90% of Macintosh spreadsheet users have been working on this program.

---

**Selected Five-Year Financial Data**

(In thousands, except employee and per share data)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue and Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Revenue</td>
<td>$432,806</td>
<td>$318,663</td>
<td>$309,266</td>
<td>$239,656</td>
<td>$207,907</td>
</tr>
<tr>
<td>Cost of Revenues</td>
<td>79,809</td>
<td>165,570</td>
<td>58,344</td>
<td>40,710</td>
<td>40,215</td>
</tr>
<tr>
<td>R and D</td>
<td>79,809</td>
<td>52,361</td>
<td>33,081</td>
<td>21,420</td>
<td>20,676</td>
</tr>
<tr>
<td>Sales/Marketing</td>
<td>87,680</td>
<td>33,106</td>
<td>62,490</td>
<td>48,999</td>
<td>26,409</td>
</tr>
<tr>
<td>Gen Admin</td>
<td>27,653</td>
<td>18,537</td>
<td>12,594</td>
<td>7,306</td>
<td>4,520</td>
</tr>
<tr>
<td><strong>Income from Operations</strong></td>
<td>$157,855</td>
<td>$(5,913)</td>
<td>$142,756</td>
<td>$121,221</td>
<td>$116,088</td>
</tr>
<tr>
<td>Non-op Income</td>
<td>7,804</td>
<td>6,639</td>
<td>3,715</td>
<td>2,008</td>
<td>1,387</td>
</tr>
<tr>
<td>Income Before Taxes</td>
<td>165,659</td>
<td>726</td>
<td>146,471</td>
<td>123,229</td>
<td>117,475</td>
</tr>
<tr>
<td>Provision for Taxes</td>
<td>67,082</td>
<td>294</td>
<td>59,321</td>
<td>49,908</td>
<td>47,577</td>
</tr>
<tr>
<td><strong>Net Income</strong></td>
<td>$98,567</td>
<td>$432</td>
<td>$87,150</td>
<td>$73,321</td>
<td>$69,898</td>
</tr>
</tbody>
</table>

**Assets and Liabilities**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Assets</td>
<td>223,579</td>
<td>112,622</td>
<td>79,282</td>
<td>44,256</td>
<td>44,055</td>
</tr>
<tr>
<td>Net Property</td>
<td>75,468</td>
<td>73,937</td>
<td>41,209</td>
<td>23,957</td>
<td>19,374</td>
</tr>
<tr>
<td>Other Assets</td>
<td>5,643</td>
<td>3,764</td>
<td>3,673</td>
<td>2,402</td>
<td>1,899</td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td>$304,690</td>
<td>$190,323</td>
<td>$124,164</td>
<td>$71,615</td>
<td>$65,327</td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>34,423</td>
<td>18,319</td>
<td>11,599</td>
<td>5,077</td>
<td>9,948</td>
</tr>
<tr>
<td>Long-term Liabilities</td>
<td>4,578</td>
<td>1,114</td>
<td>3,602</td>
<td>2,203</td>
<td>3,146</td>
</tr>
<tr>
<td>Stockholder's Equity</td>
<td>265,698</td>
<td>171,300</td>
<td>108,964</td>
<td>63,245</td>
<td>52,242</td>
</tr>
<tr>
<td><strong>Total Liabilities and Equity</strong></td>
<td>$304,690</td>
<td>$190,323</td>
<td>$124,164</td>
<td>$71,615</td>
<td>$65,327</td>
</tr>
</tbody>
</table>
In 1985, not long after the Macintosh was unveiled, Microsoft Excel became the most compelling reason to buy one. Within minutes, it became a standard on the Macintosh. Before we knew it, 9 out of 10 Macintosh spreadsheet users were swearing by it. Not surprisingly, they still are.

But, of course, we weren’t satisfied. Well enough alone—and Microsoft Excel version 2.2 has come to the small screen. In a big way.

In mathematical terms, 2.2 is greater than 1.5. In technical terms, your spreadsheets aren’t limited to 1MB of memory—version 2.2 makes the most of even 8meg machines. Which translates into spreadsheets of outrageous proportions.

Equally outrageous: 40% faster calculations—thanks to advanced intelligent recalc. As for presentation? Version 2.2 also lets you highlight data in ways well worth highlighting: You can pick up to 256 different fonts per sheet, including up to six styles and eight colors. You can change row height. You can shade. And basically pack your documents with more visual punch than ever before.

Microsoft Excel version 2.2. Another improvement designed to make Mac enthusiasts even more enthusiastic. Something 90% of you are already used to. And you other 10% easily can be.

SELECTED FIVE-YEAR FINANCIAL DATA

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue and Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Revenues</td>
<td>$432,806</td>
<td>$358,663</td>
<td>$309,266</td>
<td>$239,656</td>
<td>$207,907</td>
</tr>
<tr>
<td>Cost of Revenues</td>
<td>79,809</td>
<td>65,570</td>
<td>56,344</td>
<td>45,710</td>
<td>40,215</td>
</tr>
<tr>
<td>R and D</td>
<td>79,809</td>
<td>52,310</td>
<td>33,081</td>
<td>23,130</td>
<td>20,670</td>
</tr>
<tr>
<td>Sales/Marketing</td>
<td>87,680</td>
<td>88,108</td>
<td>62,490</td>
<td>48,999</td>
<td>26,409</td>
</tr>
<tr>
<td>Gen Admin</td>
<td>27,653</td>
<td>18,587</td>
<td>12,994</td>
<td>7,206</td>
<td>4,500</td>
</tr>
<tr>
<td><strong>INCOME FROM OPERATIONS</strong></td>
<td>$157,205</td>
<td>$124,087</td>
<td>$122,756</td>
<td>$121,221</td>
<td>$116,088</td>
</tr>
<tr>
<td>Non-op Income</td>
<td>7,604</td>
<td>6,639</td>
<td>3,715</td>
<td>2,008</td>
<td>1,387</td>
</tr>
<tr>
<td>Income Before Taxes</td>
<td>163,609</td>
<td>120,625</td>
<td>116,471</td>
<td>123,229</td>
<td>117,470</td>
</tr>
<tr>
<td>Provision for Taxes</td>
<td>67,092</td>
<td>56,290</td>
<td>39,321</td>
<td>49,908</td>
<td>47,570</td>
</tr>
<tr>
<td><strong>NET INCOME</strong></td>
<td>$98,517</td>
<td>$64,346</td>
<td>$77,150</td>
<td>$73,321</td>
<td>$69,896</td>
</tr>
<tr>
<td><strong>Assets and Liabilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Assets</td>
<td>223,579</td>
<td>112,622</td>
<td>79,282</td>
<td>44,256</td>
<td>44,055</td>
</tr>
<tr>
<td>Net Property</td>
<td>75,468</td>
<td>73,927</td>
<td>41,269</td>
<td>24,657</td>
<td>19,374</td>
</tr>
<tr>
<td>Other Assets</td>
<td>5,643</td>
<td>3,764</td>
<td>3,673</td>
<td>2,402</td>
<td>1,699</td>
</tr>
<tr>
<td><strong>TOTAL ASSETS</strong></td>
<td>$304,690</td>
<td>$190,323</td>
<td>$124,164</td>
<td>$123,229</td>
<td>$117,470</td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>34,423</td>
<td>18,319</td>
<td>11,599</td>
<td>5,077</td>
<td>3,940</td>
</tr>
<tr>
<td>Long-term Liabilities</td>
<td>4,578</td>
<td>4,114</td>
<td>3,602</td>
<td>2,309</td>
<td>1,146</td>
</tr>
<tr>
<td>Stockholder’s Equity</td>
<td>265,689</td>
<td>167,890</td>
<td>108,964</td>
<td>90,042</td>
<td>90,042</td>
</tr>
<tr>
<td><strong>TOTAL LIABILITIES &amp; EQUITY</strong></td>
<td>$304,690</td>
<td>$190,323</td>
<td>$124,164</td>
<td>$123,229</td>
<td>$117,470</td>
</tr>
<tr>
<td>Working Capital</td>
<td>189,642</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>1,681</td>
<td>1,390</td>
<td>1,086</td>
</tr>
<tr>
<td><strong>Common Stock Data</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Income per Share</td>
<td>$1.13</td>
<td>$1.64</td>
<td>$1.94</td>
<td>$1.90</td>
<td>$2.50</td>
</tr>
<tr>
<td>Book Value per Share</td>
<td>$4.56</td>
<td>$3.56</td>
<td>$2.29</td>
<td>$1.46</td>
<td>$0.78</td>
</tr>
<tr>
<td>Cash and Investments</td>
<td>$2.65</td>
<td>$1.60</td>
<td>$0.83</td>
<td>$0.64</td>
<td>$0.48</td>
</tr>
<tr>
<td>Average Shares Outstanding</td>
<td>87,535</td>
<td>83,258</td>
<td>45,956</td>
<td>38,634</td>
<td>26,964</td>
</tr>
<tr>
<td>Shares Outstanding/Year-end</td>
<td>86,903</td>
<td>51,305</td>
<td>26,589</td>
<td>15,950</td>
<td>9,082</td>
</tr>
<tr>
<td><strong>Key Ratios</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return on Net Revenues</td>
<td>23%</td>
<td>25%</td>
<td>30%</td>
<td>31%</td>
<td>34%</td>
</tr>
<tr>
<td>Return on Total Assets</td>
<td>32%</td>
<td>44%</td>
<td>70%</td>
<td>102%</td>
<td>107%</td>
</tr>
<tr>
<td>Return on Stock Equity</td>
<td>37%</td>
<td>50%</td>
<td>80%</td>
<td>116%</td>
<td>134%</td>
</tr>
</tbody>
</table>

New pick from 256 fonts. Change row height. Shade. Add notes. And get used to the sound of applause.
NEW PRODUCTS ....................................................... 261
A quick look at new Macintosh hardware, software, and accessories.

HOW TO/Quick Tips ................................................... 287
By Lon Poole/Drop-shadow labels in ReadySetGo, WriteNow style sheets, spreadsheet tabs, and more.

HOW TO/Getting Started with Digital Sound ........................... 299
By Jim Heid/Learn to record, edit, and play back sound on the Mac.

HOW TO/Insights on MacWrite II 1.1 ........................... 311
By Charles Seiter/Enhancing the newest version of the Mac's first program.

Updates ...................................................................... 319
The latest software upgrade news.

Where to Buy .............................................................. 323
Contact information for products in this issue.

Best-Sellers .............................................................. 364

DEPARTMENTS

How to Contact Macworld .................................................. 12
Reprints, subscriptions, Macworld in microform, editorial contacts.

Commentary/Jerry Borrell ........................................... 23
Apple's Mac Portable: to buy or not to buy.

Letters ...................................................................... 35

Art Beat ...................................................................... 45
By Deborah Branscum/The artists and techniques behind selected illustrations.

The Iconoclast ............................................................... 61
By Steven Levy/Apple's master plan to keep company secrets under wraps.

Conspicuous Consumer .................................................. 71
By Deborah Branscum/A user-group news service; Apple fixes some hardware problems; this month's events.

State of the Mac ............................................................ 79
By Thom Hogan/Making the transition to System 7.0 as painless as possible.

Verbatim ................................................................. 97
GCC Technologies founder Kevin Curran on hard disk trends, competition, and QuickDraw.

NEWS

Mac Bulletin ............................................................. 17
Late-breaking news.

Macworld News ......................................................... 114

- Apple Introduces the High-Performance Ilci Big things come in small packages.
- Midrange DTP from Silicon Beach New features at an old-fashioned price.
- RetixMail Brings x.400 to the Mac Opening doors to the world.
- ModelShop: 3-D in the Fast Lane Playing what-if with architecture.
- Matching Colors on Printers and Monitors Tektronix's new technology.
- CompuServe Refines Navigational Equipment Host-Micro Interface means smoother sailing.
- Micron Technology Enters Graphics Adapter Fray More color for the SE/30 and the Mac II.
- Microsoft Mail: Almost Like Being There Tying your workgroup together.
- Not Gone with the Wind Saving Hollywood's greatest films.
- Mac II on Steroids 88000 on a NuBus board.
- PostScript Clone on a Disk Talking PostScript to non-PostScript printers.
- Mitsubishi Introduces 37-Inch Monitor, 24-Bit Color Printers Color in, color out.
- We Now Return You to the Program Already in Progress When memory never sleeps.
**Features**

The Macintosh Portable ............................................ 144
By Bruce F. Webster/This preview of Apple's long-awaited portable reveals the high cost of slimming down a Mac.

Network Connections ............................................. 152
By Dave Kosier/AppleTalk has made great strides in the networking world—improving its connectivity capabilities and inspiring a wide range of third-party products—but it still has some maturing to do.

High-Capacity Hard Disks ....................................... 160
By Cheryl England Spencer/In the market for a monster hard disk? Macworld Labs tests twenty-three 300MB-plus drives.

A Full Accounting ................................................. 170
By Alan L. Slay/Should you use a one-write, general, or multiuser program? Our overview of accounting packages analyzes each one's strengths and weaknesses and points you in the right direction.

Can Excel Be Beaten? ............................................... 180
By Charles Seiter/Wingz and Full Impact challenge Excel 2.2—can the flashy newcomers beat out the old workhorse? Find out in this head-to-head comparison.

SuperStacks—The 1989 Winners .................................. 187
By Liza Weiman/We've judged over 400 HyperCard stacks in ten categories to select this year's best.

**Reviews**

ColorBoard 264 ......................................................... 196
24-bit color board.

Studio/1 1.0 ............................................................ 197
Paint and animation program.

REO-650, Jasmine DirectOptical, Genesis 6000, 
Sumo Optical, Disk Drive RSSM 600B, 
and Cirrus 600 Magneto Optical Drive ................. 202
Five optical disk drives.

Expressionist 2.0, Formulator, MathType 2.0 ....... 211
Three equation editors.

XTreemac 1.0 ............................................................ 213
Hard disk-management utility.

Cosmic Osmo 1.0 ....................................................... 215
Interactive storybook.

Atlas Explorer 1.0, Where in the USA Is Carmen 
Sandiego? 1.0, Global Trespass 1.0 ................. 217
Educational geography games.

TableTools 1.01 .......................................................... 220
Tables for desktop publishing.

4th & Inches 1.0 ....................................................... 224
Arcade-style sports game.

QuickMap, Electronic Map Cabinet ....................... 226
Desktop map-making software.

SimCity ................................................................. 231
City-development simulation game.

Harmony Grid 1.02 .................................................... 233
Software for exploring harmonic theory.

Hidden Agenda 1.0 .................................................... 235
Geopolitical simulation game.

Showcase F/X 1.0 ..................................................... 237
Title animation and slide presentation package.

Bernoulli Box II 44 ..................................................... 238
Removable media drive.

The Ancient Art of War at Sea 1.0 ....................... 240
War strategy game.

MiniCAD+ 2.0 ........................................................... 242
Computer-aided drafting program.

PC MacTerm/Network 1.2 ........................................... 247
Mac control of networked PCs.

For the Record 1.0, Family Matters 1.0 ................. 249
Personal record-keeping programs.

Acta Advantage 1.0 ................................................... 251
Outliner.

StellaStock 1.0 ........................................................ 251
HyperCard front-end simulation.

Deja Vu II: Lost in Las Vegas 1.0 ....................... 253
Adventure game.

Window Shopping ................................................. 255
Flower 1.03, HyperOne, Hard Disk DeadBolt 1.0, and ScriptLibrary.
The HyperCard™ upgrade you've been waiting for.

- Cards of any size and different window types
- Full color for dazzling displays
- Database fields with formatting
- Draw object graphics
- Full color for dazzling displays
- Buttons of any kind and color
- Free runtime version
- Forget SuperCard (which is slow, difficult to use and unintuitive)

1-800-822-0772
Only $99 (suggested retail price)

10% off SuperCard upgrade to PLUS

Only $99 (suggested retail price)

Call today for PLUS, the only HyperCard upgrade that delivers on the HyperCard promise. As Dan Shafer, author of the bestselling "HyperTalk Programming" book said, "PLUS extends HyperCard in widely sought and useful directions, without sacrificing speed or ease of use."

Attention SuperCard™ users...
upgrade to PLUS today for only $99!
Call for details.

Circle 39 on reader service card.
There's A Better Way To Share Peripherals.

If you have TOPS® or AppleShare®, you don't have to run around anymore to share files. So why do it to share peripherals? A Shiva NetSerial lets Macs and IBM PCs or compatible MS-DOS computers on your AppleTalk® network share just about any serial device there is. In fact, most popular devices can't be shared any other way. Which is why many peripheral manufacturers recommend NetSerial for use with their products. It makes expensive peripherals, such as Hewlett-Packard plotters, LaserJet® printers, Hayes and compatible modems or almost anything else with a serial port available to any Mac or PC on your network. So you don't have to buy extra equipment or run around your office with floppy disks. You can even use the NetSerial to share a minicomputer. Installing and using the NetSerial is easy. Thousands are in use today. If you have an AppleTalk® network, you need a NetSerial. Call for the name of your nearest dealer: 1-800-458-3550.

NetSerial™
by Shiva
We're Putting Networks To Work®
Shiva Corporation, 155 Second St., Cambridge, MA 02141
All product names are trademarks of their respective manufacturers.
It is the second largest river in the world. And it carries nearly twenty percent of the world's total water to the ocean. It starts high up in the Peruvian Andes and provides the only means of transportation through the largest rain forest. It is the Amazon. It was discovered by the Western World in 1541 by Francisco de Orellana.
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 Apple's 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 Macintosh’s 16.7 million colors, our Radius DirectColor/24™ is the perfect tool for retouching color photographs or producing high quality color publications.

If you don't require the full palette of Macintosh color, the Radius DirectColor/16™ lets you work with 32,768 colors simultaneously.

And, upgrading to the Radius DirectColor/24 is as simple as adding video RAM.

For those of you who use only 256 of the Macintosh 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 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.

Circle 46 on reader service card
Great Faces
"Unusual Typefaces...Interesting, Distinctive, and Inexpensive."
John Dvorak

Fluent Laser Fonts
$89.95 ea. PostScript™ or Macintosh® or IBM® PC

1 Bodoni
2 Sans Serif
3 Ritz & Right Bank
4 Monterey
5 Regency Script & Calligraphy
6 Prelude Script
7 Coventry Script & Zephyr
8 Gregarim & Dorovan
9 Кириллица (Cyrillic)
10 Bodoni Ultra
11 Sans Serif Bold
12 Sans Serif Extra Bold
13 Gatsby
14 Micro
15 Micro Extended
16 Galileo Roman
17 Calligraphy
18 Alexandria
19 Jott Casual
20 Gazelle, Kells, & Meath
21 Paladin & ABILENE
22 COLLEGIATE

Glasnost Главность
New Cyrillic Font Collection $300

Glasnost Главность
Odessa
Мурманск

Glasnost Главность
Кириллица
Glasnost Главность
Кириллица
Glasnost Главность
Кириллица

Other Font Collections
Quill Pack: $160 vol. 8, 20
Headlines: $225 vol. 10-12
Classic: $300 vol. 3-6, 13

Glasnost Главность
Distinctive: $300 vol. 18, 19-22
Modern: $300 vol. 7, 14-18

- Fluent Fonts 2.0
"...the most useful and beautiful typefaces we've seen."—Macintosh Bible
65 typefaces & borders for the ImageWriter.
Only $49.95

Casady & Greene Inc.
P. O. Box 223779, Carmel CA 93922. FAX (408) 624-7865 (408) 624-8716

Circle 16 on reader service card.
To debug a Pascal object like this lightning bolt lightning fast, there's only one choice. THINK Pascal. Because only THINK Pascal fully supports object oriented programming from creation to debugging. And only THINK Pascal lets you debug objects "on the fly."

For example, say you programmed an object, (Lightning Bolt), and it crashed. Your mission: debug. THINK Pascal's source level debugger pinpoints the exact code line of the crash, and shows all your variables and their values in plain English. Then, just run your program again. THINK Pascal lets you step through your source code while watching the variables ... as your program is running. The result is faster debugging. And faster finishes. Whether you use objects yet or not.

You'll also blaze through compiling at 44,000 lines per minute. And link any size program in less than 2 seconds. THINK Pascal not only makes programming faster, its high-quality, ultra-compact code makes faster programs.

With an integrated environment of an ultra-fast compiler, editor, instant linker, and source level debugger, THINK Pascal gives you total Pascal speed. Any way you measure it. Try THINK Pascal, the #1 Pascal on the Mac. Its speed will shock you. Call (800) 228-4122 Ext. 346G for more information.

THINK PASCAL SPEED

- Compiles 44,000 lines per minute. *
- Links any size program in less than two seconds.
- Multi-pass optimizing compiler creates compact, commercial quality code.
- Allows virtually unlimited program size.
- Generates 32-bit clean code.

*44,000 LPM on a Mac II. THINK Pascal is a trademark of Symantec Corporation. © 1989 Symantec Corporation
The NeXT™ Computer System is the first computer in the world (and so far the only) to use read/write/erasable optical storage. While PCs today are typically equipped with Winchester drives that store 20 to 40 MB, a single optical disk can store 256 MB. Plus, it is removable, for portability and added security. This dramatically new technology provides storage that is simultaneously vast, reliable and cost-effective—a combination unmatched by computers of any size.

NeXT has made the power of UNIX usable by mere mortals. UNIX is the high-performance operating system used by workstations to achieve true multitasking and superior networking. Unfortunately, it has always been the antithesis of user-friendly. NeXT has given UNIX a revolutionary new interface—one that is both visual and intuitive. Now computer users of every level can instantly wield this tremendous power, with no technical knowledge whatsoever.

To achieve the power needed for the 90s, NeXT bypassed traditional workstation architecture and went directly to that of a mainframe. This eliminates bottlenecks and attains an extraordinary level of system "throughput"—the true measure of computer performance. Only through the use of VLSI (Very Large Scale Integration) technology could this architecture be reduced in size so that it could fit inside a desktop computer. It's a mainframe on two chips.

While PostScript has long been the industry standard for printing, NeXT has made it fast enough to also be used on the display. This "unified imaging model" ensures that what you see on the display is precisely what you will get on paper. All your work, in any size type and any degree of rotation or magnification, appears with perfect 92-dots-per-inch clarity on the NeXT MegaPixel Display. And with laser precision at 400 dpi on the NeXT Laser Printer.

IN THE 90s, WE'LL ONLY TEN REAL BREAKTH
HERE ARE SEV
The NeXT Computer System is the first to be capable of producing CD-quality sound. Without requiring any additional equipment. This feat is made possible by a chip that has been specifically designed for the task of manipulating sound—the Digital Signal Processor (DSP). Because this processor is standard in every NeXT machine, software developers will be able to call upon its power to enrich programs we use every day. Now computers will not just be seen, but heard.

NeXT Mail takes electronic communications beyond anything you’ve seen on a personal computer before. Now you can send and receive multimedia mail—including text (with varied type fonts, styles and sizes), graphics and voice messages. And despite its high level of sophistication, NeXT Mail is so intuitive, you may not ever need to open the manual. NeXT Mail is built into the system, along with Ethernet and TCP/IP, so the NeXT machine can quickly become a part of existing networks.

Programmers can create software on the NeXT Computer up to ten times faster than on any other computer—the result of a breakthrough called NextStep.* It gives software developers the power to create the graphical user interface portion of their applications (often the most time-consuming and difficult part) without any programming at all.

This revolutionary environment means we will see more programs, and better ones, in less time than ever possible before.

These seven breakthroughs will change the way we use computers in the 90s. Which is why Businessland, the leading supplier of computers to corporate America, chose the NeXT Computer System as the workstation they will offer. Call us at 800-848-NeXT, and we’ll send you a 28-page brochure describing the NeXT Computer. We’ll also give you the address of your nearest Businessland Center. There, you can experience for yourself the first seven breakthroughs of the 90s. And get a good idea where the next three will come from.

©1989 NeXT, Inc. NeXT is a trademark of NeXT, Inc. NextStep is a registered trademark of NeXT PostScript is a registered trademark of Adobe Systems, Inc. UNIX is a registered trademark of /.

Circle 485 on reader service card
If your spreadsheet is spreading you too thin, pinpoint your prospects with GeoQuery.

A spreadsheet can tell you where your customers are. But it can't show you. So you lose precious hours just locating your prospects, instead of selling them.

If only you had GeoQuery! It turns your names and addresses into pushpins on a map. Using the data in most any spreadsheet or database, from a Macintosh, PC, or mainframe.

Don't know the client in Fresno? No problem. Click on the Fresno pushpin, and GeoQuery will tell you all about him.

Will that new territory support a field office? Ask GeoQuery. Draw a circle anywhere, and get a report on every prospect inside.

To see how GeoQuery addresses these and other pointed questions, call the toll-free number below.

GeoQuery


MACWORLD

HOW TO CONTACT MACWORLD

Subscription Services
For subscription service questions, call 800/234-1038, 800/525-0643, or 303/447-9340, or write Subscriber Services, P.O. Box 54529, Boulder, CO 80322-4529. To place new orders, call 800-642-9606.

Macworld is available on microfilm and microfiche from UMI, 300 N. Zeeb Rd., Ann Arbor, MI 48106-1346, 313/761-4700.

Back Issues of Macworld
Write to: Back Issues of Macworld, 144 Townsend St., San Francisco, CA 94107; 415/243-9505.

AppleLink: Macworld Connect: Macworld
Computerve: 70570, 702 Fax: 415/442-0766

Letters to the Editor
All your written comments, questions, and suggestions regarding any aspect of the magazine are read by our editor. We reserve the right to edit all submissions; letters must include your name and address. Direct all correspondence (by mail or electronically) to: Letters to the Editor.

Questions and Quick Tips
Direct questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to: Quick Tips, Lon Poole.

Consumer Advocate
Been burned? Really steamed? Direct your concerns (by mail or electronically) to: Consumer Advocate, Deborah Brunsam.

New Products and Updates
Direct press releases and product announcements (by mail or electronically), and shrink-wrapped software upgrades (by mail or courier) to: New Products Editor.

Editorial Calendars
For a copy of Macworld's editorial calendar, direct requests (by mail) to: General Information, Editorial Dept.

Reprints and Permissions
For written permission to quote or reproduce material from Macworld, direct requests (by mail) to: Reprints and Permissions, Editorial Dept.

Writing for Macworld
Please do not send us unsolicited manuscripts. If you're interested in writing for Macworld, send a stamped, self-addressed envelope along with a request for our writer's guidelines. Direct (by mail) to: Writer's Guidelines, Editorial Dept.

November 1989, Volume 6, Number 11
Macworld (ISSN 0946-6461) is published monthly by IDG Communications, Inc., 501 Second Street, San Francisco, CA 94107. Subscription rates are $50 for 12 issues, $110 for 24 issues, and $50 for 72 issues. Foreign orders must be prepaid in U.S. funds with additional postage. Add $6 per year for surface mail or $8 per year for airmail from all other countries. Second-class postage paid at San Francisco, POSTMASTER: Send address changes to Macworld, P.O. Box 54529, Boulder, CO 80322-4529. For dealer inquiries, call 800/52T-SMFD. Editorial and business offices: 501 Second St., San Francisco, CA 94107; 415/243-0659.

Macworld is a publication of IDG Communications, Inc. Macworld is an independent journal not affiliated with Apple Computer, Inc. APPLE, the APPLE logo, Macintosh, and MACWORLD are registered trademarks and MACLETTNER is a trademark of Apple Computer, Inc. Printed in the United States of America. Copyright IDG Communications, Inc. All rights reserved. Macworld is a member of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 120 computer publications in more than 200 countries. Fourteen million people read one or more IDG Communications publications each month.
NEW SUM II PROTECTS YOUR DATA, INSIDE AND OUT.

Recover lost data on floppy and crashed hard disks. Repairs crashed hard disks in minutes with new SUM Quick Fix.

Protects your data against hard disk crashes and file deletions with an automatically updated hard disk "map."

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.

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 floppy 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. 685G

SUM is a trademark of Symantec Corporation. © 1989 Symantec Corporation

Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014. 408/253-9600.
Current SUM Users, or MacUser users migrate now to new SUM II. Call Symantec Customer Service at 408/253-3578.
SUM II is a trademark of Symantec Corporation. © 1989 Symantec Corporation

Circle 237 on reader service card

Three years ago Jasmine set the standard for value by bringing the first affordable external hard drive to the Macintosh market. Today we're pleased to celebrate our third anniversary with a spectacular savings event—Jasmania! Buy direct from Jasmine before December 31, 1989 and save.

The Award Winning DirectDrive Series.
Jasmine continues to set the quality standard with the hard drives that swept the 1989 Macworld World Class Awards. Macworld readers selected Jasmine #1 in the “80MB or less” category, and in every single ranking (that's all 5) in the “above 80MB” category!
Jasmine DirectDrives are also the value standard. Every drive is bundled with DriveWare, Jasmine's exclusive formatting and partitioning software which insures your data by performing drive diagnostics and error corrections on the fly; SUM II by Symantec which lets you recover data from a mistakenly-initialized hard disk; DemoWare, a collection of demonstration versions of some of the most popular programs available; plus 5MB of public domain and shareware software.

All Jasmine DirectDrives Feature
☑ 2 Switched, Surge Protected, AC Outlets
☑ Precision Ball Bearing Fans
☑ Removable Air Filters
☑ External Push Button SCSI Switch
☑ Dual Power On and Data Access LED Indicator
☑ Hard Drive Encyclopedia
☑ All Cables and Connectors
☑ Easy Access Termination Panel

World Class Award Winner 3 Years In A Row!

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Regular direct price</th>
<th>Jasmania direct price (thru 12/31/89)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20MB</td>
<td>$549</td>
<td>$399</td>
</tr>
<tr>
<td>40MB</td>
<td>$699</td>
<td>$599</td>
</tr>
<tr>
<td>80MB</td>
<td>$999</td>
<td>$849</td>
</tr>
<tr>
<td>100MB</td>
<td>$1199</td>
<td>$1099</td>
</tr>
<tr>
<td>130MB</td>
<td>$1349</td>
<td>$1199</td>
</tr>
<tr>
<td>180MB</td>
<td>$1599</td>
<td>$1499</td>
</tr>
</tbody>
</table>
DirectServe File Server.
Now you can liberate your Macintosh from the mundane task of network file serving.

DirectServe is a combination of hardware and software that's designed specifically to be a high-performance, low-cost file server. DirectServe can support up to 255 workstations with Mac IIcx speed, for less than the cost of a Mac Plus and AppleShare software!

DirectServe plugs right into your LocalTalk™ or twisted-pair network, is 100% AppleShare/AFP 2.0 compatible, and comes complete with Installer and Administrator software. Now you can purchase DirectServe bundled with our highly-reliable (70,000-hour MTBF) DirectDrive 130 or 180 at special Jasmania direct pricing.

The DirectPrint Page Printer.
Now everyone can afford the printer MacUser called the "Best New Output Device" in their 1989 Editors' Choice Awards. DirectPrint's crystal shutter technology is PostScript®-compatible and provides deep velvet blacks with super sharp 300 dpi output. Thanks to a 4 MIPS RISC processor and 3MB of RAM, DirectPrint is up to 5 times faster than the competition and comes complete with 39 resident fonts.

<table>
<thead>
<tr>
<th>Regular Price</th>
<th>Jasmania Direct Price (thru 12/31/89)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3495</td>
<td>$2995</td>
</tr>
</tbody>
</table>

Worry-Free Ordering
- 72 Hour Shipping Guarantee
- 30 day Money Back Guarantee
- 2 year Parts and Labor Warranty (1 year for DirectPrint)
- FREE Telephone Support
- Call 7:30 a.m. to 5 p.m. (PST).
- Visa, MasterCard and American Express accepted.

Call 1-800-347-3228

© Jasminia Technologies, Inc. 1760 Army Street, San Francisco, CA 94124. Jasminia, DirectServe, DirectPrint, DriveWare and DemoWare are trademarks of Jasminia Technologies. Macintosh and AppleShare are registered trademarks of Apple Computer, Inc. All other product names are trademarks or registered trademarks of their respective manufacturers.

Circle 102 on reader service card
Colorful choice.

PixelPaint 2.0, the best value for your 8-bit color Macintosh.
Or PixelPaint Professional, the most powerful
graphics program for any color Mac.

The first. And still champion.

PixelPaint." The first color paint program for the
Macintosh.

Now there are two new SuperMac" color paint pro-
grams. For creating superior color graphics with ease.
PixelPaint 2.0, to get the most out of your 8-bit color Mac.
And PixelPaint Professional," for the highest quality
graphics in 8, 16, 24 or 32-bit modes.

PixelPaint 2.0. Excellent
performance. Excellent value.

PixelPaint 2.0 lets you work
easily with tools you use every day—
like pens, brushes, lines and shapes.
And gives you versatile tools for
precision work—like masks and a
PANTONE® Color selector. You can
even make your own color
separations.

You'll get the most out of 256
colors on your 8-bit system. With
tools like our PixelScan® scan-
ning utility. And advanced
computer effects like dither-
ing, for smooth blends of up to
256 colors.

PixelPaint Professional.
Exceptional graphics
on any color Mac.

We've revolutionized the features we pioneered
with PixelPaint. To take advantage of the millions of
colors available in 16, 24, and 32-bit modes. And to dra-
matically improve how you work in 8-bit mode.

These new true color tools work easily and
naturally. Mix colors on screen like paint on a canvas.
Add transparent tints and shadows. And use real an-
tialiasing for smooth shapes and blends. To create
photographic-quality images. For the first time on a
personal computer.

Make the right choice.

PixelPaint 2.0 and PixelPaint Professional. See for
yourself at your SuperMac software reseller. (And if you
already own a color Macintosh paint program, ask us
about our Software True
Color TradeUp" offer.)
Then choose the one
that's right for your busi-
ness—and your budget.

PixelPaint Professional delivers the best
possible graphics on any color Macintosh.
Its revolutionary true color tools work
naturally, to let you create and enhance
photographic-quality images.

The first. And still champion.

© 1989 SuperMac Technology
All Rights Reserved
SuperMac, PixelPaint, PixelPaint Professional and TrueColor TradeUp" are trademarks of SuperMac Technology.
PANTONE® is a registered trademark of Pantone, Inc. Macintosh and Mac are registered trademarks of Apple Computer, Inc. All other brand and product names are trademarks of their respective holders.
INDUSTRY NOTES

Du Pont Does PostScript

Du Pont is planning to license Adobe’s PostScript for use in its East Digital Color Imager, a Macintosh-based color printer that uses dye thermal sublimation transfer.

Color Prices Cut

QM has knocked $4000 off the price of its ColorScript 100, Model 30 printer, bringing it down to $15,995. The 300 dpi color PostScript printer can print on 8 1/2-by-11-inch and 11-by-17-inch paper.

Racet, Jasmine at Odds

Citing dissatisfaction with Jasmine’s ability to market Racet’s tape and optical drives, Racet has decided to sell its Cosmos 600 Magneto Optical drive, its SA1250 DAT drive, and other products directly to the Mac market. Previously, Jasmine had exclusive U.S. distribution rights for Racet’s products.

QuickMail-AppleLink Gateway

CE Software is making its QuickMail-to-AppleLink gateway available free of charge. The gateway will be posted on AppleLink and available from user groups, or direct from CE Software for a $20 handling charge.

Gateways for QuickMail and Microsoft Mail

StarNine is developing gateways from Microsoft Mail and CE Software’s QuickMail to a variety of mail platforms that implement SMTP, the standard UNIX mail protocol.

Crosfield Images Mac Slides

Crosfield, a developer of high-end pre-press systems, has announced an interface for imaging slides from Aldus Persuasion, Corel, Microsoft PowerPoint, VBS #5, and PICT format files on Crosfield’s D148 or Captivator film recorders. The interface links PICT to Crosfield’s DRAS raster format.

Microsoft-Apple Trade Cuts Adobe Out

Recent agreements between Apple Computer and Microsoft Corporation will have a profound impact on font technology for both the Macintosh and OS/2’s Presentation Manager. Under the agreements, Apple will license a PostScript clone from Microsoft, which it plans to use in future printers. In exchange, Microsoft will license Apple’s QuickDraw-based outline fonts for use in OS/2, establishing a second font standard that will force users to choose or buy fonts in both formats. Apple is developing its outline fonts as part of System 7.0; its advantage is true WYSIWYG display. In response, Adobe announced plans to publish the complete specifications for Adobe PostScript, including the proprietary curve-hinting strategy for Type 1 fonts. Adobe hopes that opening up Adobe PostScript will block Apple and Microsoft from creating a second widespread font standard. However, most Macintosh and IBM font suppliers, including Bitstream, Agfa Compugraphic, ITC, Linotype, and Monotype, have announced support for Apple and Microsoft, and Altsys plans to add the ability to create fonts with the new format to its PostScript font development tool, Fontographer.

A Storm for Any Port?

Olduvai has been showing the German HyperCard-like Plus running under OS/2. Olduvai says that Plus on the Mac can open HyperCard stacks without modification, and the OS/2 version of Plus can open Plus files that were created on a Mac, in effect making it possible to run HyperCard applications on IBM PCs. It is possible that SNA (Systems Network Architecture)—IBM’s strategy for compatibility among mainframes, minicomputers, and microcomputers—would eventually permit Plus stacks to run on IBM mainframes.

Wingz Adds Support for CL/1

Informix is developing an add-in application for its graphic spreadsheet Wingz that allows users to communicate directly with large databases by using SQL from inside Wingz. The add-in supports a point-and-click interface for nonprogrammers and a programming interface for more sophisticated users. The application is written in Wingz’s native HyperScript programming language and uses Apple’s CL/1 implementation of SQL. The module will not be available until Apple ships CL/1, which is expected by the end of the year. Wingz lists for $395; the SQL module will cost $99 per end user and $999 for the network administrator version. For more information, contact Informix at 913/599-7100.

WordPerfect at the Office

WordPerfect Corporation is preparing a Mac implementation of WordPerfect Office. The Mac version will communicate with and match the functionality of Office on WordPerfect’s other platforms. It is a set of four desk accessories including E-mail, a calendar, a flat-file database, and a file-management utility. The E-mail DA can look at attachments from within a message, and has a conference mode and internal support for X.400. The calendar DA provides built-in functions for searching and sorting dates and can write the results of a search out to the calendar. Pricing had not been set at press time. For more information, call WordPerfect Corporation at 801/222-5800.

Virex Blocks New Virus, Adds Full-Time Protection

At press time, HJC Software had begun shipping Version 2.1.1 of Virex, which detects and eradicates a new nVIR strain known as nFLU. Version 2.0 of the virus-detection and -eradication utility added some new features. VirexGuard is an INIT-level watchdog that can examine floppy (continues)
INDUSTRY NOTES

Mac Software Sales Booming

According to figures gathered by Arthur Anderson & Company, during the second quarter of 1989 Macintosh software sales increased by 26.6 percent over the same quarter of 1988 to $10.1 million. Curiously, the sales of programming languages almost doubled, while integrated packages, desktop publishing software, and recreation software declined. Mac software also increased its share of the market relative to DOS software, from 19.8 percent to 21.1 percent.

Apple Will Buy Its Own Stock

Apple Computer says that it will buy back 2.5 million of its own shares “from time to time.” The company noted that the repurchase will mostly offset dilution caused by various employee stock ownership plans.

Apple Makes Huge Sale to Government

Apple has won a contract from Honeywell Federal Systems to provide from 10,000 to 80,000 Mac II-series computers to the government’s Worldwide Military Command and Control System (WWMCCS). The contract is expected to bring Apple $164 million over five years.

Vendor Changes Name

The personal computer software and hardware distributor Microamerica recently changed the name of its Macintosh division from Bonsu to Macamerica.

Kobe Steel Acquires Racet

Kobe Steel, of Japan, has acquired a majority of the stock of mass storage vendor Racet Computers, of Brea, California. With the backing of Kobe, Racet plans to diversify into other electronics-related areas.

NuVista Prices Fall

Truevision, of Indianapolis, cut the prices on its NuVista series of video capture and display boards for the Mac II series. A NuVista board with 4MB of RAM is now $6995, a drop in price of $1000. Smaller price cuts for NuVista boards with less RAM were also announced.

disks for known viruses as you insert them. Virex 2.0 lists for $99.95. For more information, contact HJC at 919/490-1277.

CE Software in the News

CE Software has been showing version 4.0 of DiskTop, the venerable Swiss Army knife of Macintosh utilities, as well as a new network application called In/Out. DiskTop 4.0 adds better search controls and batch operations on found files, a file-launching utility that can open more than one document at a time, and a pop-up menu showing all drives on line. It will list for $99.95 and include a copy of version 2.0 of Microlytics’ Gofer. In/Out is a network equivalent of a magnet board for leaving messages. It does not provide a calendar for scheduling. In/Out lists for $199.95 for five users and $299.95 for ten users. For more information, contact CE Software at 515/224-1995.

Running UNIX on the Plus and SE

An Australian company has developed an implementation of POSIX for would-be UNIX users who are not in the market for a Mac II and an 80MB hard disk. Macldriss, from Whitesmiths, provides a multitasking executive, interprocess communication, and C and Pascal development tools, as well as other UNIX utilities. Macldriss runs as an application under the Finder with 1MB of memory or under MultiFinder with 2MB, and it requires only 5MB of disk space. Macldriss runs on the Plus and all later Macs and costs $499. For more information, contact Jean Batty at 301/657-3775.

Squeezing Typeset Quality from Laser Printers

LaserMax Systems’ first two products offer close-to-typeset-quality output from ordinary laser printers. The LaserMax 1000 is a 1000-by-400-dpi plain-paper desktop printer selling for $7995. The MX6 series of high-speed controllers for all models of Apple’s LaserWriter series generate 600-by-300 dpi output from the 300-dpi laser printers. The controllers come with 2MB, 4MB, or 6MB of memory and install in a NuBus slot on the Mac. Both products come with 35 resident Bitstream typefaces. For further information, call 612/944-9058.

14 MIPS in a Mac

Du Pont Pixel Systems, a division of E. I. Du Pont de Nemours, has announced the fastest coprocessor board to date for the Mac. The MacbRISC, a NuBus board based on a 50MHz Intergraph Clipper C300 RISC chip, offers Mac users 14 MIPS of computing power and a transparent Mac interface to the UNIX file system. The board was scheduled to ship early next year and the price had not been finalized at press time. For more information, call Du Pont Pixel Systems at 800/225-8418.

SIMMs for Solid State Storage

Newer Technology is preparing SCSI Dart, a Mac version of DartCard, its nonvolatile RAM disk drive for the PC. The SCSI Dart has 16 slots for memory, providing a maximum capacity of 64MB, and may be upgraded in increments of two 256K, 1MB, or 4MB SIMMs. At press time, very tentative pricing for the unit was $995 with no memory and $1495 with 4MB. For more information, call Newer Technology at 316/685-4904.

Electronic Camera Replaces Film with Floppies

Canon’s $995 XapShot camera records photos on a two-inch video floppy and can be hooked to an inexpensive digitizer such as Digital Vision’s color ComputerEyes. The images can then be treated like any digitized image. For more information, contact Canon at 516/933-6300.

When a Dot Is Not a Pixel

Canon has just introduced the first ink jet printer for the Macintosh that creates variable-size pixels. The $4995 Full Color Printer changes the size of pixels to produce different colors and shades. Halftones are reproduced in the same way. The printer requires special paper and takes 8 1/2 minutes to produce one 8-by-6-inch image at a resolution of 160 dpi. For more information, contact Canon at 516/933-6300.
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.

In terms of speed, only a very few milliseconds separate the Jasmine and the Ehman hard disk drives. Both come with excellent back-up and hard drive utility software programs included free. Both come with two-year warranties and a 30-day money back guarantee. And since both companies have been around almost since the time Macintosh was first introduced, both 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.

The reasons for such a difference trace to our low Rocky Mountain overhead and a business philosophy centered around customer value and service. And now, for the first time, we’re offering a 24-hour replacement program in the unlikely event that your Ehman drive should require repair.

But don’t take our word on it. *MacWorld Magazine* called the Ehman drive "a real bargain." Call us today and see the difference for yourself.


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>$399</td>
</tr>
<tr>
<td>30+</td>
<td>$379</td>
<td>$449</td>
</tr>
<tr>
<td>45+</td>
<td>$449</td>
<td>$499</td>
</tr>
<tr>
<td>60+</td>
<td>$499*</td>
<td>$579</td>
</tr>
<tr>
<td>80+</td>
<td>$579*</td>
<td>$649</td>
</tr>
<tr>
<td>105</td>
<td>$799</td>
<td>$899</td>
</tr>
<tr>
<td>125</td>
<td>$899</td>
<td>$999</td>
</tr>
<tr>
<td>180</td>
<td>$1099</td>
<td>$1199</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.
The more you work with numbers, the more you'll like working with Wingz. Wingz is the fastest, easiest way to transform your raw data into eye-catching persuasive graphic presentations. What more can we say? Wingz simply has more. Which means every other spreadsheet has less.

**WINGZ HAS DRAWING TOOLS.**

The Wingz drawing tools give your work a finished look quickly and easily, without using another software application. Choose from line, arc, circle, rectangle or polygon tools. And after you've drawn the basic shapes, you can color, size, group and move them.

**WINGZ HAS 3D GRAPHICS.**

3D graphs make your data more understandable and more impressive. And Wingz is the only spreadsheet with built-in 3D graphic capabilities. Wingz features 3D bar, 3D line, 3D layer, 3D step, 3D pie and 3D combination graphs. You can change the rotation, elevation and viewing distance of your 3D graphs.

**WINGZ HAS UNLIMITED COLOR AND FONT SELECTIONS.**

Color enhances the appearance of your data. And Wingz maximizes your use of color. In fact, the number of color choices is limited only by your hardware. If you have a 24 bit color system, you'll have over 16 million color choices when you enter our custom color mixing dialog box.
Wingz Has HyperScript.

You don't have to be a rocket scientist to do powerful, work-saving programming in Wingz' HyperScript. (Although a lot of rocket scientists are using Wingz.) HyperScript unleashes the full power of the Macintosh. HyperScript uses intuitive English language commands, not abstract jargon.

For example, to hide the cell grid with Excel macros would require:

```excel
=DISPLAY (false, false, true, true, 0)
```

To perform the same action in HyperScript:

```hyper
HIDE CELL GRID
```

It's that simple.

Wingz Has Happy Users.

According to International Data Corporation (July, 1989) Wingz ranked number one in user satisfaction among Macintosh spreadsheet users.

Wingz Has Buttons.

Buttons can make your spreadsheet as easy and natural to use as the radio or the dishwasher. They're easier and faster than menus or typing in commands. (You can also put other Macintosh controls, including radio buttons, check boxes and slide bars, directly onto the worksheet.) Just as important, buttons unleash the power of HyperScript. So you can attach lists of frequently used commands to buttons, and then execute them with the click of a mouse.

Wingz Has Future Users.

The same survey found Wingz an eye-popping two-to-one favorite when users were asked which spreadsheet they intend to buy in the next six months.

In fact, all the graphics in this ad were created with Wingz and QMS ColorScript 100 Printer.

And when your reports and graphs look great, so do you.

Now If Wingz Has All This, Shouldn't You Have Wingz?

Just call toll-free 1-800-331-1763, Ext. 1000, to find the Wingz dealer nearest you. In Canada, call 416-566-7024.

©Copyright 1989 Informix Software, Inc. Informix and HyperScript are registered trademarks and Wingz is a trademark of Informix Software Inc.; Apple and Macintosh are registered trademarks of Apple Computer, Inc.; all other trademarks are used for information purposes.
La Cie products are the choice of professional critics and critical professionals. But don't take our word for it, take Macworld's, MacUser's and La Cie customers. You will find that La Cie creates the standards for excellence.

"Sure winners, the lightweight, silent and inexpensive Cirrus drives from La Cie come with first-rate utility software."


Cirrus drives are fast and quiet — most models boast a 1:1 interleave and 15 ms seek time. Cirrus drives are first in speed and silence in the Macworld tests. We achieve speed by pairing the finest 3-1/2" drive technology with the best software drivers available exclusively from La Cie. Cirrus is silent because La Cie uses 1/2 speed fans — found only in Cirrus drives.

"There's no benchmark test for hardware design, but the elegance and convenience of a drive — an external one in particular — should concern you."


La Cie offers you mass storage solutions from 42 to 1038 megabytes. Except for the 613 and 1038, all drives weigh under 4-1/2 pounds and measure less than 3"x6"x9". These compact units don't clutter up your desk-top and do fit into our FREE shoulder-strapped Cordura ™ carrying case or inside your brief-case for easy portability.

```
<table>
<thead>
<tr>
<th>Capacity (Mb)</th>
<th>Speed (ms)</th>
<th>Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>25</td>
<td>599</td>
</tr>
<tr>
<td>93</td>
<td>25</td>
<td>899</td>
</tr>
<tr>
<td>137</td>
<td>23</td>
<td>1399</td>
</tr>
<tr>
<td>182</td>
<td>23</td>
<td>1699</td>
</tr>
<tr>
<td>42</td>
<td>15</td>
<td>699</td>
</tr>
<tr>
<td>76</td>
<td>15</td>
<td>899</td>
</tr>
<tr>
<td>84</td>
<td>15</td>
<td>999</td>
</tr>
<tr>
<td>105</td>
<td>15</td>
<td>1099</td>
</tr>
<tr>
<td>138</td>
<td>15</td>
<td>1499</td>
</tr>
<tr>
<td>172</td>
<td>15</td>
<td>1799</td>
</tr>
<tr>
<td>613</td>
<td>15</td>
<td>3399</td>
</tr>
<tr>
<td>1038</td>
<td>15</td>
<td>5199</td>
</tr>
</tbody>
</table>
```

"La Cie products were my favorites."

Macworld, September 1989.

All Cirrus drives include our Silverlining ™ hard-disk-management software, Silverserver ™ hard-disk-sharing software and DS-Backup.

"La Cie drives include the best software we tested."

Macworld, September 1989.

5 YEAR mfg. warranty now included.

Silverlining performs hard-disk management tasks like formatting, partitioning, diagnostics, password protection, defragmentation and much much more.

"The best survival history of any drive purchased."

Al Forster, Dow Chemical.

All Cirrus drives are burned in for 24 hours before shipping, include a 30 day money back guarantee, and most drives offer you the reassurance of 50,000 hours of continuous use — that's 5.7 years!

"Of all the drives tested, we recommend La Cie's Cirrus drives."


So compare. You'll find there's really no comparison at all — just lots of good reasons to order your Cirrus drive today.

Call us now.
1-800-999-0143

16285 SW 85th, Bldg. 306, Tigard, OR 97224, (503) 684-0143

Prices shown are cash prices and do not include shipping. Add 5% for VISA, Mastercard, 5% for American Express. Add 10% for rush handling. Cirrus, La Cie, Silverlining and Silverserver are trademarks of La Cie Ltd. Macintosh is a trademark of Apple Computer. Prices and specifications shown are subject to change without notice. * 5 year warranty on selected models only.

Circle 145 on reader service card
Will You Buy This Portable?

