $1,099 |
| Quantum 170 15ms (2 Year Warranty) | $2,499 | $1,099 |
| PowerDrive 150 16ms | $2,499 | $1,099 |
| PowerDrive 200 19ms | $2,499 | $1,244 |
| Toshiba 105 25ms | $2,499 | $799 |

---

## SE, SE30 & llcx, llci Internals

| 30 Megabyte |            |
| Cache Systems 30 28ms | $649 | $375 |
| CMS Enhancements Pro 30 36ms | $649 | $399 |

| 40 Megabyte |            |
| Cache Systems 45 28ms | $615 | $449 |
| CMS Enhancements Pro 45 32ms | $625 | $469 |
| Quantum 40 19ms (2 Year Warranty) | $699 | $479 |

| 60 Megabyte |            |
| Cache Systems 60 28ms | $799 | $509 |
| CMS Enhancements Pro 60 40ms | $1,499 | $999 |

| 80 Megabyte |            |
| Cache Systems 80 28ms | $1,299 | $899 |
| CMS Enhancements Pro 80 28ms | $1,799 | $1,149 |
| Toshiba 105 25ms | $1,499 | $699 |

---

## Mac II & llX Internals

| 300-600 Megabyte |            |
| CMS Enhancements PD 300 16ms | $4,295 | $2,395 |
| CMS Enhancements PD 600 16ms | $5,645 | $3,499 |
| Imprimis - MacWren 300 16ms | $4,295 | $2,099 |
| Imprimis - MacWren Runner 320 10.7ms | $4,895 | $2,649 |
| PowerDrive 320 16ms | $8,499 | $1,799 |
| PowerDrive 600 16ms | $9,499 | $2,799 |

| 100-170 Megabyte |            |
| Quantum 80 19ms (2 Year Warranty) | $1,699 | $999 |
| Quantum 120 15ms (2 Year Warranty) | $2,099 | $999 |
| Quantum 170 15ms (2 Year Warranty) | $2,099 | $999 |
| Toshiba 105 25ms | $1,499 | $699 |

---

## Mac Hard Disk Drives

Hard disk drives, tape back ups, removable hard drives, high capacity drives, CMS has them all and we carry their full line.

| 40 Megabyte |            |
| Cache Systems 45 28ms | $699 | $449 |
| CMS Enhancements Pro 45 32ms | $669 | $469 |
| Quantum 40 19ms (2 Year Warranty) | $699 | $479 |

| 60 Megabyte |            |
| Cache Systems 60 28ms | $799 | $509 |
| CMS Enhancements Pro 60 40ms | $1,499 | $999 |

| 80 Megabyte |            |
| Cache Systems 80 28ms | $999 | $579 |
| CMS Enhancements Pro 80 28ms | $1,799 | $1,149 |
| Quantum 80 19ms (2 Year Warranty) | $1,799 | $699 |

| 100-170 Megabyte |            |
| Cache Systems 150 16ms | $1,499 | $899 |
| CMS Enhancements Pro 170 16ms | $2,099 | $1,299 |
| Quantum 105 19ms (2 Year Warranty) | $1,699 | $999 |
| Quantum 120 15ms (2 Year Warranty) | $2,099 | $999 |
| Quantum 170 15ms (2 Year Warranty) | $2,099 | $999 |
| Toshiba 105 25ms | $1,499 | $699 |

| 300-600 Megabyte |            |
| CMS Enhancements Pro 300 16ms | $4,995 | $2,195 |
| Imprimis - MacWren 300 16ms | $4,995 | $2,195 |
| Imprimis - MacWren Runner 320 10.7ms | $4,695 | $1,999 |
| PowerDrive 320 16ms | $8,499 | $2,499 |
| PowerDrive 600 16ms | $9,499 | $2,699 |
| CMS Enhancements Pro 600 16ms | $5,699 | $3,499 |

---

*For Ordering and Technical Support Call 1-800-333-3353 (FAX #602-345-2217)*

5006 South Ash Avenue, Suite 101 Tempe AZ 85282 (602) 820-5802
WARNING: Beware of money-back offers on hardware! MacLand sells only NEW, NEVER USED merchandise. We will not send you re-packaged, slightly-used hard disks.

<table>
<thead>
<tr>
<th>Erasable Optical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral Land 635 Optical 45ms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Printers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewlett Packard DeskWriter</td>
</tr>
<tr>
<td>Ricoh Ricoh PostScript Laser Printer</td>
</tr>
<tr>
<td>Qume Crystal Print Publisher</td>
</tr>
<tr>
<td>ScripTEN Postscript Printer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Removables/Tape Back-Ups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
</tr>
<tr>
<td>44 Megabyte Removables</td>
</tr>
<tr>
<td>Peripheral Land 44 25ms</td>
</tr>
<tr>
<td>PowerDrive 44 25ms</td>
</tr>
<tr>
<td>40-150 Megabyte Tape Back-Ups</td>
</tr>
<tr>
<td>CMS Enhancements 150</td>
</tr>
<tr>
<td>Irwin 40 Meg Tape</td>
</tr>
<tr>
<td>Irwin 80 Meg Tape</td>
</tr>
<tr>
<td>SyQuest Removable Cartridges (Will fit Any 44 Removable Drive)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory Upgrades</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacSnap 524</td>
</tr>
<tr>
<td>MacSnap 524E</td>
</tr>
<tr>
<td>MacSnap 524S</td>
</tr>
<tr>
<td>MacSnap 548</td>
</tr>
<tr>
<td>MacSnap 548E</td>
</tr>
<tr>
<td>MacSnap 548S</td>
</tr>
<tr>
<td>One Meg SIMMS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accelerator Boards</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacSprint II Cache Board</td>
</tr>
<tr>
<td>MaraThon 020 MSE 1</td>
</tr>
<tr>
<td>MaraThon 020 MSE 2 (1 Meg)</td>
</tr>
<tr>
<td>MaraThon 020 MSE 3 (Math Chip)</td>
</tr>
<tr>
<td>MaraThon 020 MSE 4</td>
</tr>
<tr>
<td>MaraThon 030 Accelerator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dove MacSnap Memory Upgrades and Accelerator Boards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need a memory upgrade for your Mac? Dove Computer's MacSnap line offers a variety for all models from 512 on up. Maybe you want to speed up your Mac. Dove's MaraThon accelerators are available for the SE, SE/30, II and IIx. And at these prices, MacLand makes it easy!</td>
</tr>
</tbody>
</table>
The Lowest Prices with Technical Support, Too!

**POWER UP.**

**POWERDrive**
Hard Disk Drive External Subsystems

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWERDrive 30</td>
<td>$399.</td>
</tr>
<tr>
<td>POWERDrive 45</td>
<td>$449.</td>
</tr>
<tr>
<td>POWERDrive 60</td>
<td>$539.</td>
</tr>
<tr>
<td>POWERDrive 80</td>
<td>$588.</td>
</tr>
<tr>
<td>POWERDrive 150</td>
<td>$1,096.</td>
</tr>
<tr>
<td>POWERDrive 200</td>
<td>$1,244.</td>
</tr>
<tr>
<td>POWERDrive 320</td>
<td>$1,796.</td>
</tr>
<tr>
<td>POWERDrive 600</td>
<td>$2,796.</td>
</tr>
<tr>
<td>POWERDrive 45 Removable</td>
<td>$749.</td>
</tr>
</tbody>
</table>

All units are factory-tested and pre-formatted for hassle-free setup. Each steel external case comes complete with power supply, cabling, Ontrack's "Disk Manager Mac" software and a comprehensive reference manual. Just POWER UP and Go!

### Scanners

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewlett Packard ScanJet</td>
<td>$2,695.</td>
</tr>
<tr>
<td>Microtek MS II Sheet Feed</td>
<td>$2,995.</td>
</tr>
<tr>
<td>Microtek MSF 300GS</td>
<td>$4,195.</td>
</tr>
<tr>
<td>Microtek MSF 400GS</td>
<td>$9,995.</td>
</tr>
<tr>
<td>Microtek MSF 300Z - Color</td>
<td>$2,995.</td>
</tr>
</tbody>
</table>

**Notes:**
Scanners are in stock. Call for ordering and technical support.

### Monitors

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Machines Z-21 SE</td>
<td>$2,295.</td>
</tr>
<tr>
<td>E-Machines Z-21 SE30/125</td>
<td>$2,295.</td>
</tr>
<tr>
<td>E-Machines Z-21 IQ Grayscale</td>
<td>$2,595.</td>
</tr>
<tr>
<td>E-Machines T-16 Color</td>
<td>$2,595.</td>
</tr>
<tr>
<td>E-Machines T-19 Color</td>
<td>$2,595.</td>
</tr>
</tbody>
</table>

**Note:**
RangerOps Color Monitors from RangerOps, the manufacturer of large screen color displays. Pre-test setup is included. Whether you require 8, 24 or 32 bit color, you can be assured the end result will be crystal clear high resolution images. Our prices include the card, cables and software. One year warranty.

### Fax Modems

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technicolor Fax Modem</td>
<td>$499.</td>
</tr>
<tr>
<td>Sigma ColorMax Trinitron</td>
<td>$2,399.</td>
</tr>
<tr>
<td>Sigma LaserView 19&quot; Mac II</td>
<td>$4,695.</td>
</tr>
<tr>
<td>Sigma SilverView 24&quot; 21&quot;</td>
<td>$2,099.</td>
</tr>
<tr>
<td>Sigma SilverView S8 21&quot; Mac II</td>
<td>$2,499.</td>
</tr>
<tr>
<td>Sony 1302 Color Monitor</td>
<td>$679.</td>
</tr>
<tr>
<td>Sony 1304 Color Monitor</td>
<td>$719.</td>
</tr>
</tbody>
</table>

**For Ordering and Technical Support Call 1-800-333-3353 (FAX #602-345-2217)**

5006 South Ash Avenue, Suite 101 Tempe AZ 85282 (602) 820-5802

Please circle 50 on reader service card.
1. Please indicate which of the following computers you currently use in your company or organization:
   (check all that apply)
   a) Mac Plus  b) Mac SE  c) Mac II
   d) IBM PC  e) Other

2. For how many micro computers do you buy products?
   a) 1-4  b) 5-9  c) 50+  
   d) 101-200  e) 201-300  f) 301-400  
   g) 401-500  h) 501-600  i) 601-700
   j) 701-800  k) 801-900  l) 901-1000

3. Your primary job function is:
   a) Administrative/General Management
   b) MIS/DC, Communications Systems, Programming
   c) Engineering/R&D
   d) Finance/Accounting
   e) Marketing/Sales
   f) Computer Dealer/VAR

4. For which of the following products are you involved in selecting brands/models to be bought by your company or organization?
   (Check all that apply)
   a) Accounting  b) Mainframe
   c) Spreadsheets/Financial Planners  d) PC
   e) Project Managers  f) Printers/Plotters
   g) Word Processors  h) Disk/Tape Back-up
   i) Database Managers  j) Add-in Boards
   k) Graphics  l) Communications

5. Are you involved in the purchasing of microcomputer equipment at your company?
   a) Yes  b) No

6. If so, what function do you serve in the buying process?
   a) Evaluation/Specification  b) Recommendation  c) Buyer/Purchaser

---

FREE INFORMATION
ON MACINTOSH PRODUCTS & SERVICES

IT'S AS EASY AS 1, 2, 3

1. Fill in your name and address and check off your answers to the six research questions. (One card per person, please.)

2. Circle the numbers on the card that correspond to the ads or articles you'd like more information about. (Numbers for advertised products are repeated in the Advertiser Index as well.)

3. The literature will be mailed to you from the advertiser free of charge.

---

PLEASE PRINT CLEARLY
MU 2002

Name__________________________

Phone ________________________

Company_______________________

Title__________________________

Address________________________

City __________________ State ______ Zip________

Please send me a one-year subscription to MacUser for $19.97. I'll save 44% off the newsstand price of $35.40. Annual basic subscription price is $27.00.
HOW TO STAY ON TOP OF WHAT'S IN THE MAC MARKET

USE THIS CARD TO OBTAIN FREE
INFORMATION ABOUT MACINTOSH PRODUCTS
AND SERVICES IN THIS ISSUE

(SEE OTHER SIDE)

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 33854 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE

MacUser
P.O. Box 40008
Philadelphia, PA 19106-9866

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 33854 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE

MacUser
P.O. Box 40008
Philadelphia, PA 19106-9866

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES
The next best thing to a portable Macintosh.

Author Danny Goodman calls the Liberty Portable Hard Disk “everything I hoped it would be: compact, lightweight, quiet, fast, and durable enough to ride with me in my briefcase to demonstrations and talks.”

With Liberty, you’re ready to work anywhere there’s a Mac. Use it to send large documents and graphics between locations. Create a multimedia show and take it on the road. Daisy-chain several drives together for expandable, instantly-accessible mass storage. There’s no end to the uses you’ll find for this small wonder.

The Liberty is the only portable with all the features you’d expect in a full-size drive: super-reliable, high performance Quantum and Conner drive mechanisms; a built-in power supply; and memory from 40 to 200 MB. Yet it measures only 2”x5”x7”, weighs under 3 pounds, and costs less than comparable full-size drives.

Once you spend a month with a Liberty portable hard disk, you’ll wonder how you got along without it.

Liberty Systems
The Affordable Portable
120 Saratoga Ave., Ste. 82, Santa Clara, CA 95051

Call us today for your free 30-day trial.
(408) 983-1127

Please circle 88 on reader service card.

When your surge protector fails will your insurance save you? SAFEWARE® computer insurance covers power surges, lightning, storms, theft, fire, accidental damage and more! Full replacement of hardware, media and purchased software for as little as $49 per year.

<table>
<thead>
<tr>
<th>Total Value, Hardware, Media &amp; Purchased Software</th>
<th>Annual Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to $2,000</td>
<td>$ 49</td>
</tr>
<tr>
<td>$ 2,001—$ 5,000</td>
<td>$ 89</td>
</tr>
<tr>
<td>$ 5,001—$ 10,000</td>
<td>$ 89</td>
</tr>
<tr>
<td>$ 10,01—$15,000</td>
<td>$109</td>
</tr>
<tr>
<td>$15,001—$20,000</td>
<td>$129</td>
</tr>
</tbody>
</table>

For immediate coverage, info. and rates on higher coverages, call 1-800-848-3469.

SAFEWARE®, The Insurance Agency Inc.
2929 N. High St., P.O. Box 8221, Columbus, OH 43230

Please circle 150 on reader service card.

Please circle 120 on reader service card.
Don’t get burned by high storage prices. Take CHARGE of your mass storage decisions! With POWERDrive you have the ability to choose a storage system that is perfect for your specific needs -- at a price that will shock you.

You’ve never had so many choices! Not only can you choose price and megabyte, but you can also decide which brand hard drive you prefer.

POWERDrives have been designed with the Mac user in mind. The sound-controlling metal case fits perfectly beneath your Mac, enabling you to conserve valuable desk space while elevating your Mac to a more comfortable viewing level. POWERDrive incorporates low heat production and an efficient air-flow cooling system that maintains a constant operating environment.

Another electrifying POWERDrive feature is simple installation. If you can plug a power cord into a wall socket and click your mouse three times, you can install a POWERDrive. Every POWERDrive includes a free copy of “Disk Mac” from Ontrack, a $69.95 value. Ontrack is the #1 producer of formatting software for DOS hard disks and is now a leading producer in the Macintosh arena.

Hard Drives International’s award winning service and low prices combined with POWERDrive’s outstanding engineering gives you a hot deal - not one that will burn you! So when it comes to making storage decisions, start with the obvious choice. POWERDrive.
The **POWER of Choice.**
If you don’t like it, we will configure your system solution!

**HARDWARE**

30-day money back **GUARANTEE**

No ifs, ands or buts, we want you to be happy with your purchase.

**SOFTWARE GUARANTEE**

If it doesn’t fit your needs, we will refund the purchase price minus the applicable trial fee. No hassles!

**OVERNIGHT DELIVERY AVAILABLE**

**Plus**

**INSTALLATION & TRAINING ... available anywhere in the U.S.**

**How To Order**

- Use our toll free number for ordering, tech support and free advice. The number applies in all 50 states as well as Puerto Rico and the Virgin Islands. If you prefer, we will also accept your order via FAX.
- We accept MasterCard and Visa with no surcharge.
- We charge your purchase when we ship your merchandise — **not before**!

**LEASING** is now available to qualified businesses. Call for details.

---

**SYSTEMS**

- Mac IIx B&W Full-Page System, 2Mb RAM, 46 Mb Hard Drive, Mac 101 Keyboard .............. 4950
- Mac IIx B&W Two-Page System, 2Mb RAM, 46 Mb Hard Drive, Mac 101 Keyboard .............. 5600
- Mac IIx 14" Trinitron 24-bit Color, 5Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard .......... 6650
- Mac IIx 19" Trinitron 8-bit Color, 5Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard .......... 9195
- Mac IIX 16" Trinitron 8-bit Color, 5Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard .......... 8750
- Mac IIX 19" Trinitron 8-bit Color, 5Mb RAM, 160 Mb Hard Drive, Mac 101 Keyboard .......... 10095
- Mac SE/30 14" Trinitron 24-bit Color, 5Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard ...... 6650
- Mac SE/30 System, 5Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard .....................4995
- Mac SE w/2-Floppy Drives, FP Display, 2.5Mb RAM, 46 Mb Hard Drive, Mac 101 Keyboard ...3550
- Mac SE w/2-Floppy Drives, 2.5Mb RAM, 46 Mb Hard Drive, Mac 101 Keyboard ..........3000

---

**SCANNERS**

- Lightning Scan .................. 459
- Microtek ScanStation 7500 .... 1129
- Microtek MS 300GS (256GB) .. 1649
- Microtek MS 400GS (256GB) .. 2959
- Microtek MS 302Z (Color) ...... 1979
- ScanMan ......................... 399
- Sharp JX 300 Color ..........3495
- Sharp JX 450 Color .......... 5695

**COMMUNICATIONS SOLUTIONS**

- Software
  - LapLink Mac .................. 84
  - MacLink Plus .................. 139
  - MacNet Starter Kit ........... 51
  - Microphone II ................ 225
  - QuickMail (10 Users) ....... 262
  - White Night .................. 81
  - Timbuddu ...................... 99
  - TOPS (Mac) ................. 149
- Hardware
  - Abatron InterFax ............ 329
  - Everex 3400 ................. 195
  - MacFax .................... 449
  - Practical Peripherals 2400 Bundle ........ 235
  - Prometheus 2400 Bundle .... 199
  - Prometheus 9600N Plus .... 765
  - Shiva NetModem 2400 ....... 459
  - SmartModem 2400M (Internal Mac II) ........ 459

**ACCELERATORS**

- AOX DoubleTime SE ............ 199
- Dive SE Marathon 802 .......... 419
- Macceler8te SCSI Acc ........... 469
- Orchid MacSprint ............... 245
- Radius 16SE w/68881 ........... 819
- Radius 25SE w/68882 ........... 1419
- SICLONE (w/68882) ............. 2850
- SmartModem 2400 ................ 3500
- 1 Megabyte SIMMS ................. Call

**OTHER PERIPHERALS**

**TARGUS PREMIUM CASES**

- IV II Case ...................... 49
- Mac Plus Case ................ 59

---

**UNINTERRUPTABLE POWER SUPPLIES**

- 330 XT ......................... 299
- 450 AT .......................... 379
- MinuteMan 300 ................ 429
- MinuteMan 600 ................. 695

**Deluxe Mac SE Ext. Keyboard Case**

$75

---

**When you need to return something . . .**

We are true pioneers when it comes to our return policy. In fact, we were the first company to offer returns. We offer a refund of the purchase price on all software except fonts, clip-art and special order items, minus the applicable trial fee (10-day minimum, plus 6 free days for shipping).