Inquiring minds want to know, as Apple unveils the long-awaited luggable

by Jerry Borrell

Everyone wants to know after all of these years of waiting: Should we buy this thing? Let's look at the downside. It's expensive, it's heavy, it doesn't have color ROMs, (it can't open a lot of color programs, and it can drive a color monitor only if you set monitors to black-and-white mode in the Control Panel). Like earlier machines, the Macintosh Portable will doubtless be superseded by another more powerful model. The Portable is limited, for now, to a couple of megabytes of RAM (so MultiFinder will probably have only occasional use) and a 68000 processor for a CPU. There is 1MB on the system board, and one slot for memory expansion. And Apple recommends that only static RAM be used. This is the most expensive variety of semiconductor memory, but it's fast and requires less power. Apple will offer memory upgrades, but not at the time of announcement and shipment.

In its carrying case, the machine looks like an old-fashioned Remington portable typewriter—big and bulky. (Speaking of bulky, Apple will be the only source for the battery.) In fact, given the Portable's weight (about 16 pounds), I feel better calling the Mac Portable a luggable or a transportable. It has a trackball built in, but most of us won't want to do a lot of work with that. Jeez, can't wait—can you?

TO BUY OR NOT TO BUY

So, do I want one? After some unhappiness about the computer's shortcomings hit me (and threatened my wallet) and I had time to cool off, the answer is yes. Now I'm going to spend the next several paragraphs telling you why I advocate plunking down about $6500 to buy a Macintosh Portable.

First some background. As a journalist and an editor at five computer magazines, I've been using and breaking portables for longer than I care to remember. (The first thing I did to the Mac Portable shown during the product introduction was to knock it off the table onto the floor. The computer was in its carrying case and, after the gasps died down, product manager Didier Diaz opened the case, took the machine out, redadjusted some loose parts, and started the machine—no problem. Impressive.)

I've used portables most people won't remember. Like the Hewlett-Packard laptop. The DOT. (DOT was a great little machine. 8086, 600 by 400, built-in thermal printer, 3½-inch drives.) The Chameleon. The Panasonic hand-held computer in a briefcase that came complete with acoustic coupler. The Osborne. The first Compaq portable. The Kaypro. And the original IBM portable. I've lugged them all, I've broken a lot of them. I found them all less than useful.

But that was the past. To be fair to readers and the market for portable computers, I needed to see what had happened to portables in recent years on the DOS side. So I visited the Computer Attic store in Palo Alto, California. I wanted a store that carried both Toshiba and Compaq portables.

The first thing I said to Computer Attic salesman Camp Peavy was, "I want to buy one of your best portables." Peavy quickly escorted me to the Compaq 386. It reminded me of an incident I'd seen a week earlier at JFK airport. This guy balanced a Compaq 386 on the edge of a seat divider, held a keyboard on his lap, and tried to read the display sideways at the same time. The thing wouldn't sit on his lap. He looked miserable. Typical DOS machine, I thought at the time.

Nevertheless, I wanted to give it a chance. "What's it got?" says I to the salesman. "Well, a 40MB hard drive; 1MB of RAM, expandable to 13MB; a 20MHz (continues)
NO MATTER WHAT
YOU FEED
YOUR SCANNER,
ACUTEXT CAN
READ IT.
Finally artificial intelligence comes to OCR. Introducing AccuText™ document scanning software by Datacopy. The first Optical Character Recognition software that truly allows you to watch your p’s & q’s.

Unlike other products, Datacopy’s AccuText is one of the first true applications of artificial intelligence. It actually thinks and learns as it works.

Scan thousands of typestyles and AccuText will recognize them. Scan a poor-quality photocopy or facsimile and AccuText will decipher it. And when you show AccuText a document, it will reconstruct its format automatically—headlines, italics, and underlines. Spacing, line-feeds, and indents. Even justification and tabs.

Plus, the built-in 50,000 word lexicon insures that your input will always form legal words in their intended sequence. Which means that amiable won’t become am i able. All of which means that proofreading normally associated with scanning is virtually eliminated.

What’s more, AccuText is compatible with the leading scanners—Datacopy’s complete line of scanners, Hewlett-Packard’s ScanJet™ and ScanJet Plus,” the Apple Scanner, and others.

The best part is that AccuText transfers all of your information into your current word processing, desktop publishing or spreadsheet programs.

If this sounds too good to be true, pick up the telephone and give us a call. We’ll tell you all about AccuText from A-Z and where to find your nearest dealer. And give your current software a little R & R. (800) 821-2898.

Datacopy Xerox Imaging Systems, Inc.

Copyright 1989 by Xerox Imaging Systems, Inc. Datacopy, AccuText are trademarks of Xerox Imaging Systems, Inc. All other product names are trademarks or registered trademarks of their respective holders.

Circle 376 on reader service card
Circle 361 on reader service card.

80386; a 5¼-inch floppy drive; and a plasma display for $6060. My immediate reaction was pretty good. The Mac Portable is in for tough sledding. Then I stared at the screen. Could my eyes be deceiving me? The interface, with those abhorrent DOS directories, was the same as it was when I sold my IBM PC in 1986. It's still using the A> prompt. Good God, this is progress? What about all of that interface stuff I’ve been hearing to these past two years about Windows and Presentation Manager?

“How long is the battery life?” I asked. “Well, sir, with the plasma display it has to be plugged in to the wall.”

Then we went to look at other portables—ones that could operate on batteries. Most had LCD displays. We started with the Toshiba 80386-based family. Same deal—it used a plasma display. Now that's portable, I thought, spying the Toshiba 1200 on another table. “How about this one?” I asked. “Oh, the Toshiba 1200,” Peavy responded. “It's got an 80268, 1MB of RAM, 3½-inch floppy drive, 20MB hard disk. Only $2000.” My eyebrows went up—had I found the Macintosh Portable killer? Perhaps not. I looked at the screen. In polite terms, it was garbage. Small, hard to read, little contrast, poor keyboard.

“But if you really want a true portable with power,” Peavy went on, “you should look at the new Compaq SLT.” We moved back to the original table. “This machine has a 12MHz 286; 1MB of RAM, expandable to 3MB; a 40MB hard disk; a battery life of three to four hours; a slot for a math coprocessor; VGA graphics; built-in 2400-baud modem. It weighs only 14 pounds and folds up into one small package.” And it did. I hefted it. Good design. Respected manufacturer. Nice. “It lists for $5125, but today I can offer it to you for $4595. I sat it up again and started looking real hard. This is the Macintosh Portable competitor (especially for anyone with a cost discount on the Apple list price). But there were those DOS directories again. And the viewing angle on the LCD screen was poor; no, it was awful. The cursor smeared as I typed. And the keyboard is junk. (Hey, I live on a keyboard, I’m picky.)

All things said, I’d rather be in Kansas with a Macintosh portable. In desperation I grabbed a copy of Byte off the store shelf. It had a cover article on DOS portables. Featured on the cover were the Agilis and the Zenith Minisport. The Agilis, with a chiclet keyboard and a configuration equivalent to the Macintosh Portable, would cost about $8000 (and include all the advantages of DOS). The Zenith, though cheaper, isn’t available in the same configuration as the Mac Portable.

THE REAL REASON TO BUY

First of all, the Portable is a no-compromise Macintosh. When Jean-Louis Gassée said that to me, I thought, it was more product PR. In retrospect, it actually meant something. Apple could have built a cheaper, lighter, less functional machine a year ago. Instead, the company opted to make the Macintosh Portable. And if you don’t understand the distinction, read the fine print about a machine like the new IBM portable. The small type informs you that due to design decisions, some programs will have problems. Okay—PixelPaint Professional and some color programs simply won’t run on the Mac Portable, but it runs spreadsheets, word processors, databases, communications, games, and virtually everything else with no compromises. (Pity the poor engineers at Apple who have to revise system software and ROM for every new machine so that every application out there runs as if the new machine were designed for that application. They’re the unsung heroes of the Mac world.) If you still don’t get it, then you also don’t mind DOS.

The Portable’s screen is crisp—the best flat-panel display on a portable computer. Period. The screen is actually pleasant to use. It’s big, but it also fits conveniently on an airplane tray table. Or on your lap. It’s stable. It has a great keyboard. (Don’t mind not being able to detach the keyboard to use it; in fact, I prefer it.) And I may not like the trackball, but if I’m on a plane, I don’t want to run a mouse on my pants leg. So the trackball’s convenient. And when I’m ready to add a mouse, it connects easily via the ADB port in the back.

The battery life is quoted at eight hours, due to power-saving techniques (continues)
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**
  45Megabytes 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. 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.
Letraset Software. Graphic Design First.

Have you ever asked yourself what it takes to develop software that lets your creativity run wild and keep pace with your imagination? Software that gives you the power and flexibility you need to experiment, to turn a good idea into a great one?

Maybe it's time you did. Particularly if you're in the market for software that can help you create incredible layouts. Develop type solutions that you thought you could only get by hand. Create custom halftones and effects without ever calling the lab.

What it takes is more than a company that specializes in just software. It takes a company that understands graphic design and software. A company with 30 years experience in graphic design, with the software expertise to put together tools that understand the way you work.

Software that puts graphic design first.

Come see Letraset, for Graphic Design Software from the graphic design specialists.

In the U.S. call 1-800-343-TYPE for information. Outside the U.S. contact any Letraset international subsidiary.
Images Created using Letraset Software:
DesignStudio™, ColorStudio™, ImageStudio™, LetraStudio™, FontStudio™, LetraFont™, Type Library
The Rendezvous™ electronic appointment diary keeps you in control, working smart, prioritized, organized and on time.

And in case you ever forget, Rendezvous™ remembers.

Complete package $200.

PMC Telesystems Inc.
(604) 255-9949
P.O. Box 5127, Vancouver, B.C. V6B 4A9

Circle 395 on reader service card.

Copy II®

for Apple Macintosh

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

...Copy II is now a utilities package whose components are powerful, useful, and, best of all, easy to use."
Jake Paden
MacUser 3/89

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 H.F.S., M.F.S., 400K and 800K disks, 1 or 2 drives, hard disks and all available memory.

To Order: see your local dealer.

$39.95

Central Point Software

INCORPORATED
- Founded in 1981 -
15220 N.W. Greenbrier Pkwy. #200
Beaverton, OR 97006 USA
503/690-8090

Circle 357 on reader service card.

THE LIMITATIONS OF REALITY

But why a 68000? Why no color? Reality. Motorola does not make a low-power version of the 68020 or 68030 yet—maybe next year. To produce a real Mac and make it portable, Apple was forced to build a computer with a higher-performance version of the 68000. And Apple's engineers simply could not make a 68000 do enough processing to support color graphics, especially not 32-bit QuickDraw.

So we got the machine that technology allowed Apple to build.

And because I want to carry my office along, want to write on a real computer with a usable screen, collect my mail, and log on to the office network while I'm on the road, I think the Portable's a good trade-off. It makes it worth writing that check.
A color display is a major investment. Before you settle for second best, you owe it to yourself to experience the MegaScreen. 

MegaScreen is the first choice 19" color display system for Macintosh II family, according to Macworld magazine's August issue. They praised the rich, precise color and the flicker-free performance. Our monitor uses special Trinitron-technology tuned to our uniquely high standards. With our high-refresh graphics controller, it produces accurate color and a stable image. And for all its performance, it costs less than some second choice systems. 

Our #1 rating should come as no surprise, since our black and white system was rated #1 as well. And, after all, we pioneered dual-page displays for the Macintosh. 

Call us at (805) 484-3799 for a review reprint and your nearest dealer. 

MegaScreens by MegaGraphics. We make technology beautiful.
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.
We're celebrating our fifth year anniversary. Join us for incredible savings on every issue of Macworld.

Discover Macworld with a Special Anniversary Savings Rate!

12 ISSUES JUST $24

Each issue is packed with powerful techniques, straight-shooting reviews, tips and how-tos.

☐ YES, send me one year (12 issues) for only $24.00. That's almost 50% off the annual cover price of $47.40.

☐ Even bigger savings! Send me two years (24 issues) for just $37.90.

Name ____________________________

Company ____________________________

Address ____________________________

City/State/Zip ____________________________

This rate limited to the USA and its possessions. Basic subscription price is $30 for 12 issues. The annual cover price is $3.95 per issue. $47.40 for 12 issues. Please allow 6 weeks for delivery of the first issue.

MACWORLD

Develop an understanding of the Macintosh with thought-provoking articles and insightful features.

☐ YES, send me one year (12 issues) for only $24.00. That's almost 50% off the annual cover price of $47.40.

☐ Even bigger savings! Send me two years (24 issues) for just $37.90.

Name ____________________________

Company ____________________________

Address ____________________________

City/State/Zip ____________________________

This rate limited to the USA and its possessions. Basic subscription price is $30 for 12 issues. The annual cover price is $3.95 per issue. $47.40 for 12 issues. Please allow 6 weeks for delivery of the first issue.

MACWORLD

User-friendly hints and applications to make using the Mac more fun and productive than ever before.

☐ YES, please send a one year subscription (12 issues) to my associate or friend listed below for only $24.00. That's almost 50% off the annual cover price of $47.40.

☐ Please Bill Me Later.

Send Gift To:

Name ____________________________

Company ____________________________

Address ____________________________

City/State/Zip ____________________________

This rate limited to the USA and its possessions. Basic subscription price is $30 for 12 issues. The annual cover price is $3.95 per issue. $47.40 for 12 issues. Please allow 6 weeks for delivery of the first issue.

MACWORLD
No other magazine helps you like Macworld. Powerful, Intuitive and Friendly. Macworld is a wealth of information which keeps you up to date on the latest products, news, tips and tactics. Dedicated exclusively to the Mac II, SE and Plus.

We look out for your interests. We tell you what’s new for the Mac. What it does. Who it’s for. Compare similar products—and name names! Discuss pros and cons. Assess value for money for both hardware and software.

Macworld helps you make the most of your Mac.

MAIL THE ATTACHED CARD TODAY!
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. Indeed, it does quicken the time required for routine bookkeeping.

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
  • "Modeless" 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.

SPECIFICATIONS
Software Compatibility: Exports to SYLK, Text, Excel*, HyperCard® and MacIntax
Hardware Compatibility: All Macintoshes with at least 512K RAM. Works with your printer and monitor. We guarantee it.
Capacity: Unlimited number of bank accounts and transactions (subject to available disk space). Maximum amount to $5,000,000,000.
Other: Unlimited FREE technical support. Not copyrighted. Checks are preapproved by all financial institutions in the US and Canada. Sample checks and order form are enclosed in Quicken package. Also available for IBM and compatible Apple IIe (feature sets vary).

Quicken is available at most computer and software stores.

Say Goodbye to Financial Hassle!
Try Quicken FREE for 30 Days
Order from the coupon below, and if you're not completely satisfied for any reason, simply return it for a full, no-questions-asked refund. So, why wait? Say goodbye to financial hassle, and order Quicken today.

Send in the coupon, or call 1-800-624-8742 U.S. and Canada.

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 Vers. 1.5 for Macintosh, US $59.95, includes free shipping to US and Canada residents. For charge card 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 CODS please)
□ Visa □ MasterCard □ American Express

Card No ________ Exp. Date ________

Signature ________________________
Mail to: Intuit
540 University Ave.
Palo Alto, CA 94301

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-MW11
The fastest way to learn Macintosh software is to play it by ear

The fastest way to learn software is to have an expert sit beside you and talk you through the program, step by step. With your hands on the keyboard, trying each new skill as it's explained, learning is a snap.

So Personal Training Systems gives you that expert—on an audio cassette. Each 90-minute tutorial contains the cassette, example files on a disk, and a quick reference card. It's like having your own private tutor... only this one works anytime, anywhere, and doesn't charge by the hour.

In addition to training on the Macintosh itself, tutorials are available for Microsoft Excel, Word and Works; Aldus PageMaker and Persuasion; Adobe Illustrator 88; and HyperCard. Since we offer beginning, intermediate and advanced levels for each software program, there's sure to be one that meets your needs.

All our tutorials are unconditionally guaranteed. You'll learn how to use your Mac or favorite software program—without opening a book or attending a class—or your money back.

So if you're looking for a fast, convenient, affordable way to learn, contact Personal Training Systems by calling 1-800-TEACH-99, or mail in the coupon below. Because we know you have better things to do with your time.

YES, please send me information on Personal Training for:
- Macintosh
- Excel
- Word
- PageMaker
- Illustrator 88
- FileMaker
- HyperCard
- Persuasion
- Works
- FreeHand

Name ____________________________
Company _________________________
Street ____________________________
City ____________________ State ______
Zip ____________________ Telephone No. __________

PERSONAL TRAINING SYSTEMS
408-559-8635  P.O. Box 54240  San Jose, CA 95154
800-TEACH-99

Circle 42 on reader service card
LETTERS

A forum for Macworld readers

Upgrade Mania

I've been a Word/Excel/File user from the early days in 1985 and have never failed to keep current by chipping in a few bucks for the occasional upgrades. I flinched when Word 4.0 came out at $50—a substantially higher upgrade fee than ever before. But I am absolutely fuming about Excel 2.2 costing me $99! For $99, you get version 2.2, which seems only moderately better than 2.0.

In the past, a $20 to $30 upgrade fee was thought to be a moderate fee to cover Microsoft's costs and perhaps pay for a little R&D. But fees of $100 cover more than the disk they send you. Charging a $99 fee to established Excel users constitutes profiteering off Microsoft's loyal customer base.

If you like Excel and want to use the latest version, you've got no choice but to cough up $99—and brace yourself for the many $99 fees in the future. Of course, you could take my route and cut your losses. Goodbye, Excel. Hello, Wingz.

David Lange
Glennview, Illinois

DMA and the NuBus

Your article "New Life for the NuBus" [July 1989] cites DMA (direct memory access) across the NuBus as a panacea for the Mac's slow SCSI transfers. To quote from Apple's own Macintosh Technical Note #221, "The Macintosh is not real-time. The Macintosh doesn't support DMA."

Two myths are perpetuated in the article. The first is that the Mac's CPU is free to perform other tasks while another bus master is DMA-ing to its memory. Since the other master takes control of the CPU during DMA transfers, the CPU is completely incapacitated. And until Apple provides hardware support on the system board for DMA, this will not change. In addition, the NuBus specification does not provide for DMA hardware support.

The second is that other bus masters are as fast as the Mac in transferring data across the NuBus. The Mac has a 4-to-1 speed advantage over other masters on the bus. It takes the Mac 50 nanoseconds to arbitrate for the NuBus, while other masters require 200 nanoseconds. Consequently, the Mac is much faster at pulling SCSI data from a slave across the bus to the Mac's memory than another master is at pushing data into it. All in all, DMA-ing SCSI data across the NuBus to Mac memory buys very little in performance. It's unfortunate that a powerful technology, like DMA, gets hailed by some manufacturers as the ultimate solution to every performance problem regardless of the specific situation. And unfortunately for the user, such behavior perpetuates the myth that any new technology offers a universal cure to all performance shortcomings.

Finally, FirePower, our 68020 Macintosh Applications Platform, was listed in the wrong category. It should be listed under coprocessors.

Marsha Moraes
Golden Triangle
San Diego, California

Corrections

The phone number for Bantam Electronic Publishing (New Products, June 1989) is 800/223-6834, ext. 9479 (212/492-9479 in New York City).


The bug in QuarkXPress that caused irregular spacing in justified italic text was fixed in version 2.1 (Letters, September 1989). QuarkXPress 2.1 also has a graphics search-and-replace feature that allows you to update or relink graphics to a document.

PLI's Disk Drives

Several things have changed at PLI since the article "Hard Disk Alternatives" [July 1989] was written. One statement was somewhat misleading as well.

PLI has discontinued production of its 10MB floppy (continues)
disk, the Infinity 10, and has begun shipping the Turbo Floppy 1.4, an external 1.4MB floppy disk upgrade for the Mac Plus and greater. PLI is also introducing the Infinity Optical drive, a rewritable magneto-optical drive.

The section about 45MB removable hard drives states that “drive utilities from larger vendors (Jasmine, Mass Microsystems, and Peripheral Land, for example) are often worth several hundred dollars on their own.” The problem with this statement is that Jasmine does not offer a 45MB removable, and Mass Microsystems ships only a partitioning program. On the other hand, Peripheral Land (or PLI, as it is now known) bundles its TurboWare utilities—which would cost $436 purchased separately—with the Infinity 40 Turbo.

Tad Shelby
PLI
Fremont, California

Guarding Against Surges

I've just read Thom Hogan's column “Keep Your Mac Healthy” [State of the Mac, July 1989]. I've been installing and maintaining electrical and data lines for five years and have a few prescriptions for avoiding power-related problems.

First, a hard-wired receptacle that replaces an existing wall outlet has a higher level of protection than a protected outlet strip or some other plug-in device. Also, the farther away you install surge arresters from your breaker or fuse box, the better they work.

Since surge protectors do not protect against lightning, avoid using your computer during an electrical storm. If you must stay online, invest in a lightning arrester. You can expect to spend at least $450 for a unit that can handle an average residential service.

Computers and peripherals should be connected to grounded outlets. Don't assume that equipment is grounded because you've used a receptacle with a third prong for grounding. Have an electrician check it or get an outlet tester. If you use an extension cord, make sure it's a three-wire cord. Never use a three-prong to two-prong adapter.

If possible, install a dedicated circuit for your computer and avoid running this wire parallel to other wires. If you must use a non-dedicated line, have an electrician check to make sure this circuit is not sharing its neutral (white) wire with another circuit.

Static electricity can be as damaging as a surge. Use a static-reducing spray and install a static mat under your chair.

If you have a modem, invest in a surge arrester for communications equipment. Finally, when cabling a printer or LAN, avoid running the wires parallel to power lines.

Thomas Ogryski
Shineston, West Virginia

Healthy Skepticism

Keep Your Mac Healthy” was in the right spirit, but it was poorly executed and

The best printing solutions don’t always come...
full of misinformation. First, the article suggested that you should leave a hard disk on as much as possible to keep dust off the spinning platter. The hard disk media is in a sealed module through which no air flows. The idea of dust getting in is ludicrous and is certainly no reason to leave a hard disk on continuously (which means you've thrown away many hours of useful life).

Then you overlook the actual reason smoke and dust are so dangerous to floppies. Ash and dust particles small enough to travel in the air are highly abrasive; your heads and media will be scratched into oblivion long before any mythical layer can build up thick enough to block the signal.

And what's this about lightning jumping cables to get to a disconnected computer? Electricity follows the path of least resistance to ground. No ground, no path. Yet you leave the impression that there's nothing we can do, and even disconnected equipment is vulnerable to the whims of nature.

One moment you're telling us not to vacuum our equipment because we might damage something, and the next you're saying we should open the Mac and use a pencil eraser to clean the contacts on the SIMMs. Scratching through the gold plate on the contacts with an eraser guarantees oxidation and future problems. Why not contact cleaner and a soft cloth?

And what about discharging the CRT first? It can keep a lethal charge for days. Advising anyone who doesn't know any better to poke around inside a Mac is foolish and demonstrates reckless disregard. Why no warning?

Frank Jaubert
Houston, Texas

You shouldn't open a Mac Plus or an SE and meddle with its innards—unless you know how to discharge the CRT safely. See the Apple Service: Technical Procedures, Macintosh Family manual for details. Disconnecting just the Mac from wall sockets may not be enough to guard against lightning, because spikes can come into a computer through other equipment (such as a modem or printer) that is still connected.

Although contact cleaner may be preferable for cleaning board edges, most engineers use erasers because they're handier. With reasonable care (gently lift off the dirt, don't abrade the contacts), it should work fine.—Ed.

---

from mixing apples with apples.

It used to be that when people wanted a printout from their Apple computer, the first thing they thought of was an Apple printer. But things change.

Because now your Macintosh can give you letter-quality printouts on a high-resolution 24-pin Toshiba printer—at a cost that's not much more than a 9-pin Apple printer.

All it takes is our new, low-cost MacMatrix diskette and connecting cable. In no time at all, MacMatrix can teach your Macintosh to give you crisper, cleaner printouts. With features like scaleable outline fonts and 360x360 DPI graphics.

So basically what we've come up with is a new twist on an old idea. A teacher for the Apple.

Circle 480 on reader service card.
A powerful argument for the Macintosh IIcx.

One of the best arguments for owning the new generation of Macintosh® personal computers is the new generation of Macintosh software.

Presenting FullWrite Professional™ and Full Impact™ from Ashton-Tate.

FullWrite Professional combines a full featured set of powerful writing and publishing tools with an interface that's so easy-to-use, it could only have been written for the Macintosh.

Full Impact brings the promise of Macintosh to reality for the users of spreadsheets. Full Impact's accessible power lets you quickly place charts, graphs, text and numbers all on one page. All at one time.

Together, FullWrite Professional and Full Impact let you take full advantage of the full power of the Macintosh IIcx. For a free sampler of either FullWrite or Full Impact, call 1-800-437-4329, ext. 2102.*

And who could argue with that?

* In Colorado call (303) 799-4900, ext. 2102. © 1989 Ashton-Tate Corporation. Apple Computer Inc. Ashton-Tate and the Ashton-Tate logos are registered trademarks and FullWrite Professional and Full Impact are trademarks of Ashton Tate.
The Macintosh IIcx is our newest member of the Macintosh family. It's sleek. It's powerful. And it's exceptionally versatile. But and best of all, it's a Macintosh. Which means you already know how to use it.

But to truly appreciate the Macintosh IIcx you have to see it at work. Blazing through spreadsheets. Or creating professional quality documents that look like they came from a publishing house.

And the best way to do just that is to call 1-800-538-9696 for the name of an authorized Apple® reseller who can give you a demonstration of the Macintosh IIcx with Ashton-Tate's FullWrite Professional and Full Impact software.

We're sure that one demonstration will resolve any arguments you may have been having about which computer you should have.

The power to be your best.
to the minimum visible width.

The Lasergraphics film recorder was incorrectly described as having a spot size of 1.7 millimeters. The spot size is actually 1.7 mils (1/1000 inch), which is 0.043 millimeters.

We now ship our film recorder with a 1.5-amp fuse to prevent the blown fuse caused by turning the recorder on and off too quickly.

Tracey Farr Hanel Lasergraphics Irvine, California

Baud versus BPS

In the sidebar “Data Carriers” in your article “Communicating at Speed” [July 1989], you correctly state that “baud is the same as bps (bits per second) only if each signal... represents one bit.” However, you also say that in general, beyond 3000 baud, modems start to use more than 1 bit per baud.

I was under the impression that this occurs at 600 baud, meaning 1200-baud full-duplex modems use two 600-baud channels with each channel using 2 bits per baud, and 2400-baud modems also use two 600-baud channels, but with each running at 4 bits per baud (one baud being a signal; 2 bits per baud means four distinct tones: one for 0, one for 1, one for 10, and one for 11). Four bits per baud implies 16 tones, currently accepted as the most an average phone line can handle; otherwise, 9600 baud wouldn’t be a problem: just use 16 bits per baud, or 256 different signals. You seem to be saying that 1200- and 2400-bps modems use 1200- and 2400-baud carriers, respectively, while both actually use 600-baud carriers.

Steve Ihde Chevy Chase, Maryland

Although modems can use single-bit representations on voice lines up to 3000 baud, many modems instead employ data compression at speeds below 3000 baud. Both 1200- and 2400-baud modems use a 600-baud carrier and some data compression scheme.—Ed.

High-Speed Compatibility

To correct your story on high-speed modems (“Communicating at Speed,” July 1989): our Courier HST modem’s high-speed channel operates at speeds of 14,400; 12,000; 9600; 7200; or 4800 (depending on phone line conditions); its low-speed reverse channel operates at 450 bps, as specified in the proposed V.34 standard.

Mark Smith
U.S. Robotics
Skokie, Illinois

Memorybank Mass Storage

We’d like to make a couple of corrections to your review of our Memorybank mass storage subsystem [Reviews, July 1989]. First, to change backup parameters, click the Edit button and edit the original backup list. You don’t have to “define a whole new set.” Second, a single file can be restored easily under the file/folder backup methodology.

Prudence F. Heikkinen
Northern Telecom
Ann Arbor, Michigan

---

Tables in PageMaker!

Aldus PageMaker® + TableTools™ = Tables in Desktop Publishing

To order PageMaker, visit your nearest authorized Aldus dealer. Or, call 1-800-333-2538, for a FREE information packet.*

To order TableTools, visit your nearest authorized Mansfield Systems dealer. Or, call 1-800-872-3332, In California 1-800-367-3332, for a FREE information packet.*


Circle 33 on reader service card
GOOD MORNING!

AGFA / ADOBE SEMINAR ON POSTSCRIPT AND THE FUTURE OF ELECTRONIC PUBLISHING

COFFEE 8:15

SEMINAR 8:30
“My future lies with PostScript®. Whatever that is.”
—a graphic designer

A lot of people—like you—depend on the PostScript page description language in their work, everyday. And a lot of them—like you?—aren't really sure what it is.

Or what it means for typography and electronic publishing.

Or what its future is.

To help answer important questions like these, AGFA Compugraphic and Adobe Systems Incorporated recently sponsored a series of free seminars across the country. Typographers, printers, MIS directors, designers and computer users attended. Most who came told us they went away with a lot of useful information.

Of course, not everyone who wanted to—or needed to—could attend the seminar. So we decided to do the next best thing.

Over the next few pages, we’re going to bring the seminar to you.
Imagine the Chinese ambassador wants to ask the Brazilian ambassador across the table to please pass the salt.

Unfortunately, he doesn't speak Portuguese.

But he does speak Malay. So he asks the Malaysian ambassador (who speaks Dutch) to ask the Dutch ambassador (who speaks French) to ask the French ambassador (who does speak Portuguese) to give him the message.

Sounds ridiculous, doesn't it?

Yet it's the way many people still go about producing a document.

Different people create text and graphics using different systems, with different output devices. Sometimes these devices are compatible. Often they aren't.

And, putting the whole thing together—setting type, scanning in images, page layout—involves many different systems and a lot of time-consuming work. It's a complicated process full of bottlenecks—and no common language.

Which is why Adobe Systems created the PostScript language.

**POSTSCRIPT LANGUAGE TO THE RESCUE.**

PostScript really isn't complicated at all. It's a standard language computers can use for communicating visual information.

PostScript acts as a common interpreter among many different computer systems and output devices that create images by laying down a pattern of dots. It's a transparent language—that is, you don't have to learn it to put it to use. (The computers and peripherals use it.)

Your application automatically “writes” a general code into your document which any PostScript interpreter can “read.” The interpreter tells the output device specifically how the document should look, optimizing that device's special features. (PostScript is a common page description language, but each device has its own interpreter.)

**A SINGLE LANGUAGE THAT UNDERSTANDS MANY LANGUAGES.**

Once you create a job file with a PostScript software application, you can output it on any PostScript device you choose—plain-paper printer, laser imagesetter, even a slide maker.

Adobe calls this “device-independence”, and it's a large reason why the PostScript language became the industry's standard page description language.

Over 40 different PostScript output devices are on the market today,
ranging from 300 dots-per-inch (dpi) plain-paper printers to 2,400-dpi laser imagesetters, to slide-making film recorders.

Over 4,000 software applications support PostScript—page layout programs, graphics and drawing programs, word processing programs, even spreadsheets. The roster of computer and graphic arts companies supporting PostScript includes AGFA Compugraphic, Apple Computer, IBM, NeXT Inc., and Digital Equipment Corporation, to name just a few.

A NEW WAY TO SHARE IDEAS.

There's another benefit to using PostScript products—different people can share jobs.

Say you want to create a document with both text and graphics. You lay out the page using Aldus PageMaker®. Your designer creates an illustration using Adobe Illustrator 88®. Because both are PostScript language applications, you can move the illustration directly into the page-layout file. You've just created a single job file using two different applications—and one common page description language.

You can transfer these files by exchanging floppy disks, or over local area networks like TOPS® or AppleTalk®. And because PostScript language files are standard ASCII files, you can send your information around town or around the globe, using standard telephone circuits.

IT'S THE OUTPUT THAT REALLY COUNTS.

Ultimately, all of this boils down to one thing—the quality of output you get on a page. The PostScript language first became a standard with designers because, as you're about to see, its creators understood as much about typography and design as they did about programming.
“RIGHT NOW WE WERE IN GUTENBERG WAS IN

The Fust and Schoeffer Psalter,
1458—the first book printed in color.
Gutenberg’s associates showed
that movable type, like PostScript,
wasn’t just a passing fad.

The higher the resolution, the
sharper the type, of course. So it’s
important to specify whether you
want final output from a laser
printer or an imagesetter like the
AGFA Compugraphic 9400-PS.

just five years after Johannes Gutenberg and his associates
published their Mainz bible—the first modern printed
book—they printed the psalter you see to the left.

In color.

While others believed movable type was a passing fad of
limited use, Gutenberg’s associates proved its possibilities were far wider.

If you follow desktop publishing this may sound familiar. Five years
ago, Adobe introduced the PostScript language, Apple introduced the
Macintosh and LaserWriter®, and Aldus introduced PageMaker.

Desktop publishing was born.

Today, you pick up a trade magazine and everyone’s talking about
color. Or “electronic publishing.” Some have even asked, “What comes
after PostScript?”

To us, the last question seems a bit odd. Because, like movable type
in Gutenberg’s era, the design possibilities of the PostScript language are
still in their infancy.

OUTLINE FONTS AND HINTED TYPE.

“Type,” as one of our colleagues put it, “is the blood that runs
through any publishing system.”

Before PostScript, type from personal computers was pretty
weak—unrefined bitmaps that couldn’t print clearly at small point sizes.
Characters defined by short, straight vectors that didn’t appear smooth,
especially at higher resolutions.

The PostScript language, on the other hand, uses precise
mathematical outlines called Bezier curves to define characters. The
curves make sure the rounded parts of your
letters are properly rounded. The outlines
let you choose different resolutions, because
each output device “fills” the outline with
its own pattern of dots.

And to help characters keep their
character at low resolutions, Adobe adds
special hints to its PostScript fonts. These hints, “read” by Adobe
PostScript interpreters, preserve the most important typographic features,
such as equal stem weights and uniform serifs. (Of course, the type isn’t
exactly the same, because a 2,400-dpi imagesetter actually has sixty-four
times the resolution of a 300-dpi laser printer.)

POSTSCRIPT TYPOGRAPHY.

Hinting is an Adobe PostScript language exclusive. But it’s not the
PostScript language's only contribution to computer-generated typography.

Today, most PostScript page layout applications offer professional kerning and leading capabilities. You can space letters (kerning) and lines (leading) as you wish, on your own computer, proof the results on a laser printer, then output the final copy on a laser imagesetter.

Before the PostScript language, only proprietary typesetting systems offered these features. The systems weren't compatible with other computers, so all text—from headlines to entire books—had to be re-entered by the typesetter.

With PostScript, if things don't come out right the first time, you can make the changes yourself, instead of telling someone else what you'd like done. Chances are, this alone will eliminate a round or two of proofing.

DESIGNED WITH DESIGN IN MIND.

PostScript lets designers do other things they couldn't do before, too, such as rotate text, fill outline letters with patterns, and shadow letters. And it's easier to make type colorful, because color specification was included in the PostScript language right from the start.

Today, designers create letterheads, books, posters, and ads with PostScript type, such as the book jacket to the right. Designer Ronn Campisi combined AgfaType Professional Series Garamond 3" and Futura®, both hinted Adobe fonts, with AgfaType Studio Series Collage Italic, an unhinted user-defined font.

The faces were sized to fit, shaded, and color-specified. The result was a unique design created on a computer instead of a drawing board.

(User-defined fonts, incidentally, feature accessible character outlines that let you customize typefaces for logos, designs and headlines. Because they're unhinted typefaces, our Studio Series fonts are ideal for high-resolution output.)

With over 575 PostScript typefaces on the market today, there's a lot more we could say about type. But the PostScript language isn't just a type language. It's a text and graphics language. And these days, designers are doing things with PostScript language graphics we think you'll have to see to believe.

Designer Ronn Campisi created this book jacket using AgfaType Professional and Studio Series fonts. The type was sized to fit and output in the specified colors.

You can choose type from many different vendors. Agfa and Adobe together offer over 575 fonts, from classics like Sabon to the ITC Franklin Gothic® you're reading now.

The accessible outlines of AgfaType Studio Series user-defined fonts let designers create unique typefaces for high-resolution output.
Do-it-yourself pre-press. Proofs of the image above, separated on a Macintosh with Adobe Separator, and output as films on an AGFA Compugraphic 9400-PS.

Color came to the movies 50 years ago. Agfa PostScript products are bringing it to desktop publishing today.

Fifty years ago, Dorothy walked through a black-and-white doorway and into a world of color.

Today, the same thing is happening on our desktops. Color monitors are selling faster than monochrome monitors, and new color editing and separation software appears almost every month.

At the output end, things are changing, too. There are color PostScript printers, which are good for making a few prints, or proofs, at a time. Desktop color has come to slide presentations as well, and even to electronic publishing.

Today, it's possible to create a document at your desktop, or at several desktops, with color images, and prepare and output the separated films for platemaking without leaving the PostScript language format!

THE DAWN OF “DESKTOP COLOR.”

For many applications, you can control the entire pre-press process, from concept up to the final printing itself. And you'll save time, too, because you won't have to wait for the typesetting and color separations you now send out for.

What does this "desktop color" system look like? Basically, you need an Apple Macintosh with a hard disk and a good color monitor, a scanner (gray-scale or color), a laser printer (regular or color), color software, and an imagesetter. AGFA Compugraphic offers this type of system with its Macintosh-based professional publishing systems.

You compose pages using PostScript applications, combining text, images, and graphics. You can pull your proofs using a plain-paper laser printer such as the AGFA P3400 PS, or a color PostScript printer.

If your final output doesn't have to be of the highest resolution (an in-house newsletter, for example), you can do the color scanning and photo editing yourself with a low-resolution color scanner and editing software.

For highest-quality work, it's best to scan your images for position only with a gray-scale scanner like the AGFA Focus S800 GSE. Then send them to a color service bureau, along with your job file. The service bureau performs high-quality scans and separations using a professional color scanner (which, for the moment, is above the "desktop" price range), then merges the scanned images with your job file for final output.

You can now output the series of four registered films—cyan, yellow, magenta, and black—used for process-color printing with a PostScript
imagesetter like the CG 9600-PS, which is specially calibrated to keep all four films in register.

A POSTSCRIPT PRODUCTS SLIDE SHOW.

PostScript products and desktop color can enhance your presentations, too. Instead of text-only slides in simple block letters, you can produce professional slides that combine text, graphics and images.

You'll need a Macintosh (or PC) with color monitor, color scanner, page layout and color software, and the new AGFA Matrix PostScript film recorder—the industry's first—to set up a slide-making service bureau in-house. You create and scan images as needed, combine them into the final image, then output the image to the film recorder.

Consider the slide on the right. The hat was photographed as a 35mm color slide. This slide was scanned, a color halftone created, and the new image saved as a PostScript language file.

The line art and special text effects like shadowing were created using Adobe Illustrator 88. The background patterns were selected from the Adobe Collector's Edition: Patterns and Textures.

The designer combined the color halftone with the image to complete the file. The final image was produced on the new AGFA Matrix film recorder.

Because the entire process uses the PostScript language, the text and graphics reproduce on the slide with the same clarity of a printed piece. Instead of presentations where everyone sits reading what you've just said, you'll have them waiting to see what comes next.

WHAT COMES NEXT?

The technology you've just read about is state-of-the-art, but it's by no means complete. At AGFA Compugraphic, finding new ways to combine color and PostScript is our goal. Our new enhanced CG 9600-PS imagesetter is but one example.

In future months, we'll have more color ideas to share with you. In the meantime, the next spread may give you a better idea of what you can do right now.
All of the type, electronic art and most of the color halftones in this advertisement were produced on an Apple Macintosh, and output on AGFA Compugraphic PostScript imagesetters. One result: the designer has more control over page layout.


Two different companies, one common goal.

This advertisement is truly state-of-the-art, but it was produced with unmodified, affordable equipment. The point is, with the same equipment, you could do the same quality work today.

And by choosing PostScript equipment, you're choosing an industry standard that will continue to grow. Adobe Systems Incorporated is committed to keeping PostScript “the standard way computers communicate visual information.”

To back that commitment, AGFA Compugraphic offers the broadest range of PostScript type and output devices on the market today.

A family of PostScript solutions.

We’ve been in the graphic communications business for 29 years, so our products are designed with the needs of typographers, designers, printers,
ad agencies, and corporate operators in mind.

Our family of laser imagesetters—the CG 9400, 9600, and 9700-PS—all produce 2,400 dpi output for text, graphics, and color separations. They also offer better throughput, thanks to our new, faster Adobe RIP (raster image processor).

Our P3400 PS laser printer offers 400-dpi resolution combined with the twelve-pages-per-minute output of a departmental printer. Our AGFA Focus scanners and image-editing software let you add and alter graphics at up to 800 dpi.

Our sister division, AGFA Matrix, offers the industry’s only PostScript film recorder. And our AgfaType collection currently offers 575 fonts. With a library of over 1,700 typefaces to draw on, we plan to offer many more soon.

Behind all of these products are over 400 service engineers and product applications specialists who understand not only our products, but your business, too. And we offer a full line of AGFA Compugraphic phototypesetting materials and processing equipment.

QUESTIONS, ANYONE?

If you’d like to know more about the PostScript language, or the AGFA Compugraphic family of PostScript solutions, please return the attached reply card or give us a call at 1-800-227-2780 (in Canada 1-800-387-9533).

We’ll send you a set of free booklets on PostScript and the future of electronic publishing, written by the same Agfa and Adobe people who spoke at our seminars.

Thanks for taking the time to read through. The next time we get together to talk, we’ll be sure to send you an invitation.

PRODUCTION NOTES

This advertisement was created by Anderson & Lembke, Stamford, CT, with production assistance from Burns, Connacher & Waldron and MicroColor, New York, and Digital Pre-Press International, San Francisco. Page layouts were produced with Aldus PageMaker and QuarkXPress, using a Macintosh II and an AGFA Focus S800 GS scanner. Proofs created with AGFA P3400 PS and QMS ColorScript™ laser printers. Images scanned at 1K resolution, and color separations created with Adobe Photoshop imaging technology software and output on a CG 9600-PS imagesetter.

I ENJOYED YOUR SEMINAR. I'D LIKE TO KNOW MORE.

- I'm very interested in your family of PostScript® solutions. Please have an AGFA Compugraphic representative contact me.
- Please send me more information about your
  - PostScript laser imagesetters.
  - PostScript plain-paper laser printers and scanners.
  - AGFA Matrix PostScript film recorder.
- Please send me
  - Your free set of booklets on PostScript and the future of electronic publishing.
  - Additional copies of this advertisement.

Name ____________________________________________ Title ____________________________
Company ____________________________________________
Address ____________________________________________
City ____________________________________________ State __________________________________
Phone ____________________________________________

AGFA COMPUGRAPHIC DIVISION
Clash of the Titans

Four months of glowing praise and rave reviews for Microsoft Word 4.0 and no one bothered to mention that PageMaker can't place its files.

Gary B. Mohr
Bar Harbor, Maine

PageMaker was unable to place Word 4.0 files because the new version of Word was still in development when the current version of PageMaker was released. As we reported in Mac Bulletin (September 1989), a $25 upgrade to PageMaker 3.02 lets you place documents from Word 4.0 and lets you place and edit tables created with Word's new table features.—Ed.

The Insurer Speaks Out

Thank you for helping to remind people not to take everything for granted when considering the protection of their investment in computer equipment ['Protecting Your Investment,' Conspicuous Consumer, July 1989].

The homeowners' and renters' policies of the Farmers Insurance Group of Companies in California specifically exempt computers and software from the category of business property. So your use of the computer is not considered in the event of a loss.

Safeware is not an insurance company per se. The policy protecting computers is underwritten by Central National Insurance Company, at least in California. Farmers covers them under the policy as any other unscheduled personal property, that is, no inventory is required for the coverage to be effective.

I also object vehemently to your statement, "As a good Californian, I hate insurance companies." While insurance company-bashing is popular now, to characterize it as the duty of "a good Californian" is inflammatory and in poor taste.

Dale A. Dimas
Cupertino, California

Virtual Memory

Jerry Borrell's Commentary in the July issue provided a good overview of the ramifications of the new features Apple recently announced for System 7.0. However, there was one small problem with his mention of virtual memory, which he says is "crucial to Apple's commitment to retain a low-cost CPU that will run with only 1MB of main memory." Unfortunately, Apple's implementation of virtual memory is not intended to run under 1MB of RAM but will require 2MB.

The virtual memory software from Connectix, Virtual, works fine with only 1MB of physical memory, and version 1.05 even provides a 20 to 25 percent increase in speed on a 1MB machine.

Mark H. Arbibinder
Tibacca, New York

At only $995*

it's the most affordable tape system you can own.
And we can back it up.

Sooner or later your Macintosh will need the security of data back-up. So the question is, which method? Removable disk media is too expensive. Floppies are too slow. And some systems' media are too volatile.

That's why the Braemar SX40 Data Cartridge Sub-system makes sense. There's no faster, safer method of back-up than cartridge tape. And now, the Braemar SX40 makes it affordable. Braemar is a leading manufacturer of tape-based systems for the OEM marketplace. In fact, we make many of the drives sold by our competition.

So obviously we can back our claim. And build it for less.

TO ORDER THE SYSTEM THAT BACKS YOU UP, CALL.
1-800-328-2719

*60Mb per Cartridge Capacity. The SX40 uses the DEI or 3M Series 2000 Data Cartridge.
Macintosh brought the power of a computer to everyone. Now the New Macintosh Portable lets you take it everywhere. Like all Macintosh computers, it runs thousands of powerful business programs that work in the same graphic, intuitive way. But because it's a portable, it'll run them on the run.

Portable doesn't mean light on power. In fact, the Macintosh Portable crunches spreadsheets and draws complex graphics twice as fast as the Macintosh SE, our most popular computer.

An optional adaptor lets you show your Macintosh Portable screen on a TV screen. So you can use your hotel room for a Desktop Media presentation. And with an optional internal modem, you can send or receive information anywhere in the world. As long as you're next to a phone.

With up to 2 megabytes of RAM, you'll have plenty of space to run the most sophisticated programs. And with up to 40 megabytes of internal hard disk storage, you'll be able to take a lot of them along. In very little space.

If the keyboard feels like a real Macintosh keyboard, there's a good reason. It is. Another reflection of our design philosophy: Portability, yes. Compromises, no.
Even when there's no power.

We don't want you knocking around without a carrying case, so one comes with every Macintosh Portable. There's room for paperwork, extra disks, the battery charger, even an extra battery. We thought of everything.

Another thing you won't find in other portables is our Active Matrix display technology. The Macintosh Portable screen is the only battery-powered screen fast enough and sharp enough to display spectacular Macintosh graphics — even animation.

You could change the world in 10 hours. That's how long a battery charge typically lasts in the Macintosh Portable. That's 2-3 times longer than most other portables. A special Power Management System conserves power by putting the computer into a "sleep" mode whenever you take a break. It even has a handy little "fuel gauge" that tells you when it's time to start looking for a wall socket.

This polycarbonate shell is the same super-tough stuff used in motorcycle helmets. Appropriate protection for a precious brain.

The trackball does everything a mouse does. In less space. It allows you to control the computer without complex keyboard commands. You can even switch it to the other side of the keyboard if you're left-handed. Or if you still prefer the mouse, just plug it into the back. No other portable can give you the thoughtful details you'll find in the Macintosh Portable. Simply because no other portable is a Macintosh.

Portable is here.

The power to be your best.
Panorama Will Permanently Alter Your Viewpoint On Flat-File Databases

If you have the impression that all flat-file databases are pretty much alike, you’re in for a big surprise. True, you can use any database to simply store and retrieve information, but that’s where the similarities between Panorama and ordinary flat-file databases comes to an abrupt halt.

What makes Panorama so formidable is its spreadsheet-like analysis features that give you the power to unlock the secrets hidden in your data. In seconds a mass of sales figures becomes a valuable report ranking your top customers. Or, just as easily, Panorama tells you who your hottest salesmen are, what products are your biggest money-makers, or what regions have the fastest growth. Instead of just storing data, Panorama uses it to reveal the kind of useful information you need to get an edge on the competition.

Of course, data analysis isn’t Panorama’s only strength—it’s got everything you’d expect in a full featured database and then some. Panorama’s blazing speed, data entry shortcuts (including Clairvoyance®), full palette of form design tools, mail-merge capabilities, macro recorder, Flash Art™ and semi-relational features have earned it accolades in review after review. In fact, MacUser editors were so impressed they selected Panorama as their 1988 "Eddy" Award Winner in the flat-file category. So climb aboard—let Panorama start paving your road to success today!

Demo Video Only $9.95*
Now you can watch the same 30 minute Panorama demo that has captivated packed audiences at user groups and trade shows all over the country. Call us today to order your copy of this informative VHS tape, or send your name, address and payment to:

PROVUE DEVELOPMENT
15180 Transistor Lane
Huntington Beach, CA 92649
(714) 892-8199

*Price refundable with purchase of Panorama. CA residents add 6% sales tax.

Circle 451 on reader service card
by Deborah Branscum

This column examines the tools and the talent behind Macworld's graphics

Artist: John Craig lives and works in a bucolic Wisconsin setting that includes apple orchards and grazing sheep.

Tools: Mac II, ThunderScan scanner, and PixelPaint 2.0.

How It Was Done:
For this month's "Getting Started with Sound," Craig researched sound waves and sound science for a better understanding of the topic.

"I wanted to do a spiral to represent how you might experience a sound wave if you were inside it," he says. The spiral also represents "a musical staff, with the notes broken into primary colors for different voices."

Because PixelPaint doesn't have a spiral-drawing tool, Craig went to a drafting book to find the traditional way to plot a spiral. When the spiral was done, it suggested the eye idea.

"The way sound works with the Mac is visual, so I wanted the eye and ear connection." Then to balance the image, Craig added the screen of sound information. The right part of the image represents capturing sound. Craig wanted the jagged lines over the grid to be reminiscent of a sound wave but more structured, to represent the binary aspects of sound.

The ear, trumpet, and telephone were part of a catalog of existing images Craig has, which he scanned in with his ThunderScan. He used PixelPaint 2.0 to create the rest of the image, lassoing the end of the spiral and aligning it with the ear after the ear was brought in as a Clipboard MacPaint image.

As a veteran PixelPaint user, Craig is happy with 2.0, except for a misnumbering problem with the metric ruler. "This version has the Pantone colors that I'm familiar with, so that, along with the new color palettes, is an advantage."

His biggest gripe at the moment is a badly fragmented 80MB hard disk. Craig says it's absurd that he's already filled up the disk, but housekeeping is difficult. "It's hard to go back and throw out all my old files. I bought the drive a year ago and thought it would be a bottomless pit, but now it's bulging."
Oracle for Mac Solves DBMS Puzzle

SQL/HyperCard Combo Produces Sophisticated Applications

By Susan Janus

Database giant Oracle Corp., of Belmont, Calif., recently rounded out the list of platforms supported by the company's relational database-management system (DBMS) with the release of Oracle for Macintosh.

The new Mac DBMS teams the power of Oracle's Structured Query Language (SQL) with HyperCard's customizable and easy-to-use interface. This combination allows Mac developers to create sophisticated applications that appear simple to users—a unique software-development opportunity unavailable on any other platform, including the PC, according to early corporate users we contacted.