Unlike the competition, this offer covers over 1000 products, including those published by Microsoft, Aldus, Adobe, Ashton-Tate, Borland, Broderbund, Claris, Cricket, Letraset, WordPerfect, Mindscape and Caere.
MONITORS w/Cards

- E-Mach Z-21 IQ (GS) .......... 2795
- E-Mach Z-21 (Mac II) .......... 1995
- E-Machines Z-21 (SE) .......... 2049
- Radius Solutions .......... Call
- Sony 1304 .......... 1299

CALL! Other Monitors Available!

We specialize in high-end graphics work stations.
33 MHz Mac IIX with 19" RasterOps 12-bit Color System, SCSI Accel, 8 Mb RAM, 320 Mb Hard Drive, Mac 101 keyboard, 300 dpi 24-bit Color Scanner, 32-bit 11" x 17" Color Printer ...... 26,250

SOFTWARE THAT FITS™
P.O. Box 4028 • Humble, Texas 77347

1-800-972-3018 FAX 713-446-8499

Please circle 154 on reader service card.
## AMERICA'S SOURCE

### UPGRADeS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1MB SIMM's 70 ns, 80 ns, 100 ns</td>
<td>$89</td>
</tr>
<tr>
<td>4MB SIMM's</td>
<td>$499</td>
</tr>
<tr>
<td>Available now: Lifetime Manufacturer's Warranty!</td>
<td></td>
</tr>
<tr>
<td>256K SIMM's</td>
<td>$24</td>
</tr>
<tr>
<td>Magic SCSI</td>
<td>$69</td>
</tr>
<tr>
<td>128K-512K Upgrade</td>
<td>$149</td>
</tr>
<tr>
<td>128K-1024K Upgrade</td>
<td>$295</td>
</tr>
<tr>
<td>512K-1024 Upgrade</td>
<td>$149</td>
</tr>
<tr>
<td>800K Drive and ROM's</td>
<td>$299</td>
</tr>
<tr>
<td>SE/30 Upgrade</td>
<td>$1399</td>
</tr>
</tbody>
</table>

### DISPLAY SOLUTIONS

19" B&h Monitor - 2 Page Display: 72 dpi, 78 hz. Includes card for +, SE, SE/30, II, IIx, Iicx...
13" & 14" 100% Apple Compatible 8 bit color card...
13" 8 bit color card for SE/30...
19" 8 bit color card for Mac II series...
19" 32 bit color card Mac II series...

### MAGICNet

100% Flash Box, Phone Net, Local Talk compatible. 19.00

### MAGICMODEM

100% Hayes Compatible - Auto Dial/Auto Answer
2400/1200/300 Baud - 2-Year Warranty...
White Knight (Red Ryder 11.0)...

### MAGIC DRIVE/MAGIC TAPE

<table>
<thead>
<tr>
<th>Feature</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 mb Tape Backup</td>
<td>$695</td>
</tr>
<tr>
<td>150 mb Tape Backup</td>
<td>$895</td>
</tr>
<tr>
<td>1.2 gig Tape Backup</td>
<td>$2995</td>
</tr>
<tr>
<td>2.3 gig Tape Backup</td>
<td>$3995</td>
</tr>
<tr>
<td>100 mb CDC</td>
<td>$850</td>
</tr>
<tr>
<td>150 mb CDC</td>
<td>$1395</td>
</tr>
<tr>
<td>200 mb CDC</td>
<td>$1995</td>
</tr>
<tr>
<td>300 mb CDC</td>
<td>$2150</td>
</tr>
<tr>
<td>600 mb CDC</td>
<td>$2800</td>
</tr>
<tr>
<td>600 mb Read/Write</td>
<td>$2950</td>
</tr>
<tr>
<td>Optical Drive</td>
<td>$3395</td>
</tr>
</tbody>
</table>

### ACCELERATORS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 mb 68030 +, SE</td>
<td>$599</td>
</tr>
<tr>
<td>25 mb 68030 +, SE</td>
<td>$999</td>
</tr>
<tr>
<td>16 mb 68020 SE</td>
<td>$499</td>
</tr>
<tr>
<td>25 mb 68020 SE</td>
<td>$895</td>
</tr>
<tr>
<td>68881, 68882 Co Processors</td>
<td>$125/$199</td>
</tr>
<tr>
<td>PMMU - 68851</td>
<td>$149</td>
</tr>
</tbody>
</table>

### SMARTCACHE

- SCSI Disk Cache
- Cuts 30-50% off the access time of any SCSI hard drive
- Tracks your history and optimizes using 64 caching algorithms
- Write through cache for maximum data integrity

### ACCELERATORS

020/030

<table>
<thead>
<tr>
<th>Feature</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 mb 68030 +, SE</td>
<td>$599</td>
</tr>
<tr>
<td>25 mb 68030 +, SE</td>
<td>$999</td>
</tr>
<tr>
<td>16 mb 68020 SE</td>
<td>$499</td>
</tr>
<tr>
<td>25 mb 68020 SE</td>
<td>$895</td>
</tr>
</tbody>
</table>

### MAGICDRIVE/MAGICTAPE

Available Now Call For More Info Run System 7 on 512, Mac+, SE

MacProducts USA

8303 Mopac Expressway • Suite 218 • Austin, Texas 78759 • USA • 1-800-622-3475

1-800-MAC-DISK
### HARDWARE
- Bar Code: 299
- Communications: 299
- Computer Systems: 299-301
- Data Acquisition: 301
- Disk Drives: 301
- Diskettes: 301-302
- Engineering: 302
- General: 302
- Insurance: 302
- Memory Upgrades: 302-304
- Peripherals: 304-305
- Printers: 305
- Security: 305

### SOFTWARE
- Accounting: 305
- Back-Up: 305
- Bar Code: 305
- Business: 306
- Business Time Management: 306
- Desktop Publishing: 306-307
- Educational: 307
- Emulation: 307
- Engineering: 307
- Entertainment/Games: 307-308
- Fonts: 308
- Fund Raising: 308
- Genealogy: 308
- General: 308
- Graphics: 308-309
- Language Tools: 309
- Mental Arts: 309
- Music/MIDI: 309
- Public Domain: 309
- Religion: 310
- Shareware: 310
- Stackware: 310-311
- Statistics: 311
- Taxes: 311
- Utilities: 311

### MISCELLANEOUS
- Accessories: 311-312
- Business Opportunities: 312
- Data Conversion Services: 312
- Desktop Publishing Services: 312-313
- Insurance: 313
- Supplies: 313

### ADVERTISING RATES AND INFORMATION
*MacUser Marketplace* is a special economical section for product and service listings. Advertisements are grouped by category and sold by column inches. Second color option available. Standard Directory Listings are also available for a minimum of 3 issues at $375.00 per issue ($1,125.00 total).

For additional information call 212-503-5115.

### CLASSIFIED ADVERTISING STAFF

<table>
<thead>
<tr>
<th>Group Advertising Director</th>
<th>Sales Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kathryn J. Cumberlander</td>
<td>Ron Kost</td>
</tr>
<tr>
<td>Daniel L. Rosensweig</td>
<td>Wanda D. Brown</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Production Director</th>
<th>Advertising Support Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anne R. Brockinton</td>
<td>Monica Dixon</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Production Manager</th>
<th>Sr. Production Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carolynn Bingham</td>
<td>Bessi Dion</td>
</tr>
</tbody>
</table>

### ACCOUNT MANAGERS

<table>
<thead>
<tr>
<th>DENNIS M. LEAVEY (212) 503-5111</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK, AL, AR, CO, CT, GA, IA, IL, IN, KS, KY, LA, MN, MS, NB, ND, NM, OH, OK, OR, SD, TN, VA, CA (ZIPS 93000 &amp; UP), CANADA EXCLUDING BRITISH COLUMBIA, ALL OVERSEAS</td>
</tr>
<tr>
<td>C. WESLEY WALTON (212) 503-5136</td>
</tr>
<tr>
<td>AZ, FL, MA, MD, MI, MO, NJ, NC, NV, NY, TX, UT, VT, WA, WI, CANADA (ONLY BRITISH COLUMBIA)</td>
</tr>
<tr>
<td>KAREN A. CASTORINO (212) 503-5140</td>
</tr>
<tr>
<td>DC, DE, HI, ID, ME, MT, NH, RI, PA, SC, WV, WY, CA (ZIPS 92999 &amp; DOWN)</td>
</tr>
</tbody>
</table>
**Absolutely the Lowest Prices Anywhere**

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macintosh Plus</td>
<td>$1195</td>
</tr>
<tr>
<td>Macintosh IIcx (4/80)</td>
<td>$4595</td>
</tr>
<tr>
<td>Macintosh SE 1.44 (1/80)</td>
<td>$2695</td>
</tr>
<tr>
<td>Macintosh IIcx (4/105)</td>
<td>$4795</td>
</tr>
<tr>
<td>Macintosh SE 1.44(1/105)</td>
<td>$2895</td>
</tr>
<tr>
<td>Macintosh IIc (4/80)</td>
<td>$5595</td>
</tr>
<tr>
<td>Macintosh SE/30 (4/80)</td>
<td>$3995</td>
</tr>
</tbody>
</table>

All items are configured with Quantum hard drives backed by a two year warranty. Other configurations are available. Call today!

**Discount Technologies**
2486 Channing Way • Berkeley • CA 94704
(415) 649-9003

**DATA**
Computer Ctr
Tel (213) 470-9555 Fax (213) 470-9457
2053 Westwood Blvd, L.A. CA 90064

**Macintosh COMPUTER PACKAGES**
SE- Mac IIs - Laser Printers
Hard Drives - Monitors - Scanners
CALL FOR FULL SYSTEM PACKAGES PRICING TODAY!