In addition, users said, the network version of Oracle for the Mac allows the advantages of the HyperCard interface to serve as a front end to existing corporate relational databases residing on other platforms, such as mainframes and minicomputers. Consequently, the Mac software has great potential for software development.

"Oracle for Macintosh is a well-designed product...a programmer can, with just an hour's training, create a database on a host with a simple Macintosh interface in three minutes—honest." - MacUser, June 1989

"Get yourself a copy of ORACLE for Macintosh and get a flexible toolkit that can be melded to solve just about any database problem." - MacUser, June 1989

Until 10/31/89, for $299 you can access the number one SQL database from either HyperCard or 4th DIMENSION. With our 30-day money-back guarantee, the only thing you stand to lose is a great buy. Call today.

$299 Two-Thumbs-Up Special Offer Ends 10/31/89

Call 1-800-ORACLE 1, ext. 7869 today.

By Susan Janus

Oracle for Macintosh

WHAT CORPORATE BUYERS LIKE

- Offers SQL capabilities
- Uses HyperCard to mask complexity of database applications
- Serves as front end to relational databases on other platforms
- Can link different Oracle database platforms with network version
- Provides good documentation and support

Oracle Provides the Groundwork

"ORACLE for Macintosh is a well-designed product...a programmer can, with just an hour's training, create a database on a host with a simple Macintosh interface in three minutes—honest." - MacUser, June 1989

"Get yourself a copy of ORACLE for Macintosh and get a flexible toolkit that can be melded to solve just about any database problem." - MacUser, June 1989

Until 10/31/89, for $299 you can access the number one SQL database from either HyperCard or 4th DIMENSION. With our 30-day money-back guarantee, the only thing you stand to lose is a great buy. Call today.

$299 Two-Thumbs-Up Special Offer Ends 10/31/89

Call 1-800-ORACLE 1, ext. 7869 today.

Oracle for Macintosh

WHAT CORPORATE BUYERS LIKE

- Offers SQL capabilities
- Uses HyperCard to mask complexity of database applications
- Serves as front end to relational databases on other platforms
- Can link different Oracle database platforms with network version
- Provides good documentation and support

Oracle Provides the Groundwork

"ORACLE for Macintosh is a well-designed product...a programmer can, with just an hour's training, create a database on a host with a simple Macintosh interface in three minutes—honest." - MacUser, June 1989

"Get yourself a copy of ORACLE for Macintosh and get a flexible toolkit that can be melded to solve just about any database problem." - MacUser, June 1989

Until 10/31/89, for $299 you can access the number one SQL database from either HyperCard or 4th DIMENSION. With our 30-day money-back guarantee, the only thing you stand to lose is a great buy. Call today.

$299 Two-Thumbs-Up Special Offer Ends 10/31/89

Call 1-800-ORACLE 1, ext. 7869 today.
The latest upgrade for your Mac is absolutely FREE!
Bigger, better, and more powerful than ever

**Excel 2.2**

Excel 2.2 delivers a host of improvements and new features. Excel can now use the full memory of your Mac — up to 8 Megabytes. It recalculates up to 40% faster and empties cells consume no memory at all. Cell annotation lets you add notes to any cell and auditing functions help you track cell references.

The new Search and Replace function makes global changes.

Charting is improved—just double-click anywhere on a chart to see the dialog box for all the chart formatting commands. Charts are now dynamically linked to the original worksheet, so the chart automatically reflects any changes in the spreadsheet. Excel 2.2 also supports “warm links” to Word 4.0, so changes to your spreadsheet data automatically appear in your Word documents.

**BUS 003 NCP**  
Publisher: Microsoft  
Suggested Retail: $95

---

**MacWrite II**

MacWrite II now offers multiple columns, mail merge, footnotes and endnotes, multiple documents, font sizes from two to 500 points, direct import/export of files (for MS Word, MS Write, MS Works, and WriteNow), plus the ability to search and replace by font, size and style.

**WRD 0026 NCP**  
Publisher: Claris  
Suggested Retail: $49

---

Microsoft's basic, "no-frills" word processor

**Write 1.0**

Microsoft Write is great for people who like Word but don't need all its fancy functions. Microsoft calls it "a streamlined subset of Word." Write is fast, and full of useful functions, such as a spelling checker with an expandable 80,000 word dictionary, footnoting, the ability to embed graphics in text, multiple columns, page preview mode, and suppression of headers and footers on title pages. If you don't need mail merge, outlining, glosaries, or style sheets Microsoft Write is right for you.

**WRD 0014 NCP**  
Publisher: Microsoft  
Suggested Retail: $29

---

**Handy tool for technical writers**

**Formulator**

Use Formulator to create mathematical equations and scientific formulas — then paste them into a word processor or DTP document. Special symbols, from Greek characters to integrals and radicands are all built into Formulator. It makes the distinctions among superscripts and subscripts, and normal characters at different levels, and selects the appropriate point size.

**WRD0027 NCP**  
Publisher: ICOM Simulation  
Suggested Retail: $149.95

---

The simple, easy to use terminal module supports MacBinary transfers for error-free data transmission and reception. Winner of the 1988 Macworld World Class Award.

**BUS 0014 NCP**  
Publisher: Microsoft  
Suggested Retail: $295

---

Microsoft Excel is compatible with the MS-DOS version of Word, and with PageMaker (both Mac and PC versions), so you can exchange files among all four formats. Version 3.0 won the 1989 MacUser/Europe Victor, and the Macworld World Class Awards.

**WRD 0022 NCP**  
Publisher: Microsoft  
Suggested Retail: $249

---

Bigger, better, and more powerful than ever

**Excel 4.0**

Excel 4.0 adds new page design capabilities to the feature-laden previous versions. Create newsletters with multiple columns, or even movie script-style documents. Design pages with different numbers of columns on the same page. Place sidebars exactly where you want them. Word automatically wraps text around graphics. For creating graphics, Word 4.0 includes SuperPaint at no extra charge.

Tables are a breeze. Just tell Word how many rows and columns you need, and it generates your table, with automatic text wraps within cells. Word even has facilities for creating mathematical formulas. Word 4.0 has a spelling checker, hyphenation, automatic indexing, mail merge, and an integrated outliner. It is compatible with the MS-DOS version of Word, and with PageMaker (both Mac and PC versions), so you can exchange files among all four formats. Version 3.0 won the 1989 MacUser/Europe Victor, and the Macworld World Class Awards.

**WRD 0003 NCP**  
Publisher: Microsoft  
Suggested Retail: $249
The Cutting Edge series of hard drives offer dependability at a low price.

**Cutting Edge Hard Disk Drives**

- **45MB Removable Hard Drive**
  - Features:
    - Mac's SCSI port and pre-formatted, so they're ready to use, right out of the box.
    - Compact, virtually noiseless, and use components from Seagate Technology.
    - Extra security and protection, including a convection cooling current.
    - Seamless integration with any Macintosh computer.
  - Benefits:
    - Incredible flexibility.
    - Easy to retrieve.
    - able to keep your double internal floppy disk drives.
    - Access speed of 25 milliseconds.
    - Fast, quiet, sturdy and reliable.

- **20 Meg Under the Mac Drive**
  - Manufacturer: Cutting Edge
  - Suggested Retail: $439

- **30+ Meg Under the Mac Drive**
  - Manufacturer: Cutting Edge
  - Suggested Retail: $499

- **45+ Meg Under the Mac Drive**
  - Manufacturer: Cutting Edge
  - Suggested Retail: $549

- **65+ Meg Under the Mac Drive**
  - Manufacturer: Cutting Edge
  - Suggested Retail: $629

- **80+ Meg Under the Mac Drive**
  - Manufacturer: Cutting Edge
  - Suggested Retail: $739

- **XL 30 Internal**
  - Manufacturer: Cutting Edge
  - Suggested Retail: $469

- **XL 45 Internal**
  - Manufacturer: Cutting Edge
  - Suggested Retail: $645

- **XL 65 Internal**
  - Manufacturer: Cutting Edge
  - Suggested Retail: $799

- **XL 80 Internal**
  - Manufacturer: Cutting Edge
  - Suggested Retail: $899

**Removable cartridges for extra security and protection**

**Cutting Edge 45MB Removable Hard Drive**

- **Inexpensive, dependable external disk drive**
  - **800K Disk Drive**
    - Manufacturer: Cutting Edge
    - Suggested Retail: $149

**Hardware Hard Disk Drives**

- **30+ Meg Under the Mac Drive**
  - DRI 0158
  - Manufacturer: Cutting Edge
  - Suggested Retail: $499

- **45+ Meg Under the Mac Drive**
  - DRI 0159
  - Manufacturer: Cutting Edge
  - Suggested Retail: $549

- **65+ Meg Under the Mac Drive**
  - DRI 0160
  - Manufacturer: Cutting Edge
  - Suggested Retail: $629

- **80+ Meg Under the Mac Drive**
  - DRI 0161
  - Manufacturer: Cutting Edge
  - Suggested Retail: $739

- **XL 30 Internal**
  - DRI 0119
  - Manufacturer: Cutting Edge
  - Suggested Retail: $469

- **XL 45 Internal**
  - DRI 0111
  - Manufacturer: Cutting Edge
  - Suggested Retail: $645

- **XL 65 Internal**
  - DRI 0162
  - Manufacturer: Cutting Edge
  - Suggested Retail: $799

- **XL 80 Internal**
  - DRI 0163
  - Manufacturer: Cutting Edge
  - Suggested Retail: $899

**Cutting Edge**

- Manufacturer: Cutting Edge
- Suggested Retail: $499

**I'm Nancy, call me at MacA-Renewal**

- **1-800-255-6227**
  - (1-800-ALL-MACs)
- **Inquiries:** 1-714-267-5489
- ** Hanson, 1-800-785-6447**

**ONLY $3.00**

**MACWORLD • NOVEMBER 1989**

---

**Cutting Edge**

- Manufacturer: Cutting Edge
- Suggested Retail: $149

**I'm Nancy, call me at MacA-Renewal**

- **1-800-255-6227**
  - (1-800-ALL-MACs)
- **Inquiries:** 1-714-267-5489
- **Hanson, 1-800-785-6447**

**ONLY $3.00**

**MACWORLD • NOVEMBER 1989**


HARDWARE
PRINTERS
INTERFACES

Need to hook up a parallel printer to your Mac?

**Grappler Interface**

The Orange Micro Grappler interface card connects your Mac to most parallel printers. Just plug the Grappler into the serial port, and it converts the output to the Centronics parallel format. If you have an old daisy wheel or dot matrix printer sitting around the office unused, put it to work and alleviate the traffic jam on your LaserWriter.

**Grappler Interface LQ**

The Grappler LQ connects your Mac to any 24-pin dot matrix printer, or HP compatible laser or inkjet printer — as if they were ImageWriter LQS. Just set the switch for the printer you want to use. For dot matrix printers, you can use any Mac, but for laser and ink jet printers, you'll need a Mac Plus, SE, or II, and a hard disk. Grappler does not recognize PostScript commands.

**Grappler Interface LS**

The Grappler LS works with serial Hewlett-Packard (and compatible) printers. Now you can print Mac documents on the HP ink jet printer, plus laser printers such as the LaserJet, Okidata, Kyocera, and Blaser. Grappler cannot print PostScript files.

---

HARDWARE
INPUT
DEVICES

The more keys the better

**Mac-101 Keyboard**

The only extended keyboard available for the Mac 512, 512KE, and Plus. Includes macro software.

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Suggested Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac-101 ADB</td>
<td>Mouse Systems</td>
<td>$199</td>
</tr>
<tr>
<td>Mac-101 II</td>
<td>Mouse Systems</td>
<td>$199</td>
</tr>
</tbody>
</table>

---

Retire your mouse

**New Turbo Mouse**

Kensington's New Turbo Mouse speeds up Mac use, and saves desk space. The Turbo Mouse is like an upside-down mouse, or a trackball, so you only need to move the ball in its socket, not the whole assembly. Nudge it for tiny adjustments, or give it a good spin to dash across the screen. The automatic acceleration sensor is like a two-speed automatic transmission. It speeds up cursor movement when you move faster, and slows it down for precise positioning. A second button is a click lock, and you can assign one of seven common functions (Close, Save, Print, etc.) for both buttons at once. This well-designed mouse alternative won the 1988 Macworld World Class Award.

**New Turbo Mouse 512, Plus**

For the Mac 512, 512KE, and Plus.

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Suggested Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Turbo Mouse 512, Plus</td>
<td>Mouse Systems</td>
<td>$199</td>
</tr>
</tbody>
</table>

**New Turbo Mouse ADB**

For the Mac SE or II.

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Suggested Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Turbo Mouse ADB</td>
<td>Mouse Systems</td>
<td>$199</td>
</tr>
</tbody>
</table>

---

High-tech alternative pointing device

**QuadLYNX Trackball**

The QuadLYNX Trackball uses Honeywell aerospace technology to give you precise fingertip control over cursor movement. This device offers much greater precision in cursor placement than the standard-issue Apple mouse. Just spin the trackball and the cursor flies across the screen, quickly and accurately landing where you want it.

**QuadLYNX Trackball ADB**

For the Mac SE or II.

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Suggested Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>QuadLYNX Trackball ADB</td>
<td>Mouse Systems</td>
<td>$199</td>
</tr>
</tbody>
</table>

---

Enter the world of optical mousing

**A+ Mouse**

The A+ Mouse has no moving parts, except for the mouse itself. It uses an infrared LED and a reflective plastic mouse pad to determine its position. The mouse glides over the glassy smooth surface of the pad. Anyone who works with graphics or CAE/CAD applications will appreciate the convenience and precision of an optical mouse. Comes with manufacturer's lifetime warranty.

**A+ Mouse ADB**

For the Mac SE and II, connects to the Apple Desktop Bus.

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Suggested Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+ Mouse ADB</td>
<td>Mouse Systems</td>
<td>$99</td>
</tr>
</tbody>
</table>

**A+ Mouse**

For the Mac SE or II.

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Suggested Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+ Mouse</td>
<td>Mouse Systems</td>
<td>$99</td>
</tr>
</tbody>
</table>

**Kraft QuickStick**

The button placement ensures fast action and comfortable use, whether you’re playing an arcade game or working on a complex page layout. Precision gimbals and dual-axis fine-tuners give you complete control over its operation. Comes with manufacturer's five-year warranty.

**Kraft Premium III Joystick**

The Kraft Premium III Joystick is the same as the QuickStick, but it connects to the ADB port of the Mac SE or Mac II. It also works with the Apple IIIgs.

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Suggested Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kraft Premium III Joystick</td>
<td>Mouse Systems</td>
<td>$29</td>
</tr>
</tbody>
</table>

**QuadLYNX Trackball**

For the Mac SE or II.

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Suggested Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>QuadLYNX Trackball</td>
<td>Mouse Systems</td>
<td>$29</td>
</tr>
</tbody>
</table>
Upgrades or optimization for specific tasks. They rival the Mac II's performance for a fraction of the cost. Because Marathon 020 Accelerators use a programmable Logic Cell Array controller, you can re-configure them to accommodate future hardware upgrades or to optimize them for specific tasks. The on-board expansion slot gives you back the expansion slot you gave up to install the accelerator.

**Marathon 020 Accelerator Boards**

Marathons 020 Accelerators are equipped with a 68020 chip running at 16 MHz. They rival the Mac II's performance for a fraction of the cost. Because Marathons 020 Accelerators use a programmable Logic Cell Array controller, you can re-configure them to accommodate future hardware upgrades or to optimize them for specific tasks. The on-board expansion slot gives you back the expansion slot you gave up to install the accelerator.

**Marathons 020**

**Accelerator MSEL**

DRI 0098
Manufacturer: Dove
Suggested Retail: $499

**Marathons 020**

**Accelerator MSE2**

DRI 0125
Manufacturer: Dove
Suggested Retail: $179

**Bring your Mac up to date - inexpensively**

**MacSnap Memory for Older Macs**

MacSnap memory expansion kits give your old Mac (512, Plus, or SE) the power to run the new generation of software. Using MultiFinder, keep several applications open and switch from one to another without quitting and launching. Or, explore the exciting world of HyperCard. You'll need at least two Megabytes to run System 7.0 when it arrives. So modernize your old Mac with more memory. It's cheaper than buying a new computer.

**MacSnap 524E**

Expands enhanced Mac 512KE to one Mb.
DRI 0120
Manufacturer: Dove
Suggested Retail: $895

**MacSnap 524S**

Expands enhanced Mac 512KE to one Mb. Includes SCSI interface and external SCSI connector.
DRI 0065
Manufacturer: Dove
Suggested Retail: $895

**FastNet Ethernet Adaptors**

FastNet connects your Macs to Ethernet LANs. It supports TCP/IP, EtherTalk, DECnet, and other protocols, so you can talk to mainframes and minis at Ethernet speeds. The FastNet SCSI and FastNet II are intelligent controllers, with their own 68000 chips and RAM buffers to take the processing load off your Mac.

**FastNet SCSI**

FastNet SCSI is an Ethernet interface that works with any Mac with a SCSI port. It is an intelligent controller with its own 68000 chip and 512K buffer RAM, but is not as fast as the FastNet NuBus cards.
DRI 0142
Manufacturer: Dove
Suggested Retail: $749

**FastNet II**

FastNet is an intelligent NuBus card for the Mac II, with 512K RAM, 64K ROM, and a 68000 chip.
DRI 0143
Manufacturer: Dove
Suggested Retail: $699

**FastNet III**

FastNet is a NuBus card for the Mac II, but without on-board intelligence and buffering.
DRI 0144
Manufacturer: Dove
Suggested Retail: $599

**FastNet SE**

Plugs directly into the SE's slot, and has 64K RAM and 64K PROM.
DRI 0145
Manufacturer: Dove
Suggested Retail: $559

**FastNet SE/30**

Plugs directly into the SE/30's slot, and has 64K RAM and 64K PROM.
DRI 0146
Manufacturer: Dove
Suggested Retail: $559

**Unleash your Mac - and save money**

**MacSnap CMOS Memory**

MacSnap CMOS memory expansion kits require less power, so they run cooler than standard RAM chips. Don't settle for that one Megabyte Mac you bought because you couldn't afford the deluxe model. Upgrade it to full power with inexpensive, high-performance MacSnap memory.

**MacSnap 25 CMOS**

Expands Mac Plus or SE to two Mb. using one Mb. surface mount CMOS chips: expandable to four Mb.
DRI 0122
Manufacturer: Dove
Suggested Retail: $175

**MacSnap 45 CMOS**

Expands Mac Plus, SE or II from one Mb. to four Mb., with one Mb. surface mount CMOS chips.
DRI 0123
Manufacturer: Dove
Suggested Retail: $579

**MacSnap 85 CMOS**

Expands Mac II from one Mb. to eight Mb., using one Mb. surface mount CMOS chips.
DRI 0124
Manufacturer: Dove
Suggested Retail: $989

**MaraThon Racer**

A high-speed cache card with accelerator-like performance designed for the Mac II, plugs into the existing 68020 socket on the motherboard.
DRI 0181
Manufacturer: Dove
Suggested Retail: $499

**Open your Mac in a snap**

**MacSnap Tool Kit**

The essential tools for opening your Mac 512, Plus, or SE to install memory upgrades, adapter cards and fans. Includes the required hex screw driver, case spreader, and a static strap.
DRI 0040
Manufacturer: Dove
Suggested Retail: $15

**FastNet Ethernet Adaptors**

FastNet connects your Macs to Ethernet LANs. It supports TCP/IP, EtherTalk, DECnet, and other protocols, so you can talk to mainframes and minis at Ethernet speeds. The FastNet SCSI and FastNet II are intelligent controllers, with their own 68000 chips and RAM buffers to take the processing load off your Mac.

**FastNet SCSI**

FastNet SCSI is an Ethernet interface that works with any Mac with a SCSI port. It is an intelligent controller with its own 68000 chip and 512K buffer RAM, but is not as fast as the FastNet NuBus cards.
DRI 0142
Manufacturer: Dove
Suggested Retail: $749

**FastNet II**

FastNet is an intelligent NuBus card for the Mac II, with 512K RAM, 64K ROM, and a 68000 chip.
DRI 0143
Manufacturer: Dove
Suggested Retail: $699

**FastNet III**

FastNet is a NuBus card for the Mac II, but without on-board intelligence and buffering.
DRI 0144
Manufacturer: Dove
Suggested Retail: $599

**MacSnap Plus 2**

Expands Macintosh Plus from 1024K to 2048K using 256K DRAM. Not expandable.
DRI 0035
Manufacturer: Dove
Suggested Retail: $499

**MacSnap 2 SE**

Expands Macintosh SE from 1024K to 2048K using 256K DRAM. Not expandable but fully compatible with internal expansion cards.
DRI 0099
Manufacturer: Dove
Suggested Retail: $499

**MaraThon 030 Accelerator Board**

For the Mac II. Plugs directly into the 68020 chip socket to provide you with a 68030 chip running at 32 MHz. A 68882 math co-processor is available as an option.
DRI 0130
Manufacturer: Dove
Suggested Retail: $999

**MaraThon 030/SE Accelerator Board**

For the SE/30. Available options include up to four Megabytes of on-board memory, and the 68681 Math Co-processor or the 68882 Floating Point Unit.
DRI 0151
Manufacturer: Dove
Suggested Retail: $1250

**MaraThon 030**

Accelerator Board

For the Mac II.
DRI 0152
Manufacturer: Dove
Suggested Retail: $999

**Suggested Retail:**

MacSnap 524S $249
MacSnap 548E $419
MacSnap 548S $499
MacSnap 546S $289
MacSnap 45 CMOS $312
MacSnap 85 CMOS $1276
MacSnap Plus 2 $312
MacSnap 2 SE $312
MacSnap Tool Kit $15
MacSnap 4S (Dove)
The 4S is a 4 Meg memory expansion kit that allows you to get the maximum amount of memory in the Plus and SE or a 4 meg upgrade for the Mac SE/30. II. It or Iix. The 4S uses state-of-the-art CMOS surface mount CMOS SIMMs and guarantees that today's memory investment will continue to work and grow with you. Step by step manual for easy installation. Dove offers a toll-free number for service and support. (memory) $638.

ACCESSORIES
Avery Labels (full line available) .... 4.
Color Coded 3 5 Diskette ............ 6.
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.
Dust Covers - grey Nylon Ripstop 
ImageWriter or LaserWriter ...... 12.
Mac Plus and keyboard ......... 11.
Mac SE and ext'd, or reg. keyboard 11.
Mac II and ext'd, keyboard .... 12.
Universal Laser Printer Stand .... 26.
Computer Friends, Inc.
MacChar (1V & 1V II) ........ 41.
MacInColor Black Ink ........ 3.
Curtis
Computer Tool Kit (52 pc.) ...... 49.
Curtis Groms ........... 6.
Disk Holder (holds 40) ....... 3.
Jewel Surf Suppressor ........ 1.
Ergotron
MacTilt SE ............ 68.
MacTilt II-RGB ........ 78.
Goldstein & Blair
The Macintosh Bible ....... 20.

MacPrint (Insight Development)
Introducing MacPrint - the easy-to-use software utility that lets you use almost any Mac application on virtually any printer including HP LaserJet II and III. MacPrint displays all your printer's fonts for true WYSIWYG performance. Prints text and graphics at your printer's maximum resolution. After the simple installation, it's completely transparent in operation. It's the cost effective print option for your Mac. (utilities) $79.

Smack-a-Mac
Smack-a-mac .................. 9.
SoundSight
FastKeys ............. 35.
Targus, Ltd.
Deluxe Plus/SE-XKB Case (black) .... 49.
MacPlus/SE Case (black) ....... 59.

ACCOUNTING

and PERSONAL FINANCES

Astrix
Checkwriter .............. 37.
Payroll 3.6 ............ 109.
Payroll PLUS ....... 175.
TimeMinder ............ 175.
Bedford (Computer Associates)
Simply Accounting ....... 209.
Brown-Wag Publishing

MacLeasers ............ 159.
Service Industry Accounting .... 209.
DAC
DeskEasy Light ....... 42.

Intuit
Quicken 1.5 ............ 36.
Layered, Inc.
at Once! ............ 99.
Monogram
Business Sense ....... 89.
Dollars and Sense .... 81.
Nolo Press
For The Record ....... 39.
WinMaker ........... 32.
Peachtree
Back to Basic Professional .... 159.
Reality Technologies
WealthBuilder ........ 34.
ShopKeeper Software
Bill It! 2.0 ....... 99.
Survivor
MacMoney 3.5 ....... 60.

BLANK MEDIA

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

MapMaker 4.0 (Select
Micro Systems, Inc.)
Now includes dozens of powerful new features such as built-in drawing tools, on-screen distance measurements, graphics tablet support, and much more. Creates publication quality color maps of the U.S. by states and counties, and the world by country. Enter or import your own data, or use the included U.S. Census statistics. Quickly displays hidden relationships in geographic data with striking presentation graphics. Mac 5 l 2K, Plus, SE and II (graphics) $245.
Win
THE NeXT COMPUTER

Just imagine yourself as the winner of the most powerful personal computer ever built! More RAM, more speed, incomparable CD quality sound — Steve Job’s personal computer of the 1990’s.

All you have to do is enter the brand new MACWAREHOUSE SUPER COMPUTER GIVEAWAY. Your name is automatically entered into the drawing when you order from MACWAREHOUSE. (Or just send in the Official Entry Coupon.)

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.

WillMaker 3.0 (Nolo Press)
Make your own will! WillMaker’s documents are valid in every state (except Louisiana), including the District of Columbia. Just answer the questions; it asks, and WillMaker constructs a personalized will with full legal standing. No one likes to think about a will but WillMaker makes it easy $32.

For the Record 1.02
Keep tabs on essential items like household inventory, locations of safety deposit boxes, insurance policies, names of guardians and trustees. It compiles every critical tidbit into a neatly organized database (personal finances) $29.

SuperPaint 2.0 (Silicon Beach)
Award winning SuperPaint combines the spontaneity of paint and the precision of Draw in one easy-to-use program. Powerful new features include AutoTrace™ automatically converting Paint graphics into Draw objects; a customizable airbrush; a framesetter that tools to quickly sketch editable bezier curves; and Super Blit™ to edit bitmaps at any resolution. Mac fonts, styles and sizes are in a single font block; freely rotate, scale, or slant text and graphics without sacrificing high resolution output. (graphics) $128.

Dreams (Innovative Data Design)
IDD creators of MacDesk®, offers a powerful precision drawing tool for professional scaled drawings, illustrations, presentations and general purpose graphics. Dreams offers zoom, rotation, layers, dimensioning, symbol libraries and a vast array of drawing tools, as well as many advanced illustration features. You can merge shapes together, cut edges of objects using other objects as templates, even glue lines and curves together to form unique shapes to be filled with colors or patterns. (graphics) $269.

I’m Kerry, call me at:

MacWAREHOUSE
1-800-255-6227

(1-800-ALL MACS)
Inquiries: 201-367-0440
Canada: 800-255-6447
FAX # 201-905-9279

MONDAY THRU FRIDAY
8 A.M. TO 11 P.M. (Eastern Time)
SATURDAY
8 A.M. TO 8 P.M. (Eastern Time)
OPEN SUNDAYS!
8 A.M. TO 8 P.M.
(Eastern Time)
Just connect your Mac to the PC via the Lap-Llnk Mac universal cable. Made of strong, durable steel, it's available in burgundy and platinum designs. It's priced at $26.

LETS SET THE SCENE

Targus Macintosh line offers a range of cases and accessories. For example, the Carry Case for the Macintosh SE/Plus w/Extended Keyboard is made of Zilicone treated nylon to give it waterproof durability and impact absorbing high-density foam layer with a protective lining. Priced at $75. Full set with pockets for your mouse, handles provide extra comfort and protection. Cushioned shoulder pad and absorbent high-density foam layer with a protective lining. Priced at $58.

HardPac Mac (Aristotle) Portable hard disk drive. Store your data and just unplug this compact, self-contained unit, tuck it into your briefcase, and take your data with you. The sturdy injection molded case, shock mount, and automatic head parking protect the drive while it's in transit. HardPac Mac is a SCSI device with an input and output port for data transferring. The SCSI address select switch allows you to plug it in without disrupting the host system.(drives) 20 meg $549, 40 meg $799.

DISK DRIVES/BOARDS

Aristotle Industries, Inc.
HardPac Mac 105 Meg $1395
HardPac Mac 70 Meg $799
HardPac Mac 50 Meg $549
CMS
MacStack 10 Meg $549
MacStack 20 Meg $549
MacStack 30 Meg $549
MacStack 40 Meg $549
MacStack 50 Meg $549
MacStack 60 Meg $549
MacStack 80 Meg $549
Cutting Edge
800K External Floppy Drive $149
SyQuest Removable 45Meg $99
Under the Mac 20 Meg $49
Under the Mac 30 Meg $49
Under the Mac 45 Meg $49
Under the Mac 60 Meg $49
Under the Mac 80 Meg $49
DynaCommunications
DynaFile Single 360K (5 1/4") $99
DynaFile Dual 360K & 1.44M $169
Dolphin Systems Tech
Integra 20 Meg $549
Integra 30 Meg $595
Integra 40 Meg $765
Integra 60 Meg $815
Integra 80 Meg $1175
Flipper 150 Meg Tape Backup $1439
Flipper Removable 44 Meg $1139
Kennon Technology
Drive 2.4 $359
Rapport $219
Mobius
MultiScreen Video Card $315
PCPC
MacBottom Hard Drives Call
Peripheral Land, Inc.
Turbo Floppy 1.4 $359
Quantum
Quantum 40 MB Raw Drive $549
Quantum 80 MB Raw Drive $899

EDUCATIONAL PERSONAL

BrightStar
Alphabet Blocks 3.0 $30
MACINTOSH SE/Plus w/Extended Keyboard
Carrying Case (Targus)
Pamper your Mac with a Targus carrying case made of Zilicone treated nylon to give it waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. Plus there's room for everything from your Mac, a hard disk drive, and the extended keyboard to separate your mouse, floppies, cables, and pens. (accessories) $75. Full Targus Macintosh line available in black, blue, burgundy, and platinum.

MacSoft
Talking Tiles $27
Bookware Software
Resume Writer Pro $60
Davidson
Math Blaster $37
Entertainment
Speed Reader II $36
First Byte
The Dinosaur Discovery Kit $27
The Puzzle Storybook $27
The Rhyming Notebook $27
Fair Tide Technologies
Navigat© mono $199
Great Wave
KiesTime 1.2 $26
Learning Company
Reader Rabbit or Math Rabbit $31
MicroTech
Elementary Sig© $49
Finger Speller $49
The Software Toolworks
Mavis Beacon Teaches Typing $35
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
Artworx
Bridge 6.0 $24
Daily Double Horse Racing $19
GrailQuest $19

DESKTOP PUBLISHING

Arius
Pro Art Library (Multi Ad Services)
Clip Art from an Industr y Leader. The Pro Art Library contains over 100 EPS illustrations in each of the three volumes (Business, Holidays, and Sports). Created by talented illustrators, these illustrations will improve the appearance of all your DTP projects. Floppy disk versions include a durable binder, a pictorial index, and each CD-ROM version (graphic) $229.

EDUCATIONAL

Casady & Greene
QuickD EX $31
JAM Software
Smart Alarms & Appointment Diary $49
Smart Alarms (1-4 users) $99
Smart Alarms (5-8 users) $149
Smart Alarms (9-16 users) $199
Preferred Publishers
Database $72
Vantage $55
Solution $45
SmartScrap & The Cli pper 2.0 $45

DESKTOP ACCESSORIES

World Class Leader Board
FORE! Putt around and play the courses that challenge the greatest golfers or create your own. Digitized sound. Practice greens and driving range. Choose your club and type of shot. $27.

Laser Printer Stand
Free up your valuable desktop space by raising your printer four inches. This lets you store two extra cartridges, supplies, or just paper work conveniently underneath your printer. It's made of strong durable steel and comes in an attractive platinum design. (accessories) $26.

Lap-Link Mac
Just connect the Lap-LInk Mac universal cable to the PC and the Mac and you're moving files in both directions. Comes with transformers, cable, 3.5" and 5.25" diskettes. (communications) $83.
BUSINESS AND PRESENTATION

A Lasting Impression
ResumExpert (word vers.) ........................................... 39.
Adobe Systems, Inc.
TrueForm SetUp ......................................................... 299.
AEC Management Systems
FastTrack Schedule ....................................................... 115.
Aldus
Persuasion 1.0 .............................................................. 375.
Antic Software
FlexForm Business Templates Vol 1 or 2 .............................. ea. 49.
Avery
List & Mail ................................................................. 79.
Claris
MacProject II ............................................................. 375.
Smart-form Designer w/Assistant ............................... 299.
Cognition Technology
MacSMARTS PRO .......................................................... 249.
Cricket (Computer Associates)
Cricket Graph 1.3 ......................................................... 115.
Cricket Presents ............................................................. 395.
DeltaPoint, Inc.
DeltaGraph ................................................................. 249.
DeltaGraph Call ............................................................. 49.

SmartArt Effects
Emerald City Software
Brings custom text and graphic effects to your written word processor. Page layout or presentation program. It uses PostScript inside your laser printer to preview precisely how your effect will print. Rotate text, and modify effects instantly. SmartArt I or II, for text effects or SmartArt II for Graphic Effects. You don't have be an artist to look like one! Requires Mac SE, Plus or II and a PostScript laser printer. (Desktop Publishing) ea. $85

Symantec
More II 2.01 ............................................................... 249.
Symmetry
Keygen ................................................................. 339.
Symplex
MacEnvelope 4.1 ....................................................... 55.
MacEnvelope Plus ......................................................... 149.
Vertical Solutions
FastLabel ................................................................. 49.

CAD/CAE
Claris
ClipsCAD ................................................................. 599.
Generic Software
Generic GACO Level 1 ............................................... 85.
Symbols Libraries available Call. .................................... 349.
Graphsoft
Blueprint ............................................................... 519.
MiniCal Plus ............................................................. 146.
Innovative Data
MacDraft ................................................................. 269.
Dreams ................................................................. 389.
I.S.I. Precision ............................................................. 399.
Strata
Stratavision 3D ............................................................. Call.

COMMUNICATIONS
CE Software
InOut (1-10 Users) .................................................... 129.
QuickMail 2.0 (1-10 Users) ........................................ 259.
Computer Serve
Computer Serve Navigator 3.0 ...................................... 54.
Computer Serve Subscription Kit .................................. 9.95.
DateVIZ
MacLink Plus w/Cable 4.1 ............................................ 129.
MacLink Plus/Translators 4.1 ......................................... 115.

Dow Jones
News/Retrieval Membership ............................................ 24.

DATABASE SOFTWARE
Aculs
4th Dimension 2.0 ..................................................... 499.
AEC Management Systems
AEC Information Manager ........................................... 415.
Claris
FileMaker II .............................................................. 229.
Fox Software
FoxBASE+/Mac ......................................................... 255.
FoxBASE+/Mac Multi User ........................................... 355.
FoxBASE+/Mac Runtime ............................................... 155.
Microsoft
File 2.0 ................................................................. 125.
TimeBase ................................................................. 209.
ProVUE 
Panorama ................................................................. 205.

COMMUNICATIONS
CE Software
InOut (1-10 Users) .................................................... 129.
QuickMail 2.0 (1-10 Users) ........................................ 259.
Computer Serve
Computer Serve Navigator 3.0 ...................................... 54.
Computer Serve Subscription Kit .................................. 9.95.
DateVIZ
MacLink Plus w/Cable 4.1 ............................................ 129.
MacLink Plus/Translators 4.1 ......................................... 115.

Dow Jones
News/Retrieval Membership ............................................ 24.

DATABASE SOFTWARE
Aculs
4th Dimension 2.0 ..................................................... 499.
AEC Management Systems
AEC Information Manager ........................................... 415.
Claris
FileMaker II .............................................................. 229.
Fox Software
FoxBASE+/Mac ......................................................... 255.
FoxBASE+/Mac Multi User ........................................... 355.
FoxBASE+/Mac Runtime ............................................... 155.
Microsoft
File 2.0 ................................................................. 125.
TimeBase ................................................................. 209.
ProVUE 
Panorama ................................................................. 205.

AcuWeather Forecaster
Instant, and reliable weather information direct from the nation's #1 weather service. Quickly download weather data by modem (see page 67). It display it in easy to read maps, graphs, charts and forecast. Hourly updates are available for every region of the country Ideal for boating, construction and travel Automated telecommunications makes it easy to use (communications) $58.

MacEnvelope 4.1
All of the features of envelope and label printing in one easy-to-use package. Import up to 100 addresses. Unique Postal Bar Code printing speeds delivery. Create / save layouts, graphics, fonts and colors. $59.

For Kerry call me at
1-800-255-6227
(1-800-ALL-MACS)

MacWAREHOUSE
1600 Oak Street, P.O. Box 1579.
Lakeland, FL 33802

Monday thru Friday 8 A.M. to 11 P.M. (Eastern Time)
Saturday 9 A.M. to 5 P.M. (Eastern Time)

Copyright 1989 MacWAREHOUSE, Inc. MacWAREHOUSE and MacWAREHOUSE are trademarks of MacWAREHOUSE, Inc. Terms availability and price subject to change without notice. Next is a trademark of Next, Inc.
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.

OVERNIGHT DELIVERY ONLY $3.00

WordMaker 4.0 (New Horizons)
The new high performance, personal word processor for the Macintosh. WordMaker's intuitive design makes it easy to learn and to use. It has a fast WYSIWYG display, headers and footers for both left and right pages, color capability, multiple document support, a 100,000 word spelling checker, print merge and more! With WordMaker you can even wrap text around irregularly shaped graphics. It reads and writes MacWrite files for compatibility with other programs. (word processing) $69.

Broderbund
Ancient Art of War At Sea ................ 27. 
Shufflepuck Cafe ............................. 24. 
Where in the World is Carmen? ........ 27. 
Bulleseye
Ferrari Grand Prix or PS1 .................. ea. 32. 
Fokker Tri-plane ............................. 29. 
Centron Software, Inc.
BlackJack or CrapsMaster ................ ea. 27. 
CasinoMaster (5 pack) ..................... 49. 
Discovery Software
Avanced CAD .............................. 26. 
Electronic Arts
Chuck Yeager .............................. 27. 
Mindscape
Balance of Power, Deja Vu .............. ea. 30. 
The Colony or Gauntlet ............... 30. 
Road Racer (XOR Corp.)
Drive a high-performance 1965 Corvette through 5 environments from super-high speed desert flats to twisting mountain roads. Uses digitized sounds, with spectacular scenery, obstacles, and wild crashes. Fly over hills around curves at up to 200 mph. Score points for fast, skillful driving by steering and accelerating with your mouse and using your keyboard for brakes and shifting. Each level is tougher than the last. With the most sophisticated high-speed graphics ever achieved on a personal computer. For use on the Macintosh II, Mac Plus & SE (entertainment) $39.

RoadRacer (XOR Corp.)

MacGolf Classic ............................ 59. 
Road Racer ................................. 39. 
NFL Challenge ............................. 54. 
Spectrum HoloByte
Falcon 2.0 .................................. 31. 
Tetris Color version ..................... 24. 
Springboard
Hidden Agenda ............................. 36. 
The Software Toolworks
ChessMaster 2100 ....................... 32. 
Life & Death ............................... 32. 
The Hunt for Red October .............. 32. 

ROADRACER

MacWrite II .............................. 229. 
Aegis Development, Inc.
Showcase XYZ ......................... 199. 
Aldus
Freehand 2.0 ......................... 349. 
Broderbund
Drawing Table ............................ 75. 
Casady & Greene
Vivid Impressions Vol. 1 ............. 67. 
Claris
MacDraw II .................................. 209. 
MacPaint 2.0 ............................. 99. 
Cricket (Computer Associates)
Cricket Color Paint ...................... 179. 
Cricket Draw ............................... 167. 
Deneba
Canvas 2.0 ................................ 169. 
DreamMaker
Ciphers, Business Images .......... 85. 
MacGallery ................................. 27. 
Electronic Arts
Studio 1 ................................... 99. 
Studio 8 ................................. 299. 
MacroMind
MacroMind Director ..................... 449. 
Videoworks II ............................. 175. 
Miles
Mac The Knife (all volumes) .......... 39. 
Mindscape
ZING ....................................... 125. 

Nemesis
Go Master .................................. 49. 
Joschi Tutor ............................... 30. 
PCAI/XOR
Lunar Rescue or MacGolf 2.0 ........ 34. 

WordMaker 4.0 (New Horizons)
The new high performance, personal word processor for the Macintosh. WordMaker's intuitive design makes it easy to learn and to use. It has a fast WYSIWYG display, headers and footers for both left and right pages, color capability, multiple document support, a 100,000 word spelling checker, print merge and more! With WordMaker you can even wrap text around irregularly shaped graphics. It reads and writes MacWrite files for compatibility with other programs. (word processing) $69.

Nemesis
Go Master .................................. 49. 
Joschi Tutor ............................... 30. 
PCAI/XOR
Lunar Rescue or MacGolf 2.0 ........ 34. 

Generic CADD Level 1
(General Software)
Easy to learn and use. Drawing tools give you true CAD capabilities, including 256 layers, floating point precision, stereoscopic display. New features include snap to grid, direct copy support. Symbol libraries also available. Now for a limited time, purchase a GENERAC CADD from MACWAREHOUSE and get a free symbol library, send a proof of purchase along with your choice of library to Generic Soflware.(please reference Nov. ad.) Offer expires 1/1990 (cad/cae) $85.

Bridge 6.0
Bridge 6.0 is a comprehensive contract or duplicate bridge playing program which allows you and your computer partner to bid against two computer opponents and play out the hand. Ideal way for the novice to improve his or her game, and advanced player to get into a game without having to round up three additional players. (entertainment) $24.

MacProof 3.2 (Lexpertise)
You'll never get a second chance to make an impressi on! MacProof3.2 is your English proofreader. Without leaving your document, it proofreads all writing done on your word processor. Business, educational, personal and professional. MacProof's a desk accessory for the Apple Macintosh Plus, SE, II, IIc. Checks: mechanics (punctuation, spelling, capitalization, double words), Word usage, Writing style and Structure. You can customize the Usage and the Spelling dictionaries to your specific requirements. Comes with MacWrite II V 1.0. MacWrite V 4.6 & 5.0. Microsoft Word 4.0. PageMaker 3.0, w/ 2mg memory, MindWrite V 1.0 and V 2.0(text editor) $115.

MacWordMail
The ideal mail list management system. Contains duplicate elimination, various sorting capabilities and search codes. Can utilize all fonts and styles, mail merge, envelope printing, plus much more. Works great with Canadian postal codes and other international mailing requirements. (business) $78.

Balk Mailer
Receive Electronic mail, check stock portfolios or flight reserve. Features include Quicklink, MacNet, ComputeServe, auto dial and a two year warranty. (modems) $145.

Multi Ad Services
ProArt. Bus., Sports or Holidays ea. $5. 
NuEquation
NuPaint ................................. 128. 
SuperMac
Pixel Paint 2.0 ............................. 229. 
Bridge 6.0
delivered only $3.00

Multi Ad Services
ProArt. Bus., Sports or Holidays ea. $5. 
NuEquation
NuPaint ................................. 128. 
SuperMac
Pixel Paint 2.0 ............................. 229. 

Balk Mailer
Receive Electronic mail, check stock portfolios or flight reserve. Features include Quicklink, MacNet, ComputeServe, auto dial and a two year warranty. (modems) $145.

SmartOne Modem
Receive Electronic mail, check stock portfolios or flight reserve. Features include Quicklink, MacNet, ComputeServe, auto dial and a two year warranty. (modems) $145.

MacProof 3.2 (Lexpertise)
You'll never get a second chance to make an impressi on! MacProof3.2 is your English proofreader. Without leaving your document, it proofreads all writing done on your word processor. Business, educational, personal and professional. MacProof's a desk accessory for the Apple Macintosh Plus, SE, II, IIc. Checks: mechanics (punctuation, spelling, capitalization, double words), Word usage, Writing style and Structure. You can customize the Usage and the Spelling dictionaries to your specific requirements. Comes with MacWrite II V 1.0. MacWrite V 4.6 & 5.0. Microsoft Word 4.0. PageMaker 3.0, w/ 2mg memory, MindWrite V 1.0 and V 2.0(text editor) $115.

MacWordMail
The ideal mail list management system. Contains duplicate elimination, various sorting capabilities and search codes. Can utilize all fonts and styles, mail merge, envelope printing, plus much more. Works great with Canadian postal codes and other international mailing requirements. (business) $78.

Balk Mailer
Receive Electronic mail, check stock portfolios or flight reserve. Features include Quicklink, MacNet, ComputeServe, auto dial and a two year warranty. (modems) $145.

SmartOne Modem
Receive Electronic mail, check stock portfolios or flight reserve. Features include Quicklink, MacNet, ComputeServe, auto dial and a two year warranty. (modems) $145.

MacProof 3.2 (Lexpertise)
You'll never get a second chance to make an impressi on! MacProof3.2 is your English proofreader. Without leaving your document, it proofreads all writing done on your word processor. Business, educational, personal and professional. MacProof's a desk accessory for the Apple Macintosh Plus, SE, II, IIc. Checks: mechanics (punctuation, spelling, capitalization, double words), Word usage, Writing style and Structure. You can customize the Usage and the Spelling dictionaries to your specific requirements. Comes with MacWrite II V 1.0. MacWrite V 4.6 & 5.0. Microsoft Word 4.0. PageMaker 3.0, w/ 2mg memory, MindWrite V 1.0 and V 2.0(text editor) $115.

MacWordMail
The ideal mail list management system. Contains duplicate elimination, various sorting capabilities and search codes. Can utilize all fonts and styles, mail merge, envelope printing, plus much more. Works great with Canadian postal codes and other international mailing requirements. (business) $78.

Balk Mailer
Receive Electronic mail, check stock portfolios or flight reserve. Features include Quicklink, MacNet, ComputeServe, auto dial and a two year warranty. (modems) $145.

SmartOne Modem
Receive Electronic mail, check stock portfolios or flight reserve. Features include Quicklink, MacNet, ComputeServe, auto dial and a two year warranty. (modems) $145.
Mac-101 Reyboards (Data Desk 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. International Versions also available. (input/output) $139.

PixelPaint Professional .................... 399.
Tactic Software
Art Clips .................................. 51.
SoundClips ................................ 49.
Zedcor
DeskPaint 2.0 .................................. 65.

Silicon Beach
SuperCard ........................................ 129.
SoftStream International
HyperHl ....................................... 125.
Springboard
Family Matters .......................... 28.

Focal Point II
Personal information manager stores all those unrelated pieces of information that usually end up on loose scraps of paper. Time & Schedule Manager, Project & Task Manager, Clients & Vendors file, Expenses, and Phone Manager with an auto­dialer ($117).

Dolphin Subsystems
(Dolphin Systems Tech)
The intelligent choice for Apple Macintosh mass storage. Integra Zero foot­print external hard drives from 20mb-80mb capacity. Flipper 4mb removable hard disk high performance (35ms). offers unlimited storage and convenient portability. Flipper 160mb high speed SCStape with FlexID/image Backup. (disk drives) see line listings for prices.

General Computer Company
WriteMove Ink Jet Printer .................. 585.
Magnavox
Color Monitor 14" ............................. 599.
Qume
Crystal Print Publisher ........................ 3745.
Seikoshia America
Seikoshia Printer (dot-matrix) ............ 235.
Sharp
The Wizard ..................................... 249.
ThunderWare
LightningScan ................................... 409.
ThunderScan 5.0 ............................... 189.

HYPERWARE

Cutting Edge CE-105 ADB Keyboard ............ 125.
DataDesk Intl.
Mac 101 Keyboards ........................ 129.
Kensington
MaraThon
MacVision 2.0 ................................ 219.
Mozilla
ADB Joystick Premium 31 II .............. 51.
QuickStick .................................. 39.
Kurta
IS/ADB Tablet 8 1/2 x 11 ..................... 255.
Symmetry
A+ Mouse (S12/Plus or SE/II) ................ 57.
Summagraphics
Bit Pad Plus ................................. 205.

INPUT/OUTPUT

CanOpener
The information retrieval utility for the Mac. Search anywhere, and lets you remove just about anything, including text, pictures and sounds. It even locates text inside pictures, and gives you the whole picture - anything retrieved can be stored in it's library, so the next time you need it, it's just a click away (utility) $85.

MacOpen

Fastkeys (SoundSight)
Speed up your computing by 50%! Bring the keyboard to your fingertips. Imagine simply pressing Fastkeys on your mouse, instead of pad to perform everything from printing to deleting. Execute mouse operations INSTANTLY! Shift-Select is now a one hand operation as well as cut, paste, copy, quit, undo, open, close... Virtually anything you choose. (accessories) $35.

Hardkey

Microsoft
QuickBasic ......................... 65.
Shana Corporation
Inside Out ......................... 369.
Symantec
THINK'S C 4.0 .................... 165.
THINK'S Lightspeed Pascal ........... 89.
Zedcor
ZBasic 5.0 ................................. 95.

MEMORY UPGRADES/ACCELERATORS

Dove (full line available)
MaraThon 030 Accelerator ........... 969.
MaraThon 050X .................... 969.
MaraThon Racer .................... 162.
MacSnap 2S .................... 319.
MacSnap 4S .................... 639.
MacSnap 8S .................... 1276.
MacSnap 524E .............. 187.
MacSnap 524S .............. 248.
MacSnap 548S .............. 479.

Acta Advantage (Symmetry)
With Acta you can jot down your ideas whenever they occur. Later you can export the outline to a word processor or spreadsheet for more serious work. Acta outlines lists of things to do, items needed people on a project, appointments, name and address books, or any set of data you need to keep handy. Acta can sort, find, replace, mix fonts within topics, and accepts graphics too. (word processors) $65.
MAcKNOWLEDGE (Prometheus Products, Inc.)

MAcKNOWLEDGE is the latest communications software available for your Macintosh. Icon based scripts provide instant access to all major online services with just the click of your mouse. The TAL scripting language provides all the capabilities for customizing and automating your own online sessions or the record function will watch your session and create an icon based script automatically. Also provides support of 9600 bps and MNP modems. (communications) $149.

MUSIC AND SOUND

Altech MIDI Interface ........................................ 59.
Bogas Productions Super Studio 2.0 .................. 69.
Coda Finale .................................................. 479.
MacDrums ..................................................... 31.
Percive Electronic Arts ........................................ 50.
ExeLus Engineering Music Mouse .................... 49.
Fairlight Computing MacRecorder (records sound) 165.
Screen Recorder ............................................. 132.
First Byte SmoothTalker .................................... 33.
Great Wave Concertware/MDI 4.0 .......................... 76.
HIP Software Harmony Grid .................................. 59.
Intelligent Music OvalTune ..................................... 95.
Passport Designs Master Tracks Pro 3.0 .............. 259.
NoteWriter .................................................... 189.
Passport MIDI Interface ...................................... 95.
PrimaSoft Software Different Drummer ................. 59.
Repertoire Music Publisher ................................. 375.
Resonate Listen 2.0 ........................................... 62.

MODEMS/FAX

Abaton InterFax 1248 .......................................... 325.
Best Data Products SmartOne 2400/1200 ............ 145.
Hayes Smartmodem 1200 ..................................... 295.
Smartmodem 2400 ............................................. 429.
Smartmodem 9600 (V series) .............................. 985.
Orchid Tech MacFax .......................................... 448.
Prometheus ProModem 2400 SE Int. ....................... 209.
PreModem 2400M ............................................. 199.
Supra Supra Modem 2400 .................................... 209.
Supra MKFn ................................................... «a
ProModem 2400M ............................................. 199.

NETWORKING PRODUCTS

Connect Inc. MacNet ........................................... 47.
FastNet SCSI .................................................. 749.
FastNet II .................................................... 565.
FastNet III ..................................................... 375.
FastNet SE or SE/30 .......................................... 375.
Timbuktu 3.0 .................................................. 185.
Timbuktu Remote 1.0.1 ........................................ 185.
TrafficWatch .................................................. 135.
PhoneNET PLUS .............................................. 55.
PhoneNET Replicator ......................................... 365.
PhoneNET Star Controller ................................. 1095.
Microcom Software Carbon Copy Mac .................. 119.
Shiva NetBoot ................................................. 349.
NetSerial X232 ................................................ 279.
TOPS NetPrint ............................................... 279.
FlashBox ..................................................... 125.
FlashCard ..................................................... 159.
Repeater ..................................................... 129.
Teledesigners ............................................... 29.
TOPS ....................................................... 145.
TOPS DOS ................................................. 115.

Checkwriter (Atrix) Enter recurring transactions and it reminds you to write checks and enter deposits. Print your own ledger, debt/credit and tax sheltered transactions. Unlimited numbers of checking accounts and transactions per account. Lets you design your own check and stub, and will write them too! $337.

Payroll Plus Made for larger companies, will handle many employees, plus special accounting for restaurants, contractors, and commissioned sales people. Can manage payroll from up to 10 income sources. Prints checks, itemizes, accumulates O/T and can provide sick/vacation pay. (accounting) $175.

SECURITY AND VIRUS PROTECTION

ASD Software, Inc.
FileGuard 2.0 ................................................. 129.
TWINS ......................................................... Call.
HJC Software, Inc.
Virus 2.1 ...................................................... 59.
Kent Marsh
MacSafe or NightWatch ......................... ea. 87.
QuickLock ...................................................... 57.
Mainstay AntiVirus ............................................ 65.
Symantec Corporation
S. A. M. .......................................................... 69.

SPELLING/DICTIONARY

Deneba Software
BigThesaurus .................................................. 59.
Spelling Coach Pro ........................................... 115.
Electronic Arts
Thunder II ...................................................... 52.
Lexicon ......................................................... 115.
Microlytics
MacProof 3.2.1 ................................................. 115.
Electronic Word Finder ................................. 75.
Word Finder 2.0 .............................................. 55.
Sensible Software
BookEnds or Sensible Grammar ....... 33.
You can now contact MacWAREHOUSE or place orders with us in the Electronic Mall on CompuServe. The MacWAREHOUSE GO code is GO MW. As always, you'll get fast, dependable overnight service and you can leave messages for Kerry or any of our support staff.

**DiskFit 1.5 (SuperMac)**
A handy utility for backing up your hard disk on a series of floppies. It saves time because it backs up only those files which have changed since the last backup. DiskFit can verify each floppy after copying files onto it. So you know that your files are safe. DiskFit also discards old versions of files so your backup set doesn't keep growing. Version 1.5 supports a variety of cartridge tape drives, including the Apple tape backup system. Utilities $59.

**STATISTICAL ANALYSIS**
Abacus Concepts
StatView II ........................................ 225.
BrainPower
StatView 51+: (requires 512k) .... 149.
D2 Software
MacSpin 2.0 ......................................... 169.
Odesta
Data Desk Professional .................. 289.
Paracomp
Mile .................................................. 159.
Select Micro Systems, Inc.
Eratlas .............................................. 219.
Wolfram Research
Mathematika (SE) .......................... 450.

**UTILITIES**
Abbott Systems
CanOpener ......................................... 65.
Affinity
Tempos ........................................... 79.
Aladdin
Programmer's Assistants .......... Call.
Shorcut ............................................ Call.
ALSoft
DiskExpress II ................................. 42.
Font/DA Juggler ............................... 139.

**1 Meg SIMMs**
New Low Price! Increase your Mac's power - at a fraction of the cost of a new computer with these low profile 1 MB SIMMs. Each SIMM comes with a one-year manufacturer warranty. Adding memory doesn't require technicians in lab coats. Just open your Mac, slide out the main circuit board, and plug in your memory cards. Special $15 Mac Tool Kit available to open your Mac Plus or SE (memory) 80ns $145. or 100ns $125.

**CONTEST RULES**
1. Entries must be received on or before 1/31/90. 2. Winners selected in random drawings by our staff. 3. MacWAREHOUSE reserves the right to substitute wholesale cash value up to $10,000. 4. Winners responsible for taxes. 5. Odds of winning depend on number of entries. 6. Prizes - two MacII Computer systems each worth over $5,000. 7. Contest is open to US residents, except where prohibited by law. Entries postmarked 12/31/89. Entries not eligible. 8. Prizes - two MacII Computer including keyboard and monitor and 156 software and media prizes.

**STOP PRESS**

NEW! Price breakthrough! Under the Mac Drives (Cutting Edge)

The Cutting Edge Under the Mac Drive hard disk drives are quiet and reliable with access times down to 20 milliseconds making it almost three times faster than most. Push button external SCSI address switch and removable-SCSI terminators allow easy daisy chaining up to 7 SCSI devices. Sizes available 20 megs to 80 megs (disk drives).

20 megs only $439.
30+ megs only $499.
45+ megs only $549.
60+ megs only $629.
80+ megs only $739.

**900 Drive**
The Cutting Edge 900 drive's attractive styling, quiet performance and high tech reliability make it our most popular floppy drive. Features an LED light to indicate disk access and a hinged door over the disk insertion slot to keep the mechanism clean. One year manufacturer's warranty. Drive disk $1494.

**MacWAREHOUSE**
1-800-255-6227

Talk to Kerry - FREE on CompuServe®
Now you can contact MacWAREHOUSE or place orders with us in the Electronic Mall on CompuServe® and there's no time charge October 15 thru December 31. The MacWarehouse® GO Code is GO MW. As always, you'll get fast, dependable, overnight service and you can leave messages for Kerry or any of our support staff.

And if you're not yet a CompuServe subscriber, MacWarehouse brings you this exclusive offer:

**SAVE $300**

CompuServe subscription kit - just $9.95
You save $30 off the regular retail price and get 12 weeks of free CompuServe time, plus free access to the MacWarehouse® store October 15 thru December 31. The subscription also includes the 290 page user manual CompuServe puts on line database at your service. You can search this for any information you need - complete text from major publishers, encyclopedia, stock data, books, and more, reviews, etc.

There's never been a time like now to join CompuServe.

To order call Kerry at: 1-800-255-6227
Tomorrow's Upgrade For Your Mac Is Only $125.*

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@$125).

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

<table>
<thead>
<tr>
<th>Memory Needs</th>
<th>How to Achieve</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>6 MB</td>
<td>Remove all four existing 256K SIMMs; install four 1M SIMMs, leave remaining sockets for future expansion.</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 In-line 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, 100 ns Samsung kits is $125. 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, 90 or 100 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 7:00 p.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
Mon - Fri 8:00 a.m. - 11:00 p.m. (E)
Weekends: 8:00 a.m. - 8:00 p.m.
Inquiries: 1-201-367-0440
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.
The Dirt on Apple Security

Fighting loose lips, missing code, and probing garbologists

by Steven Levy

Apple’s legendary “1984” commercial ran only once on network television. The exit line on this bit of advertising history, in case you somehow forgot, went like this: “On January 24 Apple Computer will introduce Macintosh. And you’ll see why 1984 won’t be like 1984.” Well, roll over, George Orwell. There’s a new Apple advertising campaign, and it’s not directed at prospective computer buyers. It’s aimed at the people who design, manufacture, sell, and support Macintoshes: Apple’s employees. Its goal is to generate a corporate wartime consciousness within the previously mellow Apple culture. It’s a lot like what Michael and Elliot, those yuppie admeisters of “thirtysomething,” would have come up with if asked to design a campaign for the KGB.

The campaign is witty, at least judging by the photos in the internally distributed newspaper devoted to the Apple Information Protection Program (IPP). There is a picture of John Sculley, his grinning head sticking out of a pile of spaghettied documents. “John Rips New Organization to Shreds,” it says, making light of Sculley’s hobby of reshuffling Apple’s hierarchy as often as a blackjack dealer mixes the deck. In small print it urges Appleniks to “use shredders and confidential bins.” Then there’s lame-duck executive Del Yocam, sitting with knife and fork—and a gag around his face. In another layout, one of Apple’s first employees, Chris Espinosa, is pictured holding his hands over the ears of his mom, fellow Appleworker Sue Espinosa. “There Are Some Things Even Your Mother Shouldn’t Know,” it says, adding that even pillow talk with “significant others” should be discreet. And most impressively, there is Jean-Louis Gassée, decked out in punk sunglasses and a black leather jacket, pointing at a circuit diagram stamped “Confidential.” The legend under this picture attempts to explain the baffling distinctions between Apple’s various levels of confidential information.

More ominously, there is also a full-page spread covered by the boldface names of more than 100 employees who have volunteered to be information protection coordinators. “Every department should have one,” says the message underneath the names. Presumably these “ambassadors” to the IPP are to aid fellow workers in keeping the secrets. “There are a thousand things” an Apple employee can do: ten examples are given. They include instructions not to speak to journalists without specific authorization, to get passwords installed on computers and voice mail, and to accost “unfamiliar people who are lingering in your area,” in case they may be...well, who knows who they may be. You get the idea.

LIFE DURING WARTIME

The Information Protection Program might appear to be a sign that Apple Computer is getting somewhat paranoid, or at least tense in the buttocks, at the onset of its middle age. But consider its opposition: the emergence of something called the nuPrometheus group, which has borrowed its name from that Greek dude who brought us fire. In this case, program listings and comments for the Macintosh ROMs have been distributed to the press, perhaps in hopes that the liberated information might inspire others to make great products that Apple may no longer be planning. The first salvo was bona fide source code for Color QuickDraw: if not the crown jewels, a close approximation.

It was a guerrilla action, presumably against Apple’s increasing regimentation and information-scrounging practices. As one ideological ally of the nuPrometheus bunch put it to me, “this is a battle between the morons running around in suspenders,” who make up Apple management, and “the guys they keep in closets,” who actually design the products and make up the real heart of Apple Computer.

(continues)
seen in this light, the Information Protection Program is more than your normal "Loose Lips Sink Ships" propaganda campaign. It is management's attempt to retain the hearts and minds of its employees during an era in which Apple can no longer rightfully claim to be a little guy, but is an unmistakable giant, matching its technical efforts with vigorous legal machinations designed to intimidate fellow giants and squash little guys who might one day impinge on Apple turf.

Apple's director of corporate security is a former FBI operative named Ken Moore. Until a few years ago, he headed security for United Airlines, where the worst-case scenarios he worked with included murderous terrorist attacks. His worries now are not as dire, but no less challenging: he must turn around a corporate culture in which keeping secrets, shredding papers, and other security measures are regarded lightly. To date, the unofficial theme song of Apple has been "Yakety Yak." But despite Apple's reputation as the sieve of Silicon Valley, the company managed to become one of the biggest success stories in American history. It can even be argued that Apple's openness has been an integral part of its success. Apple, after all, has benefited mightily from a freewheeling flow of information within the company and its developer community. If Moore's efforts overly inhibit that, the net result will be stagnation. Something beneficial will have been lost, and though it won't be easily identified on a financial accounting, its long-term effects would be decidedly negative for both the company and its customers.

Moore says that he respects Apple's culture and wants to work within it. "I don't want to do away with openness," says Moore. "We want to change behavior without stifling creativity." He claims that the IPP has engendered little resistance at Apple; to the contrary, he says, "People have asked, 'What took you so long?'" The nuPrometheus caper may have helped Moore's quest for acceptance. "Apple culture is a feeling of family," he says. "If a leak occurs in a newspaper or anything else, there's a reaction of anger. . . . It's hurting your buddies."

DEVIL IN THE DUMPSTER

Strangely, even some of the most strident critics of Apple's increasing conservatism agree with Ken Moore. Which brings us to Chuck Farnham, perhaps the premier representative of a group of career gadflies who buzz around Apple, seemingly to bedevil the company by spiriting its secrets out into the public domain. In Farnham's own words, he's an ally of Apple, "just a guy who likes the machine." Yet he seems to take particular pride in the fact that many people at Apple hold him in greater disregard than stinging insects or food poisoning.

One of Chuck's hobbies is garbology, which he practices in various dumpsters outside of Apple buildings. He is not squeamish about getting his hands dirty in the cause of obtaining information that Apple holds dear. It was Farnham, for instance, who pulled off what he calls The Four Blind Mice Caper—smuggling and distributing the documentation for Apple's laptop computer, months before its release. A follow-up work in progress is a documentary about breaching Apple security. I'm told it includes some really nifty dumpster shots.

Farnham reminds me of the cyberpunk-style hackers who break into protected computer systems and then complain that it wasn't challenging enough—it offends them that even stupid people can do it. "I would like to see it be not as easy as it is to get information out of the company," he says. "It's ridiculously easy. For instance, eight months before HyperCard came out, I got 10MB of development code for the program from a secretary's hard disk drive. When she got a new SE, she sold the drive, forgetting to erase the contents, and someone outside the company bought it. Within five days the drive was in my house."
Most computer printers are sentenced by their own sheer bulk to lifelong confinement on a desktop.

But now GCC Technologies has created a printer for the Macintosh with considerably more freedom than that. It's called WriteMove: the "biggest" printer ever to come in a remarkably small package.

WriteMove weighs a scant three lbs. It measures just 2" x 6 1/2" x 10 3/4". (Any smaller and you couldn't get the paper in.)

But it's the only ink jet printer of any size that gives you unlimited freedom to reduce and enlarge both type and documents. Because it's the only one with outline fonts — imaging software that provides functionality usually associated with laser printers.

High Quality Output, To Go.

As a result, you can use WriteMove to compose documents with word processing software like Microsoft Word, or Excel. And then silently print them out on a cut sheet or fanfold paper at 192-dpi resolution. So, you get much higher print quality than the ImageWriter II, for not much more money.

All of this has obvious consequences for the highly mobile. Since WriteMove works off rechargeable batteries, you will have direct access to letter-quality output on airplanes, in hotel rooms or even at that popular weekend workstation called home.

Which could bring a whole new meaning to the phrase "freedom of the press."

To exercise that freedom, use the number below to order WriteMove today. Or ask for the authorized GCC Technologies dealer nearest you. Here's how.

Toll-Free, Hassle-Free, Risk-Free.

To order just call 800-422-7777 from 9 to 9 on weekdays, or 10 to 4 on 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.

If after trying WriteMove for up to 30 days you aren't completely satisfied, just return the printer and we'll cheerfully refund your money, no questions asked.

One Year Warranty.

Finally, WriteMove carries a full one year warranty covering both parts and labor. We also offer repair service at any one of hundreds of GCC dealers.

WriteMove Portable Printer $579.

For the name of the authorized 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.

Circle 305 on reader service card
MACWORLD • NOVEMBER 1989

THE ICONOCLAST

As Apple's acting general counsel, senior vice president Al Eisenstat talks about the law, common sense, and confidentiality.

Other things that bother Farnham include the fact that he has purchased Apple security badges at a flea market for a buck apiece. And that he often visits supposedly secure Apple sites without having his bags checked.

After talking to Farnham, the suggestions in the IPP newspaper to erase all disks after use and shred all papers no longer sound slightly threatening and borderline paranoid. There are bogeymen out there. Farnham himself supports the Information Protection Program: "There should be [security] education for Apple employees," he says.

But obviously Ken Moore's problems go beyond education. He is eager to stop the Chuck Farnhams and especially the nuPromethians. But how far should he go to root out all evil? Security mania at Apple is in full swing: Cupertino checkpoints are guarded more diligently than at any time in Apple history. Employees are encouraged to utter but two words to inquiring journalists—no comment—even on the most innocuous of queries, before referring them to the public relations department. Informal communication between various departments of Apple, formerly a wellspring of creative ideas, is limited to situations of "need to know."

And the idea that a large number of employees are encouraged to report on the activities of others has engendered a black sort of humor in which the company is referred to as Little China.

The danger of an Information Protection Program, in concert with these other measures, is that Apple's reputation will change—from that of an irreverent, free-wheeling company to that of a cautious giant—and the best and brightest will no longer want to work there.

THE RAMSEY FILE

Of course, the Information Protection Program really doesn't deal with the issue of what happens when employees knowingly leak information. In some cases, the leaks come from top executives. In others, like nuPrometheus, there is that pesky ideological component. The perpetrators probably think that in some weird way, releasing confidential data is helping Apple. "That's a tough one to fight," Ken Moore admitted, before the vigilant public relations operative monitoring our phone conversation shut down that line of questioning. Moore would not comment further on the search for the nuPromethians. Nor would he comment on the case of David Ramsey.

This is a shame, because the Ramsey case is the most distressing signal yet that security mania at Apple may prove destructive to the firm. Ramsey is a programmer, best known for his work on MacPaint II, who toiled for an Apple systems software group. But he was well known in the Macintosh community as someone who devoted endless hours of his own time to the Mac user group on CompuServe. To many he was the only person at Apple available to answer questions about the products on which they spent their money.

One day, in a scene out of Franz Kafka, Ramsey was called on the carpet for some remarks he made in a CompuServe message. Apparently, the comment dealt with an unannounced Apple product.

"I had been watching myself," says Ramsey. "I thought I was on safe ground with the comment. It was information that an Apple executive had already said [publicly]." Ramsey said that after he (continues)
THE HARD DISKS THAT SURVIVED HARD DISK HELL.

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. We've called this place 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®

Two Year Warranty.

Finally, UltraDrive carries a full two year warranty on parts and labor (ask for details). We also offer repair service at any one of hundreds of GCC dealers.

The UltraDrive Family.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>EXTERNAL</th>
<th>INTERNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>UltraDrive 20.</td>
<td>$549</td>
<td>NA</td>
</tr>
<tr>
<td>UltraDrive 30.</td>
<td>$629</td>
<td>$529</td>
</tr>
<tr>
<td>UltraDrive 45.</td>
<td>$699</td>
<td>$599</td>
</tr>
<tr>
<td>UltraDrive 80.</td>
<td>$949</td>
<td>$849</td>
</tr>
<tr>
<td>UltraDrive 155.</td>
<td>$1499</td>
<td>$1399</td>
</tr>
</tbody>
</table>

For the name of the authorized 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.

GCC TECHNOLOGIES
Peripherals With Vision.
All computers emit electro-magnetic radiation that bathes the user through the screen. The figure on the left shows a visualization of electromagnetic radiation from the computer and in red from the screen. The photo on the right shows that the NoRad Shield™ virtually eliminates screen emitted electromagnetic radiation.

Now you don’t have to accept the risks of Electromagnetic Radiation emitted from your computer

You may have wondered, how harmful is it? Many writers, editors, and newspapers have wondered the same thing. Here are just a few examples.

This could be absolutely nothing, or it could be something that makes asbestos look small... FORTUNE

...we have to seriously consider whether the VDT might be causing some breakdown in the eye-focusing mechanisms.

Dr. James Sheedy, University of California

The New York Times

Women who used VDTs for more than 20 hours each week in the first trimester of pregnancy suffered almost twice as many miscarriages as women in other types of office work.

The New York Times

Evidence mounts which shows a connection between non-ionizing radiation and skin irritation, eye damage, and an increase in miscarriages. *99.999% E field attenuation from 20kHz to >200 kHz. H field > 50% above 30 kHz.

FREE BOOKLET To get the facts, write or call and ask for our free booklet entitled, “How to reduce the stress, strain, and hazards from your computer.”

NoRad

800-262-3260 Ext. 400
NoRad Corporation 1549 11th St.
Santa Monica, CA 90401 213-398-0800

NoRad Shield is a trademark of the NoRad Corporation.

admitted making the comment, Apple suspended him from work for two weeks. At the end of that time, his employment was terminated. He does not know precisely who at Apple ordered the firing.

Ramsey is still loyal to Apple and hopes to return there one day. He has agreed not to repeat whatever comment it was that got him fired so precipitously.

Some of Ramsey’s supporters have reacted with outrage, vowing never to buy Apple products if they can avoid it. Ramsey himself shrugs off the more extreme responses. He speculates that the reason he lost his job was simply “bad timing.” It seems Apple made an example of David Ramsey.

Is the Ramsey firing an aberration? Or is it the dark side of those funny pictures in the Information Protection Program newspaper? Friends of Apple, myself included, fervently hope the former. Otherwise, we await the resurrection of George Orwell to document the next chapter of the history of Apple Computer.

Steven Levy is a Macworld columnist and the author of The Unicorn’s Secret: Murder in the Age of Aquarius (Prentice-Hall Press, 1988).
THE $1,699 PERSONAL LASERPRINTER. BECAUSE A DOCUMENT SHOULD REFLECT YOUR ASPIRATIONS. NOT YOUR SIZE.

At GCC Technologies™, we believe high-quality laser printing should be available to the many, not just the mighty.

Which is why we created the Personal LaserPrinter™ (PLP™): the first QuickDraw™ laser printer that does everything other laser printers do, except cost a lot of money.

The reason the PLP is so inexpensive is that instead of coming with its own memory and processor, it uses the hardware you already own: your Macintosh®.

Laser printer that does everything other laser printers do, except cost a lot of money.

The reason the PLP is so inexpensive is that instead of coming with its own memory and processor, it uses the hardware you already own: your Macintosh®.

Improve Your Appearance, Instantly.

With it, you can create near typeset quality newsletters, business plans and proposals using software like Microsoft® Word and Aldus® PageMaker®. Or manipulate eye-catching, scanned photographs and illustrations using graphics packages such as MacDraw® II and SuperPaint®.

The PLP includes 22 Bitstream® outline fonts. All of which can be enlarged or reduced to any point size or fraction thereof.

Final output is quietly produced at 300 dpi resolution. (With rapid 75 and 150 dpi draft modes for works in progress.) And the PLP handles a variety of paper weights including envelopes and transparencies. All of which means you’ll finally be able to produce the kind of documents that get your ideas noticed, instead of ignored.

What’s more, the PLP can grow as you do. A simple upgrade turns it into a PostScript® printer for high-level desktop publishing and use on a network. An enhanced version of the PLP, PLP Plus™ ($1,899), offers 40 fonts.

In other words, the PLP can enjoy the same future you’re planning to enjoy. A future that only awaits a call to the toll-free number below.

The PLP includes 22 Bitstream® outline fonts. All of which can be enlarged or reduced to any point size or fraction thereof.

Final output is quietly produced at 300 dpi resolution. (With rapid 75 and 150 dpi draft modes for works in progress.) And the PLP handles a variety of paper weights including envelopes and transparencies. All of which means you’ll finally be able to produce the kind of documents that get your ideas noticed, instead of ignored.

What’s more, the PLP can grow as you do. A simple upgrade turns it into a PostScript® printer for high-level desktop publishing and use on a network. An enhanced version of the PLP, PLP Plus™ ($1,899), offers 40 fonts.

In other words, the PLP can enjoy the same future you’re planning to enjoy. A future that only awaits a call to the toll-free number below.

Finally, the PLP comes with a full one year warranty which covers both parts and labor. But that’s not the only way we ensure your peace of mind. We also offer expert repair service at any Xerox® carry-in service center, or at any one of hundreds of authorized GCC Technologies dealers.

One Year Warranty.

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.

GACC
TECHNOLOGIES
Peripherals With Vision™
When you combine Aldus PageMaker® with Aldus® FreeHand™, you have the power to create anything imaginable. And do it faster and easier than ever before.

Today's best-selling desktop publishing and advanced drawing programs give your Macintosh powerful capabilities. And they give you unequaled versatility, control, and productivity for serious desktop publishing.

With Aldus FreeHand, you can produce everything from simple graphics to sophisticated illustrations. Unlike other advanced drawing programs, it lets you see your changes on the monitor while you work. So it's easy to refine a shape or apply PANTONE® Colors without losing sight of the big picture.

And Aldus FreeHand gives you greater text handling capabilities than any other program. Which gives you total control over typography. Curve text on a path, rotate or stretch type, mix sizes, fonts, and colors. You'll spend less time running back and forth to the typesetter. And less money on type.

LOOK WHAT HAPPENED! GIVE PAGEMAKER.
After you polish your graphics and display type in Aldus FreeHand, place them into PageMaker. And marvel at how well these powerful design tools work together.

Only PageMaker's unique combination of precision and grace can make page layout such a rewarding experience. For both short and long documents. Ruling, kerning, spot color, text flow, wraps. You name it. It's all there, in a familiar environment as natural as your drawing board.

When you combine Aldus FreeHand and PageMaker, you have more than today's most advanced illustration, design, typography, and page layout capabilities. You have a creative edge in business.

**Discover today's powerful design team.**

Call 1-800-333-2538, Department J-2, for your FREE copy of the Aldus Design Team information packet.** Or visit your nearest authorized Aldus dealer.

The Creative Edge in Business.
Take a look. You'll see the difference! PAGEMAKER cannot rotate text, create fill patterns and slant margins. You'll need additional—and expensive—programs. With PUBLISH-IT!—all you need is PUBLISH-IT!

Make way for the new standard in DTP software, PUBLISH-IT!—the first completely self-contained desktop publishing program for Macintosh computers. PUBLISH-IT!—with 11 DTP “firsts”—combines word processing, page layout, typesetting, graphics, and paste-up in one easy-to-master program.

What Makes PUBLISH-IT! the New Standard in Professional Business Communications?

- It integrates advanced text, page layout, editing, and complete drawing and painting features—all into one program.

- Includes 11 DTP firsts: text and graphics rotation in 1 degree increments; patterned text; integrated bit-map graphics editing; text wrap inside any object; slanted margins; true editable thumbnails; 8 overlap modes; page magnification from 12% to 800%, and much, much more!

- Contains more integrated word processing features—like a 240,000-word thesaurus and 160,000-word spell checker. You can import text from all popular word processors.

- Allows you to edit scanned images after they're placed into your document.

- A Quick-Start Mini-Manual; 70 built-in sample layouts; a unique on-screen help reference system. You'll produce your first document in less than 90 minutes!

- It's designed specifically for the Mac. Written in Assembly language, it's faster across most functions, and requires less than half the disk and memory space of PAGEMAKER.

- And, with all this, you'll spend a few hundred dollars less! PUBLISH-IT!’s suggested retail price is $395!

Available for Macintosh computers.* Ask your dealer for a demonstration today, or call Timeworks for more information:
1-312-948-9202. FAX: 312-948-7626

*PageMaker version 3.02. Registered trademarks of their respective companies. © 1989 Timeworks, Inc. and Postai Corp. All rights reserved.

Circle 418 on reader service card
That Fits
All the News
That Fits

The Macintosh News
Service wins fans

by Deborah Branscum

I

n user groups a handful of people usually do all the work," says Don Rittner, president and newsletter editor of the MECCA user group in Albany, New York. At a national gathering of user groups last year, "a bunch of us stood around complaining about how hard it was to get stories for our newsletters. After talking to all these people, I decided we needed a UPI or AP for the user group community." Thus Rittner launched the Macintosh News Service (MNS) in July of 1988, despite a full-time social service job.

The disk-based service is sent to more than 1000 user groups in ten countries free of charge. Each disk includes shareware and public domain programs, news picked up from Rittner's bulletin board perusals, and about 15 articles. "The large groups in urban centers don't need MNS," says Rittner. "It's really for the other 90 percent of user groups, those with 50 to 100 members."

It was logical to fashion MNS as a clearinghouse for the best articles from the hundreds of user-group newsletters Rittner receives every month. But there's original material included as well. In July, for example, graphic artist Fred Showker began creating clip art and graphics tips exclusively for MNS. MNS is not an inexpensive operation, but Rittner didn't want to charge user groups for the service. Instead, he asked companies to sponsor the service. User groups that use MNS material agree to run an advertisement for the sponsor or credit the company in their newsletters. The groups also agree to add the MNS disk, which includes a text file from the vendor, to their public domain libraries. In return, a company picks up the tab of several thousand dollars for compilation, disk duplication, postage, and small payments to the writers and artists who contribute the original material.

"It's saved the club a considerable amount of money," says Bill Chenault, until recently the newsletter editor of the Panhandle Macintosh User Group in Pensacola, Florida. MNS "has been a godsend for us and some of the smaller clubs. We haven't had a newsletter go out without some of his material." Like other editors he knows, Chenault was happy to find a consistent source of articles.

Seven sponsors have aided MNS so far, including Acius, Irwin Magnetics, and Berkeley Systems. "It's a good way for a small company to reach 300,000 Mac users overseas," says Rittner, who hopes MNS will become a monthly operation.

Trained in archaeology and environmental sciences, Rittner used a Mac several years ago to help save many acres of fragile pine barrens land in New York threatened by development. And now that the MNS is established, Rittner is launching a new project. This time it's the Johnny Appleseed Awards to recognize Macintosh user groups that make outstanding contributions to their communities. "I'd like to be able to take the community spirit that's in the Mac world and stimulate the user groups to take the technology of the Macintosh and use it for those people who need help," says Rittner.

Rittner is counting on the industry to donate cash and products to recognize humanitarian efforts among users; he's counting on users to respond to the challenge. The panel of judges for the awards includes Guy Kawasaki of Acius, Marci Glickman of Ashton-Tate, graphic artist Showker, and Rittner himself. The first awards event is scheduled for next April at Macworld Expo; nominations for awards will be accepted through the end of January.

Don Rittner can be reached at 518/374-1088 (BBS: 518/381-4430) for information about the MNS or the Johnny Appleseed Awards.

APPLE FIXES SOME FLAWS

If your ImageWriter LQ is having printing problems (at the top and bottom 1½ inch of the page) or noise trouble (when printing dense graphics, for example), Apple will pick up repair costs if the printer's serial number is below 1831001013. That's the good news. The bad news is that (continues)
people who had their LQs fixed or who bought so-called enhanced LQs between February and April may have received bad ROM chips that can cause stopping or reset problems when used on a network. Dealers will replace the main circuit board at no cost if that's the case. Additional bad news: some users have experienced a lengthy wait for LQ repairs.

In case you missed our Mac Bulletin item in September, let me repeat the message for owners of Apple 40MB hard disks that won't boot properly. Dealers will replace your internal 3 ½-inch drive at no cost if the serial number falls within the range of 335507 to 1023016. And, happily, Apple will reimburse customers who have paid for repairs outside of warranty; call customer relations at 408/252-2775 for details.

ATTENTION HYPERDRIVE OWNERS

Remember the old days when Macs had no SCSI ports? If you own an aging HyperDrive from GCC Technologies, please note that the company offers a trade-in program. Anyone who owns an internal HyperDrive 10, 20, or 2000 can upgrade to another GCC hard disk for at least 40 percent off the retail price. GCC says it wants to offer its early customers an upgrade path to SCSI technology. "As long as it has not been tampered with, any complete HyperDrive will be accepted under this program, even units that are no longer functioning," according to the company. Prices vary, depending on the model you want. For example, the trade-in price for an UltraDrive 20 is $419, a savings of $130 over the direct price listed in GCC's catalog. An UltraDrive 45 goes for $519 under this program, a savings of $180. An UltraDrive 80 sells for $719, a savings of $250. And an UltraDrive 155 is priced at $1189, $310 less than the direct price. Other models are available. Call the company at 800/422-7777 for details.

NOVEMBER EVENTS

The San Diego Computer Society is hosting its Tenth Anniversary Fair on November 4 and 5 at the Scottish Rite Temple. The fair, called Dazzle '89, will feature a strong Mac presence at demos, seminars, and booths. A blood donation or $5 gets you in. Call Chita Jing at 619/264-9910 for more information.

Build Boston '89 will feature four seminars sponsored by the Boston Society of Architects Macintosh User Group. The seminars ($55 each) cover the international architects office, desktop publishing (one basic, one advanced), and using the Mac in project management. This building-trades show, held November 15–17 at the World Trade Center, in Boston, will also include a Mac Village with third-party engineering, architecture, and business products. In addition, three speakers will enliven the first annual MUG Social, slotted for the first day of the show. Call the Boston Society of Architects at 617/267-5175 for more information.

Apple Professional Exchange (APX) is sponsoring a multimedia extravaganza on November 30 at the Macintosh Business Conference and Exposition in Long Beach, California. The APX portion of the show will feature panels on multimedia in corporate training and in presentations. Executives from MacroMind, Paracomp, Farallon, and other leading multimedia companies are expected to take part. For more information call Mike Bailey at 408/745-0665.

MUG ROUNDUP

What? We're not perfect? Afraid not. It seems some user groups were left out of the directory that ran in September because we couldn't reach them. Here are a
"I've got to get to the type shop."

"Boy, are my feet killing me."

"What do you mean the printer doesn't deliver?"

"Oh no! I'm late for my meeting with the illustrator."

"If they don't have the photo I need here I'm history."
Introducing CD-ROM Design

It lets you spend less time using your desk.

Now you can do all of your desktop publishing at your desk.

You’d better take a seat. Because you’re not going to believe all the things you can do. Right from where you’re sitting.

With CD-ROM desktop publishing from NEC.

All you need is a CD-ROM reader, desktop publishing and CD-ROM software and your computer. Then you’ll have the tools to put out first-rate desktop publishing. At prices that’ll knock your socks off.

You see, ROM stands for “read only memory.” So we can give you massive amounts of stock photos, type, 3D clip art and line art.

In fact, there’s so much information that you’d need over 8,000 floppies to store what we give you on six discs.

Type Gallery.” If you want more typefaces, you’ll have to buy a Type Shop.

You’ll never have to wait for someone to set your type again. Because with Type Gallery PS, you’ll have 470 typefaces from on a single CD-ROM disc.

You’ll start by picking your 3 favorite typeface families. But if you ever want to buy a font you don’t have, just call our toll-free number. Since the rest of the fonts are already on your disc, all we have to do is unlock the ones you want. So in a matter of seconds, you’ll be ready to set the type you want. And, like most of our software, it’s IBM PC and Macintosh compatible, too.

If you use a LaserJet printer, there’s Type Gallery LJ.

Seventy-six typefaces on one disc. Including
Type Director from AGFA Compugraphic.

Type Gallery. It's like having a type shop right at your desk.

Photo Gallery* and Image Folio? The end of the stock search.

Now you can have over 1,500 black and white stock photos (from UNIPHOTO) right at your fingertips. With Photo Gallery. There's everything from people and pets to sailboats and sunsets. What's more, all the images are available in TIFF files, for easy placement.

With our Image Folio program, you'll have thousands more photos that you can retouch yourself.

There's no cutting. No pasting. And, best of all, no running to the stock house.

Clip Art 3-D and Image Gallery?
If you can use a mouse, you can be an illustrator.

Did you ever think it would be that easy to be an artist? Well, with Clip Art 3-D it is. You'll have over 2,500 images you can manipulate any way you like. If that's not enough, there's also Image Gallery. Thousands of high-quality, hand-drawn black and white images (provided by Metro ImageBase) you can scale up or down. Not only that, all the images are stored in TIFF and EPS file formats.

So it's you who'll be creating all the art. Not an illustrator.

It's almost time to get up on your feet again.

After all, you don't have CD-ROM yet so there's probably something you have to run and do. However, you should realize by now that there's only one place you really have to sprint.

Your nearest NEC dealer. Then, we promise, you can hang up your sneakers once and for all.
Don't just stand there, call NEC:
1-800-826-2255 for literature.
1-800-FONE-NEC for technical advice.
1-800-268-3997 in Canada.
Shreve Systems receives good marks for excellent service from reader Dennis M. Brown of Dayton, Ohio. The company "bought my old Mac, quoted me the best price, and had a check to me ten working days after I shipped it. No hassles, no disagreements on price, only a good experience." Brown says that's how business is supposed to be but rarely is.

Another reader offers plaudits for Silicon Beach Software's fine technical support via phone and fax. "From the time I called with my problem to the time the solution was in my hand was only a matter of hours, and I was able to complete the project with plenty of time to spare," writes Dennis B. Appleton of Hewlett, New York. "It is nice to know that some companies offer customer service that doesn't make a mockery of that designation."

few of the MUGs we overlooked; others will follow in future columns.

DeMac can be reached at 400 Nut Tree Dr., Deland, FL 32724.

The Lehigh Valley Mac User Group is available c/o Barry J. Silver, 71 W. Ettwein St., Bethlehem, PA 18018; 215/691-1125.

MacNexus, the Sacramento Macintosh User Group, threatens to burn a Mac (512K or lower) on my doorstep if I don't include them in the next listing. Get in touch with the group at P.O. Box 163058, Sacramento, CA 95816; 916/446-2411, or via AppleLink at UG0003.

NASA Area Macintosh Users claims to be the best group in the Houston area. I can't vouch for that, but I can now provide an address: 403 NASA Rd., One East, #384, Webster, TX 77598. Brian Hall, the group's treasurer, librarian, and sysop can be reached at 713/644-0506.

Apple ambassador Paul Rego can be reached at 904/743-8628 for info about the North Florida Mac Users Group, P.O. Box 10262, Jacksonville, FL 32247.

The venerable Santa Barbara Macintosh Users Group can be contacted at P.O. Box 2035, Goleta, CA 93118, or by calling Morris Herman at 805/967-8200.

The Shore Area Macintosh Desktop Publishing Association concentrates on, you guessed it, desktop publishing. Co-chairs Don Stier and Marshall Makstein can be contacted at Keptel Corp., 56 Park Rd., Tinton Falls, NJ 07724; 201/389-8800.

The Macintosh SIG of the Tucson Apple Core meets on the fourth Tuesday of the month. Call Mike Peterson at 602/791-3258 for details.

And let us not forget—again—the Worcester Mac Users Group, RR 1, Box 47, East Douglas, MA 01516; 508/476-7014. You can also reach the group via AppleLink UG0199.

My apologies to anyone else we missed inadvertently; please get in touch.

NEW PHOENIX BUSINESS GROUP
Recently the Arizona Apple User Group (AzApple) launched a business offshoot called AzBUG. Monthly meetings held in the afternoon are expected to appeal to general business users, but the group hopes to bring in users from large corporations too. Call AzApple's at 602/277-8511 for information about both groups.

CONGRATS FOR USER GROUP AWARDS
Belated but heartfelt congratulations to the user group publications that won awards from the Intergalactic User Group Officers Conference some months ago. The winners, please: The Madison Macintosh Users Group, the Central Kentucky Computer Society, the Pioneer Valley PC User's Group, the Madison PC Users Group, BMUG (which won two awards), the Computer Society of South Jersey, Apple Corps of Dallas, the Alamo PC Organization, the Philadelphia Area Computer Society, and the Boston Computer Society. Good work, folks.
Simply stated, UltraPaint does everything you want it to today and tomorrow. Run it on a MacPlus or 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 compositions, using a complete set of advanced drawing tools to create up to 8 independent object-oriented layers.

Evolution's never much fun for the newly extinct. But it sure gives the rest of us better answers to our needs. In this case, a next-generation entry level graphics program that doesn't limit its users to entry level performance. Or entry level results. Or an entry level future.

Introducing Ultrapaint™ from Deneba. The tough new graphics standard for the nineties.

Color painting. Control the color of every dot on your screen with multiple customized 256-color palettes, a programmable multicolor airbrush, advanced mask & lasso, and professional special effects like blended fills, color gradients, and more.
Or open UltraPaint up on a Mac II and watch it come alive with millions of colors and enough grey scale editing power to retouch, combine, or totally recreate images captured by any scanner.

UltraPaint’s ultra-compatible, too, with built-in import/export filters for MacPaint®, PICT 1/2, TIFF, Startup Screen & even MacDraw® I formats.

And thanks to its breakthrough Open Architecture design, UltraPaint lets you add new tools, filters and effects by simply dragging them into a special folder - which means you’ll never be stuck waiting for upgrades again!

UltraPaint. We’ve made it easy. Flexible. Ininitely expandable. And, at $199 list, definitely underpriced.

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

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

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, smear, and smart selecting & masking. Produce quality halftone printed proofs.

SUPERPAINT USERS: TAKE A GIANT STEP 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 standard of reference.

Circle 282 on reader service card
Aside from being a tad easier to install than a satellite, the Hayes Smartmodem 2400M™ for the Macintosh® II and Smartcom II® for the Apple® Macintosh make up the most advanced communications system you can put inside a Mac®.

With this modem and software package, you can set up an extensive Macintosh computer work group system through a feature called HayesConnect™. It allows any Macintosh access to the Smartmodem 2400M across an AppleTalk® Network. Which means all Macintosh computers on the Network will be able to communicate with or without a modem of their own. This makes for extremely efficient office communications.

Then, to make them even more efficient, the system offers Smartcom II for the Macintosh. It's the only software designed to take full advantage of the power and graphics capabilities of all of the computers in the Macintosh family. For example, you can program your own on-screen buttons to create a personalized user interface. You also get features like moveable icons, custom color selection and full support of ImageWriter® and LaserWriter® for incredible graphics. You can even run the system unattended using an Autopilot feature. Of course, there is much more you can do with a few simple clicks on standard, easily identifiable icons.

By now it's probably clear that whether they're just used with the Macintosh II or shared by Mac computers on an AppleTalk Network, the Smartmodem 2400M and Smartcom II make a communications system that can't be beaten. At least not by anything on this planet.

The only communications system more advanced than ours won't fit inside your Mac.

For your nearest Hayes Advanced Systems Dealer, call 800-635-1225.
Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348.

Apple, Macintosh, Mac, ImageWriter, LaserWriter and AppleTalk are registered trademarks of Apple Computer, Inc.

© 1989 Hayes Microcomputer Products, Inc.
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, Ilcx and Ilic
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, Ilcx and Ilic 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.

Manufactured By:
MicroNet Technology, Inc.
20 Mason • Irvine, CA 92718 • Tel: (714) 837-6033
FAX: (714) 837-1164 • AppleLink: D1656
Connect: MicroNet

Distributed By:
CAL-ABCO
6841 Varvel Avenue • Woodland Hills, CA 91367
Sales: (800) 669-2226 • (818) 704-9100 Ext. 311
FAX: (818) 704-7733 • Canada: (800) 387-4345
The System 7.0 changeover is almost upon us. The changes in the new operating system will impact every Macintosh user. The compelling reason to change your system will come by the end of 1990, when most new software will begin taking advantage of the additional features of System 7.0. Last month I described the options classic Mac owners have for upgrading their machines in preparation for the change. This month I'll tackle what to do if you've got a Mac II.

**ORIGINAL MAC II OWNERS**

Those of us with the original Mac II (68020 processor, 800K drive, and so forth) are probably in worse shape than other Macintosh users. We bought our machine as state-of-the-art equipment and now find it's an also-ran compared to the IIcx and SE/30. Worse still, the Mac II was underengineered. The air flow in the case is terrible, the fan is noisy, you have to remove the disk drives to add RAM, you can't add an external floppy—the list of complaints runs on and on. Now, with the System 7.0 announcement, we find that we've got some new disadvantages to deal with. No one ever said a pioneer's life is easy.

First, let's deal with virtual memory. Virtual memory lets your machine act as if it had more memory than it does. With an adequately large hard disk, System 7.0 will allow you to configure your system as if it had 32MB or more of main memory. Want to run ten programs simultaneously under MultiFinder? That's not a problem with virtual memory. Moreover, System 7.0 lets you easily specify larger memory sizes than the current 8MB limit (see my description of Connectix Virtual and memory in the June issue).

Fine. But to get that feature you'll have to add a 68851 PMMU (paged memory management unit) to your Mac II. Here's where things get sticky. First, as I write this, all of the Motorola PMMU chips I've seen still have an X immediately after the number. That stands for experimental; it means that Motorola is not yet able to make the chips in production quantities. Thus, these chips are hard to find. So, if your local Apple dealer happens to have one of these $595 goodies in stock, you just might want to consider buying it.

Then again, maybe not. The problem is that the 68851 is not necessarily compatible with other options you may want to add to your machine. Any 68030-based accelerator will require you to unplug the 68851. One example is the Orchid Sprint II board I've been using in my machine during the last few months (the best $300 speedup choice available, by the way). The Sprint II is incompatible with many other options I might want to add—such as the SiClone accelerator and the DayStar Digital accelerator—because all these products fit into the 68030 socket, and there's only room for one. This is not really Orchid's fault but a result of how complex it is to build functional products that tie directly into the Mac II's hardware (as opposed to running through NuBus, which imposes some performance limitations).

The potential for incompatibilities boils down to three areas: (1) most of the CPU options affect things like RAM fetch cycles; thus, if you install two of them there's an interaction that must be dealt with; (2) some of the options use the same socket or are physically incompatible (you can't add an Orchid Sprint II and a Dove MaraThon 030 at the same time because there's no room, among other reasons); and (3) System 7.0 is not yet available, and so there may be further incompatibilities when it finally arrives.

I'd really like to recommend three accelerators to Mac II users: for low-cost modest performance improvement (20 percent), get an Orchid Sprint II; for modest cost but better performance (30 to 50 percent), get a Dove MaraThon 030; for high cost but unequalled performance, buy the SiClone 030. Unfortunately, it is possible that all three of these products will have to undergo some (let's hope minor) modifications to be completely compatible with System 7.0. You can buy now and gamble that there will be no (continues)
GOOD HELP LOW RATES.

Willing to do the shopping, banking, get the news, play with the kids, check the weather, order airline tickets and more for just $9.95 a month.
The little yellow box brings you hundreds of features for just $9.95 a month.

Who says good help is hard to find?

The PRODIGY® Service Start-up Kit is your key to a world of helpful services at a price that won't eat you out of house and home.

After you purchase your Start-up Kit, all it takes is a flat $9.95 a month, with no on-line charges, to bring you and your family hundreds of features! Now, shopping is easy, banking is a breeze, plus you can get the latest news, send messages, book your own flight, play games that are fun and educational, and that's just the beginning.

Up to six family members can choose their own personal password and then customize the PRODIGY service to fit the way they want to use it. Weather forecasts, member clubs, stock quotes, plus the features you like are all waiting for you.

The PRODIGY Service Start-up Kit comes complete with everything you need to get on-line easily. There is also a Start-up Kit with a Hayes® Personal Modem 2400 at a great price.

To find out where to get your Start-up Kit, just call 1-800-822-6922, ext. 594. Once you’re on-line, you’ll find that good help is not only easy to find, it's affordable.

Call 1-800-822-6922, ext. 594, for a dealer near you.
problems making the switch to 7.0, but you may be wrong.

This kind of uncertainty makes it difficult to justify spending big bucks now when six months from now you'll be able to make a secure, intelligent decision. (Actually, the transition to 7.0 could be a death blow to some Mac II peripheral makers as consumers wait out the change.) If you're the conservative type and have the bucks (more than $2000), about the only upgrade option you should consider for a standard Mac II is an upgrade to a IIx, courtesy of your Apple dealer. If you've already bought one of the hardware extenders or accelerators mentioned (as I have), keep your fingers crossed and pray for compatibility.

MACINTOSH II/IIHX
If you've got a Mac IIx or IIcx, you're sitting in the best position of anyone to take advantage of System 7.0 when it first appears. That's assuming that you've taken care of a few other minor things, however.

For example, how's your hard disk doing? Did you buy an 80MB disk and fill it to capacity the first week? Well, if you did, think about either removing unnecessary files or buying a bigger drive. The reason? You'll want free space on your hard disk to dedicate to virtual memory. For modest users, that may only be 8MB. For those of you working with sophisticated 32-bit color graphics, that may be 32MB. And since the performance of virtual memory swapping will be constrained by the speed of your hard disk, you might want to consider buying one with a track-to-track access time of less than 20ms, or a built-in disk cache (like the Quantum drives).

Personally, I've added a removable-media external hard disk to my system, and I've minimized what I put on the internal hard disk. The 45MB removable cartridges on my external Mass Micro drive allow me to have data sets for writing, programming, testing, and all the other work I do. If I want to work on graphics, I plug in my graphics cartridge (which has all my graphic applications and data on it). Meanwhile, the internal hard disk has the system software, the virtual memory spool file, most of my utilities, and a few standard applications.

If you are considering upgrading, among the things to think about are SIMMs. If you've got any 256K SIMMs in your machine, you're not driving a state-of-the-art machine. With System 7.0, you can use 4MB SIMMs to address up to 32MB on the system board. These days I don't recommend adding any memory to a Mac II unless you buy 1MB SIMMs. Unfortunately, you have to do that four SIMMs at a time, which can gobble up a healthy chunk of change.

Why add SIMMs? Well, System 7.0 will absolutely require 2MB of memory to run even the most minimal application. That's the maximum memory you can add using 256K SIMMs in a Mac II. I recommend a minimum of 4MB of RAM once you start using System 7.0. That should give you satisfactory performance when swapping (continues)
You've been practicing for years.
Now it's time to play.

Introducing the HP DeskWriter printer for the Macintosh. $1195.
The new HP DeskWriter printer for the Macintosh puts laser quality on your desktop. With its advanced inkjet technology you can print text and graphics, even scalable outline fonts, at 300 DPI. Just like a laser printer.

But unlike a laser printer, the DeskWriter is priced so you can have your own. No more waiting in line for output. Or having your work scrutinized by the office busybodies.

And at a compact 15" x 17" x 8", the DeskWriter fits neatly next to your Macintosh. So call 1-800-752-0900, Ext. 688E for your nearest authorized HP dealer and see a demonstration. And keep the laser quality all to yourself.

There is a better way.
between applications under MultiFinder, even with a 16MB virtual memory partition on your hard disk. It's clear from my experience with Connectix Virtual that a 2MB Mac swapping to an 8MB virtual file on disk is noticeably slower than a 4MB machine doing the same thing.

If you’re satisfied with what you have, great; just sit back and wait for Apple to send out the final disks for System 7.0. If not, save your pennies for an upgrade.

WHY CHANGE AT ALL?
Apple believes that the change to System 7.0 will be every bit as dramatic as the change to HFS and 800K drives when the Plus was introduced. I think the change is going to be even more dramatic. Simply stated, software developers see things in System 7.0 that they definitely want to add to their programs (and will). Those changes will draw a dividing line between users who have System 6.0 and users with 7.0.

I’m sure developers will support 6.0 users as long as possible, but the future of software products will force them to embrace 7.0. By 1991, I suspect, you’ll see nifty new products that run only under System 7.0. Since even a 2MB Plus owner will be able to take advantage of many of System 7.0’s features, Macintosh developers don’t feel the changeover will be as painful as, say, the changeover from DOS to Presentation Manager will be in the IBM PC world.

From the user’s standpoint the choice is easy as well. For the cost of 1MB of extra memory, all Mac owners will get better font control; closer mapping of what’s on the screen to what you get on the printer; better Clipboard support and easier moving of data between applications; better network support, including remote database access and E-mail; a wider range of printer choices; and an easier-to-use Finder. All of these features may not appeal to all Macintosh owners, but I bet that at least one of them does. Actually, the new Finder alone appears to be worth the switch (no more Font/DM Mover or fixed menus and views). And if you own a Mac II, Ixx, IIcx, or SE/30, System 7.0 gives you access to 32-bit color, 32-bit memory addressing, and virtual memory.