**DISCOUNT MACINTOSH**

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac Plus ...........</td>
<td>$1295</td>
</tr>
<tr>
<td>Mac SE 2 drive ....</td>
<td>$1995</td>
</tr>
<tr>
<td>Mac SE 40mb ........</td>
<td>$2395</td>
</tr>
<tr>
<td>Mac Portable 40mb...</td>
<td>$4995</td>
</tr>
<tr>
<td>Mac SE30 40/2mb ....</td>
<td>$3495</td>
</tr>
<tr>
<td>Mac SE30 80/4mb ....</td>
<td>$4395</td>
</tr>
<tr>
<td>Mac IIc/IIcx 40mb ...</td>
<td>$3995</td>
</tr>
<tr>
<td>Mac IIc/IIcx 80/4mb</td>
<td>$4695</td>
</tr>
<tr>
<td>Mac IIc 40/2mb ....</td>
<td>$4995</td>
</tr>
<tr>
<td>Mac IIc 80/4mb ....</td>
<td>$5895</td>
</tr>
<tr>
<td>Apple Color monitor</td>
<td>$725</td>
</tr>
<tr>
<td>Apple 8 bit video card</td>
<td>$480</td>
</tr>
<tr>
<td>Apple ox: keyboard</td>
<td>$125</td>
</tr>
<tr>
<td>Imagewriter II ....</td>
<td>$450</td>
</tr>
<tr>
<td>Laserwriter NT ......</td>
<td>$3545</td>
</tr>
<tr>
<td>Laserwriter NTX ....</td>
<td>$4795</td>
</tr>
<tr>
<td>H.P. Deskwriter ...</td>
<td>$845</td>
</tr>
</tbody>
</table>

All items new, 90 day warranty.
Most items in stock today.
Visa and Mastercard add 2%.

**KIWI COMPUTERS**
P.O. Box 67381
Los Angeles CA 90067
(213) 553-4507
Fax (213) 286-9857

**COMPUTER SYSTEMS**

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacPlus w/ 1MB RAM, 20MB internal Hard Disk, (already includes keyboard and mouse)</td>
<td><strong>$1799</strong></td>
</tr>
</tbody>
</table>

**Bar Code Reader for Macintosh Plus, SE, II**
PC-WEDGE II ........ $309

- Works with any program - no software required
- Connects to keyboard or computer
- Recognizes bar code type automatically
- Reads all standard bar code types
- Supports full ASCII, digits, on-off, on-off, preambles, postambles, macros, and more
- Automatic setup from bar code menu
- 2 year warranty

TimeKeeping Systems, Inc.
1306 W East 550th Street • Cleveland, OH 44103
Phone: (216) 361-9995 • Fax: (216) 361-0030

**Magnetic Stripe Readers**
FOR MACINTOSH PLUS, SE & II
Connects on keyboard or ADB
Requires no additional program or port
Does not affect keyboard or mouse
Industrial quality, heavy-duty units
Also available
- Magnetic encoder
- Code & 39 UPC Printing Software
- Portable Bar Code Reader

**Communications**

- WARNING: Modems, fax, answering machines, solid-state phones on phone lines & Macs & other computers on twisted-pair RJ11 nets can be seriously damaged by voltage spikes. Surge will help protect your valuable equipment. Don't be fooled by the low cost, surge is high quality & made in USA $17 prep VA + 4.5%
- Museum Quality Solutions, Inc.
P.O. Box 1893
Norfolk, VA 23501
(804) 474-9939 Orders

**MacUser Marketplace**
To place your ad call
(212) 503-5115 or (800) 825-4ADS

**Mac User** February 1990 299
## Publisher System:
- Mac II CX, 5MB, 40MB HD
- Ext. Keyboard & Mouse
- RasterOps 19” Clearvue
- Laserwriter II NTX
- Apple Scanner
- SCSI scanner cable

**Retail**
- **$18,170**

**Mac•In•Stock**
- **$13,057**

## Executive System
- Macintosh SE/30
- 2MB RAM, 1.44 FDHD
- Apple 40MB Hard Disk
- Ext. Keyboard & Mouse
- H-P Deskwriter & Cable
- Microsoft Word & Excel

**Retail**
- **$7,712**

**Mac•In•Stock**
- **Only $5,153**

## 24-Bit Color System!
- Mac II CX, 8MB, 80MB HD
- Ext. Keyboard & Mouse
- Apple 13” Color Monitor
- RasterOps 24-bit Card
- Microtek Color Scanner
- Photomac, SuperPaint
- Digital Darkroom

**Retail**
- **$13,986**

**Mac•In•Stock**
- **Only $9,183**

## New Mac CPUs
- Mac Plus
- SE Dual 1.44
- SE 20MB
- SE/30, 40MB
- SE/30, 80MB
- II CX, 40MB
- II CX, 80MB
- II CI, 40MB
- II CI, 80MB

**Prices**
- $1,295
- $2,069
- $2,495
- $3,499
- $4,725
- $3,869
- $5,089
- $5,229
- $6,499

## Rodime Hard Drives!
- 45mb to 215mb Cobras®!
- Internal or External! From $699.
- 1-yr. Warranty. Free Fastback!

## Microsoft Specials!
- Works: $199
- Word: $219
- Excel: $229

(Hurry - While Supplies Last)

## Memory Upgrades
- 2-Yr. Warranty
- 1MB, 100ns $109
- 1MB, 80ns $129
- 256KB, 100ns $35
- 256KB, 80ns $39
- Laserwriter II NTX 1M Kit $279
- Laserwriter II NTX 4M Kit $749

## Monitors & Video
- 13” Color $719; 8-bit Card $469
- 15” Color $869; 8-bit Card $529

## Printers
- Imagewriter II $437
- Laserwriter II NT $3,539
- Laserwriter II NTX $5,039

## Win A Mac Portable!
Order now, (or just check our box on the reader service card in this magazine) and you’re automatically entered to win!

## Contest Rules
Limit one entry. You must be 18 or older to win. Drawing held 1-19-89. Winner will be notified by telephone.

TERMS: Personal or business checks. Leasing available for qualified businesses. COD-cashier’s check accepted at additional charge. Shipments by UPS or FedEx. F.O.B. El Segundo, CA residents add sales tax. Prices subject to change without notice. WARRANTY: Same as Apple (although we are not an authorized Apple dealer). We will repair or replace at our expense.

Call Now! Toll-Free: 800-633-1538
USED MACS

- BEST PRICE
- BEST QUALITY
- BEST SELECTION
Call: 1-800-441-3278

MACS-IMIZER

QUALITY PRICE SERVICE

All models come with the Macs-Imizer 90 day warranty and DOD replacement policy!

CIRCLE 210 ON READER SERVICE CARD

DATA ACQUISITION

Data Acquisition & Analysis
Complete hardware and software solutions. Analysis software, Signal conditioning modules, A friendly, knowledgeable technical staff can guide you with proven solutions in Industrial, Scientific, Engineering and Lab environments. Call or write for a free catalog and price list.
BIPAC Systems
5900 Mandarin Dr. --- STE DS
Goliota, CA 93117
(805)967-6615

CIRCLE 211 ON READER SERVICE CARD

DISK DRIVES

The Lowest Prices On
CAI External SCSI
Hard Disk Drives

Seagate 1 Year Warranty

- Fully Tested
- And "Burned-In"
- Complete With Cables, Manual,
- HD Prepare Software
- With True Partitioning
- Zero Footprint
- Metal Case
- Twin SCSI Ports
- LED Busy Light

35-Day Money Back
Guarantee
1 Year Warranty

Quantum 2 Year Warranty

- Fully Tested
- And "Burned-In"
- Complete With Cables, Manual,
- HD Prepare Software
- With True Partitioning
- Zero Footprint
- Metal Case
- Twin SCSI Ports
- LED Busy Light

35-Day Money Back
Guarantee
2 Year Warranty

Seagate

- 20 Meg $389
- 30 Meg $439
- 40 Meg $559
- 80 Meg $769
- 100 Meg $859

Software Selectable SCSI ID

CIRCLE 212 ON READER SERVICE CARD

DISKETTES

Reclaims Desk from Disks
The VDS 240
- Metal Desk Frame
- Strong Shelf Supports
- Large Desk Space

To Order: 1-800-942-4008

CIRCLE 308 ON READER SERVICE CARD

CIRCLE 211 ON READER SERVICE CARD

COMPUTER SYSTEMS

IBM PS/2 502, 70, 80
Compaq Deskpro 386, 386E, Portable III, SLT/286
Macintosh SE, SE/30, Mac IICx
Apple Laser Writer NT, NTX
H P LaserJet Series II

800-622-3384

Seagate

- 20 Meg $389
- 30 Meg $439
- 40 Meg $559
- 80 Meg $769
- 100 Meg $859

Software Selectable SCSI ID

CIRCLE 212 ON READER SERVICE CARD

800-288-8025

800-422-8591-919-7464961

CIRCLE 213 ON READER SERVICE CARD

DISKETTES

category continued
on next page.
Sony® 3.5" DS/DD
(1.0 MB) Diskettes - 50 Pack
(Sony On The Shuttr)
SAH: $4.00, first 100 or fewer disks.
$3.50, each addl. 100 or fewer disks.

3.5" Disk Storage Case
(50ct: $1.00 per Storage Case)

FREE DISKETTES

FREE DISKETTES

IEEE 488 Interfaces
Mac488 + NuBus IEEE board for Mac!
MacSCSI488 + SCSI/IEEE controller
Mac488B + SerialIEEE controller
MacSerial488 + IEEE plotter interface
MacDAS488 + IEEE disk accessory
MacDriver488 + IEEE language driver

Call or send for your FREE Technical Guide
(216) 439-4091

Toll Free: 800-258-0028

New Lower Prices

3.5" DS/DD White
3.5" DSHD White
3.5" DSHD

USER LA DES B .00 FOR

INSURES YOUR COMPUTER
SAFEWARE provides full replacement of hard­
ware, media and purchased software. As low as
$49 a year provides comprehensive coverage.
Thief, fire, power surge, storms and more. No
lists of equipment are needed. One call does it
all! Call 8am to 10pm ET (Sat. 9 to 5).
SAFEWARE, THE INSURANCE AGENCY INC.
2929 N. High St. P.O. Box 0211
Columbus, OH 43202
(800) 848-3469 (NAT) or
(614) 202-0559 (OH)

MacUser Marketplace
To place your ad
Call (212) 503-5115 or
(800) 825-4ADS

MacUser Marketplace

MEMORY UPGRADES

If You Put Quality Before Price . . .
You need TEKCAP SIMMS®

Sony® 3.5" DS/DD

3.5" DS/DD BULK .60
3.5" DSHD 2.00

3.5" DSHD 2.00

Mac Parts/SystemS!

Power supplies • 800K drives • Logic boards
Genuine Apple parts • 90 day limited warranty
Special program for dealers & service companies
• 24 hour turn-around!
• Call now for a catalog:
(800) 274-5343

Pre-Owned Electronics, Inc.

Toll Free (800) 891-6851/Fax: (617) 891-3556

Mac Parts-CALL!

WE WILL BEAT ANYONE'S PRICE
CALL

1-800-227-3971

We Buy, Sell, Trade & Upgrade!

ACCU-SIMMS

ACCU-SIMMS

...We manufacture our own SIMMS and guarantee
them for life. Add dependable memory from
someone who can back them up with support.
Call for latest price. as prices change so fast.

15 Union Street
Lawrence, MA 01840
(508) 683-2325 in MA. Fax (508) 975-5232

ACCU-SIMMS

ACCU-SIMMS

ACCU-SIMMS

ACCU-SIMMS

$100 per meg or lower. We've been in the
memory business for 25 years. Call Toll
Free 1-800-662-SIMM.

ACCU-SIMMS

ACCU-SIMMS

ACCU-SIMMS

ACCU-SIMMS
MEMORY UPGRADES

LOWEST PRICE!!!

- 1 Meg Module
- 4 Meg Module
- IINT/NTX Module
- Laptop Module
- Lifetime Warranty
- 30 Day Money Back Guarantee
- Credit Cards & Personal Checks

FREE Installation Kits

(800) 622-2210

PO FAX: (512) 794-8520
Same day shipping

SIMMS... Your Way

Resellers
WE BUILD SIMMs...
Control your SIMM pricing
you supply the RAM-
we do the rest!
Call For Pricing

End users
BUY DIRECT & SAVE
One Meg SIMMs in stock
Available immediately
Fits All MACs
Money Back Guarantee
Lifetime Warranty

MICRO ELECTRONIC TECHNOLOGIES, INC. 800-766-SIMM
35 South Street, Hopkinton, MA 01748
FAX: (508) 435-6481

Apple Memory Upgrades

Macintosh

Kelly Micro Systems, Inc.
(800)350-3900

SOUTH COAST ELECTRONICS
10920 Wilshire Blvd, Suite 1100
Los Angeles, CA 90024
213-208-3260 Fax 213-208-3282
800-289-8801

FREE Installation Kits

(800) 622-2210

PO FAX: (512) 794-8520
Same day shipping

SIMMS... Your Way

Resellers
WE BUILD SIMMs...
Control your SIMM pricing
you supply the RAM-
we do the rest!
Call For Pricing

End users
BUY DIRECT & SAVE
One Meg SIMMs in stock
Available immediately
Fits All MACs
Money Back Guarantee
Lifetime Warranty

MICRO ELECTRONIC TECHNOLOGIES, INC. 800-766-SIMM
35 South Street, Hopkinton, MA 01748
FAX: (508) 435-6481

Apple Memory Upgrades

Macintosh

Kelly Micro Systems, Inc.
(800)350-3900
MEMORY UPGRADES

Mac Rescue™ for the Classic Mac

Some “experts” are telling us to trash out the 128K and 512K Macs. Don't do it! Classic Macs are far from moribund. Computer Core developed Mac Rescue, a daughter board that snaps on the enhanced Classic Mac motherboard. No need to fold, spindle or mutilate. Installs in minutes to get Mac Plus functionality.

Mac Rescue has 6 SIMM slots so you can upgrade the Classics to 1 meg, 2 megs, 2.5 megs or 4 megs of RAM.

It also has a SCSI port to breathe even more life into your faithful servant.

Limited time offer: We'll buy back your old-fashioned expansion boards when you order Mac Rescue, call for exact price quote.

Ford Centre, Suite 1180, 420 North Fifth St. Minneapolis, MN 55401 (812) 371-0061 (800) 950-CARE (2273)

Dealer inquiries welcome. Visa/MC accepted.

MacUser Marketplace is a special economical section for product and service listings.

256K 1 MEG 4 MEG

* Lowest Prices Possible
* Unconditional Lifetime Warranty
* In Stock / Same Day Shipping
* VISA MC CODs
* Educational and Corporate POSs

505-294-2007

RAM

Haven't you waited long enough?

Upgrade your Mac Plus, SE or II with 1 megabyte SIMMs modules. Low-profile and EDP mounted SIMMs available in 128K and faster. Call for current price. We are the lowest.

Hardware House 1-800-RAM-4MAC

MEMORY

1 Meg & 256K SIMMs

Nation's $LOWEST

Highest quality • Lifetime warranty •

505-294-2007

PERIPHERALS

Do More! Call for pricing on QUALITY Memory! 800-542-7466

...with SIMMs in your Mac.

Free Opening Kit with order. MIlchtech Opening Kit includes all tools needed. Separately for $19.95

Included: 60 W/ B. P.S., 32, External Cables, 2 External Connectors for Daisy Chain, Hour pro-sell for all add-on software. For your convenience the drives come formatted:

PRICES REFLECT CASH DISCOUNT PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

McDonald & Associates

Mac User Marketplace is a special economical section for product and service listings.
PERIPHERALS

SCAN MAN
Complete Scanner
for Macintosh*
Plus, SE, II
$399.95
Includes:
* SCSI Interface
* Heavy Duty Power Supply
* Optional Formatting Software

Scanner & OCR
$529.95
Includes:
* Zero Foot Print Case
* Adaptable for 5/8" or 3/4" SCSI Drive
* Heavy Duty Power Supply
* Internal SCSI Cabling
* External SCSI Cabling
* Optional Formatting Software

Mac-True
Hard Drive Case
$149.95
External Hard Drive Kits
For Macintosh Plus SE & II configurable
20 MB 40 MB 60 MB 80 MB 120 MB
$375.95 $439.95 $489.95 $549.95 $725.95

TRUE DATA PRODUCTS
115 So Main Street
Uxbridge, MA 01569
Tel. 508-278-6555
1-800-635-0300

CIRCLE 236 ON READER SERVICE CARD

SOFTWARE/ACCOUNTING

MacUser Marketplace
To place your ad
Call (212) 503-5115 or (800) 825-4ADS

POINT OF SALE & BILLING
P.O. Box 39160
Tallahassee, FL 32315
(904) 222-8808

BACK-UP
Auto-Backup, Auto-Save... While You Work!

SHADOW
Shadow works automatically in the background. Just set it and forget it!

Automatic Save: Saves your documents at an interval you specify.
Automatic Backup: Shadow periodically copies the documents that have changed since they were last backed up. Shadow can back up onto any floppy, hard or removable disk, network server or Finder-mountable tape drive.

Introductory Price: Only $49.95 (+ $3 S&H)
Orders: 800/999-4649 Info: 617/266-7858
Natural Intelligence, Inc. 86 Richdale Ave., Cambridge, MA 02140
CIRCLE 237 ON READER SERVICE CARD

BAR CODE

Print Bar Codes Yourself.

PrintBar Fonts for Macintosh are easy to install and print to ImageWriters or PostScript® printers (including Linotronic). The fonts work with any Mac program that has a font menu.

Volume I Code 39.............. ImageWriter, LaserWriter
Volume II UPC-A(E), EAN-13(6)........ LaserWriter, Linotronic
Volume III Interleaved 2 of 5.............. ImageWriter, LaserWriter

Call for information
916-622-4640 Fax 916-622-4775

Bear Rock
6069 Enterprise Drive • Diamond Springs, CA 95619
CIRCLE 238 ON READER SERVICE CARD

SOFTWARE/COUNTING

PRINTERS

APPLE DAISYWHEEL PRINTER

SECURITY

Mac Lock/Mac Cables
Mac Lock, fixed security kit for Mac II, SE. Mac II secures Mac, keyboard, mouse, 2nd drive, modem, & printer. Attractive red vinyl-covered steel 3-1/2" cables. Lock included. No tools req., "B"-back guarantee. Also, all IBM, Apple II, $49.95. Mac Cables provide any length custom cables for any computer need. MAC PRODUCTS
20221 San Gabriel Valley Dr. Walnut, CA 91789 (714) 395-8438

Validating Mac Cables
Directly secures Macs to PS/2 Keyboards, Modems, etc. Keyed Locking. Also available long computer cables. Computer Locks, Inc. 36336 Mowbray Rd. Suite 100, Laguna Niguel, CA 92653 (714)242-5090

PrintBar Fonts for Macintosh are easy to install and print to ImageWriters or PostScript® printers (including Linotronic). The fonts work with any Mac program that has a font menu.

Volume I Code 39.............. ImageWriter, LaserWriter
Volume II UPC-A(E), EAN-13(6)........ LaserWriter, Linotronic
Volume III Interleaved 2 of 5.............. ImageWriter, LaserWriter

Call for information
916-622-4640 Fax 916-622-4775

Bear Rock
6069 Enterprise Drive • Diamond Springs, CA 95619
CIRCLE 239 ON READER SERVICE CARD
BUSINESS

Spreadsheet Business Solutions

"A powerful and practical tool for solving real-world business problems..."