System 7.0 is going to breathe additional life into the Macintosh family. Yes, it is expensive to make some of the changes and upgrades. Yes, there will be a hassle with some preexisting hardware that suddenly needs an upgrade of its own. Yes, some software products will be left behind. And yes, Apple is hurting many of the smaller utility developers by incorporating new features into the Finder.

No change comes without a little pain. Just remember that change always brings with it opportunity. I predict that once we’ve all completed the switch to System 7.0 we’ll find ourselves more productive and happier.
RasterOps Monochrome

ClearVue/SE: The only SE big-screen display with an integrated 3x FREE Accelerator.

The most technically advanced monochrome display for the SE gives you a choice of our 19" 1024 x 768 display, or Apple's® 15" Portrait Display. It is the only display board to give your SE the performance boost you need to run big screen applications fast, for maximum productivity.

16 MHz Accelerator
The ClearVue/SE adds a high speed microprocessor that immediately doubles the performance of your SE from 8 MHz to 16 MHz.

Optimized RAM Interface
Incorporating a tightly designed memory interface to take advantage of our 16MHz CPU, the ClearVue/SE pushes the performance gain beyond 2x. With the vast improvement in our DRAM (Dynamic Random Access Memory) technology, faster DRAM speeds are now available. The ClearVue/SE takes full advantage of the faster DRAMs by reducing the number of CPU wait states for 100ns or faster parts, while still supporting the slower 150ns parts.

Optimized ROM Interface
To take further advantage of the 16MHz CPU, a tightly designed ROM (Read Only Memory) interface was added, which reduces the number of CPU wait states.

Flicker-Free Display
You get Apple's standard 72 dot-per-inch resolution, so your screen display is accurate. This high-speed oscillator gives you a 72Hz refresh rate for a stable, flicker-free image - essential long, intensive work sessions.

Shadow RAM
In order to draw to the SE's monitor and produce sound, some DRAM must be present on the slow, SE board which can create an access bottleneck. To improve performance, the ClearVue/SE incorporates a shadow copy of the SE board's DRAM in its high speed, optimized DRAM so that reads are executed to both, and reads are executed from the shadow copy. This feature gives you a 50% performance gain in accessing SE board DRAM.

Productivity Software
To keep you as productive as possible, we provide software for 2x, 4x, and 8x zooming, large text presentation mode, and pop-up menus.

Sound Protection
Accelerators can distort the sound functions of SEs as a result of the speed increase. RasterOps provides special sound RAM so you get zero distortion. Your Mac SE sounds and acts completely as it did before, only much faster.

Floating Point Unit
The standard SE forces the slow CPU to do all mathematical calculations. We provide an optional 16MHz 68881 Floating Point Unit to increase mathematical calculation performance as much as 600%.

Integrated Display/Accelerator
RasterOps is the only company integrating display and acceleration circuitry on one board. This gives you several benefits: the speed you need to drive big-display applications like desktop publishing, graphics, or databases; reduced price through elimination of redundant parts and margin that multiple boards require; and a more reliable, cooler, single-board solution.

For your nearest dealer and literature on the most advanced Macintosh graphics products, call:
Information Hotline: 1-800-952-6300, Dept. X28

RasterOps has a complete line of Monochrome products to choose from. (When purchased for use with the Apple 15" Portrait Display, only the board is sold. Your participating Apple Dealer supplies the monitor.)

RasterOps
2500 Walsh Road, Santa Clara California 95051 USA

AUSTRIA - Power Publish (1) 3059-411, AUSTRALIA - Mitai (2) 582-052, BELGIUM - Megazak (416) 820-4922 - France (413) 523-7222, DENMARK - Intermac (2) 58242, FRANCE - RasterOps (41) 30-40-55, GERMANY - Magica (1) 30-84-89, GREECE - L-Cube (1) 36-14-509, HOLLAND - Postwerka (00) 41-63-53, ITALY -Hofiland (012) 30-1922, JAPAN - Nikon (2) 30-75-85, MACINTOSH - Macdesign Informatics (09) 2922, SINGAPORE - Chard Electronics Ltd (79) 5001, SPAIN - ITC (91) 255-7900, SWEDEN - Sofware Plus (11) 16-12-70, SWITZERLAND - Corno (044) 20-13-55, U.S.E. - Axt Business Machines (917) 623-038, U.K. - Gomax Limited (01) 721-7930. All registered and unregistered trademarks above are the sole property of their respective companies. Specifications and features subject to change.
CALL MONDAY THRU FRIDAY 9 AM - 9 PM SATURDAY 9 AM - 6 PM (EASTERN TIME)

MAC-101 Keyboard by DataDesk

Replace your Mac's keyboard with the MAC-101 by DataDesk. The positive tactile, firm feel includes a full numeric keypad, 15 function keys, 6 page control keys, and a T-style cursor pad. Includes 101-Keays desk accessory software, a powerful macro utility that allows you to exploit the full power of the function keys in almost any Mac application. Available in ADB and non-ADB versions. $139.

C-A-T Version 3 by Chang Labs

Placing a new definition on "personal productivity"! C-A-T combines a relational database with an integrated word processor, drawing program, forms generation, and on-line calendar, that files each document by person, type and date/time of creation for instant retrieval. And the multi-user/sharing/database publishing features allow extension of this productivity to an entire group. $225.

Exposure & Direct Mail by Preferred Publishers

Exposure ($55) is an integrated CDEV screen graphics utility for screen capture, painting and formatting of color and gray scale images. Unique format includes built-in painting tools and fonts. Direct Mail ($55) is the complete correspondence solution for labels, envelopes, address, and telephone dialing. Easily searches, sorts and mails address files for select mailing, merging or exporting. Available as DA or application.

Electronic Art by Metro ImageBase

High quality, 300dpi, electronic art created by leading professional illustrators. 4 times sharper than "clip art". Enhances brochures, menus, newsletters, reports and presentations. One large image per file (100 files per package). Volumes include Newsletter Maker, Computers & Technology; Business Graphics: Report Maker; Four Seasons; Nine to Five; Art Deco; Borders & Boxes; People; Exercise & Fitness; Team Sports; Weekend Sports; Travel; Food. $85 ea.

Address Book Plus by Power Up

Address Book Plus is the most complete, ready-to-use solution for managing names, addresses, phone numbers and other vital information. The program makes it easy to print top quality address book pages, mailing labels, rotary-file cards, index cards, envelopes, and phone lists. It also provides searching and automatic dialing capability in a separate Desk Accessory. $85.
MacInteriors by Microspot

MacInteriors is for all of us who have ever wanted to do our own interior design. Now for the price of a typical 2D package you can have 3D space-planning software that lets you work and examine creations in several views (inc. perspective and bird's-eye), then print it out to a laser printer or plotter. You can create your own objects or use the ones provided. Soon you'll be designing everything from bedrooms to buildings. ...... $199.

MODEMS

Abaton InterFax 1248..........275.
Anchor Automation
MacPac 2400E w/software & cable ......179.
Best Data Products
SmartOne 2400/1200 w/software & cable Special 145.
CMS CMS 2400BMX ..........179.
Hayes Microcomputer
Smartmodem 1200 ...........295.
Smartmodem 2400M w/smartcom II ....459.
Practical Modem Mini 1200SA .........179.

Smartmodem 2400BMX ..........179.
Prometheus Promodem 2400 M Ext. (MacKNOWLEDGE & Cable) .....199.
Promodem 2400SE Ext for the Mac......209.
Promodem 2400M Pro with MACKNOWLEDGE & DA ..........269.
Promodem 9600M Plus Ext. (MacKNOWLEDGE & Cable) .......750.
Supra Corporation
Supra Modem 2400 ...........129.
U.S. Robotics
Courier 1200 (Hayes Compatible) ......199.
Courier 2400 (Hayes Compatible) ......335.
VenTel
Mac 2400E (int. Mac II w/MS Works) ....399.

Macinware Carrying Cases by I/O Design

Features a tear and soil resistant Cordura outer shell and ultra-high density foam. Compartments which holds mouse, cords, extended keyboard and external hard drive. Comes in navy, platinum and black.

DESK ACCESSORY PROGRAMS

Affinity Microsystems
Tempo II .................Special 75.
Affinity ..........45.
Cassedy & Greene, Inc
QuickCursor 14A ..........31.
CE Software DeskTop ..................32.
Donbest Software Clen 2.0 ....59.
Icon Simulations MacKern ..........115.
Jam Software
SmartAlarms w/Alert Diary ..........49.
Smart Alarms Multi-User Appt. Diary (1-4 users) ..........99.
Smart Alarms Multi-User Appt. Diary (5-8 users) ..........149.
Smart Alarms Multi-User Appt. Diary (9-15 users) ..........199.
Mainstay Thinkin Time ................55.
Solutions, International Super Quill ....62.
SmartScrap & The Clipper V2.0 ....45.
Symmetry HyperDA (Reg 5/12K) .......35.

MacPrint 1.1 by Insight Development

Introducing MacPrint 1.1, an easy-to-use software package that lets you use virtually any Mac application on alternative printers including HP LaserJet, series II, IID and compatibles and the HP DeskJet and DeskJet Plus. Use MacPrint 1.1 for true WYSIWYG performance. Four Compugraphic font families are included with point sizes from 9 to 96. Completely transparent after installation. ....... $79.

DATABASE MANAGEMENT

Acus 4th Dimension V2.0 ....549.
4th Dimension .............349.
4th Dimension Runtime ..........229.
Activity
Reports for Hypercard ..........65.
Focal Point & Business Class Bundle ....49.
Apple Computer HyperCard ..........42.
Blyth Software
Omnis 5 Special 359.
Borland Reflex Plus ..........185.
Clara FileMaker II ..........229.
Exodus Retrieve ..........59.
Fox Software FoxBase* V2.0 ....255.
Foxbase* Multi-User V2.0 ....355.
Foxbase* Runtime V2.0 ..........155.
Generation Four
Multiuser Business Administration Series
MBA Clients ..........115.
MBA DaList ..........115.
MBA Docurtak ..........115.
MBA Inventory ..........115.

GOfer by Microlytics

GOfer – the ultimate textfinder. As a disk accessory GOfer is a powerful utility that searches, finds and retrieves text from anywhere on your disk. A phrase, a fact, a note, a date; if you need it, GOfer will find it in seconds. Automatically imports the section of text into the document you’re currently working in. ...... $47.

MacPrint 1.1

FOX: 201/381-9043
Inquiries: 203/378-3662
Canada: 1/800/344-7753
75 RESEARCH DRIVE
STRATFORD, CT 06697
1/800/832-3201

GOFER

GOffer

SmartOne 2400/1200 by Best Data Products

The Smart One 2400/1200 – a complete package for the Mac. Includes free communication software, free cable assembly, free access to CompuServe and Con-nect Professional Information Network. 100% Hayes compatible. Two year warranty. ...... $145.

Now Toll-Free
In Canada
1-800-344-7753

Monday thru Friday
9 a.m. - 9 p.m. (Eastern Time)
Saturday
9 a.m. - 6 p.m. (Eastern Time)

AIRBORNE EXPRESS $3 OVERNIGHT DELIVERY

SPECIALS GOOD THROUGH NOVEMBER 30, 1989

NOVA COMPUTER DISTRIBUTORS

115.
115.
115.
115.
115.
115.
115.
89.
125.
528.
339.
285.
199.
69.
202.
65.
115.
115.
115.
115.
115.
115.
115.
115.
MBA Massmail
MBA Netmail
MBA Personnel
MBA Projects
MBA Ship rec
MBA Telecall
MBA Traveling
Icon Simulations
Microsoft
Microsoft Fax 2.0
Microsoft Office (includes Excel, Word, Powerpoint & Mail)
Odesta Double Helix III
Database Professional
GeoQuery
Preferred Publishers
Database
ProVue Panorama
Software Discoveries
RecordHolder Plus

© 1989 Microlytics, Inc.
<table>
<thead>
<tr>
<th>GRAPHICS SOFTWARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image w/impact Graphics &amp; Symbols</td>
</tr>
<tr>
<td>Image w/impact Business</td>
</tr>
<tr>
<td>Adobe Systems</td>
</tr>
<tr>
<td>Adobe Illustrator 8</td>
</tr>
<tr>
<td>Adobe Collector's Ed. 2</td>
</tr>
<tr>
<td>Broderbund Print Shop</td>
</tr>
<tr>
<td>Poster Maker Plus</td>
</tr>
<tr>
<td>Drawing Tables</td>
</tr>
<tr>
<td>Casady &amp; Greene Vivid Impressions</td>
</tr>
<tr>
<td>Quill Pack (vol. 8 &amp; 20)</td>
</tr>
<tr>
<td>Headline Pack (vol. 10-12)</td>
</tr>
<tr>
<td>Modern Pack (vol. 7, 14-16) or Display Pack (vol. 8-22)</td>
</tr>
<tr>
<td>Classic Pack (vol. 3-6, 8 &amp; 13)</td>
</tr>
<tr>
<td>CE Software Calendar Maker</td>
</tr>
<tr>
<td>Classic Print Pack</td>
</tr>
<tr>
<td>MacDraw II</td>
</tr>
<tr>
<td>Claris Card</td>
</tr>
<tr>
<td>Cricket Software Cricket Draw</td>
</tr>
<tr>
<td>Cricket Draw</td>
</tr>
<tr>
<td>Cricket Graph</td>
</tr>
<tr>
<td>Cricket Color Paint</td>
</tr>
<tr>
<td>Cricket Presets</td>
</tr>
<tr>
<td>Desktop Video Canvas 2.0 (includes Desk Accessory)</td>
</tr>
<tr>
<td>DreamMaker</td>
</tr>
<tr>
<td>MacCafe (Hypercald or Painl)</td>
</tr>
<tr>
<td>Dubl-Click Software</td>
</tr>
<tr>
<td>World Class Fonts: Originals 1 &amp; 2</td>
</tr>
<tr>
<td>World Class Fonts: Sylvan 3 &amp; 4</td>
</tr>
<tr>
<td>World Class Fonts: Giants 5 &amp; 6</td>
</tr>
<tr>
<td>World Class Fonts: Triples 7 &amp; 8</td>
</tr>
<tr>
<td>World Class Laserype: Aukland, Metropolitan</td>
</tr>
<tr>
<td>World Class Laserype: 2</td>
</tr>
<tr>
<td>Hobsom, Ixtapa, Saigon</td>
</tr>
<tr>
<td>World Class Laserype: 3 Versatilles</td>
</tr>
<tr>
<td>World Class Laserype: 4</td>
</tr>
<tr>
<td>El Paso, Tijuana</td>
</tr>
<tr>
<td>World Class Laserype: 5 Hancock Park</td>
</tr>
<tr>
<td>World Class Laserype: 6</td>
</tr>
<tr>
<td>Silver Lake, Math/Whiz</td>
</tr>
<tr>
<td>World Class Laserype: 7 Frankfurt</td>
</tr>
<tr>
<td>World Class Laserype: 8 Santa Monica</td>
</tr>
<tr>
<td>World Class Laserype: 9 Aspen</td>
</tr>
<tr>
<td>WePrint Classic Clip Art (1 &amp; 2)</td>
</tr>
<tr>
<td>WePrint Publishing (3 &amp; 4)</td>
</tr>
<tr>
<td>WePrint Animal Kingdom (5 &amp; 6)</td>
</tr>
<tr>
<td>WePrint Special Occasions</td>
</tr>
<tr>
<td>WePrint Printer's Helper (9 &amp; 10)</td>
</tr>
<tr>
<td>WePrint Industrial Revolution (11 &amp; 12)</td>
</tr>
<tr>
<td>WePrint Odd Earth Amazons (13 &amp; 14)</td>
</tr>
<tr>
<td>WePrint Island Life (15 &amp; 16)</td>
</tr>
<tr>
<td>WePrint All the People (17 &amp; 18)</td>
</tr>
<tr>
<td>Electronic Arts Studio 8 (Macintosh)</td>
</tr>
<tr>
<td>UNIX</td>
</tr>
<tr>
<td>Enabling Technology</td>
</tr>
<tr>
<td>Clip 3D Accents</td>
</tr>
<tr>
<td>Clip 3D Business</td>
</tr>
<tr>
<td>Clip 3D Fonts</td>
</tr>
<tr>
<td>Clip 3D Graphics</td>
</tr>
<tr>
<td>Clip 3D Lifestyle</td>
</tr>
<tr>
<td>Clip 3D Messages</td>
</tr>
<tr>
<td>Clip 3D Multicast</td>
</tr>
<tr>
<td>Clip 3D Recreation</td>
</tr>
<tr>
<td>Foundation Publishing</td>
</tr>
<tr>
<td>Comic Strip Factory</td>
</tr>
<tr>
<td>Generic Software</td>
</tr>
<tr>
<td>Generic CAD</td>
</tr>
<tr>
<td>Basic Home Design</td>
</tr>
<tr>
<td>Bathroom Design</td>
</tr>
<tr>
<td>Comm/Residential Plumbing</td>
</tr>
<tr>
<td>Comm/Residential Furnishing</td>
</tr>
<tr>
<td>Flow Charts &amp; Schedules</td>
</tr>
<tr>
<td>HVAC Heat/Air Conditioning</td>
</tr>
<tr>
<td>Home Landscape</td>
</tr>
<tr>
<td>Kitchen Design</td>
</tr>
<tr>
<td>Landscape Architecture</td>
</tr>
<tr>
<td>Pipe Fitter</td>
</tr>
<tr>
<td>Graphsoft Mini Cad + Blueprint</td>
</tr>
<tr>
<td>Innovative Data Design</td>
</tr>
<tr>
<td>Residential Construction</td>
</tr>
<tr>
<td>MacDraft 12B</td>
</tr>
<tr>
<td>lettuce MapsStudio 1.5</td>
</tr>
<tr>
<td>MacroMind MapMind Director</td>
</tr>
<tr>
<td>VideoWorks Hyper Card Driver</td>
</tr>
<tr>
<td>VideoWorks Accelerator</td>
</tr>
<tr>
<td>VideoWorks II</td>
</tr>
<tr>
<td>Mainsoft MathCAD</td>
</tr>
<tr>
<td>Metro ImageBase Art Deco</td>
</tr>
<tr>
<td>Borders &amp; Boxes</td>
</tr>
<tr>
<td>Exercise &amp; Fitness</td>
</tr>
<tr>
<td>Four Seasons</td>
</tr>
<tr>
<td>NewsletterMaker</td>
</tr>
<tr>
<td>Ninio to Five</td>
</tr>
<tr>
<td>People</td>
</tr>
<tr>
<td>ReportMaker</td>
</tr>
<tr>
<td>Team Sports</td>
</tr>
<tr>
<td>Travel</td>
</tr>
<tr>
<td>Weekend Sports</td>
</tr>
<tr>
<td>Micro: Maps</td>
</tr>
<tr>
<td>MacAtlas Hyper Atlas</td>
</tr>
<tr>
<td>MacAtlas Print v2.0</td>
</tr>
<tr>
<td>MacAtlas Professional</td>
</tr>
<tr>
<td>MacPlot Color Thermal</td>
</tr>
<tr>
<td>MacPlot DMA Electrostatic</td>
</tr>
<tr>
<td>MacPlot DMA Color Thermal</td>
</tr>
<tr>
<td>MacPlot Electrostatic</td>
</tr>
<tr>
<td>MacPlot Pen Plotter Professional</td>
</tr>
<tr>
<td>MacPlot Pen Plotter Standard</td>
</tr>
<tr>
<td>MacPaint</td>
</tr>
<tr>
<td>Mac the Ripper or Orchestra of Fonts</td>
</tr>
<tr>
<td>People, Places, Things or Talking</td>
</tr>
<tr>
<td>Care of Business</td>
</tr>
<tr>
<td>NeEquation No Pain, No Gain</td>
</tr>
<tr>
<td>Parascope Swivel 3D</td>
</tr>
<tr>
<td>Model Shop</td>
</tr>
<tr>
<td>Presentations</td>
</tr>
<tr>
<td>Presentation Exposure</td>
</tr>
<tr>
<td>Silicon Beach Software</td>
</tr>
<tr>
<td>SuperPaint 2.0</td>
</tr>
<tr>
<td>Digital Darkroom</td>
</tr>
<tr>
<td>Super 3D 20</td>
</tr>
<tr>
<td>SoftStream HyperText</td>
</tr>
<tr>
<td>Systems Integration</td>
</tr>
<tr>
<td>The Curator (Catalog Your Art)</td>
</tr>
<tr>
<td>Springboard Certificate Maker</td>
</tr>
<tr>
<td>Springboard Publisher</td>
</tr>
<tr>
<td>SuperMac Software</td>
</tr>
<tr>
<td>Pixel Paint v2.0</td>
</tr>
<tr>
<td>Pixel Paint Professional</td>
</tr>
<tr>
<td>Symmetry</td>
</tr>
<tr>
<td>Picture Base &amp; Paint Package</td>
</tr>
<tr>
<td>Synergy Kaleidoscope</td>
</tr>
<tr>
<td>Tandy AlArt Chip 2</td>
</tr>
<tr>
<td>Art Chip or ArtFronts 1 &amp; 2</td>
</tr>
<tr>
<td>Taylord Graphics FontLiner</td>
</tr>
<tr>
<td>WebWorks Publish-it!</td>
</tr>
<tr>
<td>Tira/Star</td>
</tr>
<tr>
<td>ClipArt EPS Illustrations</td>
</tr>
<tr>
<td>EPS Business Art</td>
</tr>
<tr>
<td>Zedcor DeskPaint 2.0</td>
</tr>
</tbody>
</table>

**OUR POLICY**
- VISA and MASTERCARD accepted. No surcharge.
- Your credit card is not charged until we ship.
- If we must ship a partial order, the shipment that completes the order is sent freight free.
- All shipments insured; no additional charge.
- Upon receipt and approval, personal and company checks now clear the same day for immediate shipment.
- No sales tax except orders shipped within CT, add 8% tax.
- COD maximum $1,000, cash or certified check. COD orders ship via UPS Blue Label unless UPS Ground delivers next day.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. Prices subject to change without notice. All items subject to availability.
- Call us anytime Monday thru Friday 9:00 to 9:00 Eastern Time, or Saturday 9:00 to 6:00 Eastern Time. You can call our business offices Monday thru Friday 9:00 to 5:30 Eastern Time at (203) 375-3060.
- Purchase Orders accepted at our discretion, for more information call (203) 378-1926, 9:00 to 5:30 Eastern Time.

**SHIPPING**
- Continental U.S.: Add $3.00 per order to cover Airborne Express Overnight, unless UPS ground delivers next day. Some areas require an additional day.
- All orders shipped no later than the following day, barring computer failures or other catastrophes.
- Mail-in orders (especially from foreign countries), please furnish telephone or fax number.
**ScriptEdit by Somak Software**

*ScriptEdit* is a fast intuitive desk accessory that makes it easy to create, modify and print HyperTalk scripts - the instructions that control your HyperCard stacks. Includes an installation stack with XCMD.

**Résumé Expert by A Lasting Impression**

Quick and easy résumé compilation. Professional results for students to CEOs. 42 fully formatted MS Word or Works résumé templates. Just highlight text and substitute your own information. 72-page manual provides useful tips.

**ExpressWrite by Exodus Software**

*ExpressWrite* the letter writing desk accessory...it is the easiest and fastest way to do correspondence and short documents. Using ExpressWrite you can create fast, professional letters quickly and efficiently.

**MacTilt by Ergotron**

*MacTilt* relieves the physical discomfort caused by crouching and squinting to see the Macintosh screen. By raising the Mac 4-inches and providing unequaled tilt/swivel capabilities, the *MacTilt* provides the increased height necessary to bring the Mac up to eye level and the flexibility necessary to reduce eye, neck and back strain. Models are available for the Mac Plus, SE and Mac II.

**POWERmenus by Magic Software**

*POWERmenus* puts your menus where your mouse is! With just a click, the menu bar will appear next to your mouse pointer in ANY application on ANY monitor. Includes eight POWERmenus.

**DISK DRIVES/HARD DISKS/UPGRADES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacSnap Plus 2S</td>
<td>2 MB</td>
<td>$329</td>
</tr>
<tr>
<td>MacSnap Plus 4S</td>
<td>4 MB</td>
<td>$399</td>
</tr>
<tr>
<td>MacSnap Plus 8S</td>
<td>8 MB</td>
<td>$419</td>
</tr>
<tr>
<td>MacSnap Plus 16S</td>
<td>16 MB</td>
<td>$449</td>
</tr>
<tr>
<td>MacSnap Plus 32S</td>
<td>32 MB</td>
<td>$479</td>
</tr>
<tr>
<td>MacSnap Plus 64S</td>
<td>64 MB</td>
<td>$499</td>
</tr>
<tr>
<td>MacSnap Plus 128S</td>
<td>128 MB</td>
<td>$599</td>
</tr>
<tr>
<td>MacSnap Plus 256S</td>
<td>256 MB</td>
<td>$649</td>
</tr>
<tr>
<td>MacSnap Plus 512S</td>
<td>512 MB</td>
<td>$699</td>
</tr>
<tr>
<td>MacSnap Plus 1024S</td>
<td>1024 MB</td>
<td>$749</td>
</tr>
<tr>
<td>MacSnap Plus 2048S</td>
<td>2048 MB</td>
<td>$799</td>
</tr>
<tr>
<td>MacSnap Plus 4096S</td>
<td>4096 MB</td>
<td>$849</td>
</tr>
<tr>
<td>MacSnap Plus 8192S</td>
<td>8192 MB</td>
<td>$899</td>
</tr>
<tr>
<td>MacSnap Plus 16384S</td>
<td>16384 MB</td>
<td>$949</td>
</tr>
<tr>
<td>MacSnap Plus 32768S</td>
<td>32768 MB</td>
<td>$999</td>
</tr>
</tbody>
</table>

**MacTilt 3½" DS/DD Disks**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MB</td>
<td>$16</td>
</tr>
<tr>
<td>20 MB</td>
<td>$19</td>
</tr>
<tr>
<td>30 MB</td>
<td>$25</td>
</tr>
<tr>
<td>40 MB</td>
<td>$31</td>
</tr>
<tr>
<td>50 MB</td>
<td>$37</td>
</tr>
<tr>
<td>60 MB</td>
<td>$43</td>
</tr>
<tr>
<td>70 MB</td>
<td>$51</td>
</tr>
</tbody>
</table>

**Hypermedia & Languages**

<table>
<thead>
<tr>
<th>Publisher</th>
<th>Product Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bantam Publishing</td>
<td>HyperBasic King James</td>
<td>$145</td>
</tr>
<tr>
<td>Bantam Publishing</td>
<td>HyperBasic International</td>
<td>$175</td>
</tr>
<tr>
<td>Borland</td>
<td>Hyper Animator</td>
<td>$99</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Hyper Animator</td>
<td>$99</td>
</tr>
<tr>
<td>Broderbund</td>
<td>Complete HyperCard Handbook</td>
<td>$63</td>
</tr>
<tr>
<td>Broderbund</td>
<td>Artec C</td>
<td>$63</td>
</tr>
<tr>
<td>Broderbund</td>
<td>Artec C + SD + Artec C + MPW</td>
<td>$95</td>
</tr>
<tr>
<td>Broderbund</td>
<td>Microsoft Quick Basic</td>
<td>$65</td>
</tr>
<tr>
<td>Broderbund</td>
<td>Olduvai Corporation Plus 1.1</td>
<td>$108</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>TimePointO FocalPoint II</td>
<td>$117</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>the Result Software Dialoger</td>
<td>$59</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Somak Software ScriptEdit Special</td>
<td>$55</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Symantec Thnk C</td>
<td>$135</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Think Pascal</td>
<td>$95</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Just Enough Pascal</td>
<td>$47</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>TENXpointO FocalPoint II</td>
<td>$117</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>the Result Software Dialoger</td>
<td>$59</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>ExpressWrite ScriptEdit Special</td>
<td>$55</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Intelligent Developer</td>
<td>$260</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Icon Simulations</td>
<td>$210</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>HyperTVON</td>
<td>$98</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Icon Simulations</td>
<td>$98</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Individual Software</td>
<td>$59</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>101 Scripts &amp; Buttons HyperCard</td>
<td>$36</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>TimeWorks Hyperworks Organizer</td>
<td>$60</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Trendware Corporation Stack Cleaner</td>
<td>$90</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>HyperTools 1.2</td>
<td>$52</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>XCAL</td>
<td>$79</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>T.M.L. TML Pascal II V3.0</td>
<td>$109</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>TML Source Code Library II</td>
<td>$39</td>
</tr>
<tr>
<td>Bright Star Technology</td>
<td>Zeclone ZBasic 5.0</td>
<td>$89</td>
</tr>
</tbody>
</table>

**Blank Media**

<table>
<thead>
<tr>
<th>Format</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Sided 3½&quot; Disks</td>
<td></td>
</tr>
<tr>
<td>Bulk (Sony) 3½&quot; SS/DD Disks (10)</td>
<td>$14</td>
</tr>
<tr>
<td>Sony 3½&quot; SS/DD Disks (box of 10)</td>
<td>$16</td>
</tr>
<tr>
<td>Double Sided 3½&quot; Disks</td>
<td></td>
</tr>
<tr>
<td>BASF 3½&quot; DS/DD (box of 10)</td>
<td>$15</td>
</tr>
<tr>
<td>Bulk (Sony) 3½&quot; DS/DD (10)</td>
<td>$14</td>
</tr>
<tr>
<td>Centum 3½&quot; DS/DD Color Disks (10)</td>
<td>$19</td>
</tr>
<tr>
<td>Sony 3½&quot; DS/DD Disks (box of 10)</td>
<td>$15</td>
</tr>
</tbody>
</table>

**PowerUp by Software**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacSnap Plus 2S</td>
<td>2 MB</td>
<td>$329</td>
</tr>
<tr>
<td>MacSnap Plus 4S</td>
<td>4 MB</td>
<td>$399</td>
</tr>
<tr>
<td>MacSnap Plus 8S</td>
<td>8 MB</td>
<td>$419</td>
</tr>
<tr>
<td>MacSnap Plus 16S</td>
<td>16 MB</td>
<td>$449</td>
</tr>
<tr>
<td>MacSnap Plus 32S</td>
<td>32 MB</td>
<td>$479</td>
</tr>
<tr>
<td>MacSnap Plus 64S</td>
<td>64 MB</td>
<td>$499</td>
</tr>
<tr>
<td>MacSnap Plus 128S</td>
<td>128 MB</td>
<td>$519</td>
</tr>
<tr>
<td>MacSnap Plus 256S</td>
<td>256 MB</td>
<td>$539</td>
</tr>
<tr>
<td>MacSnap Plus 512S</td>
<td>512 MB</td>
<td>$559</td>
</tr>
<tr>
<td>MacSnap Plus 1024S</td>
<td>1024 MB</td>
<td>$599</td>
</tr>
<tr>
<td>MacSnap Plus 2048S</td>
<td>2048 MB</td>
<td>$639</td>
</tr>
<tr>
<td>MacSnap Plus 4096S</td>
<td>4096 MB</td>
<td>$669</td>
</tr>
<tr>
<td>MacSnap Plus 8192S</td>
<td>8192 MB</td>
<td>$699</td>
</tr>
<tr>
<td>MacSnap Plus 16384S</td>
<td>16384 MB</td>
<td>$729</td>
</tr>
</tbody>
</table>

**Wordmaker by New Horizons**

The new high performance, personal word processor for the Macintosh. Wordmaker's intuitive design makes it easy to learn and to use. It has a fast WYSIWYG display, headers and footers for both left and right pages, color capability, multiple document support, and 100,000 word spell checker, print merge, and more! You can even wrap text around irregularly shaped graphics. It reads and writes MacWrite files for compatibility.
Red Ryder by FreeSoft

Red Ryder is the world's most popular telecommunications software. It won the 1987, 1988 and 1989 Best Communications Software Award, MacWorld; two "Macintosh 100" awards; and a 5-Mouse rating, MacUser $52.

BUSINESS SOFTWARE

Nisus 2.0 by Paragon Concepts

With Nisus 2.0, word processing comes of age. Only Nisus has unlimited undo, graphics within text, recordable macros, Easy Grep, effortless indexing, color search, footnotes/endnotes, hyphenation, 10 clipboards, automatic pagination, on-screen/printed line numbers, intelligent spell checking, plus all the search and replace power of QUE/D. And it's not just for super-users—Nisus needs only a Mac Plus or larger. $245.

MacKids Educational Software by Nordic Software

Make learning fun with MacKids Educational Software. MacKids is a complete series of quality educational software designed to teach and entertain kids. MacKids programs include preschool, math, spelling and more. $28 ea.

ENTERTAINMENT SOFTWARE

atOnce! by Layered Inc.
atOnce! is the next generation in high-speed small business accounting. Included in one seamlessly integrated module are four full featured applications: General Ledger, Accounts Receivable/Billing, Accounts Payable/Payroll. $289.

Omnis 5 by Blyth Software

Omnis 5 is a comprehensive program for developing business data management applications. It is a multi-tiered, multi-platform database management system for the Macintosh and IBM compatible personal computers $359.
**ACCOUNTING PACKAGES**

- **Aatrix Software**
  - Aatrix TimeMinder 149.
  - Aatrix Payroll Plus 149.
  - Aatrix Checkwriter v2.0 35.
  - Aatrix TimeCard 69.
  - Aatrix Payroll v3.5 95.

- **Brown-Wagner**
  - MacLedger 155.
  - Service Industry Accounting 205.

- **Insight One Write** 99.

- **Insight Expert GL AR, AP**
  - 155.
  - Payroll 209.

- **Check Mark**
  - Multilegder 259.
  - Payroll 319.
  - Cash Ledger 399.

- **Dow Jones**
  - Market Manager PLUS 189.

- **Intuit**
  - Quicken V1.5 99.
  - Quicken V1.5 Special 35.

- **Insight One**
  - Write 99.

- **MacLEDGERS** 155.

- **Rags to Riches GL AR or AP**
  - 118.

- **Rags to Riches Gen.3-Pak 3.1**

- **Monogram Business Sense**
  - Simply Accounting 199.

- **ProPlus Software**
  - Components GL 369.

- **Hayes Smartcomm II OI**
  - Infosphere Laison 175.

- **Managing Your Money by MECA**
  - With *Managing Your Money*, you can write, print checks, set up a personal budget, estimate your taxes, set up a retirement plan, manage an investment portfolio, and calculate your net worth. ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ......
**EDUCATIONAL/CREATIVE SOFTWARE**

**A Lasting Impression**
- Return Expert (Special) ................. 49
- Ars Nova (Special) .......................... 73
- Practice Musica 2.1 (Special) .......... 84
- Barron's SAT .................................. 85

**Great Wave Software**
- KidTime ....................................... 26
- Number Mazer ............................... 26
- Crystal Paint .................................. 35
- Individual Typing Instructor Encore .... 35

**EDUCATIONAL/CREATIVE SOFTWARE**

**Great Wave Software**
- KidTime ....................................... 26
- Number Mazer ............................... 26
- Crystal Paint .................................. 35
- Individual Typing Instructor Encore .... 35

**Perceive**
- Coda Mac Drums ............................ 31
- PreSchool Disk 1 (Special) ............. 31
- PreSchool Disk 2 (Special) ............. 31
- Word Search .................................. 31
- Primera Software ............................ 31
- Different Drummer .......................... 31
- Simon & Schuster ............................ 31
- Typing Tutor IV .............................. 31
- Springboard ................................. 31
- Top Honors .................................... 31
- Family Matters .............................. 31
- Atlas Explorer ............................... 31

**Comic Strip Factory/Comic People by Foundation**

**Comic Strip Factory**
- Create your own comics with Comic Strip Factory ($39) Can't draw? Don't worry! Pre-drawn characters and backgrounds make it easy. Includes tools to shape panels, assemble characters, and create dialog balloons. Comic People ($22) adds new characters.

**ACCESSORIES**

**Advanced Gravis**
- MouseStick (Plus or ADB) ............... 65
- Cutting Edge ................................. 75
- Cutting Edge MCK-1050K (Keyboard w/Quickkeys) ................................. 135
- DataDesk Hyper Dialer ........................ 24
- MAC-101 KeyBoard/Beige (Reg or ADB) .................................. 100
- MAC-101 KeyBoard/Platinum (Mac SE or Mac II) (Special) .................. 130
- Foreign Keyboards Available ............. Call
- Ergotron MouseCl. 360° (Special) ........ 65
- MacTilt (Mac SE or II) (Special) ........ 65
- Muzzle SE ..................................... 65
- Muzzle Mac II .................................. 65

**Printers**
- LaserJet 600 ................................. 43
- System Saver Mac (Beige or Platinum) .... 64
- Space Saver Printer Stand ................. 77
- Super Base ................................. 34
- System Saver SE ...................... ........... 52

**Broderbund Type'**
- Coda Mac Drums ............................ 31

**McGraw-Hill**
- Advanced Gravis ............................ 65
- DataDesk Hyper Dialer ...................... 75
- MouseStick (Plus or ADB) ............... 100
- Cutting Edge ................................. 130

**Microsoft**
- Excel (Mac SE or Mac II) ................... 150
- PowerPoint ................................. 200

**Quicken**
- Quicken 1.5 ................................. 164
- Quicken People ($22) ...................... 289

**Targus**
- Targus Mousepad ............................ 83
- Targus Mousepad 9" x 11" .................. 10

**Targus**
- Targus Mousepad 9" x 11" .................. 10

**Comic Strip Factory**
- Comic Strip Factory ($39) Can't draw? Don't worry! Pre-drawn characters and backgrounds make it easy. Includes tools to shape panels, assemble characters, and create dialog balloons. Comic People ($22) adds new characters.
Go Master & Joseki Tutor by Toyogo, Inc.
Go: the oriental strategic board game. Go Master ($49): world’s strongest playing program, “one of the most extraordinary automated aids to Go instruction developed” (MacWorld June ’89). Joseki Tutor ($30): advanced corner-opening study.

CanOpener by Abbott Systems
CanOpener is the information retrieval utility for the Mac. It will search and retrieve text, pictures and sounds from just about anywhere. Which means you can extract information from almost any document, even if you don’t have the application. Or, recover data from corrupted files. And CanOpener will scan disks, hard drives and networks to locate missing information! $65.

Fokker Triplane FS by Bullseye Software
This is the realistic simulation with fun in mind. You’ll be able to fly and land this aircraft. No need to spend hours studying complicated instructions. Includes dogfights, bombing, balloon busting and a bridge. Runs on all Macs. $25.

Endeavour Planner by SoftStream, Inc.
Endeavour Planner is project planning and a tracking application offering an easy-to-use planning alternative with a full graphical interface, for light users, working directly with a Gantt chart. $99.

MultiLedger/Payroll/Cash Ledger by CheckMark
Elegant, powerful accounting software. MultiLedger ($259) includes A/R, A/P, G/L and Inventory. Payroll ($189) calculates and tracks all employee and employer taxes. Cash Ledger ($125) provides an entry-level accounting solution.
atOnce!™ represents the next generation in accounting software. So easy to learn, the majority of business managers will be completely at ease doing their own accounting. So fast and flexible, professional accounting and bookkeeping firms can now use the Macintosh® as their platform of choice for handling numerous companies and volume data.

All modules (and up to 26 periods!) can be open simultaneously! Use atOnce!’s built-in financial reports or customize your own. Queue your reports and batchprint them --in background! Full, context-sensitive help means “click” on any field, any button, anywhere, for instant “Help” and “Rules of Thumb”. Use the mouse or keep your hands on the keyboard. We’re talking productivity here, and that means power...especially when you can do it all...atOnce!™

Call for sales information and your atOnce! demo disk ($9.95 postage & handling)

1-800-622-4436

Layered Inc.
529 Main Street • Boston, MA 02129
617-242-7700 • AppleLink:D0254

The First Family in Macintosh Accounting

©1989 Teknon Corporation. atOnce! is a trademark of Layered Inc. Macintosh is a registered trademark of Apple Computer. MultiFinder is a trademark of Apple Computer.
Kevin Curran is one of the three founders of GCC Technologies, the first company to provide add-on hardware for the Macintosh. Kevin grew up on Long Island, in New York, and attended MIT. General Computer, GCC’s predecessor, was started in March 1981 by Curran and Doug MacRae. They were joined shortly thereafter by John Tylko (chief operating officer). The company name was changed in 1987.

MW How did you and Doug decide to start a company?
CURRAN At 16 I had worked at a small electronics company and had already made up my mind that this was what I wanted to do. Doug, John, and I all lived off campus while at MIT, in the same house on Beacon Street. We started in video games by accident, with a game in our own dorm. One night we decided that the profitability was going out of operating video games and we decided it would be better to leverage our skills as engineers and design games.

We wrote and rewrote new software for coin-operated video games in the form of ROM add-on boards. Our first game was an Atari Missile Command rewrite, called Super Missile Attack. We added new bells and whistles, and sold it to the owners of the game. We basically did our first product in nine days during spring break.

MW What kind of a market was there for these games?
CURRAN We sold over 1000 kits. We also did Ms. PacMan, which we licensed to Bally. It sold over 100,000 games. In 1982 we formed a partnership with Warner/Atari and developed over 50 products for them. We did Ms. PacMan, Centipede, Pole Position, Dig-Dug, and others for various game systems. Some were originals, some were games we converted to other machines.

MW Why did you leave that market?
CURRAN The video game business went into a steep decline in 1983. After the Mac came out in January of 1984, we decided to develop products for the Mac.

MW How did you decide what product to make for the Mac?
CURRAN We looked at three software products and decided not to introduce them when we saw the dollars that Lotus was spending on the Jazz debut. We felt we couldn’t compete, so we dropped our software initiative.

The early 128K Mac was so slow that it was useless as a software development tool. The HyperDrive [an internal hard drive] was developed basically as an aid for in-house software development on the Mac. In September of 1984 we decided that the HyperDrive could be sold on the open market, and we arranged a meeting with Steve Jobs. Steve decided that Apple would not license the product but would provide benign support, and so we became a reluctant peripheral vendor.

MW When was HyperDrive introduced?
CURRAN At Comdex in November of 1984. We sold the first product in January of 1985. The reception was exceedingly positive. The original Mac so much needed it that the response was overwhelming.

MW How many were sold?
CURRAN Over 30,000 at an average price of $1600 for the 10MB and 20MB drives. When we started to sell HyperDrives, their installation voided the Apple warranty. The early drives had to be soldered to the Macintosh controller board in place of the 68000. In May of 1985 we introduced a version in which a controller board was attached to the 68000 by a clip. Apple then decided that installing a HyperDrive would not void the warranty. The last product was sold in December of 1986. Apple’s addition of the SCSI port to the Mac Plus changed the disk market completely.

MW GCC also introduced a file server, the HyperNet. What happened to that?
CURRAN There was no problem with the reliability or quality; we just decided not to push the product when Apple announced AppleShare. We support standards. For (continues)
example, the SCSI port is in some ways the best thing that happened to us. We've designed and sold many drives and printers for the SCSI port on the Mac.

**MW** There is a perception that GCC received less than fair treatment from Apple.

**CURRAN** I think that companies such as GCC have an interesting relationship with Apple. I feel Apple has a split personality in relationship to companies such as GCC. Some people in Apple are—and were—supportive of GCC Technologies. They understand the contribution we make to the market. Others in Apple view us as competition.

For example, if you were the printer product manager in Apple, you would be concerned with our Personal Laser Printer (PLP) when you introduced the LaserWriter SC. On the other hand, we’ve had a remarkably good relationship with some Apple staff over the years, such as Ed Colby. One shouldn’t think of Apple as a monolith that acts with one mind. The situation with Apple is, in some regards, what developers make of it.

**MW** There was one very bad period when HyperDrives were crashing a lot.

**CURRAN** Yes. In retrospect, we would never do the HyperDrive as a product today. We made several mistakes. These mistakes were compounded by the tremendous growth of the demand for the product. We assumed that the dealer could install HyperDrives, but it was not an easy procedure. It was vexing for us to have problems where products were not installed properly. We lived up to the responsibility of cleaning up all the HyperDrive problems that were brought to our attention. I think we overcame those problems and came back stronger for it.

A big part of the learning experience was realizing that vendors who sell subassemblies to us basically lie about certain things. Their products often don’t work as claimed or as specified. Adherence to temperature specifications was an especially big problem area. We hired several engineers out of IBM and General Motors who had a great deal of experience in qualifying subassemblies and in setting up a high-quality manufacturing process. That work has paid off since then. The FX20, our first external product, is still a hot seller. It was developed under new post-HyperDrive rules and introduced in August 1986. GCC is now making another change of direction by going from dealer-only sales to direct sales for users, much like Jasmine. The latter, meanwhile, has announced the addition of dealer sales.

**MW** What’s happening?

**CURRAN** We’re not changing from dealer sales, but adding to that channel. We see direct sales as supportive to what we do with dealers. We believe that there is a channel in direct sales and a channel for dealer sales. It is up to the users.

**MW** How big is GCC?

**CURRAN** We have 115 employees, with...
about $30 million in revenues.

**MW** What does GCC currently sell?

**CURRAN** Innovative peripherals with high software content. About 60 percent of our sales are printers, notably the PLP line, which features our proprietary software for rasterizing output of Mac software.

**MW** One question about the PLP has been the speed of the output and having to tie up the computer to process the page.

**CURRAN** The PLP is faster than the LaserWriter in some applications, and in some applications slower. It's a pretty reasonable trade-off given the cost savings, and our PLP can be made both PostScript and network compatible through upgrades.

**MW** When drive owners have problems, what should they do?

**CURRAN** It depends upon the purchase. If you bought it from a dealer, return it to the dealer, but in some ways that's unsatisfactory because you lose your data. People should always back up their data—if you lose your data, that's probably more than the value of your drive. Always ask vendors if they can help, because they know their products best. Sometimes we've recovered lost data for customers.

**MW** What are the major things likely to go wrong with hard drives?

**CURRAN** I don't think there is any one major problem. Failures fall into several categories. One problem is no spin—on power-up the drive doesn't spin up, due to a bad motor or to *sticktion* (the head adheres to the surface of the disk and the motor doesn't have enough torque to break away the read head from the surface of the disk). Another problem is unusually high error rates due to various causes, in which data is corrupted.

**MW** Where do you think disk drive technology is going?

**CURRAN** To faster, higher capacity, and lower-cost products.

**MW** How has drive technology gone from $1600 per 10MB in the original HyperDrive to today's prices?

**CURRAN** Drive mechanisms are now less expensive. They include the disks (or platters on which the data is stored), the head assemblies (that read data from the platter), the stepper motors, and the controller board. Quality and performance have increased, and costs have decreased since we entered the business in 1984. When [the COO of Seagate Technology] started in the business, 5000 hours mean time between failures for a drive was acceptable for a manufacturer like DEC. Today's manufacturers want 50,000 hours or better. Drive manufacturers are decreasing their prices, and as our volume increases we also bring prices down. That's true for all peripheral manufacturers.

**MW** The drive industry is one of the most litigious areas of the computer industry. Why?

(continues)
Introducing Tape Backup With The Attributes Of All Three.

What does the MaxStream™ have in common with the Concorde, a supertanker and the Golden Gate Bridge? Plenty, when you're talking about performance. With speeds up to 6.75 megabytes per minute, it's the fastest tape backup available. It quickly reduces even the longest, most mundane backup chore into a simple, effortless task.

But don't think that means you give up accuracy for speed. Built-in error correction and data verification guarantee that the data you put on tape will be exactly the same when you restore it—all 150 megabytes.

That's right. MaxStream packs a whopping 150 megabytes on a single industry-standard DC600™ 1/4" cartridge. With that kind of capacity, it's like a supertanker for data. (There's also a 60 megabytes version for smaller applications.)

Either one is perfect for backing up high-end applications like graphics, imaging, database or CAD programs.

And of course, MaxStream works with every popular network. It's the one drive you can trust for backing up all the valuable data on a server.

LAN administrators will also appreciate MaxStream's software. It lets you back up an entire network at pre-programmed times, instead of having to rely on users to back up their data individually.

Even if you're not on a network you'll like our full array of backup and restore features as well as scripting, which allows for automatic, unattended backups. You can run an entire backup at night, or while you're at lunch.

MaxStream also bridges the gap between Macs and IBM PCs® by letting you use the same DC600 cartridge with both systems. With Archive's Universal Tape Format,™ a tape from one of Archive's tape subsystems can be read and used by the other and vice versa.

MaxStream works with the Mac Plus, SE, II and IIx®. It plugs into the standard SCSI port, and comes with everything you need—cables, software, DC600 cartridge and manual.

Just as important, when you go with MaxStream, you're getting backup and support from the company that pioneered streaming tape technology back in 1980. Today, there are over one-million Archive tape drives in use throughout the world.

If you're looking for backup that combines speed, capacity and connectivity, it's time to look into MaxStream. For complete information call 1-800-237-4929. Or write Archive Corporation, Data Storage Division, 1650 Sunflower Ave., Costa Mesa, California 92626.

Why trust your data to anyone else?™

Circle 3 on reader service card
Once one person starts using color, everyone will want to. Thankfully there's plenty to go around. Because there's the Phaser CPS Color PrintStation. It's a 300-dpi thermal-wax printer with a PostScript-compatible controller, which takes care of spooling and AppleTalk networking. The CPS also expands for more printers, memory and controller cards.

Or if you have a Tek 4693DX, just add a PhaserCPS controller and you add PostScript-compatibility. The Phaser family from Tektronix. Bringing you beautiful, living Teknicolor. Call for more information, 1-800-835-6100 Dept. 2C, or fax to (503) 682-3408.

How to color coordinate your office.

Raising Bunnies Can Be A Fertile Investment.

For just a small investment you can get started in the exciting world of rabbit breeding.

Bunny Medical

Cost Breakdown

Bunny Food

Bunny Entertainment

Organizational Chart

President
Joe Clab

Vice President
Anna Ahrens

Dept. Manager
Don Plant

Dept. Manager
Brian Backstrom

Coordinator
Cindy Tate
CURRAN I think that just reflects the litigious nature of American society. The manufacturing of disk drives is very capital intensive and competitive. The advantages for manufacturers are few and far between. Many manufacturers fight vociferously to defend any proprietary advantage they have. We now also see the entry of Japanese companies such as Sony into the Winchester drive market. Sony's design win at Apple [Apple buys Sony 40MB hard drives for the Mac II line] is a significant event. It's the first significant win by a Japanese manufacturer in the U.S. personal computer market. But Quantum, which lost that contract, turned around and sued Sony for unfair competitive practices.

MW Why hasn't Japan competed in the hard drive market?

CURRAN That's interesting. The technology has primarily been developed in the U.S. Until recently, the number of units of a standard design sold had not reached a point where the process of manufacture lent itself to mass production, at which the Japanese excel. Also, the erosion of the dollar versus the yen, or the appreciation of the yen, has slowed their entry, made it more difficult for Japanese companies to sell in the U.S. where they have no capital investments.

In 1986 there were several Japanese drive start-up efforts and the companies closed when they decided that they had no competitive advantage. Oki Electric, for example, in Takasaki, Japan, has a huge facility, part of which was dedicated to the manufacture of disk drives. Oki tried to get into the business, but they've pretty much dropped their efforts. They simply couldn't compete on price in the disk drive market. This is changing as certain Japanese manufacturers have adjusted to the problems of the strong yen.

MW What is the best hardware, not including GCC products?

CURRAN Today, the Mac IIcx. The IIcx is going to take the Mac further into business in corporate America than the Mac has ever gone before. It's the most Macintosh-like Mac introduced to date. In terms of hardware, there is a lot of neat stuff, any number of fine products in the market. I tend to like certain clean niche products, like the Shiva NetModem.

MW What about the worst products?

CURRAN Our worst product was the HyperDrive 20. We had reliability problems that caused no end of grief for the company, and we are still dealing with customers who have problems with the product. We have an upgrade policy to swap people to a GCC SCSI drive. The networkable PLP was our worst product from the cost-of-engineering point of view. It fulfilled a need no one felt. It turns out that when people want to put a printer on the network, they want a full PostScript printer, so they buy our Business Laser Printer.

MW What is your opinion of Apple's warranty?

CURRAN Ninety days is really short given the reliability of Apple products. The company could increase that to one year without any financial concessions, and in my opinion they should do so.

MW What's the status of third-party manufacturer warranties?

CURRAN We've just increased ours from 90 days to one year on printers, and on drives we've increased our warranty from one year to two. That reflects the reliability of our current peripherals, which are really quite solid. That's one reason most people buy our printer, due to the warranty.

MW What effects will the font-rendering technology in system software 7.0 have on your products?

CURRAN System 7.0 is a complete vindication of the print model we adopted, that is, QuickDraw printing. I like to think one of the things that we do well is innovation. We first looked at laser printers in 1986 and came to the conclusion that one reason laser printers are so expensive is that the user must purchase a second CPU [the CPU in the printer itself]. We wanted to have the Mac's CPU do the processing so that we could lower the price of the printer. Do the image processing on the Mac and feed the image at video rates to the laser printer. We were the first to do that on the Mac.

All of the printers we have in the field and that we sell will be 7.0 compatible. Our printer line will also have more products, products that are faster. And some other manufacturers that were unable to easily enter the market before will appear, such as Japanese printer manufacturers.

MW What about a color laser printer?

CURRAN We're excited about the possibility of a color laser printer. Color printers run the spectrum from toys to professional tools. Historically, we have had a hard time in arriving at what people want in a color printer; that is, what technology, for what price. Some will buy a high-end $70,000 color printer, but that's a small market.

GCC has been driven to make products we want to own ourselves. We would never aspire to own a low-quality color printer, but at the high end the market is quite small. We're studying the market carefully and want to bring out a product that we—and others—would want for ourselves. For color to proliferate, people have to have a quality printer, costing under $10,000, for a price per copy of under $1.

MW Do you have any favorite anecdotes from GCC?

CURRAN The best one was the time I was about to make a presentation to Bally/Midway on our software for them on Ms. PacMan. Back in 1981. There were intermission screens between the playing screens with some cartoon action. In the first one, Mr. and Ms. met. In the second, they kissed. In the fourth, they have children. We were stuck for an idea on the (continues)
The award-winning software package that transfers and translates files between Macintosh and DOS or OS/2 programs now does the same for Sun worshippers. And for the NeXT world.

With MacLinkPlus/PC, you can now send files in either direction between Macintosh and virtually any other desktop environment. Files arrive in the new environment with the correct styles and formats in place—just as if they had been created there.

MacLinkPlus/Wang OIS and MacLinkPlus/Wang VS provide the same bi-directional connectivity between Macintosh and Wang.

**TRANSFERS AND TRANSLATES**

The MacLinkPlus/PC package arrives with everything you need—software, manual, a direct connect cable (a Hayes modem or compatible also works), and our full library of over 100 translators.*

If you don't need file transfer capabilities (maybe your Macs and PCs already share a network or server), then simply order MacLinkPlus/Translators. It's the same package without the cable and communications capabilities. And, it's the ideal software purchase for anyone with a Macintosh FDHD SuperDrive or external drive that reads DOS disks.

**INSTANT PASSPORT TO EVERYWHERE**

Make incompatibility a thing of the past with the MacLinkPlus family of Databridge products. For the name of your nearest DataViz dealer, call 203-268-0030 today.

---

* takes advantage of special connections built into MacWrite* II from Claris™

All product names are trademarks of their manufacturers.
Label printer? What do I
Introducing The LabelWriter, from CoStar—the first dedicated single-label printer for the Macintosh environment. After a week with it, the question won't be “Why do I need one?” but, “How did I ever get along without one?”

The LabelWriter takes up no more desk space than a tape dispenser. And is equipped with two powerful software programs.

One automatically extracts addresses from letters and prints them while your main printer takes care of the letter itself. The other allows you to design labels one at a time, controlling things like type size, font, and text position.

You can store labels from both sources in the LabelWriter's built-in database. Plus, you can even import labels from most software applications.

The LabelWriter is whisper-quiet, and 100% maintenance-free. You never have to add toner, or change a ribbon. Just pop on a fresh roll of labels and you're off and printing.

If you're already wondering how you ever got along without a LabelWriter, let us send you our brochure and tell you where you can go see one in action. Just call 1-800-426-7827, or complete and mail the coupon below. (In Connecticut, call 661-9700.)
third. We worked all night, but I went to bed at three in the morning. Doug and some others kept working. We lived and worked in the same place.

As I ran out the door the next morning to make the plane, they showed me what they came up with: Mr. and Ms. in bed, jumping around, going at it. I nearly died. I went to the meeting not knowing what the screen would actually do when I made the presentation.

My second favorite story is about the time I met with Jean-Louis Gasséé and Al Eisenstat, just after Jean-Louis came to Cupertino. Gasséé agreed to license the Mac OS to GCC because Apple wanted access to the HyperDrive technology. They backed out of that like crazy when they figured out what they had done.

**MW** What do you think of the transportable from Apple?

**CURRAN** The laptop Mac was long overdue. I didn't think it would take so long to bring it to market. Some people say the trackball is difficult to use; I don't find that so. Maybe it's my experience with video games. We developed the $579 WriteMove ink-jet printer in response to Apple's request that we develop a printer along the lines of our PLP to go with their laptop.

**MW** What about the technology of the Portable?

**CURRAN** It's a good first attempt. The product should be able to be made lighter and more portable, closer to the idea of a laptop computer.

**MW** Why is the product so expensive?

**CURRAN** What can I say? It's disappointing to me that there is no support for the color ROM, which is an unbelievable shortcoming. You want to have a color monitor that you can attach to a machine at work and then carry the machine with the built-in black-and-white screen. The price is disappointingly high. But there is a market and you'll see acceptance of the machine immediately; the entire initial production run will be sold. The real question is when the revision that will support system software 7.0 and color will be out.

**MW** When will we have 3½-inch erasable optical technology for the Mac?

**CURRAN** A 3½-inch drive is definitely practical technology. The 3½-inch is basically the same technology as the 5½-inch. I believe some companies have demonstrated the technology, where you get less storage at the same ariel density on a 3½-inch disk. I wouldn't be surprised to see a product within one year.

**MW** Why have so many Apple peripherals been unsuccessful?

**CURRAN** You can't generalize and say they're all bad.

The original Apple LaserWriter was a great product that required vision. At $7000 lots of people were claiming that the resellers couldn't move it. Now it's the single most successful peripheral that Apple has produced.

You're right in general that Apple peripherals are not as good as they could be, but it allows opportunities for companies such as ourselves. Apple puts its best people on the Mac OS and CPUs and leaves innovation in peripherals to third parties. It's not uncommon for Apple to invite third parties to make a product and to then emulat them when the market is successful enough to warrant Apple's corporate scrutiny.

**MW** The scanner hasn't been successful. Is it due to the scanner market?

**CURRAN** I think that scanners have been more successful on the Mac than on any other CPU to date. The real issue is what use the average Mac user can make of them. If you had a built-in facsimile and modem on a laser printer, and remote users could access them all in one workstation, that would be very useful.

**MW** GCC started the hard drive market for the Mac, but others, such as SuperMac and Jasmine, have been more successful in it. How have they done this?

**CURRAN** Actually Davong and Corvus were out when we entered the market. We started the internal drive market with a product that was well integrated into the Mac OS. HyperDrive was right from a software point of view and user response time. The external drives sold by other companies used the serial port and were all but worthless.

As for SuperMac and Jasmine, you have to look at them separately. SuperMac quickly jumped onto the SCSI port on the Mac Plus and maximized the return on that port. We were slow to the market with SCSI products. I like to feel that we have avoided some of the mistakes that SuperMac made in its product line, but looking back I wish we had gotten into the SCSI market faster.

**MW** And Jasmine?

**CURRAN** Its secret to success is in its direct response marketing. Jasmine products historically have been sold directly to the user, except for a handful of renegade dealers, six of them. All of the company's marketing and sales efforts focused on direct sales. Because of its direct sales effort, Jasmine came across as a bigger company than it was, until the point where it grew to be a large company. Its success in selling direct was a factor in our entering that market in August.

**MW** What would you do as CEO at Apple?

**CURRAN** First, in product development I would work hard to push the Mac down in cost to reach the valuable home and education market. There is no reason why there is not a Mac under $1000, especially as the Apple II is dead.

Second, I would push Mac technology in performance. The Apple market is desperately in need of a true multitasking operating system. The lack of multitasking is the most serious shortcoming for the Mac in penetrating corporate applications.

Third, I would focus Apple's advertising and PR on the enormous benefits the Mac still offers over DOS-based PCs on the market today. Anyone coming from...
The company you've trusted for high-quality floppy disks is making a full-fledged commitment to the home office user. It begins with our color-coded 3½ inch floppy disks. Making it easy to organize and identify your files for faster storage and backup. But our commitment to the home office doesn't stop here. Because included free with each 20-disk Home Office Bonus Pack is a 21st disk. The Easy Working Desk Organizer® software program from Spinnaker.® Featuring a memo pad, to-do list, world clock, calendar, address book and label maker. And if that's not enough to tidy up your desk, we'll even throw in 4 CRT cleaning towels. You might say that we're offering you three new ways to keep your home office organized, all in one neat package.

We'll not only improve your home office output, we'll clean up your desk for free.
At Microtech, we make it our business to take care of your business. Our commitment is to offer you not only quality products, but real business solutions. Solutions you can count on. Because the more you demand, the more we deliver.

Only top-of-the-line components are used in manufacturing Microtech products to insure product solutions worth raving about. Like our NOVA 80, which Macworld rated “the cream of the crop...the fastest and least expensive external drive...”. With unprecedented reliability, NOVA hard drives can work for any business solution.

For security and unlimited storage capacity, the high performance Microtech R45 removable cartridge drive is the perfect solution. Our Tape Backup Systems provide lightning fast, reliable solutions for archiving.

And only Microtech drives come with the longest warranties in the industry at no extra cost. Like five years on our external and internal hard drives and two years on our removable and tape backups. No one else offers that kind of confidence. No one! In addition, you’ll get hundreds of dollars worth of free software, including MacTREE PLUS, DS Backup, and a number of useful public domain programs. And now all of our hard drives come with demos of 4TH DIMENSION and SHOWCASE F/X.

We understand that along with great products, great service must follow. Before and after the sale, our dedicated customer service representatives are on hand to provide you with knowledgeable and friendly support. Toll free! And for 24-hour service, our MicroLink™ BBS provides technical support and software updates. Taking customer service a step further, Microtech offers the exclusive Step-Up™ Expansion Program, an easy, affordable upgrade path designed to help you keep pace with today’s technology.

Quality products. Fantastic prices. Unequaled warranties. Dedicated customer service. These are the solutions you demand, and Microtech delivers. Takin' care of your business is our business, too. Call Microtech today.

1-800-325-1895
### Nova Hard Drives

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>External Price</th>
<th>Internal Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>N20</td>
<td>20MB</td>
<td>$520</td>
<td>$569</td>
</tr>
<tr>
<td>N40</td>
<td>40MB</td>
<td>$649</td>
<td>$919</td>
</tr>
<tr>
<td>N80</td>
<td>80MB</td>
<td>$1019</td>
<td>$999</td>
</tr>
<tr>
<td>N100</td>
<td>100MB</td>
<td>$1099</td>
<td>$1399</td>
</tr>
<tr>
<td>N150</td>
<td>150MB</td>
<td>$1469</td>
<td>$2699</td>
</tr>
</tbody>
</table>

### Tape Backup Systems

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT60</td>
<td>60MB</td>
<td>$799</td>
</tr>
<tr>
<td>NT150</td>
<td>150MB</td>
<td>$1099</td>
</tr>
</tbody>
</table>

### Removable Hard Drives

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>R45</td>
<td>45MB</td>
<td>$1099</td>
</tr>
</tbody>
</table>

© 1989 Microtech International, Inc. All product names and logos are trademarks or registered trademarks of their respective owners. The 5 year limited warranty is offered on hard disk drives sold and delivered in the U.S. or Canada. Certain restrictions and exclusions apply. Terms and conditions of the 5 year warranty are available upon request. Prices and specifications subject to change without notice. MasterCard and Visa accepted at no extra charge.

Circle 243 on reader service card
the Mac using OS/2 machines recognizes the shortcomings of their interface. The other day I was using a PS/2, and I was unable to save a spreadsheet with the phrase “cash flow.” The prompt came back with an error message but wouldn’t tell me how to rectify the problem. The problem was that the string was one character too long and apparently an embedded space is verboten in the DOS world. This is a problem for most users.

Fourth, I think Apple should give serious consideration to licensing the Mac technology to third-party developers to develop specialty Macs that Apple won’t get to. Where a market is too small or Apple doesn’t have sufficient experience in a market. For example, a Mac engineering workstation to compete with Sun.

MW What does Apple’s CPU architecture of the future hold?

CURRAN Apple’s CPU architecture is wedded to Motorola 68000 development directly. Motorola is sure to protect its multi-billion dollar business, pouring money into CPU extensions just as Intel is doing with its 8086 family. I think that Motorola fulfills most of Apple’s needs in the near to midterm future.

High-performance engineering workstations are also 68000-family based, and as such there is nothing inherent in Motorola’s technology destined to limit the Macintosh’s success. For example, the Motorola product family supports true multitasking. The question is whether Apple will support it. A similar point could be made with high-performance graphics: the question is when Apple will support it rather than whether Apple will have a product. Furthermore, given Apple’s status as a client to Motorola, there is no reason why the Austin microprocessor group in Motorola could not develop application-specific support chips for Apple should the need arise.

MW What do you think of the new version of the iIcx?

CURRAN The most interesting feature of the new iIcx is the onboard support of 8-bit video. I think overall that it’s wonderful. The iIcx is the most popular Mac CPU on the market today.

MW What does 8-bit video on board portend?

CURRAN Apple is able to bring out products that are competition to third parties. The same thing happened in the IBM PC market. All of the functions of AST’s Six Pack Plus [one of the largest-selling add-on boards for the PC] were incorporated into subsequent IBM PCs. This is an example of one way Apple can make life difficult for third-party developers, that is, eliminate their market.

MW Will Apple’s introduction of the Portable drive third parties from the market?

CURRAN It does pose enormous difficulties for third-party developers in the Mac market. At the end of the day, Apple cares more about itself than anyone else. To be a success in the third-party peripheral and software business, one has to work hard to stay ahead of Apple. Apple itself needn’t worry that third-party developers will go away. The glamour of this business, if I can call it that, attracts new third parties on a constant basis. That’s obvious to those of us in this business for a long time. We’ve learned to work in that environment, but we’re challenged nevertheless. One thing I concern myself with is developing innovative products within Apple standards and keeping the products useful that we bring out in the future, like the PIP, which will support 7.0.

It’s important to give the customer ongoing support. That should be a key customer issue at the time of purchase. There is a need for companies to provide updates and support to products as Apple changes directions. We have over 100,000 products in the field today, and we have a responsibility to keep them up to date.
IT TAKES A CERTAIN TYPE TO MAKE A STATEMENT THIS BOLD.

And Adobe is just the type to do it. As the undisputed leader of the electronic publishing industry, Adobe has the perfect typeface for every communication style—more than 500 downloadable fonts in all.

But there's more to our Adobe® Type Library than just variety. Because we license original typeface designs and painstakingly create them in PostScript® format, the quality simply can't be matched. And our technology assures that every font prints perfectly, regardless of point size or resolution of your PostScript printer.

You'll find that same level of quality in our screen fonts, too. In fact, the new Adobe Type Manager allows you to scale Adobe typefaces precisely to any size right on your Macintosh® display.

We've also added the Adobe Originals®, our unique collection of classic and original typefaces specifically designed and produced for today's electronic publishers. They're complemented by extended character sets—available separately—which may include small capitals, oldstyle figures, fractions, ornaments and titling capitals.

For more information about the Adobe Originals and the rest of the Adobe Type Library, send for our free Font & Function® catalog. It's full of tips and techniques by type experts from around the world. With a little help from our catalog, your PostScript printer and your Macintosh or IBM® PC computer, you'll be all set to publish like a pro.

Just mail this coupon for your free copy of Font & Function. Or, if you're the type who can't wait, call us at 800-83-FONTS.

Adobe, the Adobe logo, PostScript and the PostScript logo are registered trademarks and Adobe Typemanager, Adobe Originals and Font & Function are trademarks of Adobe Systems Incorporated. Macintosh is the registered trademark of Apple Computer, Inc. IBM is the registered trademark of IBM Corporation. ©1989 Adobe Systems Incorporated. All rights reserved.
Not an illusion! Now the PhoneNET System lets you run LocalTalk and Ethernet on ordinary twisted-pair telephone wire.

Your desktop publishing department is growing. So is your AppleTalk network. Only now you’re about to produce the company’s biggest ever annual report. You’re right on schedule when suddenly, it feels like someone poured molasses in the network.

You’ve got a LocalTalk logjam. Sound familiar?

You call Harrington, your network whiz. On his Macintosh, Harrington brings up Farallon’s TrafficWatch software. Using TrafficWatch, he can analyze traffic patterns and check the placement of servers and routers. Everything looks fine. LocalTalk just can’t handle the traffic.

Ethernet is the answer. But does everyone have to have it? And can you run Ethernet and LocalTalk together? Harrington is a smart guy. He draws a simple picture on the chalkboard. It looks easy. Looks fast. Looks affordable. How do you do it?

Combine price and performance on one network.

The PhoneNET System just got a lot faster. Farallon’s PhoneNET StarController EN and PhoneNET StarConnector EN let you run Ethernet at 10 mbps over ordinary twisted-pair telephone wire.

What’s even better, you can combine our Ethernet components with our LocalTalk PhoneNET StarControllers and StarConnectors to create hybrid networks that are reliable, cost-effective and easy-to-manage.

Imagine, now you can run high-performance Ethernet for people who frequently access a central database, transfer large graphics files or operate network-intensive applications, such as CAD or desktop publishing. And run low-cost LocalTalk for everyone else. All on the same wiring system.

Running two well-defined standards like Ethernet and LocalTalk also means your network is compatible with Macintoshes and IBM personal computers, NeXT and Sun workstations, laser printers and DEC VAXes. And everything will communicate using popular network software, such as AppleShare, 3Com 3+, TOPS and Novell Netware.

Your future is in the stars.

If you think hybrid networks make sense, here’s an even more sensible idea: active star networks over twisted-pair telephone wire.

Stars are the standard for telephone networks, with cables running from the phone closet out to each desk. The PhoneNET System uses this same cabling for your computer network.

Which means if you already have a LocalTalk network using the PhoneNET System, then creating a hybrid LocalTalk/Ethernet network should be easy.

Manage to stay in control with StarCommand 2.0.

Of course, a larger, faster network requires more management power. Our StarControllers have been designed to make it easier and faster to isolate and fix problems without disrupting the network.
For example, our StarControllers automatically turn off jamming ports on LocalTalk and Ethernet, thus protecting the rest of the network, and turn them back on when the jam clears.

Plus, each StarController comes with StarCommand 2.0 software, which continuously monitors the network and alerts the network manager to any problems. Running under MultiFinder and password-protected, StarCommand will isolate and diagnose problems without interfering with the rest of the network. And since it works over a dedicated management bus, you can troubleshoot even if the network is down.

You say Ethernet, we say Ethernet.

Look at it this way. Even if you’re doing more things on AppleTalk than ever before, chances are only some of your people are facing critical mass. Everyone else is perfectly happy and productive. So rather than installing Ethernet everywhere, maybe you should consider running both LocalTalk and Ethernet. At the same time. Over the same network cabling. With the PhoneNET System.

For more information or technical support, call (415) 849-2331.
Apple introduces a high-performance Ilcx

Buying a Mac Ilcx, but wish you could get more power? Apple’s latest rendition of this wildly popular modular Mac gives you plenty of extra speed, but without sacrificing all-around performance. Dubbed the Ilci at press time, it incorporates all the features of the Ilcx along with a faster processor, a slot for a high-speed RAM cache, and a built-in 8-bit color video controller. It’s a classic design that just keeps getting better.

To begin with, this new machine includes a 25MHz 68030 processor running at 1.5 times the speed of the Ilcx, plus a 25MHz 68882 numeric coprocessor to speed up floating-point calculations. Besides the faster processor chips, 80-nanosecond DRAM chips for the main memory, and a parity option for RAM, Apple engineers have added a new 120-pin slot for a high-speed memory cache, a feature common to many RISC-based workstations. In some computer designs, a speedy processor wastes time waiting for instructions or data from slower memory. With a memory cache, a small block of fast memory is set aside to be ready and waiting with the information most likely to be requested by the processor. Apple estimates that the optional cache memory can speed up processing by 10 to 20 percent.

Third-party manufacturers such as Daystar Digital are already at work designing cache boards for the new machine. The size and speed of the cache will, of course, depend on a manufacturer’s design. Apple’s own board, which is scheduled to ship after the first of the year, will provide 32K of fast (25 nanosecond) static RAM.

Built-in Color
The newest modular Mac contains another first. The main board includes the circuitry necessary to display up to 256 colors on an Apple or third-party video monitor. This simply means that you don’t have to purchase a NuBus video board. It also frees up a NuBus slot for other boards, while providing faster display performance in black and white and 4 or 16 colors. The faster performance stems from some clever architectural changes on the part of Apple’s engineers (see “Built-in Video”).

When displaying 8-bit color images on the 13-inch Apple Color Monitor, the video memory occupies 320K of main memory. A black-and-white image on the same monitor uses only 64K, while images displayed on the Apple Full Page Display occupy 96K. Because the video circuitry automatically senses which Apple monitor is connected, you just plug in the monitor and it’s properly configured. Third-party monitors, however, may require a special adapter cable to operate properly with the built-in video. NuBus video boards work just as before—you can add up to three additional displays.

Performance
The performance of the new machine depends on three factors: the increased CPU speed, the cache board, and the on-board video. Beyond the 1.5 times increase in speed due to the new CPU, performance is largely influenced by whether or not you install a cache board and how you configure the on-board video (see “Mac Ilcx vs. Mac Ilci”). I ran the ma-
The major changes to the new Mac comes with version 7.0, which is scheduled to ship early in 1990. The IIci requires System 6.0.4, as well as version 1.2.3 of HyperCard. In general, you get the fastest performance by installing a cache board and setting the on-board video for black and white. When you're displaying 8-bit color, NuBus video boards can provide faster performance than built-in video.

**Expanded ROM**

The new Mac comes with 512K of ROM, twice the ROM space available in the IIcx. The major changes to the ROM-resident Toolbox routines pave the way for System 7.0, which is scheduled to ship early in 1990. The IIci includes a new custom video chip, the RBV, and a memory controller, the MDU.

Most existing applications that follow the rules for 32-bit addressing should run, however. But those that run afoul of Apple's new addressing laws may suffer some compatibility problems. All Toolbox routines can now address up to the entire 4 gigabytes of memory using full 32-bit addressing. Equally significant is the use of the 68030's on-chip memory management unit (MMU). In preparation for the virtual memory features of System 7.0, the MMU translates, or maps, all addresses from physical to logical addresses. For example, to make room for the on-board video memory, the MMU now maps the contents of low memory—previously used by the operating system—into the high memory normally reserved for NuBus boards.

In addition to being optimized for better performance, 32-bit Color QuickDraw routines now reside in ROM. Burst mode, a feature of the 68030 that can account for about a 10 percent improvement in performance, is now possible for all Toolbox routines that need to move large blocks of data very quickly.

**More Speed, Fewer Parts**

Manufacturability, a key concern in the drive to reduce costs and a major factor behind price reductions, is another area where Apple has made big strides. The main board of the new machine contains more functionality with fewer parts than its predecessor. The machine now contains 13 Apple-designed custom Very Large Scale Integration (VLSI) chips, all packed onto a board that in engineering circles qualifies as a work of art. New chips include the RBV, the MDU, and a new NuBus 30 controller chip that handles the NuBus arbitration and protocols. Although Apple has added its own NuBus controller and interface chips, the existing 10MHz speed of the NuBus remains the same.

Storage features also remain the same as on the IIcx. The new machine comes with the FDHD floppy drive and an optional hard disk. The basic machine comes with 1MB of RAM and can be expanded to 8MB with 1MB SIMMs.

**Upgrades and Price**

Comments by Apple marketers prior to the announcement suggested that the price would be expensive. Apple also indicated that an upgrade would be available—a switch that would involve swapping the logic board and RAM SIMMs, as well as the bottom of the case. In short, Apple has at long last brought the Mac up to a performance level that competes with workstations from Sun and Next, as well as with DOS machines based on 25MHz and 33MHz Intel (continues)
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.

Circle 406 on reader service card
As the sophistication and cost of PageMaker and QuarkXPress have begun to leave some desktop publishers behind, midrange products are popping up to fill the gap. In July, Timeworks released its $395 Publish It, and by the end of October, Silicon Beach plans to ship a product that will probably list for $299.

The as-yet-unnamed Silicon Beach product uses a friendlier version of Quark's box-oriented metaphor for pasting up text and graphics. The program can draw the boxes for you, on the fly, as you import files, and instead of parent-child relationships, it provides a separate pop-up window to keep track of links between blocks of text. You can number each box and save a complete layout as a template. Templates appear in the Open dialog as thumbnails, and without opening a template, you can assign text and graphics to pour into the boxes by number. This process can be automated for cloning and updating tightly structured documents. The program features pop-up note windows, and a built-in Scrapbook-like file for storing graphics and chunks of text with a document.

Silicon Beach's DTP product lacks the fine typographic controls of the high-end programs. It imports WriteNow, MacWrite, Word, and RTF files. Text processing features include spelling checker, thesaurus, and the ability to search and replace by characteristics. The program has somewhat primitive style sheets that don't update formatted text when a style's definition is changed.

The product imports graphics in TIFF, PICT, EPS, and Digital Darkroom's compressed Archive format. The program displays 256-color files but doesn't do four-color separations. Spot colors can be assigned to eight layers, but at press time, Silicon Beach had not resolved some color issues. A set of draw tools is available, and like Silicon Beach's Digital Darkroom, the new package accepts plug-in modules for special capabilities, and some Digital Darkroom modules will plug right in, for example a scanner driver that lets you scan directly into a page layout. For more information, contact Silicon Beach in San Diego at 619/695-6956.

—Dan Litman

**RetixMail Brings X.400 to the Mac**

Retix has released the first X.400 electronic mail package for the Macintosh. X.400 was designed by CCITT—an organization that sets international telecommunications standards—to be a common language or set of protocols that allows electronic mail systems to talk to each other, much as different countries' phone systems do. Mail systems can speak X.400 either by going through a translator, called a gateway, or by being native X.400 speakers. RetixMail for Macintosh is the first product that speaks native X.400.

X.400 defines two types of interactions in electronic mail. The User Agent portion of the protocol allows people to compose, read, and file mail; the Message Transfer Agent (MTA) part of the protocol stores, forwards, and routes messages. X.400 specifies how User Agents talk to MTAs, and how MTAs talk to each other. RetixMail's MTA is called RetixMail OpenServer 400. It requires a dedicated IBM PC on the network to store, send, and receive mail. Retix does not plan to build a version of OpenServer 400 for the Mac.
If you need color on cue for desktop publishing, CAD/CAM, presentation graphics or any other task requiring the most realistic images possible, the PCPC II/32 High Resolution Color Graphics System provides the power and performance to capture every shot. Crispness and brillance are yours as never before. Need colors, and lots of them? You can choose from almost 17 million different ones. With this kind of real-time quality, you are free to pool all your resources and be the best you can be. And all this happens on an absolutely flicker-free Trinitron™ monitor with a picture so sharp it must be seen to be believed! Down time? With the PCPC II/32, down time is all but a thing of the past. What could be better? More personalized choices, of course - just to ensure that you have your ideal system - a super workstation or executive center - PCPC offers two monitor sizes, so don't get hustled. If the color of your money is important to you, give your eyes the break they deserve!

Personal Computer Peripherals Corporation
4710 Eisenhower Blvd., Building A-4
Tampa, FL 33634
800-622-2888
813-884-3092

Circle 223 on reader service card
RetixMail is the sole Mac E-mail package supporting all these X.400-standard features.

RetixMail features can be customized. You control how often you will be notified of new mail, and options for how it notifies you include sounds, a pop-up dialog box, and turning the Apple icon into an envelope. A nickname feature allows you to send mail without typing in a full address each time: you simply enter the full address in an address book, give the entry a nickname, and send mail to the nickname.

A 100-user RetixMail package is available for $7300, including the Retix OpenServer 400 server and an adapter for connecting to other networks. For more information, contact Retix in Santa Monica, California, at 213/399-2200.

—Yvonne Lee

ModelShop: 3-D in the Fast Lane

ModelShop 1.0 is designed to simplify knocking out rough ideas for buildings and playing with objects in 3-D. To draw a building or an object, you start in plan view and throw down a rectangle or another primitive shape, or you can draw a complex shape with the line tool. A rubber-band line appears and you drag-click it to set the height. Another drag-and-click line sets the center of view and standpoint location, or you can enter exact numbers in a dialog box. Once you create an object, you can drag its vertices around and punch holes through it to create windows and hallways—or the mouth of a disk drive. Holes can be moved by dragging and ModelShop reconstructs the surrounding walls.

You can stop rendering at any point to work on a partly rendered model. ModelShop's color scheme is based on HSB (hue, saturation, brightness) and is limited (by 8-bit color) to seven colors per file, each with 32 brightness levels. It imports PICT files or scans. Final images can be saved as a high-resolution PICT2 files for page layouts, or output to film recorders.

Some useful features slated for versions 1.1 and 2.0 include transparency, multiple light sources, object libraries, DXF 3-D translators for exchanging files with technical CAD applications like AutoCAD, and 32-bit color support. ModelShop currently supports 235 layers; in later versions you will be able to name layers individually. The view from inside a 3-D object leaves a lot to be desired, and Paracomp plans a major overhaul for that function. The company also publishes Swivel 3D and plans to integrate the two products to provide animation and walkthrough capabilities for ModelShop creations.

ModelShop lists for $595 and should be available now. It runs on a Mac Plus and is MultiFinder-friendly. For more information, contact Paracomp in San Francisco at 415/543-3848.—D.L.

Matching Colors on Printers and Monitors

Tektronix recently introduced a method of matching the color output of printers and monitors. Called TekColor, the software displays a map of colors possible on an output device, overlapped with a similar map for the monitor. By working in the area of overlap, users choose monitor colors that the output device can produce.

The first announced method for matching monitor color with color output, TekColor should be extremely useful for graphic artists and color desktop publishers. The technique requires that the maker of the output device define its color characteristics under Tektronix's TekHVC (hue-value-chroma) color model, or under the CIE international color definition standard. TekHVC is a patented subset of the CIE standard. Tektronix's ColorQuick ink-jet printer's performance has already been mapped under TekHVC, and other vendors are expected to do the
There's a Word for
Whether you're a marketing maven on your way up, a scientist knee-deep in formulas, or a temp trying to cope with an unfamiliar corporate mindset, when it comes to putting thoughts to paper, Microsoft is the Word for you.

And our users aren't the only ones who think so. Recently, the editors of Mac User gave Microsoft® Word version 4.0 the highest rating of any Macintosh® word processing program. Period.

A move we weren't altogether surprised by. You see, besides being perversely committed to research and development, we use a highly sophisticated approach to improving our product. We listen.

All of which has led to innovations like Word 4.0's powerful Table feature, enabling users to create side-by-side paragraphs, lists and even forms, without the hassle of dealing with tabs.

And since there *are* other word processing programs, Word 4.0 provides connectivity to Microsoft Word version 5.0 for the PC, PC WordPerfect®, DCA and other file formats. So now you can share your work with those less fortunate than yourself.

What's more, Word 4.0 is uniquely capable of delivering even more performance when it's used with other applications. For example, even highly educated executives can import Microsoft Excel tables and charts and automatically update them. Making it easy to ensure document accuracy. Plus, Microsoft Mail can be sent from within Word 4.0, significantly boosting workgroup productivity.

For something a tad more informative than this ad, call (800) 541-1261, Dept. J92, to receive a brochure or ask for the location of your nearest dealer for a demo. You'll find that no matter what type of word processing you're performing, you could be doing it better. Just take our Word for it.
Rodime Introduces the Standard for Hard Disk Technology.

COBRA DRIVES SET THE STANDARD. Cobra high performance internal and external hard drives are the finest drives available for your Mac. With capacities of 45MB, 70MB, 100MB, and 210MB, Cobra is the answer to all your storage needs. External Cobra drives come in a new, sleek low profile cabinet that fits neatly beneath your Mac Plus, Mac SE or Mac SE/30. Internal Cobra drives come with two mounting brackets. One, for installation in the Mac II or Mac IIx, and one for mounting in the Mac SE/30 or Mac SE which allows you to keep both floppy ports active.

FAST 18ms ACCESS TIME. Nothing is faster! With an average access time of 18ms Cobra is the fastest drive available on the market for the Macintosh line of computers. Cobra drives also come with a 16K Caching Buffer which allows even faster access to your data, (sub 18ms), by storing frequently used data in “instant access” RAM.

CONVENIENT SINGLE POWER SOURCE. With the external Cobra, the flip of one switch on the drive activates your CPU, printer and other peripherals, eliminating cumbersome cables.

LED'S THAT PUT YOU IN CONTROL. Now you can be aware of the status of the drive at all times, with power-on, drive activity and fault warning lights.

ONE YEAR WARRANTY. Rodime Systems offers the level of reliability, innovation and support only an original equipment manufacturer can provide.

FREE BACK-UP AND UTILITY SOFTWARE. Cobra drives come with a FREE copy of FASTBACK™ back-up software, a $99.00 value, as well as Rodime’s Utility Software which allows partitioning (including A/UX), media verification, formatting and driver installation.

RODIME’S COMMITMENT TO QUALITY. At Rodime Systems, the craftsmanship built into every drive is our commitment to produce the finest, most reliable drives available. When you buy a Rodime Systems product, you are buying years of manufacturing experience, state of the art engineering and peace of mind that comes from knowing that more Mac users have chosen Rodime drives than any other.

Rodime Systems 851 Broken Sound Pkwy.
Boca Raton, FL 33487 407-994-5585
UK, Nasmyth Rd., Southfield Industrial Estates
Glenrothes, KY6 2SD, Fife, Scotland 592-774-704
France, Parc d’Affaires de Jouy-en-Josas
5bis Rue du Petit Robinson, 78530 Jouy-en-Josas, 1-34-659798

Fastback is a trademark of Fifth Generation Systems, Inc., Macintosh, Mac SE, Mac SE/30, Mac II, Mac IV and A/UX are trademarks of Apple Computer, Inc., Cobra is a trademark of Rodime Systems.
announce their support soon. Although Tektronix holds a patent on TekHVC, the company will publish the specifications for it and for TekColor in hopes of creating an industry standard.

TekColor installs in the System Folder and launches from the Control Panel. The interface, called TekColor Picker, shows a “leaf” from a “book” of colors that the monitor can display, and overlays the leaf with a boundary line that shows which of those colors the output device can produce. When monitor colors can’t be attained by the printer or other device, the software substitutes the closest available color and notifies the user. Variations in human perception of different colors are accounted for in the software, according to Tektronix.

TekColor was scheduled to ship in October at a suggested retail price of $50. It will be bundled with the QuickColor printer. Other third-party bundling arrangements are expected. For more information, call Tektronix in Wilsonville, Oregon, at 800/835-6100.—Tom Moran

**CompuServe Refines Navigational Equipment**

Using a traditional terminal emulator to explore CompuServe, with its half-million members, 1000-plus databases, and vast libraries, is like groping along through a labyrinth in a virtual world. Many Mac users who never visit would, if they knew about CompuServe Navigator. Navigator began as home-grown shareware and was picked up by CompuServe to provide a Mac-like shell for finding your way around the peaks (if not all the valleys) of the CompuServe landscape. Navigator version 3.0, which may not be available yet, will have an improved interface and add an integrated address book, accounting capabilities (to keep track of how much time you spend online), and a scroll-back capture buffer like some terminal emulators provide. The new version will not, unfortunately, expand the shell to access airline reservations, the encyclopedia, or other databases; but improvements to the terminal mode and the ability to have multiple terminal tiles and call them from the main script will take some of the pain out of building scripts to automate those more complex functions.

More significantly, version 3.0 eliminates the ASCII-based (text-based) method that CompuServe’s mainframes have had to use to communicate with Macs. The new method uses a Host-Micro Interface (HMI) that, in effect, provides the Mac with an understanding of the mainframes’ native language. In addition to providing more efficient data transfers and much better error detection and recovery, HMI allows CompuServe’s mainframes to upload the CIS interface to a Mac, on the fly, so that changes made on the host don’t make software on the Mac obsolete. In addition, CompuServe will license the HMI protocols to third-party developers, making it simple to integrate a CompuServe bridge into electronic mail packages.

Navigator 3.0 will list for $99.95. For more information, contact CompuServe in Columbus, Ohio, at 614/457-8600—D.L.

**Micron Technology Enters Graphics Adapter Fray**

Micron Technologies, long the sole U.S. vendor of DRAM chips to the general market, has entered the market for graphics adapters with four color boards, two each for the SE/30 and the Mac II family. Although Micron is already offering RAM add-in boards for Macs and PCs, the new products are its first to go (continues)
The Right Products

Since 1985 our mission has been to deliver high performance solutions at the very best prices. It all began with the ancestor of this little workhorse, the RM-8, an 800k floppy that reviewers have loved for years. We've continued to improve it and have dropped the price to $147! From that beginning, we've grown to offer four removable technologies, making us the only company that can objectively recommend the right removable for your needs.

There's no excuse for leaving your valuable data unprotected. Our new T150 tape backup combines proven DC600 technology, our easy-to-use software, and an "excuse shattering" low price.

We've joined forces with our Minneapolis neighbor, Imprimis, to introduce three new drives with capacities to 580MB. We chose Imprimis drives for rock solid performance and blistering speeds to 16ms.

We were first to introduce a combination storage/backup solution in 1986. Our new generation "C" series is comprised of seven solutions based around Quantum and Imprimis drives (the slowest being 19ms!) with a choice of 42MB removable or 150MB tape for reliable backup and archiving.

Our new MirrorImage printer breaks the $3000 price barrier for PostScript® compatible Macintosh printers!

The Right Prices

Thank you MacGuide! We couldn't have said it better ourselves. We've shown thousands of Macintosh users a better way to buy computer products. When you buy direct from Mirror Technologies, you get Factory Direct pricing, our 30 day Love-It-or-Return-It guarantee, solid warranties and answers direct from the source. (After all, for product information, who better to ask than its maker?) And our momentum lets us continue to drive prices down!

Right Now!

We've doubled our sales staff, established a 24 hour/7 days a week order hotline, and offer Federal Express delivery—all to make sure you never wait. So don't—order right now by calling

1-800-654-5294.

All prices/specifications subject to change without notice. Call for current pricing, warranty, and promotional details. Mirror and MirrorImage
20MB external $447

The cream of the crop... and are also among the least expensive."—MacWorld

Our internal drives save you space and money. We've got internal solutions for the Mac SE, SE30, II, and IIE. SE owners keep both floppy drives (or one floppy and one hard drive) with our unique mounting system. Drives ship formatted, tested and loaded with 10MB of utilities and shareware, and are backed with our 2 year limited warranty. M20: $377, M30: $427, M40: $577, M45: $527, MP80: $927, MP100: $1027. (MP designates premium 19ms Quantum drives.)

20MB internal $377

Our internal drives save you space and money. We've got internal solutions for the Mac SE, SE30, II, and IIE. SE owners keep both floppy drives (or one floppy and one hard drive) with our unique mounting system. Drives ship formatted, tested and loaded with 10MB of utilities and shareware, and are backed with our 2 year limited warranty. M20: $377, M30: $427, M40: $577, M45: $527, MP80: $927, MP100: $1027. (MP designates premium 19ms Quantum drives.)

Flatbed Scanner $597

Our VS300 and 200 scanners deliver crisp text, line art, and dithered halftones at a fraction of the cost of most scanners. The clean, elegant design means a compact footprint, fewer moving parts, 3-D capabilities, and no bulbs to replace. The simple to use software saves in all popular formats and operates as a Desk Accessory. We even include DeskPaint for retouching!

"If it were my money, I'd buy the Mirror...its price/performance ratio is unequaled"—Byte

Imagine securing your drive or file server each night by just turning a key and sliding out a hard drive module. Our RD series are removable modules containing our best sealed hard drives, with capacities to 100MB and speeds as fast as 19ms. The obvious choice for high security applications. RD30: $747, RD40: $897, RD50: $1247, RD100: $1447. (Prices include RC chassis. RDP designates premium 19ms Quantum drives.)

2644 Patton Road
Roseville, MN 55113
(612) 633-4450
fax: (612) 633-3136

Technical Support Hotline:
(612) 633-2105
Hours: Mon-Fri
8am-5pm CST

20MB removable $877

The RM20 operates as fast as many hard drives but with the integrity of a floppy. Utilizing disks and technology from Kodak, the shock resistant media is guaranteed for life, making it perfect for archiving and backups.

"...faster [and $100 less] than the Jasmine drive."—MacUser

42MB removable $897

Built around Eddy award winning Syquest technology, the RM42 is faster than most hard drives. 

"The 42MB removable [42MB formatted] were among the fastest backup solutions I tested."—MacWorld

"For convenience, flexibility and speed, the 45MB removable is the clear winner."—MacWorld

Auto head parking, self diagnosis, and a memory cache that allows optimum 1:1 interleaving on all Macs, make the RM42 the right choice. 42MB/42MB (Combo) $1697.

Dead Jasmine or Apple Drive?


30MB removable $747

Imagine securing your drive or file server each night by just turning a key and sliding out a hard drive module. Our RD series are removable modules containing our best sealed hard drives, with capacities to 100MB and speeds as fast as 19ms. The obvious choice for high security applications. RD30: $747, RD40: $897, RD50: $1247, RD100: $1447. (Prices include RC chassis. RDP designates premium 19ms Quantum drives.)

Order Toll Free
1-800-654-5294
As the storage and retrieval device for valuable information, a disc drive plays a critical role in a personal computer’s overall operation. Building hard disc drives that deliver both high performance and high reliability requires the same degree of precision employed by skilled artists.

This precision is reflected in every Seagate ST157 family drive. Using our own stepper motor processes, each drive is auto-tuned for optimum performance every time the drive is powered up.

This 21-49 megabyte 3.5” drive family is a skillful blend of performance and reliability. With access times of 28 msec, these drives feature an MTBF of 70,000 hours, and are available in SCSI, ST412 and AT* interfaces.

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 palette of high quality storage solutions, contact your authorized Seagate distributor, or call Seagate directly at 800-468-DISC, or 408-438-6550.
outside the realm of pure memory.

The Xceed NB10-78 and Xceed NB6-48 are NuBus cards that offer 1024 by 768 and 640 by 480 resolution, respectively. The Xceed SE/3010-78 and Xceed SE/306-48 are the equivalent products for the SE/30. All operate in 1-, 2-, 4-, and 8-bit mode in gray scale or color, supporting 256 on-screen colors from a palette of 16.7 million. All can support two monitors and come with a gamma color-correction DA and a Micron-developed paint program that can run at 8 bits or 24 bits.

Slated to ship in September, the two 640 by 480 resolution boards will retail at $595, while the two 1024 by 768 boards list for $995. For more information, contact Micron Technology in Boise, Idaho, at 208/386-3900.—T.M.

Microsoft Mail: Almost Like Being There

Microsoft Mail 2.0 is an example of the increasing sophistication of electronic mail systems for the Macintosh. The new version, which should be available now, adds integration with other Microsoft packages, gateways to other local and remote electronic mail systems (AppleLink, MCI Mail, IBM's PROFS, a UNIX implementation, and X.400, among others, are available or under development), and through add-on products being developed by Alisa Systems and Pacer, the ability for a VAX to act as a mail server. Microsoft Mail keeps an up-to-date list of user addresses everywhere on a network, enabling transparent access to many names across multiple servers.

Integrating Microsoft Word with Microsoft Mail is useful, if somewhat obvious. Selecting Send Mail under Word 4.0's File menu brings up the address dialog and then sends the front window off to the addressee. If the receiver happens to be using a PC on an AppleTalk network, the message appears, fully formatted, in the PC version of Word. The integration of Excel and Mail is more impressive. Excel 2.2's macro language has new functions for opening and reading Mail, and Microsoft has been showing an example that uses a custom Excel application and Mail's custom forms capabilities to run an automated office-supplies order system. Line items on an order form are read from Mail into Excel, and a series of macros sends the request to the supply room and updates an inventory database kept on a server. In spite of these features, Mail is still missing some basic capabilities. Only one file can be attached to a message, and users have to appeal to the network administrator to create customized distribution lists. Microsoft plans to correct both of these shortcomings in a later version.

Microsoft Mail is priced at $95 for the server software and $125 per Mac or PC workstation, or $1495 for 20 workstations. For more information, contact Microsoft in Redmond, Washington, at 206/882-8088.—D.L.

Not Gone with the Wind

We'd all like to save the world with our Macs, but David Wexler has already done it—at least in the Hollywood film world. Wexler knew that a lot of highly valuable master copies of movies were slowly deteriorating because temperature and humidity were not being controlled in storage. So he set out to build a storage facility that would keep great classics like City Lights from fading to black.

Wexler's biggest problem was to convince commercial lenders that the project could make money. He used a pro-

(continues)

With Microsoft Mail you can send a worksheet from within Excel to another Excel user or even to an Excel application on a server.
This space represents 14MB potential memory now available in your Mac.

And this is all you've got.

14MB? That's right! Now you can break the eight megabyte barrier—without shelling out megabucks for expensive memory chips.

Introducing VIRTUAL 2.0—the advanced virtual memory software for the Macintosh II, IIx, IIcx and SE/30. By putting information normally stored in RAM on your hard disk drive—and retrieving it transparently as required—VIRTUAL allows you to run multiple “memory hogs” concurrently under MultiFinder. And for just $199 (or $545 for the Macintosh II), VIRTUAL not only helps with memory that's too full... it also helps keep your checkbook from getting too empty.

To order call (415) 324-0727 or fax (415) 324-2958.

MEGABYTES NOT MEGABUCKS

Connectix Corporation, 125 Constitution Drive, Menlo Park, CA 94025

Circle 20 on reader service card
Tektronix’s RP88 coprocessor board sports Motorola’s 20MHz 8800 RISC chip and runs at 17 MIPS.

Program called Real Estate Master, from Tronsoft of Santa Barbara, California, to help with the complicated financial analysis for a building with temperature and humidity control, fireproofing, and automated storage systems. “The program reminded us of the little things that you would be able to overlook when you’re working on a project like this,” Wexler says. It also allowed him to present the Real Estate Master analysis to commercial lenders as a backup to the business plan.

The software takes into account the type of building, projects ten-year cash flow, and calculates the effects of partnership and syndication. It also projects before-tax and after-tax profits.

Wexler and his colleagues at Hollywood Vaults ended up using the Mac for everything associated with the building: they used MacProject for scheduling, MacPaint for the floor plans, and MacWrite for correspondence. Now the building’s interior stays at 55 degrees Fahrenheit and 50 percent humidity, preserving the films, videotapes, and audiotapes that are the mainstay of the archive. The company also stores photos, artwork, and backup media on its automated moving-shelf storage system. And with a full house and a line forming outside below the marquee, the company is hard at work preparing Hollywood Vaults: The Sequel.—T.M.

**Mac II on Steroids**

The first generally shipping 88000-based coprocessor board for the Mac II was recently unveiled by Tektronix. Incorporating Motorola’s 88000 RISC processor, the board is designed to accelerate the Mac II’s speed by as much as 30 times.

The RP88 coprocessor provides 17 MIPS at 20MHz and includes a built-in math coprocessor that can calculate up to 7 million floating-point operations per second. The Finder and the Mac II’s keyboard, monitor, and drives are still driven by the 68020 on the system board, while the 88000 performs the intense computations.

Intended for such power-hungry applications as high-end CAD/CAM, molecular modeling, and image processing, the RP88 comes with 2MB of RAM, 32K of cache RAM, and sample programs. Now shipping, the board starts at at $9575. Various programmer’s tools are also available. For more information, call Tektronix in Wilsonville, Oregon, at 800/835-9435, ext. 8800.—T.M.

**PostScript Clone on a Disk**

PostScript printing output can look great, but it’s not always affordable. That’s especially true of color PostScript. Printers such as the QMS ColorScript Model 20 and the Tektronix Phaser CPS produce stunning 300 dpi color output, but both cost $15,995.

A $495 program called Freedom of Press, which should be available now, promises to deliver PostScript-quality output at non-PostScript prices. Freedom of Press essentially uses the Mac’s processor and memory to turn a non-PostScript printer into a PostScript clone containing 35 fonts. Downloadable PostScript fonts from any vendor except Adobe can also be used.) Freedom of Press can drive about 40 output devices, including 24-pin dot matrix printers from Epson, IBM, and Fujitsu; laser (continues)
Expanded choices, extraordinary support, professional features.
Meet Mac'langelo/24. It's the 24-bit color board that puts the power of pinpoint color accuracy on practically any Mac II color screen. Large or small.
In fact, Mac'langelo/24 offers the widest range of compatibility and the most in-depth support for the monitor of your choice.
Support like color-correction tables selected for each monitor. And 72 dpi on 13", 16" and 19" models. Even a five-year warranty.
How about applications compatibility? Mac'langelo/24 runs 32-bit QuickDraw. It lets you switch between 1, 8 and 24 bits per pixel without having to reboot.

And it gives you 100% function-key customization.
Mac'langelo's Zoom magnifies your work up to 400%, and Pan lets you quickly see anywhere within the expanded desk of its Extended Screen feature.
Mac'langelo/24 from National Semiconductor. It's the true-color board that makes a full-featured professional out of practically any monitor.

(800) 538-8510
In California (800) 345-4006
Outside U.S. (408) 562-4719
National Semiconductor,
Compatible Products Group,
750 Central Expressway, M/S 34-10,
Santa Clara, CA 95050-2627.
Dealer inquiries welcome.
printers from Hewlett-Packard, Tandy, and others; color ink-jet printers from Hewlett-Packard, Howtek, Sharp, and Xerox; color thermal printers from CalComp and Seiko; and even film recorders from Presentation Technologies and LaserGraphics.