Tim Byns's Business Plan Toolkit, MacUser's best of its type in December '89 issue. "Excellent manual" plus FlexiCard SIMO spreadsheet tools for a complete plan with linked sales and personnel forecasts, cash flows, financial projections, even task tracking and follow-through. Includes a HyperCard stack for test and a sample business plan for $99.95, shipping and handling included.

The new version, 2.0, of our Sales and Market Forecasting Toolkit now includes our unique Forecast spreadsheet add-on for graphic forecasting plus dozens of Excel or SYLK models and an excellent manual explaining professional forecasting techniques. $129.95 + s/h.

Call (800) 336-5544
Calif (415) 325-3190
Palo Alto Software
260 Sheldon Ave., Suite 219
Palo Alto, CA 94306

CIRCLE 240 ON READER SERVICE CARD

RMS Plus™ Restaurant Management System

Inventory Control
Menu Management
Purchase Order
Accounts Payable
Accounts Receivable
Restaurant Payroll
General Ledger

30-Day Money-Back Guarantee

Sargent: Corporation
3518 27th Parkwy
San Antonio, TX 78213
(800) 262-6665

CIRCLE 241 ON READER SERVICE CARD

ORGANIZER +
30 DAY MONEY-BACK GUARANTEE

Manage your: Features include:
- Clients & Contacts
- Full Import & Export
- Phone logs
- Print Calendars
- Apointments
- Labels & Envelopes
- To Do lists
- Form letters
- Projects
- Contact history
- Notes
- Links between files,
- Documents
- clients, calendar.

only $79.95 plus s/h

VISA & MasterCard accepted

Dazzi 2 Chandler Court Columbia, MO 65201

314-874-8657

CIRCLE 242 ON READER SERVICE CARD

Save Time and Money with Mail Rater

Call (617) 292-6404

Mail Rater

$59.00 EA •3 for $179 • Plus COD

Next Generation Business Systems
Ste 343 IOS Charcs SL
Boston, MA 02114

CIRCLE 243 ON READER SERVICE CARD

MacUser Marketplace

Standard directory listings available for a minimum of 3 issues at $375.00 per issue ($1,125.00 total).

MacPhonebook™

MANAGE YOUR NAMES AND NUMBERS THE EASY WAY...

Prints Labels
Pocketbook
Checkbook
Quickbook
Little Book
Big Book

MacPhonebook™, 2.0 prints names, addresses and phone numbers in three convenient sizes. Also prints labels! Import/Export lists from other sources. Keeps a database of 1600 names by categories you define. Even dials telephone!

$79.95 + $3 s/h (NY add tax)
Call Toll Free 800-447-9639
VISA, MCA, AMEX
692 10th St. Sanlly 1133 SYLEX

CIRCLE 246 ON READER SERVICE CARD

ENDS

DESKTOP PUBLISHING

Automatic Kerning for Desktop Publishing

LettTuck+

Gives you total control over intercharacter spacing...no guesswork. See the kerning before final output. Works with all printers and high-resolution output devices.

Fully Compatible with Xerox Ventura Publisher, Aldus PageMaker (Mac), Quark XPRESS, Ready Set Go, others.

Includes 24 complete PostScript Kern Sets for the Most Utilized Fonts

For PC or Macintosh
$147 Each $197 both

30-Day Money-Back Guarantee

EDCO Services, Inc.
12443 141 St. Delray-Boca Raton, FL 33484
Phone 813-962-7800, Fax 813-960-2355

CIRCLE 249 ON READER SERVICE CARD

POSTSCRIPT LASER FONTS

ARABIC $99
CYRILLIC $149
GREEK 99
HEBREW 119
IPA 99
KOREAN 119
TECH 99
THAI 79
VIETNAMESE 99

MacKANJI 60.0 99

MacCHINESE MANDARIN CANTON $99
GREEK NT, MOTORIZREDHEBREW BIBLE $99
LINGUIST'S SOFTWARE
200 LANGUAGES (206) 775-1130

CIRCLE 250 ON READER SERVICE CARD

BUSINESS TIME MANAGEMENT

SMART ALARMS™
& APPOINTMENT DIARIES™

Personal & Office Scheduling System

$99

Single and Multi-User Versions

Upgrades Available

by JAM Software
Box 1345, Pt. Reyes Sta, CA 94956 (415) 663-1041

27A Norrie St., Sumner Hill NSW 210. AUS (61) 2) 799-1888

CIRCLE 251 ON READER SERVICE CARD

306 February 1990 MacUser
EDUCATIONAL

THE COURSE BUILDER SERIES

Now in 3rd release and in color! Visual authoring languages that allow you to create stand-alone courseware for teaching, training and testing. Powerful built-in features include drawing, painting, animation, voice, music, grading, intelligent branching and video interface. $10 demo disks available.

TELEROBOTIC INTERNATIONAL, INC.

7325 Oak Ridge Highway, Ste. 104
Knoxville, TN 37912
(615) 590-5500

B.S., M.S., in Computer Science

The American Institute for Computer Science

offers an in depth correspondence program to earn your B.S. and M.S. degrees in Computer Science at home. B.S. subjects covered are: MS/DEG. BASIC, PASCAL. C. Data File Processing, Data Structures & Operating systems. Program includes subjects in Software Engineering and A.I.

AMERICAN INST. for COMPUTER SCIENCES

1704-MU 11th Avenue South
Birmingham, AL 35205
(1-800-767-AICS) TOLL FREE

TEACHER'S ROLLBOOK

A complete classroom management tool.
- Grade averaging and reporting
- New quick grade entry
- Full attendance records and totals
- Records disciplinary actions and class size reports
- Up to 315 students/files
- Check out items
- Requires Mac 512E, 2 Drives, $99, Demo $10

Current Class Productions
2294 Berkeley Avenue
Torrance, CA 90502
(213) 326-4246

MacUser Marketplace

Listings are grouped by category and sold by column inches.
MacUser Marketplace
To place your ad Call
1(800) 825-4ADS
or (212) 503-5115
today to reach 300,000
Macintosh Business Buyers
"Why spend 12 months trying to get your PC or Macintosh to do video when we can get you set up in a week?"

Videographics Corporation

Call, write or stop by our new location at:
212 West Superior, Suite 403
Chicago, Illinois 60610
(312) 642-4652

MacUser Marketplace

Second Color Option Available

MOOD ALTERING SOFTWARE

Synchronicity is a mood-altering experience that turns stress into strategy in a fun and relaxing way. Stimulate intuition to complement logic for fresh insight into dilemmas, office politics, negotiations and relationships. Elaborate hypertext with beautiful animated art. A fantastic gift-only $149.95. Visa/MC. Demo's $5.

VISIONARY SOFTWARE

P.O. Box 69191
Portland, OR 97201
(800) 877-1832, ORDERS. (503) 246-6200

CIRCLE 271 ON READER SERVICE CARD

MIDi BLUES?

I'm just called MACBEAT!

MACBEAT smooths out the bumps with our exclusive instructional tips and tricks that take the mystery out of the most complex music programs. Circle reader's service number and register to win Passport's new Pro 4. You'll also receive our bi-monthly newsletter. For great prices and support on Music Software.

CIRCLE 276 ON READER SERVICE CARD

MacUser February 1990 309
**MacBible™**
formerly ThePerfectWORD™
Bible Study Software
for the Apple® Macintosh®
Super Concordance Capability
Search for words and phrases
Texts currently available:
- King James Version
- New International Version
- Revised Standard Version
- Greek New Testament
- Hebrew Bible

- Outstanding speed
- AND, OR, NOT logic
- Word count statistics
- Simultaneous viewing of different versions

In the beginning

**Ev בדרך**

Send for our fully featured demo (Genesis-KJV) $5

Zondervan Electronic Publishing 800 727-7759
1415 Lake Dr. S.E. Dept. MU • Grand Rapids, MI 49506

**GEMS of the Word™**
1,000 favorite, most useful Bible passages, indexed by over 100 contemporary topics/ everyday needs. Offers “Verse of the Day”; use as a D/A for immediate access from any program to these “jewels” from the Bible - for insight, study, and inspiration.

Introductory Price $29.95

from the makers of HyperBible™
Beacon Technology, Inc.
P.O. Box 9722-MU
San Jose, CA 95157
(800) 777-1841

**FREE! MAC CATALOG**

**CALL NOW! TOLL FREE-24 HRS.**
1-800-245-BYTE

**STACKWARE**
A powerful desk accessory
script editor for HyperCard™
- Edit multiple scripts simultaneously
- Global Find-and-Replace command
- Compare two scripts instantly
- Move to other stacks while editing
- Window listing of all stack objects
- Quick comment & annotation
- XCMD for easy custom access
- HyperTalk pop-ups and info bar
- Includes 24-page manual, fold-out reference card and installation stack

Available now for only $79!
See your dealer or call today!

**Ideal for HyperCard**
Performs Forms

Send for your GDT “stacks” of forms to print. Don’t fill in the blanks at your typewriter. Get HyperForm to fill in checks, P.O.s, invoices, vouchers, all your preprinted forms, directly from HyperCard stacks. Find your forms nightmare with HyperForm. Order today for $59.95 Visa/MC

Beacon Technology, Inc.
P.O. Box A-57
Hanover, N.H. 03755
(800) 622-1014 or (603) 643-4503

**SHAREWARE**
Hyperform™ Performs Forms

Have you GOT “stacks” of forms to print? Don’t fill in the blanks at your typewriter. Get HyperForm to fill in checks, P.O.s, invoices, vouchers, all your preprinted forms, directly from HyperCard stacks. Find your forms nightmare with HyperForm. Order today for $59.95 Visa/MC

P.O. Box 725
San Jose, CA 95157

**STACKWARE**
**ADD SPREADSHEET CAPABILITY TO STACKS!**
Trendware XCAL™ allows you to integrate calculations into new or existing stacks. Initialized from HyperCard’s standard menu, XCAL displays a spreadsheet-like grid over cards in your stack. Clicking HyperCard objects in the grid window lets you create formulas for fields and objects much like a stand-alone spreadsheet program. Over 100 functions built-in!

Another way...a spreadsheet within a stack! Performs calculations automatically on numerical data. Text & dates when data is entered or item is clicked. Automatic formatting of numeric, text & date fields! Perform calculations on groups of cards and substacks that match a search criteria. Built-in macro editor for advanced capabilities. $1,495

**HyperTools™ #1** Icon Editor, Alignment & Auto Creation tools. Script Analysis tools, use Fmt tools on groups of fields & buttons, Checkbox tools, XCMD tools, Button tools & more. $99.95

**HyperTools™ #2** Add Multiple Choice Lists to Fields, Field Sorting, Data Formatting & Validation. Sound tools, tools for moving & copying groups of objects, reorder cards & more. $99.95

**TRENDWARE Corporation**
Box 2285
Huntington, CA 92649
(714) 992-1116

**Add Multiple Choice Lists to Fields, Field Sorting, Data Formatting & Validation.** Sound tools, tools for moving & copying groups of objects, reorder cards & more. $99.95

**HyperTools™ #2** Icon Editor, Alignment & Auto Creation tools. Script Analysis tools, use Fmt tools on groups of fields & buttons, Checkbox tools, XCMD tools, Button tools & more. $99.95

**TRENDWARE Corporation**
Box 2285
Huntington, CA 92649
(714) 992-1116

**Stack Cleaner™**
Add menus to stacks with the Menu Editor. Plug modules to merge, split, close & reduce the size of scripts. Now includes utility to compact all stacks on your disk. $49.95

**HyperTools™#1** "The tools and utilities in these two packages (16 in each program are powerful, and they can definitely help stack authors take fuller advantage of HyperCard’s potential." - MacWorld, Dec 88

**TRENDWARE Corporation**
Box 2285
Huntington, CA 92649
(714) 992-1116
STACKWARE

You can learn French, German, Russian, Spanish or Latin the efficient way with MacFlash Cards!

Powerful, yet easy to use. Over 2000 words & 1000 synonyms. Learn vocabulary fast! Can be used as a "point and click" dictionary. Use "Look Up" to find just the right word. 40 pg manual, German 1/II, French 1/II, Russian I, Spanish I, Latin I: $25 each. S&H $3, CAL Res 7 1/4% tax. Money-back guarantee. Call or send for additional information. Order today by calling 1-800-283-9080 X850

The Language Quest Software Company | Same Day Shipping
101 First Street, Suite 428, Los Altos, CA 94022 | Quality product: low price

HyperGlot-The Leader in Foreign Language Software

Russian, German, Spanish, French, and Japanese. Most with extensive digitized sound. 25 products, many new from $29.95-$149.00.

In formation. Order today by calling 1-800-328-0077. FAX: (612) 557-1979

Japanese Language Instruction

Kanji Exercises No. 1 Using HyperCard

Japanese Language Instruction

Kanji Exercises No. 1

Japanese Language Instruction

Kanji Exercises No. 1 Using HyperCard

RATS Version 3.0

RATS is an integrated environment for data analysis, forecasting and graphics. Forecast with Box-Jenkins (ARIMA), exponential smoothing, vector autoregressions, large models and others. Choose from a wide variety of techniques to analyze your data, from stepwise regression to logit and probit, from two-stage least squares to special analyses. $300.00

VAR Ecometrics, Inc.
P.O. Box 1818
Englewood, CO 80155
(303) 791-2077

STATISTICS

RATS Version 3.0

RATS is an integrated environment for data analysis, forecasting and graphics. Forecast with Box-Jenkins (ARIMA), exponential smoothing, vector autoregressions, large models and others. Choose from a wide variety of techniques to analyze your data, from stepwise regression to logit and probit, from two-stage least squares to special analyses. $300.00

VAR Ecometrics, Inc.
P.O. Box 1818
Englewood, CO 80155
(303) 791-2077

TAXES

BOTTOMLINE TAX SOLUTIONS

Personal and Professional Tax Solutions using Hypercard and Excel 2.2. From $39.95. 1000P

- Professional Series • Client Services Manager manages contact, billing, invoice, time, & mail info. • Tax Services Manager for personal, corporate, estate forms. 1040s & 1040L Tax solutions for individuals.

ComputaCraft
P.O. Box 3155
Englewood, CO 80155
(303) 791-2077

ACCESSORIES

MOUSE PADS

Custom Printed or Plain Cloth In 13 Colors:

Size:

9 x 7 1/2
8 x 9 1/2
8 1/2 x 11

12
144
2000

$3.25 $5.35
$3.25 $5.35
$3.75 $5.50

Polymer Coated Fast Pad:

12
36

$6.50 $9.00

PRECISION LINE INC.
14100 23rd Ave. N.
Plymouth, MN 55447
(800) 328-0077, (612) 557-1979

THE MACH-1 MAC CASE

The first SEMI-RIGID LIGHTWEIGHT Mac case with an impact-resistant protective core. Made of Propex Ballistics, a virtually indestructible material frequently used in bulletproof vests. The Mach-1 holds all of your components. Available in black/red & black/blue. 14"x10" x19". $179.00 Free Catalog!

The Mach-1 holds all of your components. Available in black/red & black/blue. 14"x10" x19". $179.00 Free Catalog!

THE BEST CASE SCENARIO

Airline Check-In or Local Use
Zero Halliburton Aluminum Mac Cases: Lightweight, Durable, Distinctive Styling Plus/SE Ix/III Monitor Cases Portable Attaché ImageWriter II from $299.95 1-800-542-4591

TCC 1301 Wash. Blvd., #110 L.A., CA 90066
CIRCLE 289 ON READER SERVICE CARD

MacUser Marketplace

Second Color Option Available

MacUser Marketplace To place your ad call (212) 503-5115 or (800) 825-4ADS

UTILITIES

Plotter Utility...with professional fonts for Apple, HP, Houston; A-E sizes.

$125

Terminal Utility...fast VT100, Tektronix, file transfer, color, and large screens.

$195

Mesa Graphics, Inc
P.O. Box 600
Los Alamitos, NM 87544
(505) 672-1998

CIRCLE 287 ON READER SERVICE CARD

MISCELLANEOUS

ACCESSORIES

MOUSE PADS/Co. Logo Specialist

Dy

Ody

Canada

Hard Surface

Hard Surface

12

$8.50/2nd

N/A

12

$5.90/2nd

$7.5/3rd


$5.25/2nd

$4.53/3rd

3033 Chestnut Street
Philadelphia, PA 19104
(800) 443-8278

MacUser Marketplace

To place your ad call (212) 503-5115 or (800) 825-4ADS

THE WORLD AT YOUR FINGERTIPS

Global Data Manager™ has 190 variables—population, energy, environment and more—for every country in the world, from the UN, World Bank, CIA, etc. A powerful research and planning tool, GDIM will export data to your statistics, spreadsheet, mapping software.

- Available for Macintosh, Apple II, IBM
- Over 1000 Additional Variables Available on Selected Topics from $50.00

GLOBAL DATA MANAGER plus BASIC WORLD DATA — $145.00

Additional Data Discs Available Call For Prices

VISUAL ACCURATE

World Game Institute, 3508 Market St., Phila., PA 19104 (215)387-0520
CIRCLE 286 ON READER SERVICE CARD

COTTON CANVAS

COVERS

100% ComputerWear

COTTON CANVAS

COVERS

100% Breathable! Static-Free! Beige with Grey Trim

For Computers, Keyboards, Printers & Laptops All Popular Models. Superior Quality. Best Price

NEW! Seal-Skins For Keyboards

$24.95

VISACircle 111 on Reader Service Card

In Stores Nationwide

1-800-826-5761

Visa

MC

1-800-826-5761

Visa 415 759-1466

AMERICAN EXPRESS
1300-26th Ave San Francisco CA 94112

CIRCLE 280 ON READER SERVICE CARD

MacUser February 1990 311
Millions of copiers and laser printers need toner cartridges!

Cash in on this demand by starting your own toner cartridge recharging business. As a LaserCharge-trained entrepreneur, you will be able to offer companies in your area a long-like recharged toner cartridge—backed by a nationwide LaserCharge guarantee—for far less money than a new cartridge. LaserCharge provides training, tools, supplies, trade secrets, marketing strategies and technical support. Choice of two plans.

Call today! 800-999-8134 512-335-8191

LaserCharge
1130 Metric Blvd., Austin, TX 78756

CIRCLE 291 ON READER SERVICE CARD

DESKTOP PUBLISHING SERVICES

Slides From Your MAC
We want your business. And we'll prove it! We offer the best service available. Experts in Persuasion, PowerPoint and others, on staff to serve you. Free Federal Express shipping, toll-free Customer Service. And if you should make a mistake, we'll reshoot your slides, free. Call today, and say "I'd like to try your service. Free."