To use Freedom of Press, you spool a PostScript file to disk instead of to a printer, and then start Freedom of Press and tell it to interpret the disk file. Freedom of Press uses the Mac's memory and processor to interpret the PostScript code and control the printer, wherein lies the rub: Freedom of Press requires a Mac SE/30 or II with 2MB of memory, and because Freedom of Press runs on the Mac, you can't share it or the printer it controls over a network.

But these limitations may be worth the money you can save. Freedom of Press isn't as convenient as a networked PostScript printer, but non-PostScript printers and film recorders often cost 30 to 50 percent less than their PostScript counterparts. For further information, contact Custom Applications in Billerica, Massachusetts, at 508/667-8585.

—Jim Heid

Mitsubishi Introduces 37-Inch Monitor, 24-Bit Color Printers

Mitsubishi Electronics America has introduced a continuous-tone, 24-bit color printer designed for creating near-photographic-quality color proofs for applications including color electronic publish-

The Mitsubishi S340-10 uses sublimable-dye-thermal transfer technology to place dots of transparent color one on top of another, thereby producing up to 16.7 million different colors without dithering. Dithering, a technique of alternating dots of two colors to get a color that's between the two, can reduce apparent resolution.

The number of actual colors produced by the S340-10 will vary with the software and hardware controller used, Mitsubishi said. The company is working with third-party vendors to provide PostScript compatibility through a PostScript interpreter.

The printer completes an A-size color image in about 1 minute and 40 seconds at a resolution of 150 dpi. It can also produce legal-size pages. The S340-10 is shipping now at a suggested retail price of $13,995, including 6MB of RAM. Mitsubishi also announced a color thermal-transfer printer, the G370-10, which attaches to Mac IIs via a parallel interface board. The 300-dpi G370-10, which uses the dithering technique, produces letter, legal, and A4-size output. Also available now, its suggested retail price is $5995.

The company also has a 37-inch color monitor (with 35-inch viewing area) that can accept a wide variety of video formats, including PAL; SECAM and the U.S. standard, NTSC. Intended for presentations and multimedia, the XC-3715C monitor also accepts composite video, Super-VHS, RGB, and TTL input. Compatible with Mac IIs and IBM PCs, the monitor is available at a suggested retail price of $7599. For more information, call Mitsubishi in Torrance, California, at 213/515-3993.

—T.M.

We Now Return You to the Program Already in Progress

For those who are tired of waiting for their SE to boot, or afraid of losing data in a blackout; Checkmate Technology is bringing out MacSaver, an internal battery back-up device. MacSaver lets you literally unplug an SE while it's on, plug it in hours later, and be right back in the same application or document. A small amount of static RAM on the MacSaver board stores the state of the microprocessor and other devices, and the battery (continues)
We don't mind telling you that the Mass Microsystems™ 45MB Removable Hard Drive is currently the best selling removable on the market. We also don't mind telling you that it features a SyQuest™ mechanism, excellent driver software and an average access speed of 25ms. We are even willing to tell you that they're available at your favorite dealer at a list price of $1,799.

Or you could buy a 45MB Removable Hard Drive from Ehman. It has the same SyQuest mechanism, excellent driver software, and the same access speed. Plus, the Ehman Removable has a two year warranty on the SyQuest mechanism and two years on all other parts and software. And it also comes with everything you need including cables.

Oh, and by the way, Ehman is sold direct for just $849. That's a difference that makes a difference.

Since 1985 Ehman has been adding value to the Macintosh® with a broad line of quality peripherals, and backs all its products with a 30 day, hassle free, return policy.

Call us at 1-800-257-1666 and order your 45MB Removable Hard Drive from Ehman for $849. A real deal. Or get one from a dealer and pay an extra thousand bucks.

But don't say we didn't tell you.
MacSaver, an internal battery back-up device from Checkmate Technology, connects to the SIMM slots on an SE’s system board.

Power preserves the data and programs in the SE’s relocated system RAM. Because MacSaver does not power the disk drive, the company cautions that if the power fails during a write to disk, some data may be permanently lost.

To install the device, you take the system memory out, plug it into the MacSaver board, and then plug MacSaver’s cables into the emptied SIMM slots on the system board. An accompanying desk accessory allows you to set a password so that others cannot simply turn the SE on and see your most recent work. The DA also gives you the option of selecting a short delay period so the hard disk drive read/write head can park on power-down.

At press time, Checkmate Technology planned to ship MacSaver in September but had not yet determined if the standard battery would support 12 or 24 hours of backup. MacSaver is expected to retail for $399. For more information, contact Checkmate Technology in Tempe, Arizona, at 800/325-7347.

—T.M.

Reader Survey: Computer-Related Health Problems

With carpal tunnel syndrome and other repetitive strain injuries being reported more frequently among office workers, and with new studies indicating that magnetic and electrical fields around electronic equipment may cause illness, concern is growing about the safety of personal computers. Perhaps in part because the United States has no real equivalent of the strict European ergonomic standards for workstations and office furniture, some experts believe that in the next ten years an enormous legal battle will be fought over whether it will be manufacturers, employers, or employees who will bear the cost of these work-related injuries. Our reader survey this month reveals that a significant fraction of readers feel they have sustained computer-related damage to their health.

Thirty-two percent of responding readers who use personal computers reported health problems that they believed were caused by computer use. Of those who had health problems, 64 percent experienced back or neck pain, 56 percent said they had eye trouble, and 12 percent said they had sustained strain injuries from repetitive motions. Miscarriages and other pregnancy complications were also reported among readers who responded.

However, 73 percent of readers with health problems said they had not missed any work days, 13 percent said they had lost less than a day, and 8 percent said they had missed one or two days of work. One percent said they had missed a week to a month, and 1 percent reported being out more than a month.

Only 18 percent of personal computer—using respondents said that their employers have a policy of helping employees with ergonomic problems. However, 40 percent of respondents said that their employer makes ergonomic furniture available. Of those readers, 72 percent said their employer provides ergonomic chairs, 65 percent said monitor tilt-and-swivel stands or suspension devices were available, 57 percent said type stands, 44 percent said monitor shields, 34 percent said keyboard supports, and 21 percent said their employer offers replacement input devices for a mouse.—T.M.

Of the responding readers who said they had computer-related conditions, 64 percent reported neck or back problems, 56 percent cited eye trouble, and 12 percent had repetitive motion injuries.

HEALTH PROBLEMS

Which of the following problems did you experience?

*Includes some reports of miscarriage and other complications of pregnancy.
To manage a shop

What's easy to remember, has a great rap beat, and you can dance to? Our new 800 number. Give it a 10. Actually give it a 3 then another 3 then five 4's, because henceforth our new number is 800/334-4444.

See the red stars? They highlight companies participating in our 30 or 60 day money-back guarantee program. Which means you can return any product from these companies within 30 (or 60) days of receiving it, if, by any chance, it just doesn't do what you need it to do. All we ask is that you save the original packaging. Because, in order to refund your money we need the whole kit and kaboodle back—right down to the registration card. (Just make sure that, during the warranty period, the dog doesn't run off with the money we need the whole kit and kaboodle packing. Because, in order to refund your press time. Also, all of the software we sell is not copy-protected, unless indicated otherwise by (CP).

The four-digit number next to each product is the product's ITEM NUMBER. Please refer to this number when ordering. Thank you.

Advanced Software ... 30 day MBG
DocuComp 1.1—Finds and tracks changes in different versions of word processing files or source code. It saves untold hours of marking paper by hand ... $89.

ACCOUNTING & FINANCE

* Aatrix Software ... 30 day MBG
3976 Aatrix Payroll 3.5 ... 115.
3958 Aatrix Payroll PLUS 3.1 ... 149.
4021 Aatrix TimeCard 2.0 ... 105.
4020 Aatrix Timeminder 2.1.2 ... 149.
Bedford Software
4977 Simply Accounting 1.04 ... 219.
* Chang Labs ... 60 day MBG
1613 Rags to Riches Ledger 3.1 ... 119.
1614 Rags to Riches Payables 3.1 ... 119.
1617 Rags to Riches Receivables 3.1 ... 119.
1622 Rags to Riches 3-Pak ... 269.
1612 Inventory Control 2.6 ... 239.
1615 Professional Billing 2.9 ... 239.

NUMBERS & DATABASES

* Abacus Concepts ... 60 day MBG
4482 StatView SE + Graphics 1.03 ... 225.
4481 StatView II 1.03 ... 295.
* Acius ... 30 day MBG
5618 4th Dimension 2.0 ... 469.

Quicken 1.5—Automates routine financial tasks, delivers comprehensive financial reports, even links directly with MacInTax. Perfect for anyone who'd rather spend their time earning money rather than keeping track of it ... $36.
### GRAPHICS & DESIGN

**Aegis Development** ... 60 day MBG  
4956 Showcase FX/1.0 ... 199.
**Altsys**  
4830 KeyMaster 1.0 ... 51.
1194 FONtastic Plus 2.02 ... 51.
**Bright Star Technology**  
3962 HyperAnimator 1.6 ... 99.
**Broderbund Software**  
4065 PosterMaker Plus 2.5B ... 35.
1427 Print Shop 1.3 ... 35.
4501 Drawing Table 1.0 ... 75.
**Casady & Greene** ... 60 day MBG  
1575 Fluent Fonts 2.0 ... 27.
**Claris**  
1123 MacPaint II 2.0 ... 99.
1117 MacDraw II 1.1 ... 299.
4815 Smart Form Designer 1.0 ... 299.
4814 Claris CAD 1.0 ... 599.
**Cricket Software**  
1667 Cricket Draw 1.1 ... special 139.

**Deneba Software** ... 30 day MBG  
1769 Canvas 2.0 ... $169.
**DreamMaker** ... 60 day MBG  
4088 MacGallery (MacPaint format) ... 27.
**Dubl-Click Software**  
5069 World-Class LaserType Vol. 1 ... 42.
5070 World-Class LaserType Vol. 2 ... 42.
5071 World-Class LaserType Vol. 3 ... 42.
5072 World-Class LaserType Vol. 4 ... 42.
5073 World-Class LaserType Vol. 5 ... 42.
5074 World-Class LaserType Vol. 6 ... 42.
3972 World-Class Fontsi Originals ... 42.
3973 World-Class Fonts Stylish ... 42.
3974 World-Class Fonts Giants ... 42.
5131 World-Class Fonts Tripples ... 42.
3964 WetPaint Classic Clip-Art (1 & 2) ... 42.
3965 WetPaint For Publishing (3 & 4) ... 42.
3966 WetPaint Animal Kingdom (5 & 6) ... 42.
3967 WetPaint Special Occasions (7 & 8) ... 42.
3968 WetPaint Printer's Helper (9 & 10) ... 42.
3969 WetPaint Industrial Revol. (11 & 12) ... 42.
3970 WetPaint Old Earth Almanac (13 & 14) ... 42.
3971 WetPaint Island Life (15 & 16) ... 42.
4940 WetPaint All the People ... 42.

**Electronic Arts**  
5289 Video Works/1.0 ... 99.
4315 Video Works/8 1.0 ... 299.
3320 BulkMail Plus 3.25 ... 78.
3321 BulkMail Plus 3.25 ... 189.
**FastBack II**  
3963 Softstream International ... 22.
3232 Endeavour Planner ... 99.
**Synergy** ... 30 day MBG  
3129 Kaleida Graph 2.0 ... 149.

**Fifth Generation** ... 60 day MBG  
4993 MiniCad + 1.04 ... $519.
**Graphsoft** ... 30 day MBG  
4993 Crystal Paint 1.0 ... special 25.
**Great Wave** ... 30 day MBG  
4707 Dreams 1.0 ... 269.
**Linguist's Software** ... 60 day MBG  
4954 Video Works II Accel. 1.1 ... special 99.
4952 Video Works II HyperCard Driver 1.2 ... 60.
4954 Video Works II Accel. 1.1 ... special 99.
5087 MacMind Director 1.0 ... 449.
**MicroMaps** ... 30 day MBG  
5516 MacAtlas (Paint version) ... 45.
5514 MacAtlas (EPSF version) ... 119.
5513 MacAtlas (Professional version) ... 119.
5515 MacAtlas Presentation Pack ... 119.
**Mindscape**  
5768 ZING 1.0 ... 139.
**NuEquation** ... 30 day MBG  
5428 NuPaint 1.0.4 ... 89.
**Paracomp** ... 30 day MBG  
4597 Swivel 3D 1.1 ... 249.
**Silicon Beach** ... 60 day MBG  
3504 Silicon Press 1.1 ... 52.
3506 SuperPaint 2.0 ... 128.
3990 Digital Darkroom 1.1 ... 248.
3507 Super3D 2.0 ... 319.
**Solutions Int'l** ... 60 day MBG  
3446 The Curator 1.05 ... 72.
**SuperMac Software** ... 60 day MBG  
3380 PixelPaint 2.0 ... 229.
5625 PixelPaint Professional ... 399.
**T/Maker** ... 30 day MBG  
3632 ClickArt Business Images ... 28.
## Publishing & Presentations

### Adobe Systems
- Adobe Type Manager ........................................ 57.
- The Collector's Edition II ............................ 139.
- StreamLine 1.0 ........................................ 229.
- True Form 1.0 ........................................... 229.
- True Form Routine ................................. 175.
- Adobe Illustrator '88 1.6 .......................... 289.
- Newsletters/Publishing Pack 1 .................. 239.
- Forms and Schedules Pack 2 ......................... 269.
- Presentations Pack 3 .................................. 289.

MacConnection carries the entire Adobe Type Library (volumes 1-106).

Listed below are Adobe's newest typefaces at press time.

<table>
<thead>
<tr>
<th>Typeface</th>
<th>Weight</th>
<th>Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>5240 85 Gothic 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5241 86 Comic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5242 87 ITC Bahns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5243 88 Sabon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5244 89 Hiroshiige</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5245 90 Arnold Becklin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5246 91 Dom Casual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5247 92 Post Antiqua</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5248 93 Folio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5249 94 Liscos</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5250 95 VAG Rounded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5251 96 Akzidenz Grotesk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5252 97 Impressum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5253 98 Baur Bodoni</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5254 99 New Astor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5255 100 Adobe Garamond</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5256 101 Adobe Garamond Expert Col.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5257 102 Candida</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5258 103 Franklin Gothic No. 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5259 104 Utopia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5260 105 Utopia Expert Collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5261 106 ITC Berkeley Oldstyle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Microsoft

### Preferred Publishers
- *3G Graphics ... 30 day MBG*
- *Zedcor ... 60 day MBG*
- *Emerald City ... 30 day MBG*

### Programming & Hypermedia

- Bantam Publishing
- 1496 HyperBible (King James) 1.0 .......................... 149.
- 4968 HyperBible (New International) 1.0 ..................... 179.

- Borland International
- 1511 Turbo Pascal 1.1 ....................................... 68.
- 1512 Turbo Pascal 1.0 ....................................... 46.

- Broderbund Software
- 4233 Icon Factory 1.0 ....................................... 29.
- 4234 HyperCard 1.0 ....................................... 29.
- 4235 Icon Factory 1.0 ....................................... 29.

- Broderbund Software
- 5237 Whole Earth Catalog (CD ROM) ....................... 89.

- Bantam Publishing
- 4155 Macs Gallery (HyperCard Format) ..................... 27.

- Bantam Publishing
- 5720 Laser Talk 1.0 ......................................... 159.

- Bantam Publishing
- 5435 HyperOne 1.0 ....................................... 29.
- 4233 Icon Factory 1.0 ....................................... 29.

- Dataesk .. 30 day MBG
- HyperAudio—Connect your Mac speaker port to the handset port of most standard home or multi-line business phones to automatically dial HyperCard, SideKick, SuperCard, Focal Point, C.A.T., or QuickDex phone numbers ........................................ 24.

- Dataesk .. 30 day MBG
- HyperAudio—Connect your Mac speaker port to the handset port of most standard home or multi-line business phones to automatically dial HyperCard, SideKick, SuperCard, Focal Point, C.A.T., or QuickDex phone numbers ........................................ 24.

- Dataesk .. 30 day MBG
- HyperAudio—Connect your Mac speaker port to the handset port of most standard home or multi-line business phones to automatically dial HyperCard, SideKick, SuperCard, Focal Point, C.A.T., or QuickDex phone numbers ........................................ 24.
on Mac monitors,
To find the best fonts

![To find the best fonts](image)

Central Point ... 30 day MBG
PC Tools Deluxe Mac 1.1—Keep your data safe. Includes Smart Locate disk accessory, hard disk backup, undelete, file un-fragmenter, hard disk & diskette recovery, file encryption/compression, track editor, & fast disk copy. $46.

![Central Point](image)

**MUSIC & EDUCATION**

★ Are Nova ... 60 day MBG
1215 Practica Musica 2.1 ........................................... 73.

★ Bogas Productions ... 60 day MBG
4255 Super Studio Session 2.0 ..................................... 69.
1459 Heavy Metal Rock .............................................. 14.
1460 String Quartet .................................................. 14.
1458 Country Dance .................................................. 14.
4832 Sound Effects .................................................... 14.
5719 Brass Disk ....................................................... 14.

Bright Star Technology
3961 Talking Ties 1.0 .............................................. 27.
4028 Alphabet Blocks 1.0 ............................................ 30.

Brodribb Software
4314 Typo 1.0 ....................................................... 19.
1423 Jam Session 1.1 (CP) ............................................ 30.

SuperMac Technology ... 30 day MBG
Dataframe Drives—Features automatic data encryption and password-locksable SCSI partitions for faster operation and protection from accidental deletion and virus attack. Includes Diskit, SuperLaserSpool, etc. See line listing.

SuperMac Technology
![SuperMac Technology](image)
for your metaphors,
For all your Mac needs,

Adobe Systems
Adobe Type Manager—Gives your ImageWriter or Hewlett Packard DeskWriter the professional edge by taking the jagged edge off your printed text. Also dramatically improves the text displayed on your Mac ........... $57.  

4320 MacGolf Classic (CP) . 53.  
4321 Lunar Rescue (CP) . 34.  
4517 Road Racer . 39.  

Premier Technology
5773 Strategic Conquest Plus 2.0 . 35.  
5774 NetTrek The Real Version . 35.  
SavTech
3347 Mac Wrangly (CP) . 35.  
★Softstream Int'l, Inc. . 60 day MBG 
4071 MacMan . 23.  
4072 The Solitaire DA . 23.  
4995 Cribbage Tutor . 26.  
4073 Colour Billiards . 38.  
★Spectrum Holobyte . 30 day MBG 
4175 Solitaire Royale (for Mac SE) . 19.  
4001 Solitaire Royale (for Mac II) . 19.  
3464 Tetris . 20.  
3460 GATO . 26.  
3459 Falcon 2.0 . 31.  
★Spinneker . 60 day MBG 
2328 Sargon IV (CP) . 29.  
★Springboard . 30 day MBG 
4989 Hidden Agenda . 36.  
★SubLogic . 60 day MBG 
4989 Jet (CP) . 32.  

NETWORKS & COMMUNICATIONS
★Abaton . 30 day MBG 
4589 InterFAX Modem . 269.  
★CE Software . 60 day MBG 
5836 InOut (5 user Pak) . 129.  
5838 InOut (10 user Pak) . 189.  

5174 QuickMail (5 user Pak) . $175.  
5173 QuickMail (10 user Pak) . 259.  
★Compuserve . 60 day MBG 
1676 Compuserve Information Service . 24.  
1673 Compuserve Navigator 2.1 . 45.  
1674 Standard Service/Navigator Bundle . 59.  
Connect, Inc. 
5445 MacNet 1.5 . 95.  
★DataViz . 60 day MBG 
1823 MacLink Plus/PC 4.0 . 139.  
4842 MacLink Plus/Translators 4.0 . 109.  
★Dove Computer . 60 day MBG 
4539 FastNet III . 375.  
4938 FastNet SE . 375.  
5624 FastNet SE/30 . 375.  
4937 FastNet SCS. 749.  
★Dou Jones . 30 day MBG 
5295 News/Retrieval Membership Pack . 24.  
1785 Desktop Express 1.03 . 95.  
★Falloon Computing . 30 day MBG 
5707 Tumbiaku 3.0 . 99.  
4866 Tumbiaku Remote 2.0 . 195.  
4867 Tumbiaku 3-pack 2.0 . 1325.  
2201 TrafficWatch 1.08 . 135. 

Berkeley Systems . 30 day MBG  
After Dark 1.0—New Super Screen Saver does it all. Choose fun displays, your company logo, messages, or artwork. Programmable $25. Stepping Out II 2.0—Software Big Screen. Glide over large documents without scrolling . . . . 50.  

2202 PhoneNET to LocalTalk Adapter . 9.  
5864 PhoneNET StarConnector . 21.  
2203 PhoneNET PLUS (DIM-8) . 35.  
2204 PhoneNET PLUS (DB-9) . 35.  
5251 PhoneNET CheckNET . 65.  
4869 PhoneNET Connector 10-Pack . 215.  
4868 PhoneNET Repeater . 325.  
2206 PhoneNET StarController . 1095.  
2205 Star Wiring Kit (Punchdown) . 65.  
5455 Star Wiring Kit (Harmonica) . 65.  
★Freesoft . 60 day MBG  
2219 Red Ryder 10.3 . 52.  
Hayes 
2300 Smartmodem II 3.1 . 88.  
2307 Smartmodem 2400 . 429.  
5189 2400M (internal w/Smartmodem II) . 459.  
Insignia Solutions 
4089 SoftPC 1.3 . 249.  
Intel Corporation 
5119 2400 baud External Modem . 179.  
★Lamir . 30 day MBG 
4984 Acknowledge 1.0 . special 289.  
★Microsoft . 30 day MBG 
2875 Microsoft Mail 1.37 (1-14 users) . 195.  
2972 Microsoft Mail 1.37 (5-10 users) . $325.  
2973 Microsoft Mail 1.37 (11-20 users) . 489.  
2874 Microsoft Mail 1.37 (21-32 users) . 625.  
★NuvoTech . 60 day MBG 
3000 TurboNet ST (DB-9) . 30.  
3001 TurboNet ST (DB-9) . 30.  
5276 TurboBridge . 359.  
★Practical Peripherals . 30 day MBG 
3100 1200 baud External Modem . 77.  
3102 2400 baud External Modem . 179.  
5285 PM 2400A MNP Modem . 209.  
3089 Mac Communications Pack 1.5 . 225.  
★Shiva . 30 day MBG 
3444 NetSerial X$32 . 279.  
4347 NetBridge . 339.  
4342 TeleBridge . 399.  
3443 NetModem V2400 . 439.  
★Software Ventures . 30 day MBG 
3454 MicroPhone 1.5 . 115.  
3455 MicroPhone II 3.0 . 219.  
★Solutions Int'l . 60 day MBG 
4308 BackFX (requires Apple FAX modem) . 125.  
★Synergy . 30 day MBG 
3130 VersaTerm 4.0 . 89.  
3131 VersaTerm PRO 3.0 . 175.  
★TOPS . 30 day MBG 
4188 TOPS Teleconnect (DB-9) . 29.  
4189 TOPS Teleconnect (DB-9) . 29.  
3726 TOPS for DOS 2.1 . 115.  
4328 TOPS FlashBox . 125.  
3725 TOPS Repeater . 129.  
3723 TOPS Mac 2.1 . 145.  
3720 TOPS Flashcard . 159.  
3724 NetPrint 2.0 . 199.  
4714 InBox Starter Kit 2.2 . 149.  
4715 InBox Connection Mac 2.2 . 48.  
3729 LAP-LINK Mac 2.0 . 83.  

INPUT/OUTPUT

Adobe Systems
TrueType 1.0—Two packages in one. Use Set-Up's sample forms, forms from your drawing or page-layout program, or scanned existing forms. Fill-Out's extensive database merging tools make completion a snap .......... $229. 
4476 OmniPage 2.0 . 555.  
5607 OmniPage/Dove MSEE Bundle . 1779.  
★Cutting Edge . 30 day MBG 
3988 CE 105ADB Keyboard w/QuickKeys . 135.  
★Datadisk . 30 day MBG 
1818 HyperDialer . 24.  

Adobe Systems
TextRoom 1.0—Two packages in one. Use Set-Up's sample forms, forms from your drawing or page-layout program, or scanned existing forms. Fill-Out's extensive database merging tools make completion a snap .......... $229. 
4476 OmniPage 2.0 . 555.  
5607 OmniPage/Dove MSEE Bundle . 1779.  
★Cutting Edge . 30 day MBG 
3988 CE 105ADB Keyboard w/QuickKeys . 135.  
★Datadisk . 30 day MBG 
1818 HyperDialer . 24.  

Adobe Systems
TrueType 1.0—Two packages in one. Use Set-Up's sample forms, forms from your drawing or page-layout program, or scanned existing forms. Fill-Out's extensive database merging tools make completion a snap .......... $229. 
4476 OmniPage 2.0 . 555.  
5607 OmniPage/Dove MSEE Bundle . 1779.  
★Cutting Edge . 30 day MBG 
3988 CE 105ADB Keyboard w/QuickKeys . 135.  
★Datadisk . 30 day MBG 
1818 HyperDialer . 24.
Dear MacConnection,

MacConnection has always come through for me with its next day service, but I recently discovered another side to MacConnection: a competent and knowledgeable staff. My experience has been that in mail order, the personnel on the phone usually have an I.Q. just above room temperature—not so your staff.

I needed information on printer compatibility and cables, and the lady on the other end knew what I was talking about. A greater shock was that she was actually pleasant and offered an exchange or refund if the suggested item did not work. Someone pick me up off the floor, please!

Thanks,

C. Michael Wells, M.A.
Littleton, CO
<table>
<thead>
<tr>
<th>Item Number</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5403</td>
<td>Address Labels 17 x 4 (Qty. 1000)</td>
<td>$0.35</td>
</tr>
<tr>
<td>4685</td>
<td>Address Labels 3&quot; x 5&quot; (Qty. 1000)</td>
<td>$0.25</td>
</tr>
<tr>
<td>4811</td>
<td>Transparencies 8 1/2&quot; x 11&quot; (Qty. 50)</td>
<td>$0.34</td>
</tr>
<tr>
<td>4818</td>
<td>Round Labels 3 1/2&quot; (Qty. 150)</td>
<td>$0.17</td>
</tr>
<tr>
<td>4812</td>
<td>Laser Labels 1/2&quot; x 1 1/4&quot; (Qty. 1000)</td>
<td>$0.24</td>
</tr>
<tr>
<td>4807</td>
<td>Laser Labels 1&quot; x 2 3/8&quot; (Qty. 3000)</td>
<td>$0.40</td>
</tr>
<tr>
<td>4808</td>
<td>Laser Labels 1 1/2&quot; x 4&quot; (Qty. 1400)</td>
<td>$0.40</td>
</tr>
<tr>
<td>4839</td>
<td>Laser Labels 2&quot; x 4&quot; (Qty. 1000)</td>
<td>$0.40</td>
</tr>
<tr>
<td>4810</td>
<td>Laser Labels 8 1/2&quot; x 11&quot; (Qty. 100)</td>
<td>$0.40</td>
</tr>
</tbody>
</table>

**Basic Needs... 60 day MBG**

- 5635 Keyboard Flip ........................................... 8
- 5636 LaserWriter Printer Stand ................................ 29
- 5637 Large Screen Monitor Stand ................................ 39
- 4803 Address Labels 8 1/2" x 11" (Qty. 1000)  . 24
- 4810 MacLuggage ImageWare II .................................. 49
- 2579 MacLuggage Macinware Plus ............................... 64
- 2581 MacLuggage Macinware SE ................................ 75
- 4810 MacLuggage ImageWare II .................................. 49
- 4623 Solid Oak Disk Case, made by New England craftsmen (holds 90 disks) 29
- 4973 Power Tree 20 ............................................. $27
- 4974 Power Tree 50 ............................................. $44
- 2558 Apple Security Kit ........................................ 34
- 2559 Maccessories SuperBase ................................... 34
- 2585 Printer Muffler 80 ........................................ 43
- 4047 PowerBacker 30 ............................................ 269
- 4987 PowerBacker 50 ............................................ 339
- 4956 PowerBacker 50 ............................................ 399
- 4956 PowerBacker 80 ............................................ 749
- 4956 PowerBacker 120 ........................................... 949
- 4623 Solid Oak Disk Case, made by New England craftsmen (holds 90 disks) 29

**Computer Coverup... 60 day MBG**

- 1722 ImageWriter LQ Cover .................................. 8
- 1723 ImageWriter II Cover .................................... 10
- 1724 Mac Plus Cover ........................................... 10
- 1724 Mac SE Cover ............................................. 10
- 1725 Mac SE Ext. Keyboard Cover Set ........................ 10
- 4657 LaserWriter II Cover .................................... 10
- 4657 LaserWriter II Cover .................................... 10

**Goldstein & Blair... 30 day MBG**

- 2267 The Macintosh Bible (2nd Edition) .................... 20

**Kalam Designs**

- 2109 Teakwood Roller Case (holds 45 disks) ................. 14
- 2132 Teakwood Roller Case (holds 90 disks) ............... 21
- 2132 Teakwood Roller Case (holds 90 disks) ............... 21

**Kensington... 30 day MBG**

Kensington carries the entire line of Kensington's accessories. Partial listing below.

- 2577 Mouseway Pad ............................................ 8
- 2578 Mouse Pocket ADB ....................................... 8
- 2598 Mac Plus/SE System Saver Cover ....................... 9
- 2598 Mac Plus/SE System Saver Cover ....................... 9
- 2599 Universal Printer Stand ................................ 15
- 4970 Modern/FAX Protector 10 ................................. 15
- 4971 Modern/FAX Protector 20 ................................ 25
- 4126 LaserWriter II Dust Cover ............................... 17
- 4987 PowerBacker 50 ............................................ 339
- 4987 PowerBacker 50 ............................................ 399
- 4987 PowerBacker 80 ............................................ 749
- 4956 PowerBacker 120 ........................................... 949

**MacConnection... 60 day MBG**

- 4623 Solid Oak Disk Case, made by New England craftsmen (holds 90 disks) 29

**Mobius Technologies... 60 day MBG**

- 4470 Fanny Mac QT ............................................ 60

**Moustrak... 60 day MBG**

- 2694 Moustrak Pad (standard 7" x 9") ...................... 8
- 2692 Moustrak Pad (large 9" x 11") ......................... 9
- 2693 Moustrak Pad L/F (9" x 11") .......................... 10

**NoRad... 30 day MBG**

- 5620 Shield for Mac Plus or SE (*2524*) .................. 99
- 5622 Shield for Mac II (*2523F*) ............................. 99

RIBBONS

Available in black, blue, brown, yellow, green, orange, purple, red, silver and gold.

- 3255 ImageWriter II Ribbon ................................... 4
- 3261 ImageWriter II 4-Color Ribbon ......................... 9
- 3270 ImageWriter II Rainbow Six Pack ....................... 9
- 3280 ImageWriter II Black Ribbon ........................... 17
- 4011 ImageWriter II 4-Color Ribbon ......................... 20

**Sorig Softworks... 60 day MBG**

- 4171 Mac SE Std. Keyboard Cover (navy) .................... 15
- 4015 Mac SE & Ext. Keyboard Cover (navy) ................. 15
- 4017 ImageWriter II Cover (navy) ............................. 11

**Datadest... 30 day MBG**

Mac-01 Keyboard—Includes macro program, Masterstrokes, to assign keystrokes and mouse clicks to 15 function keys. Beige, platinum, or Aubergine version... call $139.

Foreign keyboards are also available... call 603/446-7711.

**Datadesk... 30 day MBG**

Mac-01 Keyboard—Includes macro program, Masterstrokes, to assign keystrokes and mouse clicks to 15 function keys. Beige, platinum, or Aubergine version... call $139.

Foreign keyboards are also available... call 603/446-7711.

**Sporis Softworks... 60 day MBG**

- 4171 Mac SE Std. Keyboard Cover (navy) .................... 15
- 4015 Mac SE & Ext. Keyboard Cover (navy) ................. 15
- 4017 ImageWriter II Cover (navy) ............................. 11

---

**OUR POLICY**

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- We will ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail.
- International orders U.S. $250 minimum. Upon receipt and approval, personal and company checks now clear the same day for immediate shipment of your order.
- Corporate PO's accepted subject to credit approval.
- COD max. $1000. Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices subject to change without notice.
- To order, call us anytime Monday through Friday 9:00 to 9:00 EST, or Saturday 9:00 to 5:30 EST. You can call our business offices at 603/446-7711 Monday through Friday, 9:00 to 5:30 EST.

**SHIPPING**

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders phoned into MacConnection weekdays by 8 PM EST will ship Airborne the same night for delivery the next business day (i.e. not Saturday or Sunday), except for those within UPS Ground Zone 1 (which is also an overnight service).

The total freight charge on any order placed with MacConnection is now $3. Backorders will also ship Airborne overnight at no additional charge. Some areas require an additional day delivery.

Hawaii, Alaska and Outside Continental US: Call 603/446-7711 for information.

---

**Cutting Edge... 30 day MBG**

44 Meg Removable Drive—Offers the convenience of removable media with the reliability of Winchester technology. Features the popular 5200g mechanism and includes one cartridge. $999

---

**Foreign keyboards are also available... call 603/446-7711.**
Dove Computer—60 day MBG

**Marathon Racers**—Step up to a new dimension of Macintosh performance. This easy-to-handle cache card gives you accelerator-like performance.

**MEMORY & DRIVES**

<table>
<thead>
<tr>
<th>1 Meg SIMMs</th>
<th>30 day MBG</th>
</tr>
</thead>
<tbody>
<tr>
<td>3989 800K External Drive (platinum)</td>
<td>149</td>
</tr>
<tr>
<td>5133 20 Meg Hard Drive</td>
<td>439</td>
</tr>
<tr>
<td>3990 30 - Meg Hard Drive</td>
<td>499</td>
</tr>
<tr>
<td>3991 45 - Meg Hard Drive</td>
<td>549</td>
</tr>
<tr>
<td>5275 65 - Meg Hard Drive</td>
<td>629</td>
</tr>
<tr>
<td>5276 80 - Meg Hard Drive</td>
<td>739</td>
</tr>
<tr>
<td>5456 44 Meg Removable Drive</td>
<td>999</td>
</tr>
<tr>
<td>5736 44 Meg Removable Cartridge</td>
<td>119</td>
</tr>
</tbody>
</table>

**ACCELERATOR BOARDS**

| 1793 Marathon 020 M5E1 | 429 |
| 1794 Marathon 020 M5E2 (1 Meg) | 719 |
| 1795 Marathon 020 M5E3 (math chip) | 599 |
| 1796 Marathon 020 M5E4 (4 Meg) | 899 |
| 5192 Marathon 020 M5E5 (4 Meg) | 1269 |
| 5193 Marathon 020 M5E6 (4 Meg) | 1449 |
| 4663 Marathon 030 Accelerator 32 MHz | 969 |
| 5623 Marathon Racer | 149 |

**ACCELERATORS (020) WITHERNET**

| 5391 FastNet LAN 1 | 1125 |
| 5390 FastNet LAN 2 (1 Meg) | 1499 |
| 5389 FastNet LAN 3 (math chip) | 1349 |

Dove Computer—30 day MBG

**ACCELERATORS (030) WITHERNET**

| 5388 FastNet LAN 4 (1 Meg/chip) | 1724 |
| 5387 FastNet LAN 5 (4 Meg) | 2175 |
| 5386 FastNet LAN 6 (4 Meg/chip) | 2399 |

**Epson**

| 5132 40 Meg Raw Drive (25ms) | 436 |
| 5204 70 Meg Raw Drive (25ms) | 566 |

**IONEGA**

| 5552 44M Ext. Single Bernoulli II Drive | 1399 |
| 5553 44M Ext. Dual Bernoulli II Drive | 2199 |

**SOFTWARE**

- Software Ventures—30 day MBG
- MicroPhont 11.3—New version of top-selling telecom software. Build graphic front-ends to remote services & corporate mainframes. Supports XCMDs & XFCNs, ZMODEM, European languages, icons, color & sound... $219.

- 1819 MAC-101 Keyboard (beige) 139 |
- 1820 MAC-101 Keyboard (platinum) 139 |
- 1821 MAC-101 Keyboard (ADB) 139 |
- Foreign keyboards available... call
- **Kensington**—30 day MBG
- 2576 Turbo Mouse for Mac Plus 3.0 109 |
- 2547 Turbo Mouse ADB 3.0 109 |
- **Koala**
- 2593 MacVision 2.0 219 |
- **Kraft Systems**—60 day MBG
- 2600 3-Button QuickStick 39 |
- 4082 3-Button QuickStick ADB 51 |
- **Kurtz**
- 2604 IS ADB 8½" x 11" Tablet 255 |
- 5161 IS ADB 12" x 12" Tablet 385 |
- 5162 IS ADB 12" x 17" Tablet 625 |
- 2605 Cordless 4 Button Cursor 65 |
- **Logitech**—30 day MBG
- 5082 ScanMan Mac 349 |
- **LYNX Computer**—30 day MBG
- 1211 LYNX Trackball 65 |
- 1212 LYNX Trackball ADB 65 |
- **Microspects Pub**—60 day MBG
- 4843 WristMac 1.0 149 |
- 5018 WristMac Executive 1.0 199 |
- **Mobile Technologies**—60 day MBG
- 4846 MultiScreen 315 |
- **Mouse Systems**—30 day MBG
- 2808 A + Mouse 63 |
- 2809 A + Mouse ADB 83 |
- **Numsys**—30 day MBG
- 2993 15" Monitor for Mac II special 799 |
- 2997 15" Monitor for Mac Plus 999 |
- 2994 15" Monitor for Mac SE 999 |
- 4002 19" Monitor for Mac Plus 1195 |
- 4004 19" Monitor for Mac SE 1195 |
- 5680 19" Monitor for Mac SE/30 1195 |
- 5697 19" Monitor for Mac II 1195 |
- Olduvai Software
- 5138 Read-III CCR Personal 2.0 99 |
- 5034 Read-III CCR 2.1 249 |
- **Orange Micro**—30 day MBG
- 4488 Grappler Spoiler 39 |
- 3036 Grappler C/Mac/GS 2.0 79 |
- 3076 Grappler LQ 1.5 103 |
- 4487 Grappler LS 1.0 103 |
- **PTI/DataShield**—30 day MBG
- 4845 MacDirector 109 |
- **Summagraphics**
- 4298 BitPad Plus ADB $325 |

**VIRTUAL STORAGE MEDIA**

- Connectix
  - Virtual 2.0—Megabytes, not megabucks. Expands your Mac II (RMMU required), ibx, Irix, or SE/30 system to as much as 14 megabytes of virtual memory using just software and hard disk space... $125.

- **Cheer Tech**—60 day MBG
- 3576 14 Meg Disk Drive 319 |

- **Cutting Edge**—30 day MBG
- 3298 Sony 32 Meg (1.44 Meg) 736 |

- **Dove Computer**—60 day MBG
- 3943 3M DC2000 $21 |
- 3944 3M DC600A $29 |

- **Epson**
- 3377 31 Meg Raw Drive (25ms) 436 |
- 3204 70 Meg Raw Drive (25ms) 566 |

- **IONEGA**
- 5507 44M Ext. Single Bernoulli II Drive 1399 |
- 5508 44M Ext. Dual Bernoulli II Drive 2199 |

- **MacVision 2.0** 219
- **Microspects Pub**—60 day MBG
- 4843 WristMac 1.0 149 |
- 5018 WristMac Executive 1.0 199 |

- **Multimetrics**—60 day MBG
- 4846 MultiScreen 315 |
- **Numsys**—30 day MBG
- 2993 15" Monitor for Mac II special 799 |
- 2997 15" Monitor for Mac Plus 999 |
- 2994 15" Monitor for Mac SE 999 |

- **Olduvai Software**
- 5138 Read-III CCR Personal 2.0 99 |
- 5034 Read-III CCR 2.1 249 |
- **Orange Micro**—30 day MBG
- 4488 Grappler Spoiler 39 |
- 3036 Grappler C/Mac/GS 2.0 79 |
- 3076 Grappler LQ 1.5 103 |
- 4487 Grappler LS 1.0 103 |

- **PTI/DataShield**—30 day MBG
- 4845 MacDirector 109 |
Apple's new portable is moving in the right direction, but has it arrived?

Portability has always been a key aspect of the Macintosh's personality. With its small footprint and narrow face, the original Mac proudly asserted the virtues of a compact and space-efficient design. Ironically, since then Macintoshes have marched off in the opposite direction—getting bigger, heavier, and wider while users continued to dream of smaller, more compact versions. The only exception to this trend has been the Mac IIcx (which may partially explain its tremendous popularity). Needless to say, most of us have been waiting to see what Apple would come up with when it did finally unveil the portable
Macintosh. Here's a report based on a sneak preview I attended at Apple Computer during the summer.

If you have been anticipating the ultimate portable you may be disappointed. There's good news and bad news. Let's get the bad news out of the way first, though it will come back from time to time. Here it is: the Macintosh Portable is not a laptop powerhouse for the rest of us. The Portable is too big (roughly 15 by 15 inches, and 4 inches high in the back) and too heavy (just under 16 pounds) to be called anything but a transportable or, to borrow a friend's favorite phrase, a lug-gable. Priced around $6500-$7000, it's too expensive to be a second Mac for most folks. It's also too underpowered to justify that price for a one-and-only. In today's paper I saw an ad offering a Mac SE/30 for half that price.

And yet so much innovation and new technology went into the Macintosh Portable that it can't be dismissed out of hand. It certainly isn't a failure; on the contrary, in terms of the design goal—a portable, battery-powered Macintosh—it's a smashing success. The screen (an active matrix liquid crystal display) is probably the finest on a laptop, short of a volt-sucking plasma screen. Power management appears to be raised to a new art. Apple claims 6 to 10 hours of normal use, including hard disk access, before recharging the battery, and up to 15 hours if you avoid the hard disk altogether.

**Profile of a Portable**
The wedgelike shape of the Portable changes when you lift the screen into viewing position. Floppy disks go into the opening on the right side.

Closed up, the Macintosh Portable looks a bit like a fourth-generation Apple IIc. The portable is platinum-white, has a slotted plastic case that is wedge shaped: thick at the back, growing thinner toward the front. Along the back are the ports (see "The Portable's Ports"). All are standard Macintosh inlets and outlets, including:

- A port for a second external floppy drive
- A SCSI port (DB-25 connector) for external devices (hard disks, for example)
- An Apple Desktop Bus (ADB) port for a mouse or other ADB device
- A port for stereo audio output
- The power inlet, where the power adapter plugs in
- Two standard Mac serial ports (DIN-8 round connectors)
- A video output port, capable (with separately sold external adapters) of producing standard Macintosh or NTSC output

It has a half-height SuperDrive floppy disk drive on the right side toward the back. A second internal disk drive is a possibility, provided you don't opt for the 40MB hard disk. Also, a port in the back lets you connect an external SuperDrive.

The standard mass storage is a 40MB 3½-inch hard disk. According to Apple, this hard disk is very rugged, a claim that was put to the test when one of the prototype Portables, zippered up in its carrying case, fell off a table and onto the floor. The Portable was removed from its carrying case and found to be working just fine. The people at Apple didn't know if the hard disk would be standard or op-
Active matrix LCDs and conventional LCDs rely on the same basic technology. The image to the right shows how an LCD creates a white (off) pixel or a black (on) pixel. Ambient light passes through a layer of polarized glass (A) into a liquid crystal solution. Uncharged crystals form a natural helix that twists at a 90-degree angle (B). This twist redirects incoming light so that it passes through a second polarized layer and reflects off the mirrored bottom layer (C). The reflected light makes the pixel look white. When an electric charge is applied to the crystals, it forces them to straighten out of the helix formation (D). The straightened crystals no longer change the angle of the light, so the second polarized layer now acts as a barrier that prevents light from reaching the reflective surface; without the reflected light, the pixel looks black.

LCDs control specific pixels by using a grid of horizontal and vertical electrodes. An evenly timed charge cycles along the horizontal electrodes. Specific pixels are activated when precisely timed vertical charges concur with the horizontal charge. This scheme provides good contrast and quick response. However, as the charge moves on, the crystals resume the helix configuration, turning the pixel off. In SuperTwist technology the crystals twist up to 270 degrees. This gives the crystals the power to stay dark longer (because it takes longer to form a more twisted helix), but does so at the expense of contrast and responsiveness. The active matrix LCD used in the Mac Portable solves the problems of conventional LCDs. The active matrix screen provides high contrast and responsiveness by using a 90-degree twist. But instead of electrodes, an active matrix LCD uses a tiny conductive wire to carry the charge to each pixel. At each pixel, a small transistor retains the charge after the cycle moves on so that the crystals stay in place.—Arne Hurty and Adrian Mello
Most LCDs are hard to read, slow to update, have limited viewing angles, and are very sensitive to ambient light.

Activating a Screen Revolution

The screen is one of the great breakthroughs of the Macintosh Portable, especially when you compare it to the various LCD displays used on other portable computers. Most LCDs are hard to read, slow to update, have limited viewing angles, and are very sensitive to ambient light. As the owner of a Z-181 laptop from Zenith, which has a superwrist backlit LCD screen, I know how much positioning and fiddling with brightness and contrast controls is often necessary to get a legible display.

In comparison, the active matrix LCD used in the Portable is crisp and sharp, with high resolution (7/7 dpi). The display has a wide viewing angle; you can read it even when the machine is positioned at an oblique angle. Since the display is reflective instead of backlit, you need a certain minimum amount of ambient light to read it. But that amount is fairly low—you can still read the display in a dimly lit room—and the screen becomes more (not less) legible in bright light.

According to Apple, the differences between the active matrix LCD and regular LCD screens are due to high contrast (the Macintosh Portable’s contrast is up to five times greater than other LCD screens) and an individual transistor associated with each pixel on the screen (see “How the Active Matrix LCD Works”). These transistors are spread out on an integrated substrate applied directly to the back of the screen; one Apple engineer jokingly dubbed it GSI, for gigantic scale integration. This approach accounts for the fast switching time for each pixel. It also accounts in part for the high cost of the Portable because of challenges in design, manufacturing, and yield.

The Macintosh Portable screen is monochrome (1 bit per pixel, no gray shades) and is 640 pixels wide and 400 lines high. This screen shares the same width but is shorter than the 640-by-480-pixel displays generated by the Apple video boards in the Mac II, IIfx, IIE, and IICl. It’s noticeably larger than the standard 512 by 482 displays on the Mac Plus, Mac SE, and Mac SE/30.

The video port at the back of the machine allows for external video. The signal coming out is very simple—it’s just the signal used to update the active matrix LCD—but Apple plans to bring out external video adapters for standard Mac monitors, NTSC output, and monitors using the European PAL standard.

Tracking Down a New Keyboard

The 65-key, built-in keyboard has a standard Macintosh layout: much like the regular Apple keyboard, though without a numeric keypad; the Enter key is down by the space bar.

Being portable means eliminating the
necessity for mouse desktop space. While the Macintosh Portable has an ADB port in the back for a mouse, and comes with one, the Portable also has a built-in trackball. A long bar located just below the trackball serves the same purpose as a mouse button.

For those of you who absolutely need a numeric keypad, Apple has an optional one, which can be installed in place of the trackball. This means, of course, that you have to plug in the mouse and find desk space to use it (unless someone markets a mouse pad that straps to your thigh). You do have the choice of having the trackball or keypad on the left or the right of the keyboard (see "Keyboard Options"). This requires some dismantling and cable unplugging; Apple says it's best handled by your dealer.

**What Kind of Mac?**

Although the Portable is a fully functional Macintosh in terms of compatibility and operation, it is more akin to a Mac SE than to a Mac II in terms of performance. To begin with, instead of a 68030 or 68020 processor, the Portable has a 16MHz 68000 processor. This is the same processor as the one in the Macintosh SE, but running at twice the clock rate. Processor-intensive tasks (excluding floating-point operations) run about twice as fast as on a Macintosh SE, and about half as fast as on a Mac II (see "Speed Tests"). According to Apple engineers, more powerful processors would have demanded too much power to work within the constraints of the Portable's design.

The system board has 1MB of high-speed static RAM, implemented using 256-kilobit static RAM chips. Static RAM is used because it consumes much less power than dynamic RAM. Using static RAM reduces drain on the battery while you're using the computer; it also makes it easy to preserve the contents of memory when the Portable is shut down. There's a side benefit as well: the static RAM has a very fast access rate (20 to 30 nanoseconds), improving performance. The system architecture can—in theory, at least—accommodate up to 9MB of RAM, though that would require higher-density static RAM chips than are currently available.

The downside is that static RAM is very expensive and only available commercially in the form of 256-kilobit chips. This creates both economic and technological barriers to putting a lot of memory into a Macintosh portable. Apple plans to market a 1MB board that would fit into a memory expansion slot on the system board; no pricing was given for the board, but $2000 is a reasonable guess, based on current static RAM prices. But even if it were $1500, assuming the lower base system price of $6500, you'd have to pay at least $8000 for a Portable with 2MB of RAM; using the higher estimates for RAM board and Portable, that total jumps up to $9000.

**The Big Sleep**

The only system software differences you are likely to notice are the addition of a battery-monitoring desk accessory, which monitors the Portable's charge, and a new CDEV that enables you to control the amount of time before the Portable goes to sleep when inactive.

**Expansion Slots**

Other aspects of the Macintosh Portable's architecture demonstrate its similarity to an SE. The Portable comes with 256K of ROM, implementing a superset of the Mac SE ROM. This means no color or grayscale support. The Portable also has relatively limited bus expansion capabilities, which is to be fully expected in a computer that must conserve power. Although there are three slots, only one of these can be considered close in capability to a slot in a Mac SE, SE/30, or II. Like the SE/30's, this expansion slot is called the Processor Direct Slot (PDS), but it is yet another standard Apple interface (joining those on the Mac SE, the Mac SE/30, and the Mac II/IIx/IIcx). The Portable's PDS is a 120-pin socket, identical physically to the one found on the Macintosh SE/30, but with a somewhat different set of signals. The people at Apple didn't mention any specific products designed for this slot, but did mention it in the contest of networking, which suggests that perhaps an Apple- or third-party Ethernet controller may be
The Macintosh Portable is never really off; in fact, it has no on/off switch. Most of the time it is in the sleep state.

**Internal View**

Removing the back of the Portable's case reveals the floppy disk drive and hard disk, as well as slots for an internal modem, ROM boards, and RAM expansion. In the background are (left to right) an internal modem, a video adapter, and a RAM board.

Taining up to 3MB of ROM. Such a board can contain code and/or data, such as custom (or commercial) applications, reference tables, and so on. The ROM board is treated like a high-speed, ready-only mass storage device; code in the ROM cannot be executed directly but first must be copied into RAM, so it doesn't really help you stretch available RAM. The third slot is an 18-pin modem slot, designed to accommodate an internal 2400-baud modem, another option from Apple (no pricing given).

**Power Supply**

The Macintosh Portable uses a lead-acid battery for power, rather than the NiCad (nickel-cadmium) batteries usually found in portables and laptops. Apple gave several reasons for going with lead-acid over NiCad, but the two most significant were charging cycles and power monitoring. NiCad batteries are a bit of a pain to recharge; unless you completely drain them before recharging, they tend to hold less and less of a charge. According to Apple, the lead-acid batteries don't have that problem; you can recharge them at any time and in any condition without getting the NiCad "memory" effect. They also recharge more quickly, taking about three hours to fully charge if you're not using the Portable, and six to eight hours if you are.