1-800-222-2592

Accent Presentations, Inc.
1280 High Bluff Drive, Ste. 250 • San Diego, CA 92130

CIRCLE 297 ON READER SERVICE CARD

MacUser Marketplace

Standard directory listings available for a minimum of 3 issues at $375.00 per issue ($1,125.00 total).
**Supplies**

**Toner Cartridges Remanufactured**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Color</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>J&amp;S Laser</td>
<td>Ultra-Black</td>
<td>$39.50</td>
</tr>
<tr>
<td>J&amp;S Laser</td>
<td>Dark Blue</td>
<td>$59.50</td>
</tr>
</tbody>
</table>

**2 Day Air Return Delivery**

**Pacific Toner Services**

**100% Guaranteed**

**Toner Cartridge Recharge**

**For Laser Printers & Canon PC Copiers**

<table>
<thead>
<tr>
<th>Recharge</th>
<th>Color</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>44.50</td>
<td>$39.50</td>
</tr>
<tr>
<td>Color</td>
<td>49.50</td>
<td>$59.50</td>
</tr>
</tbody>
</table>

**New & Remanufactured**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Lightning</td>
<td>800-BLACK99</td>
<td>$44.95</td>
</tr>
</tbody>
</table>

**HEWLETT-PACKARD DeskWriter Print Cartridges**

**Fully Recharged & Thoroughly Tested**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP LaserJets</td>
<td>$7.50</td>
</tr>
</tbody>
</table>

**BRILLIANT COLORS!**

**BROWN, VIOLET, GREEN, TURQUOISE, and more!**

**HEWLETT-PACKARD DeskWriter Print Cartridge**

<table>
<thead>
<tr>
<th>Color</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREEN</td>
<td>$27.50</td>
</tr>
</tbody>
</table>

**BrightDot Solutions**

**12008 Serrano Road**

**Lakewood, CA 90730**

<table>
<thead>
<tr>
<th>Color</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DARK BLUE</td>
<td>$15.95</td>
</tr>
</tbody>
</table>

**CIRCLE 301 ON READER SERVICE CARD**

**CIRCLE 302 ON READER SERVICE CARD**

**CIRCLE 303 ON READER SERVICE CARD**

**CIRCLE 304 ON READER SERVICE CARD**

**CIRCLE 305 ON READER SERVICE CARD**

**CIRCLE 306 ON READER SERVICE CARD**

**CIRCLE 307 ON READER SERVICE CARD**

**INSURANCE**

**What happens after the warranty runs out?**

Simple. You’re the one that pays for repairs. Unless you have extra cash to repair or replace your computer system, you need SAFEGUARD FIXIT. Be insured for mechanical breakdown (wear and tear) as well as external losses (theft, fire, power surges, natural disasters and more). A single insurance policy covers all your equipment for as little as $100. Call for Free Brochure: 1-800-822-2345

**SAFEGUARD, The Insurance Agency, Inc.**

**2929 N. High Street, P.O. Box 9211**

**Columbus, Ohio 43211**

**(614) 262-0708 Local, FAX 614-262-1714**

---

**MacUser Marketplace**

**gives you the versatility you need to get your product the most attention. Our options include:**

- A second color option
- A choice of display format or directory listings
- Frequent and advance payment discounts that let you get the most from ad dollars.

---

**MacUser February 1990 313**
The Nine Magic Keys to Success

The Nine Magic Keys to Success

1. Do not use overqualified personnel in the store. All that really counts with today’s computer-store customer is neat appearance, so hire someone who enjoys wearing a coat and tie to work.

   It’s a mistake to hire people with too much computer knowledge, as they ruin the canned sales pitch we employ. Think of the job in terms of a misdirected security guard. This is the guy who wants to be a cop and who will work cheap if he can pretend to be a cop. Look for salespeople who wish they were experts and are satisfied to pretend.

2. Use non-English speakers in the tech-support department. They don’t have to know anything. Pay them the minimum wage and train them to answer the phone by saying, “Common problem. Takes two weeks to fix. Maybe longer. We have to order parts.”

   Whatever the question, have them say the same thing. It’s a catchall answer, and if you’re lucky, the customer will go elsewhere for repairs or advice.

3. Carry a limited amount of software. Who needs people coming in and out of the store all day asking questions about software that nobody in the store uses or knows much about?

   Discourage software sales. When people ask you why you don’t have more software, always tell them that you can’t compete with those miserable mail-order companies. If you can get away with it, just stock a few old copies of Lotus 1-2-3 for PC users and Excel for Mac users.

4. Carry few, if any, magazines. While magazines used to be the mainstay of computer stores, the current thinking is that they don’t belong there. They encourage browsers and kids.

   When was the last time you went into a Ford dealer and bought a copy of Car and Driver or Road and Track? The store is better empty than filled with people reading magazines.

   Magazines also give people too many ideas about what to buy, which ruins the canned sales pitch for the stuff we need to move. If someone asks about the lack of magazines, tell them that too many miserable mail-order companies advertise in them.

5. Don’t carry books. You’re running a computer store, not a bookstore. You want to move expensive computers, useless networks, and off-the-rack copies of Word. You’d have to sell a carload of books to make as much money. So what if people want to learn more about computers or programming? Let them take a college course. You’re not running a university either.

6. Maintain a showroom atmosphere. The days of the cozy computer store are over. You’re not running a clubhouse. When people come into the store, they should encounter a stark, almost depressing place. It should be dead quiet and eerie.

   Do nothing until the customer touches a computer, then race out from behind the counter and say, “Please don’t touch the machines. May I help you with something?” This puts them on the defensive and frightens them into buying your merchandise.

7. Stay within the canned sales pitch when talking to a customer. If customers volunteer brand preferences, say, “I appreciate that. But we sell solutions.” If customers insist on a product because of a favorable magazine review, say, “Magazines have to write favorable reviews for products that are heavily advertised. Everybody knows that.” Then have them take a phony short quiz on their needs. Then, of course, guide them to the same machine we sell everyone, the one with this month’s highest profit margin.

8. Keep a mailing list. Try to get the name and address of everyone who walks into the store, in case you decide to do some direct marketing with a bulk mailing. You can purge the customers who have already bought something from you from the list, since they’ll probably never come in again. We discourage repeat customers.

9. Rotate store managers. Every three months, move the store manager to another store. Most customer-complaint cycles peak every four months. So whenever customers start griping too much about anything, blame the old manager, saying, “It got so bad we had to fire him.”

   These are the nine magic keys to success. Good luck to you all.

   By John C. Dvorak
Users Won’t Know The Difference.

But Buyers Will.

According to a recent article in MacWorld Magazine, “There is very little to distinguish one hard drive from another, other than speed, software, and price.” We agree.

Only a very few milliseconds of access speed separate the Jasmine and the Ehman hard disk drives, and both include utility software programs free. Both come with two year warranties and a 30-day money back guarantee. And both companies enjoy a reputation for manufacturing high-quality products.

That brings us to price.

As you can see, the Ehman 45 MB hard drive is $200 less than the Jasmine 40 MB. That's a difference users may not notice, but buyers certainly will. Ehman's low Rocky Mountain overhead always means lower prices.

With all Ehman products, you get a 30-day money back guarantee, a lengthy warranty, and our optional 24-hour express service replacement service policy.

The Ehman drive is a better buy. But don't take our word for it. MacWorld Magazine called the Ehman drive “a real bargain.” Call us today and see the difference for yourself.

Visa, MasterCard, American Express welcome.

Hard Drive Prices

<table>
<thead>
<tr>
<th>Size (MB)</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>$299</td>
<td>$349</td>
</tr>
<tr>
<td>40</td>
<td>$349</td>
<td>$399</td>
</tr>
<tr>
<td>60</td>
<td>$449</td>
<td>$499</td>
</tr>
<tr>
<td>80</td>
<td>$579</td>
<td>$629</td>
</tr>
<tr>
<td>105</td>
<td>$799</td>
<td>$899</td>
</tr>
<tr>
<td>180</td>
<td>$1,099</td>
<td>$1,199</td>
</tr>
</tbody>
</table>

*Good only on Jasmine II models. SE drives also available. Utility software not available on 20 MB. All product names mentioned are trademarks of their respective holders. Prices subject to change without notice and may not reflect list-priced pricing. 3% Surcharge on American Express.
A Big Screen Monitor Now Makes Big Sense.

Up to now most Macintosh users considered a big screen monitor a luxury purchase. Something desirable, but a purchase which could be put off until prices came down.

Surprise! They just did.

Introducing the Ehman 19" Two-Page Monochrome Display System, the first affordable big screen monitor. At just $899, including card, cable, Stepping Out II software, and a tilt and swivel base, the Ehman monitor means finally doing away with scrolling, squinting and scrunching.

The Ehman monitor matches all the major features of other big screen monitors costing twice as much, including a high resolution of 72 DPI, and a flicker-free refresh rate of 78 hertz.

As with all Ehman products, you get a 30-day money back guarantee, a minimum one-year warranty, and our optional 24-hour express service replacement policy. We’ve even thrown in a $25 dealer installation coupon for quick and easy set-up.

It’s the big-screen monitor you’ve been hoping for. So stop waiting for prices to come down. At Ehman they already have.

Ehman
1-800-257-1666

Please circle 78 on reader service card.
If Your Hard Drive Is Too Limiting

Consider One That Has No Limits.

$699

Jasmine 40 MB

$749

Ehman 45MB Removable

With conventional hard disk drives there is a basic problem: When you run out of storage, you run out of storage. Period. To get more you'll have to buy another hard drive.

Unless you consider the Ehman removable alternative.

At just $749, our 45MB Removable Hard Disk Drive is only $50 more than the price of a Jasmine 40MB hard drive. But, the Ehman removable gives you two, three, ten, or twenty times more capacity just by adding $99 cartridges. The sky is the limit, but the price is down to earth.

The 45MB is based on award winning SyQuest technology, with 20 millisecond access speed and a 30,000 hour reliability rating. You're buying the best technology available at the best price available.

As with all Ehman products you get a 30-day money back guarantee, a lengthy warranty, and our optional 24-hour express service replacement policy.

The Ehman 45MB Removable Hard Disk Drive is a better way to get the mass storage and computing capacity you've been needing. So why be limited by conventional hard drives, when you can have Ehman's unlimited capacity for just a few dollars more.

Ehman

1-800-257-1666

Please circle 77 on reader service card.
A Family With
A Strong Set Of Values.

At Cutting Edge we believe in doing business the old-fashioned way: give people a good product at a fair price. Our hard drives, monitors and removables are designed to give you the best price/performance in the industry. And we stand behind each one with a 30 day money-back guarantee and a lengthy warranty.

Since 1985 Cutting Edge has sold over 50,000 Macintosh peripherals from our family of products. Our customers keep coming back because they can be assured of one thing—the best value in the Macintosh industry. That's why we're the fastest growing manufacturer of Macintosh hardware. It just goes to show that you can't beat good, old-fashioned principles and you can't underestimate the virtue of value.

Cutting Edge products are available at MacConnection, MacWarehouse, Programs Plus, and better dealers everywhere.

Call (307) 789-0582
Please circle 91 on reader service card.