According to Apple, it's also easier to directly monitor the power level of a lead-acid battery. The result is the Battery DA and warning software shipped with every Macintosh Portable. The Battery DA displays a thermometer-like gauge showing how much charge is left in the battery (see "The Big Sleep"). The computer itself monitors the battery's power level, issuing warnings recommending that you plug the Portable in to an outlet somewhere before you lose too much power. Should you ignore the warnings, the computer will eventually shut itself down altogether; at that point, you have about four days to recharge the battery before the memory loses its contents.

Apple plans to sell extra batteries, as well as an external battery charger. A standard 9-volt battery maintains the contents of RAM while you swap lead-acid batteries. Also, the power adapter has a built-in transformer that automatically adapts to power levels ranging from 70 to 270 volts, allowing you to use the Macintosh Portable in most countries.

**Power Management**

Although the lead-acid battery has some obvious advantages over NiCad, its presence doesn't explain the extended hours of use claimed by Apple for the Macintosh Portable. The extra hours are provided by the whole power-management system built into the Portable; if Apple's claims are accurate, then this represents the other great breakthrough (along with the screen) in portable technology.

The Macintosh Portable's system board has a Mitsubishi 5073 processor, which acts as the power manager on a chip. This chip actually handles a number of functions—including supplying clock and calendar information, maintaining parameter RAM, and controlling the ADB port—but its main function is to monitor system activity and shut down or activate systems as required.

Here's how it works. When you're using the Macintosh Portable, it's running at full speed. However, if there has been no discernible user or program activity for a specified period of time—no use of the keyboard, mouse, or trackball, and no changes to the screen display (such as a moving cursor)—then the power manager puts the Portable into rest mode, decreasing the system clock rate from 16MHz to 1MHz (which slows down all system activity) and shutting off the display. When unused, the hard disk controller shuts itself down and the hard disk stops spinning. If a further time period goes by without any activity, the Portable goes into sleep mode; the manager turns off the CPU completely, and the power.
Macworld Labs ran some preliminary tests comparing the performance of the Mac Portable with that of the SE and the SE/30. All tests were performed using the same 300MB hard disk under a beta version of System 7.0. Results may vary somewhat under production versions of the system software. A special program, written by the author, conducted and precisely timed several number-crunching and drawing operations, the results of which appear in the Computation and Graphical charts. The other tests timed common operations on familiar application programs: searching a 103K MacWrite document for a 3-letter string and replacing that string with a 14-character text string; recalculating a 235K worksheet file in Microsoft Excel 1.5; previewing a 104K file in FreeHand 2.0; and sorting 1544 records by a single field in 4th Dimension 1.06.

When that finally happens, the power manager brings the system back to full speed immediately, turning the display back on at the same time.

The upshot of all this is that the Mac Portable is never really off; in fact, it has no on/off switch. Instead, most of the time it is in the sleep state, with just a bare trickle of current from the battery being used to maintain the contents of RAM. When you open the lid and press any key, the Portable instantly comes to full activity: all applications that were in RAM before are in the same state. Likewise, you can put the Portable into the sleep state.

As mentioned, Apple claims that this power management results in anywhere from six to ten hours of regular work on a full battery charge, with increased floppy- and hard-disk access dragging you toward the lower figure. With a 2MB system, you can configure a RAM disk, move the System files over to it, and avoid most disk access: Apple claims that by using this method you can get upwards of 15 hours' work out of a full battery charge.

MacPortable
Mac SE
Mac SE/30

Graphical
Preview
Search/Replace
Sort

All times in seconds


desc trivia that with this group of applications, the Mac Portable is faster than the SE and SE/30. The chart below shows the results of the tests.

The Mac Portable is an impressive example of high-tech engineering, and sets new standards in display and power technology. The design team that built the Portable deserves recognition for its accomplishments. Whether Apple's marketing position for the Portable is equally deserving remains to be seen. It appears for the moment that most users will continue to dream of a smaller, more powerful, and less expensive Macintosh.

Bruce F. Webster, lacking a battery-powered floccus for that matter, a regular one, uses power outlets wherever he can find them.

Farther to Travel
Apple's avowed market for the Macintosh Portable comprises sales and marketing professionals; executives; educators; and service professionals such as accountants and insurance adjusters. The unspoken corollary is that these groups have to have money to burn. They also have to be fairly hardy—even with the carrying case and shoulder strap, I'd hate to lug a Mac Portable more than a few city blocks.

There are, of course, enough people who fit that profile for Apple to sell quite a few Portables, at least at first. However, my guess is that sales will level off once the initial demand is satisfied, and that there will be little growth until Apple addresses one or more of the chief drawbacks: weight, size, price, and performance.
When I first attempted to survey options for an AppleTalk networking overview (see "Expanding the Conversation," Macworld, May 1988), I examined topics such as network topologies, servers, and software. Although these issues remain pertinent today, there are new things to consider as far as AppleTalk networking is concerned.

For one, there are more players and network products than before. In fact, network services now available to small, workgroup-based AppleTalk local area networks (LANs) easily rival those available to any IBM PC.
Connections
NETWORK CONNECTIONS

From the Bottom Up

While the original LocalTalk cables are easy to work with, they aren't always the best way to wire a network. This is particularly true when companies want to use existing cabling—like telephone systems or Ethernet—to connect a network. Luckily, the AppleTalk protocols can run on nearly any variety of network media. (Remember, AppleTalk refers to the overall architecture—the protocols—of the AppleTalk network; LocalTalk is Apple's name for the twisted-pair cables that the protocols run over.)

Farallon's PhoneNet system, which uses unshielded twisted-pair wire like that of telephone wiring systems, has long been the best-known alternative to LocalTalk. Due no doubt to PhoneNet's success, many companies now offer similar connectors (see “Connecting by Phone”).

One new development is the introduction of DaynTalk from Dayna Communications and FlashTalk from TOPS. I

YOU SAY ROUTER...

There has always been a lot of confusion as to what bridges, routers, and gateways are in the AppleTalk world. To illustrate the difference, let's look at them using the OSI layer model. Traditional bridges are protocol-insensitive, meaning that they link LANs purely at the top two layers—for example, Ethernet and token ring. Traditional routers, on the other hand, are protocol-sensitive; they connect LANs at the top three layers. Thus, a router could link LocalTalk and EtherTalk nets, but not LocalTalk and Ethernet nets running DECnet or TCP/IP. AppleTalk routers, as Apple defines them now, are more intelligent than traditional routers, because AppleTalk routers can maintain AppleTalk zones. Gateways link two LANs running completely different protocol suites—AppleTalk on LocalTalk and TCP/IP on Ethernet, for example. Gateways are responsible for converting protocols across all seven layers.
call these intermediate-speed networks because they operate at speeds three to four times faster than LocalTalk, but not as fast as Ethernet. DaynaTalk and FlashTalk are designed to coexist with existing LocalTalk installations, but each requires special software and/or hardware to deal with collisions that can occur when network packets are transmitted at different speeds on the same cable.

Moving to higher-speed networks, the number of Ethernet interface products for the Mac almost doubled in the past year (see “Hooking to Ethernet”). Ethernet-access pioneers like Kinetics, Dove Computer, 3Com, and Apple have expanded their own offerings to support new Mac models like the SE/30. In addition, companies such as Asante Technologies, Compatible Systems, Cayman Systems, and Everex now offer Ethernet add-in boards for the Mac.

Such boards provide connections via the coaxial cables most commonly used with Ethernet. Several companies have started to support Ethernet connectivity over unshielded twisted-pair wiring. Two products, the EtherPort SE/L and the EtherPort III from Kinetics, already offer the capability for twisted-pair Ethernet. Farallon now provides connectors for twisted-pair Ethernet as well as an Ethernet version of Farallon’s StarController.

Although the standards aren’t final, twisted-pair Ethernet—or 10BaseT, as it’s called—is designed to use two pairs of wire rather than a single pair as PhoneNet does. Converting an existing PhoneNet network to Ethernet requires an extra wire pair leading to each connector or face plate. Not only that, but you cannot use typical flat modular phone cable for twisted-pair Ethernet; you need what’s called DIW (wall) cable, like that used in AT&T’s premises wiring scheme.

**New Connections**

The new alternative for corporate Mac wiring schemes is token ring, an important element of IBM’s Systems Application Architecture (SAA) and a standard in its own right. Estimates indicate that the number of token ring network installations now almost equals those using

---

### Hooking to Ethernet

<table>
<thead>
<tr>
<th>Product</th>
<th>Company</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>EtherLink/II</td>
<td>3Com Corporation</td>
<td>$495</td>
</tr>
<tr>
<td>EtherLink/SE</td>
<td>3Com Corporation</td>
<td>$595</td>
</tr>
<tr>
<td>EtherPort SE</td>
<td>Kinetics, division of Excelan</td>
<td>$595</td>
</tr>
<tr>
<td>EtherPort SE/L</td>
<td>Kinetics, division of Excelan</td>
<td>$645</td>
</tr>
<tr>
<td>EtherPort SE/30</td>
<td>Kinetics, division of Excelan</td>
<td>$595</td>
</tr>
<tr>
<td>EtherPort SE/30L</td>
<td>Kinetics, division of Excelan</td>
<td>$645</td>
</tr>
<tr>
<td>EtherPort II</td>
<td>Kinetics, division of Excelan</td>
<td>$595</td>
</tr>
<tr>
<td>EtherPort III</td>
<td>Kinetics, division of Excelan</td>
<td>$595</td>
</tr>
<tr>
<td>EtherPort III</td>
<td>SynOptics Communications</td>
<td>$645</td>
</tr>
<tr>
<td>EtherTalk NIB Card</td>
<td>Apple Computer</td>
<td>$699</td>
</tr>
<tr>
<td>FastNet SE</td>
<td>Dove Computer Corporation</td>
<td>$599</td>
</tr>
<tr>
<td>FastNet II</td>
<td>Dove Computer Corporation</td>
<td>$899</td>
</tr>
<tr>
<td>FastNet III</td>
<td>Dove Computer Corporation</td>
<td>$599</td>
</tr>
<tr>
<td>GatorCard E/SE</td>
<td>Cayman Systems</td>
<td>not avail.</td>
</tr>
<tr>
<td>GatorCard E/30</td>
<td>Cayman Systems</td>
<td>not avail.</td>
</tr>
<tr>
<td>GatorCard E/11</td>
<td>Cayman Systems</td>
<td>$695</td>
</tr>
<tr>
<td>IPT 1000 (SE)</td>
<td>Information Presentation Technologies</td>
<td>$495</td>
</tr>
<tr>
<td>MacCon SE/E</td>
<td>Asante Technologies</td>
<td>$395</td>
</tr>
<tr>
<td>MacCon SE30/E</td>
<td>Asante Technologies</td>
<td>$595</td>
</tr>
<tr>
<td>MacCon II/E</td>
<td>Asante Technologies</td>
<td>$595</td>
</tr>
<tr>
<td>Mac2000</td>
<td>Network Resources</td>
<td>$595</td>
</tr>
<tr>
<td>MoraThen LAN 020</td>
<td>Dove Computer Corporation</td>
<td>$1499–$2499 depending on RAM, options; Thick Ethernet transceiver $149</td>
</tr>
<tr>
<td>NAE 1000</td>
<td>Novell</td>
<td>$595</td>
</tr>
<tr>
<td>NAE 2000</td>
<td>Novell</td>
<td>$595</td>
</tr>
<tr>
<td>NIA310 MacConnect</td>
<td>Interlan</td>
<td>$549</td>
</tr>
<tr>
<td>NuvoNet ET (50-meter)</td>
<td>NuvoTech</td>
<td>not avail.</td>
</tr>
<tr>
<td>NuvoNet ET (100-meter)</td>
<td>NuvoTech</td>
<td>not avail.</td>
</tr>
<tr>
<td>NuvoNet ET (100-meter)</td>
<td>NuvoTech</td>
<td>not avail.</td>
</tr>
<tr>
<td>SpeedLink</td>
<td>EIMC, division of Everex Systems</td>
<td>$549</td>
</tr>
</tbody>
</table>

**External Box**

| AT2000 | Network Resources | $995 |
| AT2002 | Network Resources | $1295 |
| Ether+ | Compatible Systems | $495 |
| EtherSC | Kinetics, division of Excelan | $1250 |
| FastNet AE | Dove Computer Corporation | $1299 |
| FastNet SCS | Dove Computer Corporation | $1249 |
| FastPath 4 | Kinetics, division of Excelan | $2795 |
| GatorBox | Cayman Systems | $2795 |
| IPT BB | Information Presentation Technologies | $1895 ($295 per added board) for a LocalTalk network |

**Other**

| Nodem | Adaptec | $595 |
| NuvoLink 3C | NuvoTech | $495 |
| NuvoStar ET | NuvoTech | not avail. |
| PhoneNet StarController EN | Farallon Computing | $2495 |
Ethernet across the United States.

Soon after Apple officially announced its TokenTalk NB interface board for the Mac—something Apple talked about doing for at least a year—other companies began introducing competing token ring interfaces. The variety of choice for token ring boards isn't nearly as great as that for Ethernet, but that's because token ring is a newer networking technology, especially for Macs. All of these boards currently support the older 4-megabit-per-second token ring; you should expect future boards to support the faster 16-megabit-per-second token ring as the demand for network speed grows.

Other media options for networking Macs do exist (see "More Options for AppleTalk"). IBM's original PC LAN network depended on broadband media like that used for cable television signals, rather than baseband media such as Ethernet. Although there's been a major switch to token ring in the IBM camp, the popularity of broadband LANs is on the upswing again. Products from Cactus Computer allow you to attach Macs or a LocalTalk LAN, to broadband networks. There's also a move toward wireless LANs, using either infrared (IR) or radio waves. Photonics was the first company to introduce an IR-based system for LocalTalk in office environments. And the highly secure, radio-wave-based ARLAN system can be used for creating portable networks, mainly in open spaces.

**Putting Nets Together**

Apple originally recommended a maximum of 32 nodes per LocalTalk LAN. If you used bridges to join networks together to form a larger internet, the AppleTalk protocols limited you to 254 nodes.

With the introduction of AppleTalk Phase 2, the maximum number of nodes for an AppleTalk LAN is over 16 million (see "AppleTalk Then and Now"). And Apple changed its network nomenclature. What was called an AppleTalk bridge is now called a router (see "You Say Router... "). The function of the AppleTalk bridge hasn't changed, only its name.

Partly due to expanding AppleTalk network sizes—even before the introduction of Phase 2—routers are in high demand (see "On the Net"). A year and a half ago, I could point to only three routers: Solana's R-Server, Hayes's InterBridge, and Shiva's NetBridge. Now there are seven routers that enable direct connections between LocalTalk LANs: Apple's AppleTalk Internet Router, Infosphere's Liaison (software-only solutions), Solana's I-Server, InterBridge, NetBridge, P-Ingeneer's InterTalk 2, and Nuvotech's TurboBridge (hardware solutions). There are four products that can connect LANs over modem links: Liaison, InterBridge, Solana's R-Server, and Shiva's TeleBridge.

If you travel with the Mac, you have more options for remote AppleTalk ac-
cess. Such products let you take advantage of networking services (electronic mail or file servers, for example) via modem. They include Shiva’s NetModem and NetSerial, DataSpace’s Telenode, and R-Server. Liaison also permits dial-in access to an AppleTalk network. In addition, several products such as the NetModem and the NetSerial allow modem-sharing by networked users. Hayes’s Smartmodem 2400M is restricted to sharing for networked users dialing out, and can’t be used by anyone dialing into a network.

Dial-in access to a network usually necessitates some type of security measures so unauthorized users can’t just call in. Simple password protection for users and hidden zones—offered with all dial-in products—may be enough to protect the network’s resources. Liaison provides more stringent security measures; it includes a dial-back option to register the dial-in user, hang up, and re-dial the remote user at a predetermined phone number.

**Service with a Smile**

Apple’s evangelism for its AppleTalk Filing Protocol (AFP) has led to a larger number of file servers becoming available for use by AppleShare clients. Macintosh users aren’t the only ones who can access AFP servers; PC users can, using Apple’s AppleShare PC. AFP server software now runs on Macs, PCs, VAXes, and UNIX computers, as well as on specially constructed boxes (see “Service, Please”).

Jasmine’s DirectServe is a self-contained box with AppleShare code in ROM and a SCSI port that you plug hard disks in to. These hard disks can then act as AppleShare server volumes for a network, once the DirectServe is on the net.

PCs are getting converted into AFP servers for AppleTalk networks. The pioneer product for this capability, Tangent Technologies’ TangentShare, was bought by DayStar Digital and is now known as FS100. DaynaNet from DaynaCommunications and Miramar’s MacLAN Connect also enable you to use PCs as AFP servers.

Two giants of the PC networking market are now fighting it out for Mac users as well. 3Com has been an early supporter of network services for the Mac; Novell, with its NetWare for the Mac, only recently integrated Mac support into its network operating system. 3Com’s support of the much-hyped SQL Server in the forthcoming release of 3+Open for the Mac should open some new vistas for Mac users. (In fact, 3Com’s support of SQL Server may well give Apple’s CL/1 a run for the money when it comes to networked database access.) Even Novell plans to provide access to SQL Server for Macs when it adds OS/2’s Named Pipes support to NetWare for the Mac.

### More Options for AppleTalk

<table>
<thead>
<tr>
<th>Product</th>
<th>Company</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Token Ring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GotoBox T</td>
<td>Cayman Systems</td>
<td>$3495</td>
</tr>
<tr>
<td>MacCon II/II</td>
<td>Asante Technologies</td>
<td>with Logical Link Control 5795;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>without Logical Link Control 5695</td>
</tr>
<tr>
<td>MacRing</td>
<td>3-three Systems Corporation</td>
<td>$795</td>
</tr>
<tr>
<td>TokenTalk N8 Card</td>
<td>Apple Computer</td>
<td>$1250</td>
</tr>
<tr>
<td><strong>Arcnet</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action SE</td>
<td>Actionet Systems</td>
<td>$395</td>
</tr>
<tr>
<td>Action II</td>
<td>Actionet Systems</td>
<td>$695</td>
</tr>
<tr>
<td>ARCHET220/II</td>
<td>Standard Microsystems</td>
<td>$595</td>
</tr>
<tr>
<td><strong>X.25</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AdCom24</td>
<td>Frontier Technologies Corporation</td>
<td>Board 51495; software 5995</td>
</tr>
<tr>
<td>MacX25</td>
<td>Apple Computer</td>
<td>$800</td>
</tr>
<tr>
<td>Samba Bridge</td>
<td>Connectica</td>
<td>$800</td>
</tr>
<tr>
<td><strong>Fiber Optic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT2000</td>
<td>Network Resources</td>
<td>$995</td>
</tr>
<tr>
<td>AT2002</td>
<td>Network Resources</td>
<td>$1295</td>
</tr>
<tr>
<td>Fiber Optic AppleTalk Concentrator</td>
<td>The Du Pont Company</td>
<td>$950</td>
</tr>
<tr>
<td>Fiber Optic AppleTalk Converter</td>
<td>The Du Pont Company</td>
<td>$250</td>
</tr>
<tr>
<td>Mac2000</td>
<td>Network Resources</td>
<td>$895</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARLAN 510-AppleTalk Wireless Router</td>
<td>Telesystems SLW</td>
<td>$2500</td>
</tr>
<tr>
<td>AT2000 (broadband)</td>
<td>Network Resources</td>
<td>$995</td>
</tr>
<tr>
<td>AT2002 (broadband)</td>
<td>Network Resources</td>
<td>$1295</td>
</tr>
<tr>
<td>BroadTalk LAN</td>
<td>Cactus Computer</td>
<td>BroadTalk LAN board &amp; Broadband module 5995;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BroadTalk LAN board &amp; Ethernet module 5745;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BroadTalk/Ethernet gateway 52985</td>
</tr>
<tr>
<td>DaynaTalk</td>
<td>Dayna Communications</td>
<td>$189</td>
</tr>
<tr>
<td>DaynaTalk PC</td>
<td>Dayna Communications</td>
<td>$289</td>
</tr>
<tr>
<td>LAMstar Interface Board</td>
<td>Northern Telecom</td>
<td>$249</td>
</tr>
<tr>
<td>Mac2000 (broadband)</td>
<td>Network Resources</td>
<td>$895</td>
</tr>
<tr>
<td>PhotoLink</td>
<td>Photolink Corporation</td>
<td>four nodes 5995</td>
</tr>
<tr>
<td>TOPS FlashBox</td>
<td>TOPS division, Sun Microsystems</td>
<td>DIN/8-S 189; DB-9-S 189</td>
</tr>
<tr>
<td>TOPS FlashCard</td>
<td>TOPS division, Sun Microsystems</td>
<td>$239</td>
</tr>
</tbody>
</table>

*It took four years for Dick Allen, the founder and president of Photonics of Campbell, California, to find a viable alternative to cable. His invention, PhotoLink, uses infrared light to network Macs.*
Things have changed even on the distributed server front. TOPS once had the field all to itself. Now, Information Presentation Technologies offers its Personal Server Network, which, in addition to being a distributed file server system like TOPS, is also fully AFP compatible. The most recent version of TOPS, TOPS 3.0, is AFP compatible in that it includes support for database use of AFP’s file-locking and record-locking protocols; however, TOPS still uses its TOPS DA interface, not the Chooser as other AFP-compatible servers do.

**Effects of System 7.0**

In addition to what some third-party vendors are doing, Apple’s plans for its new system software, System 7.0, also will ultimately affect the way you work with networks (see “All Together Now”). The most important of these is Apple’s interapplication communication (IAC) framework. (For more information on System 7.0, see “Here Comes System 7.0,” Macworld, August 1989.) Most of the talk about IAC concerns its ability to let applications running on one

---

### ON THE NET

<table>
<thead>
<tr>
<th>Product</th>
<th>Company</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROUTERS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AppleTalk for VMS</td>
<td>Apple Computer</td>
<td>serial license $5000</td>
</tr>
<tr>
<td>AppleTalk Internet Router</td>
<td>Apple Computer</td>
<td>$399</td>
</tr>
<tr>
<td>Cisco Routers</td>
<td>Cisco Systems</td>
<td>$7200 and up</td>
</tr>
<tr>
<td>InterBridge</td>
<td>Hayes Microcomputer Products</td>
<td>$799</td>
</tr>
<tr>
<td>InterTalk 2</td>
<td>P-Engineering</td>
<td>$695</td>
</tr>
<tr>
<td>I-Server</td>
<td>Solano Electronics</td>
<td>$695</td>
</tr>
<tr>
<td>Liaison</td>
<td>Infosphere</td>
<td>$2995</td>
</tr>
<tr>
<td>LT2000</td>
<td>Network Resources</td>
<td>$1995 (supports Ethernet, broadband, and fiber optic backbones)</td>
</tr>
<tr>
<td>NetBridge</td>
<td>Shiva Corporation</td>
<td>$499</td>
</tr>
<tr>
<td>R-Server</td>
<td>Solano Electronics</td>
<td>$595</td>
</tr>
<tr>
<td>TeleBridge</td>
<td>Shiva Corporation</td>
<td>$499</td>
</tr>
<tr>
<td>TurboBridge</td>
<td>Nuvotech</td>
<td>$499</td>
</tr>
<tr>
<td><strong>PERIPHERAL SHARING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-Server (serial printers, serial devices)</td>
<td>Solano Electronics</td>
<td>$595</td>
</tr>
<tr>
<td>Daisy Wheel NT (daisy wheel, dot matrix printer)</td>
<td>DataSpace Corporation</td>
<td>$745</td>
</tr>
<tr>
<td>ImageWriter II/LQ LocalTalk Option</td>
<td>Apple Computer</td>
<td>$139</td>
</tr>
<tr>
<td>Liaison (printer, modem)</td>
<td>Infosphere</td>
<td>$295</td>
</tr>
<tr>
<td>NetModem V2400 (modem)</td>
<td>Shiva Corporation</td>
<td>$599</td>
</tr>
<tr>
<td>NetSerial X232 (modem, serial device)</td>
<td>Shiva Corporation</td>
<td>$399</td>
</tr>
<tr>
<td>Plotter NT (plotter)</td>
<td>DataSpace Corporation</td>
<td>$2695</td>
</tr>
<tr>
<td>Printer NT (serial printer)</td>
<td>DataSpace Corporation</td>
<td>$955</td>
</tr>
<tr>
<td>R-Server (modem)</td>
<td>Solano Electronics</td>
<td>$695</td>
</tr>
<tr>
<td>SilverPlotter (hard disk)</td>
<td>La Cie</td>
<td>stand-alone $99.95; bundled with Cirrus drives</td>
</tr>
<tr>
<td>Smartmodem 7400M (modem)</td>
<td>Hayes Microcomputer Products</td>
<td>$549</td>
</tr>
<tr>
<td><strong>OTHER HARDWARE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LinkStar 8</td>
<td>Thor Manufacturing</td>
<td>$775</td>
</tr>
<tr>
<td>PhoneNet Repeater</td>
<td>Farallon Computing</td>
<td>$495</td>
</tr>
<tr>
<td>PhoneNet StarController</td>
<td>Farallon Computing</td>
<td>$1695</td>
</tr>
<tr>
<td>Telnode</td>
<td>DataSpace Corporation</td>
<td>$695</td>
</tr>
<tr>
<td>TOPS Repeater</td>
<td>TOPS division, Sun Microsystems</td>
<td>$189</td>
</tr>
<tr>
<td>Turbo Star</td>
<td>Nuvotech</td>
<td>$1795</td>
</tr>
</tbody>
</table>

---

### ALL TOGETHER NOW

A new class of software is being developed for networked computers, and the first examples of this genre (called groupware) have become available for the Mac. Farallon’s Timbuktu was the first groupware program for the Mac, allowing two or more users to see the same screen on their own Macs over the network. All the networked users have control of that one Mac; everyone can see what is being done and can provide input.

Timbuktu Remote provides the same capabilities between a pair of users connected via modems and a phone line.

Microcom Software’s Carbon Copy Mac, a program developed by Nexus Development in Australia, combines the functions of Timbuktu and Timbuktu Remote into one program.

Real groupware builds on the idea that computers can take care of some activities needed to tie coworkers together. Imagine Software’s Perfect Timing is a scheduling program that allows you to set up meetings and other appointments. The Mac collects the responses of the other members to see if everyone can attend. You don’t have to initiate contact with every member of the meeting; you simply get the tally of who can and cannot attend.

Another venture into the groupware realm is group editing. The first Mac product to provide this is Mainstay’s MarkUp, closely followed by Farallon’s Annotator. (Annotator is actually more than a group editing program, but I won’t go into the distinctions here.) Basically, MarkUp allows you to send a copy of any document to other users for review. They then add their comments or new figures, or whatever, to a transparent layer atop the original document. A database on the server keeps track of the times when each reviewer has dealt with the document.
MacTalk to each other. But thanks to Apple’s plans to incorporate a store-and-forward architecture and network awareness for IAC, you’ll be able to use new features—live copy/paste, AppleEvents, and low-level interprocess communication (IPC)—over an AppleTalk network.

Live copy/paste permits dynamic linking and information interchange between graphics and/or text documents. It uses a procedure it calls publish/subscribe: you publish (copy) a document so that others can subscribe to (paste) it. Because the link is dynamic, any changes made in a published document are reflected in its subscribers’ copies. You’ll be able to use live copy/paste with file servers to pass document changes to inactive users once those users join the network.

The purpose of AppleEvents is to provide a common vocabulary so that users can write customizable scripts that combine applications. Since IAC is supposed to work from any application, you could use the scripting capability of HyperCard to perform just about any operation you can think of on the Mac, using local resources or network resources.

The real power for controlling network resources will exist once Apple produces a system scripting language (probably based on HyperTalk and AppleEvents). And Apple’s plan to provide aliasing capabilities in System 7.0 also means that you won’t need to know where a particular resource is to use it.

**Adolescent or Adult?**

AppleTalk has more growing up to do. Some pieces are still missing for seamless integration with other systems—especially for networking by the other player’s rules. For example, there’s room to improve token ring file-transfer utilities and interfaces with MS-DOS and OS/2 in general. Some of System 7.0 should deal with these kinks in the network, at least from the Mac’s point of view.

One piece missing from AppleTalk becomes more obvious as AppleTalk matures into a corporate networking scheme. Ask any AppleTalk network manager what’s the biggest problem with AppleTalk, and the answer will be network management. So far, Apple has done little to implement network management. Unlike other network architectures, AppleTalk doesn’t include any network-management protocols. And as far as tools, Apple only offers InterPoll. Some third-party vendors—Farallon and Kinetics, for example—have released their own products to pick up the slack. While such tools make managing a network easier, none is the definitive network-management tool.

Still, there’s no doubt that AppleTalk networks have progressed beyond the early stages of Mac-to-LaserWriter networking. Lack of Mac connectivity to other computers is a thing of the past, and AppleTalk Phase 2 features are signs of a maturing network architecture. Together with products from third-party vendors, Apple’s enhancements of its AppleTalk network protocols will bring AppleTalk nets into the corporate mainstream.

See Where to Buy for contact information.

---

Dave Kosier, a Macworld contributing editor, is the publisher of Connections, an international newsletter concerned with Macintosh networking.

---

**Service, Please**

<table>
<thead>
<tr>
<th>Product</th>
<th>Company</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AilsaTalk/AilsaShare</td>
<td>Ailsa Systems</td>
<td>S4700-S21,500 depending on VAX CPU</td>
</tr>
<tr>
<td>AppleShare</td>
<td>Apple Computer</td>
<td>S1249; upgrade from LocalTalk to BeNet/LocalTalk version S699</td>
</tr>
<tr>
<td>DaynaNet/LocalTalk</td>
<td>Dayna Communications</td>
<td>S1299</td>
</tr>
<tr>
<td>DirectServe</td>
<td>Jasmine Technologies</td>
<td>S1100; upgrade from LocalTalk to BeNet/LocalTalk version S699</td>
</tr>
<tr>
<td>FS100</td>
<td>DayStar Digital</td>
<td>S895</td>
</tr>
<tr>
<td>KShore</td>
<td>Kinetics, division of Excelan</td>
<td>S995</td>
</tr>
<tr>
<td>MacLAN Connect</td>
<td>Miramar Systems</td>
<td>S995</td>
</tr>
<tr>
<td>MacServe</td>
<td>Interphase</td>
<td>S250</td>
</tr>
<tr>
<td>Netware for Macintosh</td>
<td>Novell</td>
<td>Netware 2.15 S4995; Netware for Mac/site S200; hardware extra</td>
</tr>
<tr>
<td>PacerLink</td>
<td>Pacer Software</td>
<td>S200-S32,500, depending on number of users</td>
</tr>
<tr>
<td>PacerShare</td>
<td>Pacer Software</td>
<td>S400-S7500, depending on number of users; requires PacerLink</td>
</tr>
<tr>
<td>PacerShare/Ultrix-32</td>
<td>Pacer Software</td>
<td>S400-S7500, depending on number of users; requires PacerLink</td>
</tr>
<tr>
<td>PacerTOPS</td>
<td>Pacer Software</td>
<td>S400-S7500, depending on number of users; requires PacerLink</td>
</tr>
<tr>
<td>Personal Server Network</td>
<td>Information Presentation Technologies</td>
<td>2 nodes S149.95; 10 nodes S499.95; 20 nodes S999.95</td>
</tr>
<tr>
<td>SilverPlatter</td>
<td>La Gia</td>
<td>S99.95</td>
</tr>
<tr>
<td>SilverServer</td>
<td>La Gia</td>
<td>stand-alone S99.95; bundled with Cirrus drives</td>
</tr>
<tr>
<td>3+ Share</td>
<td>3Com Corporation</td>
<td>3+ Share S2495; 3+ for the Macintosh (in addition to 3+Share) S495; hardware extra</td>
</tr>
<tr>
<td>TOPS/Macintosh</td>
<td>TOPS division, Sun Microsystems</td>
<td>S249 per Macintosh</td>
</tr>
<tr>
<td>u-Share</td>
<td>Information Presentation Technologies</td>
<td>S1193 and up, depending on configuration</td>
</tr>
<tr>
<td>Waterleaf MacJail</td>
<td>Wetware Products</td>
<td>S995 educational USA; S1950 commercial USA</td>
</tr>
</tbody>
</table>
High-Capacity

by Cheryl England Spencer

Normally I don't get too excited about hard disks. But I don't normally have hard disks with 300 megabytes or more attached to my Mac. I first fell in love with these hard disks because of their speed. After a while, I grew used to having applications open instantly and folders pop up quickly—that's when I realized just how nice it is to be able to install all the applications I want and still have room for every scrap of data.

Unfortunately, high-capacity hard disk prices are prohibitively expensive for most people. The cheapest 300MB disk that Macworld Labs tested costs $2095, while the cheapest 600MB disk takes an even bigger chunk of pocket cash—almost $3000. As a result, only users who need large file servers for network data storage, or who have huge files such as color graphics or sound to store, can really justify the cost.

Given the high price of these hard disks, most people should approach the purchase of a high-ca-
HIGH-CAPACITY HARD DISKS

The prices and specifications in this table are for external drives, unless there is only an internal model. Internal drives are usually a bit cheaper than external drives. Benchmark access times were run on a Macintosh Ix.

**A Question of Size**

All the hard disks tested, with the exception of the Jasmine unit, are physically larger than hard disks containing up to 150MB of storage. External units are often no wider or deeper than a Mac SE, but they range in height from 3 1/2 inches to 8 inches. Only a Mac II or Ix can hold a high-capacity internal hard disk—even then, some hard disks won't fit if you have tall DIP SIMMs installed. There's no way at present to squeeze one of these large hard disks into the Plus, SE, or even the Ix. However, MicroNet has announced 5 1/4-inch, full-height 300MB and 400MB hard disks that, with the help of a special bracket, can fit into a Mac Ix without sacrificing a slot. You can, of course, attach an external high-capacity hard disk to a Mac that can't accommodate an internal one.

Because of the Ix's cramped internal space, it can't take a high-capacity internal hard disk. Except for Jasmine's unit, which uses a 5 1/4-inch half-height drive, all high-capacity hard disks are based on 5 1/4-inch full-height drive mechanisms. Smaller Macs have only enough room in their cabinets for 3 1/2-inch half-height drives (unless, like Micronet, the vendor takes great pains to build a special bracket).

Until recently, the 5 1/2-inch half-height drives maxed out at a capacity of roughly 150MB. Rodime has just introduced a 215MB 3 1/2-inch half-height product, and Maxtor is currently working on a similar 200MB...
**SOUND TEST**

Of the hard disks we received in time to test for noise, FWB's hammer series and Storage Dimensions' MacinStor series were the quietest. When the units reached about 45 decibels (Relax's Hard 300 Plus and above), the noise began to bother me a bit. By the time it hit 51 decibels I was really annoyed. Decibel levels were tested with a Bruel and Kjær sound-level meter.

### Table: Hard Disk Comparison

<table>
<thead>
<tr>
<th>Model</th>
<th>Maxxess M-Series 300</th>
<th>Micronet Technology</th>
<th>Microtech Nova 320</th>
<th>PLU Turbo 300</th>
<th>Prism Corporation MaxDisk EM300</th>
<th>Procom Technology HiPerformance 320</th>
<th>Relax Technology Hard 300 Plus</th>
<th>Storage Dimensions MacinStor 345</th>
<th>SuperMac Technology DataFrame XP 330</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5 x 9.5</td>
<td>6.5 x 7.75 x 12</td>
<td>n/a</td>
<td>4.75 x 9.75 x 9.75</td>
<td>7.7 x 4.8 x 13.7</td>
<td>6.25 x 7.5 x 12</td>
<td>3.5 x 10.5 x 10.5</td>
<td>7.25 x 4 x 15</td>
<td>8 x 5 x 9.5</td>
<td>up to 1 inch</td>
</tr>
<tr>
<td>internal</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
<td>external</td>
<td>external</td>
<td>external</td>
<td>external</td>
<td>internal</td>
<td>software</td>
</tr>
<tr>
<td>push button</td>
<td>DIP switches</td>
<td>jumpers</td>
<td>rotary dial</td>
<td>push button</td>
<td>rotary dial</td>
<td>software</td>
<td>rotary dial</td>
<td>software</td>
<td>software</td>
</tr>
<tr>
<td>25/50</td>
<td>25/50</td>
<td>n/a</td>
<td>25/50</td>
<td>25/50</td>
<td>25/50</td>
<td>25/50</td>
<td>25/50</td>
<td>25/50</td>
<td>25/50</td>
</tr>
<tr>
<td>18</td>
<td>36</td>
<td>n/a</td>
<td>18</td>
<td>48</td>
<td>18</td>
<td>24</td>
<td>18</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</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>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</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>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

---

4 Minimum partition size is 800K; number of partitions will vary according to size of file directories.

5 $400 per repair after warranty expires.
How'd They Get So Fast?

While the physical size of a high-capacity hard disk may be a problem, speed isn't. Vendors can use more expensive, faster technology on these hard disks than on lower-capacity hard disks and still keep the price per megabyte down to the level it is for 80MB hard disks. For instance, high-end hard disks use voice coil actuators, which are more precise and faster than stepper motors. High-capacity hard disks use better technology for the heads and a more expensive platter surface. These hard disks pack more data on the surface so the heads don't have to move as far to get data, resulting in faster access times.

The technology that gives high-capacity hard disks their biggest speed advantage, however, is one that improves the way the drive positions the head over the data tracks. This technique, called dedicated servo surface, uses a disk platter containing just the information that keeps the drive's head aligned over the data track. Lower capacity units, on the other hand, either embed some servo information in the data plat-
Speed is a significant issue with high-capacity hard disks because they are used for more demanding applications than, say, 100MB hard disks. Real-time sound and animation applications not only require lots of disk space, but they must also run on fast systems—you don't want the hard disk to become a bottleneck. Networks, too, require speedy disk access. The faster a hard disk can grant one data request, the faster it can move on to the next one.

While you can attach any external high-capacity hard disk to any Mac with a SCSI port, you risk sacrificing the drive's speed advantage. All of the hard disks Macworld Labs tested can read and write data much faster than a Mac Plus's SCSI port can transfer it (see "SCSI Port Transfer"). Although you still get some advantage from the faster access times when using a high-capacity hard disk on a Mac Plus, you don't see the same overall system improvement that you would on a Mac II.

Hard numbers also imply that the Mac SE's SCSI port cannot keep up with these hard disks. But this

SCSI Read  Macworld Labs used SCSI Evaluator to test the amount of time a drive takes to read and write a large block of contiguous data. The smallest block of data transferred was 200K—large enough to negate the effect of a read look-ahead cache. In comparison to the application benchmarks, the Wren and Maxtor units performed as expected. The Micropolis-based hard disk, such as SuperMac's Dataframe XP 330, showed a lot of degradation. The Micropolis units do not use zoned-bit recording and were, therefore, at a disadvantage when tested on a newly formatted hard disk with only the outermost tracks full (see "Zoned-Bit Recording").

SCSI Write  We then partitioned a 600MB hard disk that uses zoned-bit recording into five 96MB partitions. Read and write tests ran at about 10,500 kilobits per second on each of the four outermost partitions. The two innermost partitions transferred data 1500 to 2000 kilobits per second slower—that is, at about the same rate as the Micropolis-based units. Still, hard disks that use zoned-bit recording will be faster on average when transferring very large files.
assumes that a hard disk is performing constant, sequential accesses. If you use a hard disk for lots of random access chores, such as database queries, grabbing scattered files from a file server, or program compiling, then the hard disk will slow down because of simple mechanics: the heads must move over a larger space, and the interleave may cause even further delay. In these situations, a Mac SE may actually be a good match for a high-capacity hard disk. But if you want to be sure that the Mac is not a bottleneck, you'll want to use one with a 68020 or 68030 processor.

**Reliability**

Products that push the limits of current technology, such as high-capacity hard disks, often do so at the risk of reliability. A higher than normal percentage of hard disks tested did not run correctly at first. Hard disks from SuperMac, CMS, Dolphin, and Relax wouldn't run, and we had to exchange them. FWI's hammer600 wouldn't run as a start-up device until a hardware problem was fixed. And La Cie's Cirrus 613 never would run as a start-up device when attached to a Mac with an internal hard drive. Make sure the company or dealer you purchase the hard disk from offers a good warranty, service, and prompt exchange of a defective hard disk.

The reliability of connectors is an issue if you frequently detach and reattach an external hard disk. The 25-pin connectors have an insertion rating of only 250 times. By contrast, 50-pin connectors have an insertion rating of 2500 times—that is, you can plug and unplug them an awful lot before you risk wearing them out. The 50-pin connectors also have a ground for each data line, making them less susceptible to cable noise.

Although hardware reliability was often troubling, the accompanying software was more reliable. Only the MacProducts and Relax units, which use the same driver, had serious problems. The MacProducts hard disk stopped in the midst of duplicating an 11MB folder and we had to reformat it twice to get it to work. The Relax hard disk had the same problem, until we installed the AppleShare Desktop Manager. A few days later we reformatted the Relax hard disk and tried to duplicate the problem but everything worked. A while later we received new software that did not produce the duplication error.

The other software problems we encountered were not serious. FWI's software brought up Apple's debugging window when we tried to name the hard disk after formatting it. Prim's software, although bug free, was extremely confusing to use, forcing us to experiment before we could figure out how to format the hard disk correctly.

**The Software Partition**

Even if a hard disk has clumsy software, you can be a little forgiving as long as it offers the features you need to get up and running. The higher the capacity of the hard disk, the more important it is to have partitioning software. Partitioning software lets you divide a hard disk into volumes, each of which acts like a separate hard disk.

Not only does partitioning keep you from running up against the System's limit of 2000 or so items on the Desktop, but it also helps to decrease the amount of time the Finder takes to update the desktop. System 7.0 promises to fix these problems, but still, partitions offer a handy way to keep 300MB worth of data organized. Partitions also help keep RAM requirements down. The System sets aside RAM for the Desktop file which keeps a directory of all the files on the disk; the RAM, however, is used only when the volume containing the files is active. On a network, partitions allow users to mount only the data they need, and they also allow the network administrator to restrict access to classified data without locking users out of the entire hard disk.
Products that push the limits of technology often do so at the risk of reliability.

Two types of partitioning are available—hard and soft. Hard partitioning, or true SCSI partitioning, works the way its name implies—the partitioning information is written directly on the hard disk and on the System. With hard partitioning you can have multiple operating systems, such as older versions of the System, Kanji, or A/UX in different partitions on the same hard disk, and you can select which partition to start up from. You can’t, however, resize partitions without reformatting the hard disk and losing data.

Soft partitioning, on the other hand, lets you resize partitions without harming data. This is possible since soft partitions emulate true SCSI partitioning by fooling the Finder with an invisible file on the hard disk. The data on the hard disk is still essentially one big file, so you can’t have multiple operating systems. The biggest problem with soft partitioning is that if the hard disk crashes, you lose all of the data on it—this is especially harmful on a network where many users’ ability to work depends on having access to the file server. With hard partitioning, you would only lose the data on the volume where the crash occurred.

Only one company, La Cie, has a hard partitioning utility that also lets you resize partitions without losing data. If you want to resize a partition, the software copies the data from the disk and moves it to a new physical location. You can lose data if the new partition is smaller than the amount of data you want to store in it. La Cie’s software, however, gives you a dialog box that compares the amount of data stored in the old partition with the amount of space in the new partition, giving you a chance to cancel the operation if the new partition is too small.

FINDING THE 20 PERCENT DIFFERENCE

Sometimes I really have to wonder if some of the leading edge Macintosh companies are asleep at the wheel.

In several of the Macworld Labs benchmark tests, one group of hard disks ran 20 percent faster (or more, depending on the test) than any of the other hard disks. Anytime I see a speed difference that large, I wonder what’s going on—and you should, too. A 5 percent speed difference could be the result of driver software; most vendors use Apple’s generic driver as a base, and then tweak it to squeeze out performance.

But 20 percent is something else. A vendor could be taking a shortcut, such as bypassing the ROM and going directly to the SCSI chip. This can be a problem if Apple releases a new version of system software that renders the driver incompatible or if you are using an accelerator board.

A shortcut isn’t the answer in this case, however. It’s a matter of who’s been paying attention in class. You see, most hard disk vendors use Imprimis’s Wren hard disks, which offer a read look-ahead cache. This cache looks ahead of the current access and reads 32K of information (a whole track) into the hard disk controller’s RAM. Unfortunately for many vendors, Imprimis’s Wren hard disks come with the cache disabled. The vendor must write a small bit of code to enable it. Micropolis drives, such as the one used in SuperMac’s Dataframe XP 330, also use a read look-ahead cache, but Micropolis enables it for the vendor.

A read look-ahead cache easily makes sequential access tasks, such as copying small continuous files from a server, at least 20 percent faster. For instance, when I first asked Dolphin Systems whether or not the company enabled the read look-ahead cache, the spokesperson didn’t know that the Wren drives supported one. A few days later I received a new version of the driver, which enabled the cache. The result? On the benchmark tests where the cache is effective, the Dolphin units catapulted from being average to being among the fastest drives.
Partitioning and security software are important—floppy drive backup software isn't

Some hard disks do not include partitioning software. MacProducts believes that third-party software such as AlSoft's MultiDisk is better than anything a hard disk vendor can provide. Still, I was satisfied with the partitioning software included with the hard disks reviewed here. To buy a hard disk and not have the software you need to set it up right the first day is a lot like getting a toy without any batteries at Christmas.

Except for the Dolphin, PLI (Peripheral Land), and SuperMac hard disks, which limit you to four, six, and nine partitions respectively, products with partitioning software let you create as many partitions as anyone realistically needs. Most hard disks also come with utility software for mounting and unmounting partitions. Some, such as Storage Dimensions, FWB, and PLI, let you mount a hard disk via a handy CDEV or desk accessory. Shareware packages such as MountEm and SCSI Tools also let you mount and unmount volumes.

Since high-capacity hard disks are frequently used as file servers, protection from unauthorized access and from virus infection is a serious issue. Several hard disks offer password protection for either the whole hard disk or, if the hard disk supports partitioning, for each volume. Since you can still look at the data on a password-protected volume using Pedit, SuperMac has gone one step further and included software for encrypting files. MacProducts and CMS hard disks also come with virus-protection shareware.

Backing Up All That Data

While partitioning and security software is important, floppy drive backup software isn't. Backing up 300MB or more of data onto 800K floppies isn't the most efficient way to ensure data safety. A tape drive, a second hard disk, or a removable cartridge drive are superior alternatives because these products are designed to handle large amounts of data. Most hard disk vendors also make tape drives that you can purchase at the same time you buy a hard disk.

MicroNet's Micro/Max SBX series of hard disks provide a cabinet that can house a high-capacity hard disk as well as a 60MB or 150MB tape backup unit. Several other companies, such as CMS and MacProd-
SEVEN TOP DRIVES

Here are Macworld’s favorite high-capacity hard disks, in order of preference.

Storage Dimensions Storage Dimensions gets its hard disks directly from its parent company, Maxtor, giving it an advantage when replacing or servicing hard disks. These hard disks gave us no problems, they’re quiet, and everything from the design to the manuals to the software is very well thought out.

SuperMac A longtime player in the Mac storage arena, SuperMac’s hard disk is one of the fastest we tested. The software provides all the necessary features plus a few more. The interface is the best you’ll find, and the manual is very clear.

MicroNet A company on the move, MicroNet is constantly adding new features to its already-excellent software. Drives are well designed, and you can purchase a service contract that extends the warranty to two years and guarantees overnight replacement for damaged hard disks.

FWB A specialist in high-capacity hard disks, FWB has fast, quiet, well-designed hard disks that offer more formatted capacity than any other imprimis-based hard disks. The security and partitioning software is a special plus.

Maxcess Excellent software (the same as FWB’s), a two-year warranty, and a 48-hour repair turnaround time (including return of your data) are enough by themselves to push these hard disks onto the top-picks list. Being one of the fastest hard disks doesn’t hurt either.

Deltaic Deltaic is a new kid on the block, but it found the read look-ahead cache in the Wren hard disk, something larger, more-established companies missed. Look for more innovation in the future.

PLU Although these hard disks weren’t the fastest we tested, they do come with TurboCache caching software, which, when tweaked, produced up to a 10 percent speed increase. You also get the other software in PLU’s Turbo series—disk optimizer, laser printer spooler, and backup utility.

These products, offer large, floor-standing cabinets that can hold custom configured combinations of hard disks, tape drives, optical drives, and removable drives. Northern Telecom provides a system that combines a whopping 940MB of hard disk capacity with 2.3 gigabytes of tape backup.

THE BIG EASY

A high-capacity hard disk is a joy to own and use. But these hard disks are expensive and, based on our experience, they’re more prone to problems than lower-capacity hard disks. You’ll want to make sure that you purchase a hard disk from a reputable, responsive company. The hard disk should also include the basic software, such as partitioning or password protection, that you need to get up and running. Once you make your choice, you’ll have a chance to appreciate the comfort that comes with having so much storage space to work with. I can only imagine that this is what it feels like to move into a mansion after living in a one-bedroom apartment.

See Where to Buy for contact information.
Deep down, everyone knows that automated bookkeeping brings numerous advantages: electronic accounting systems are efficient and accurate, and they allow instant access to transaction records. Yet, according to a recent study by Bis Cap International, nearly 47 percent of small businesses in the United States have not yet computerized.

Two commonly stated reasons for not automating are “My business isn’t big enough” and “I can’t afford it.” If your business has just a few employees and you write a dozen or fewer checks per week, there’s probably no great reason to automate. I do, however, know of some businesses this size that have automated just so they can produce instant reports. But if you can’t justify spending about $150 per month (the purchase price amortized over two years), then you’re right in thinking you can’t afford to automate.

Based on my experience with small businesses, however, I’ve found that much of the reluctance to computerize results not from cost considerations but from a fear of computers and the demanding learning curve required for accounting programs. These concerns may be justified in the mainframe, minicomputer, and MS-DOS worlds, but certainly not on the Macintosh. For instance, on the Mac, charts of accounts and lists of customers and vendors appear in pop-up windows—in English. Bookkeeping consists of just pointing and clicking with a mouse and entering basic information. And you’ll find the hotlines maintained by the various
publishers extremely helpful to the beginning user.

Once you overcome your initial apprehension, you'll need to pick out an appropriate program. I'll explain the features and benefits of the various types of accounting programs and recommend a few that particularly impressed me.

**One-Write Programs**

If you are dealing with a fairly small business, consider a one-write accounting program. These are electronic versions of manual one-write systems that let you create a carbon-copy accounting record at the same time you write checks and make deposits. With a computerized system, however, you'll also be able to view or print reports that tell you exactly how the business is doing as of that day. A one-write program takes up very little of your time (so you can still devote most of your attention to business), and at the same time provides both you and your accountant with timely and accurate information.

Both of the one-write programs I reviewed, Layered's Insight OneWrite and Great Plains' Plains and Simple One-Write, are excellent programs from reputable companies, and both are designed for simplicity and ease of use. When you write a check, for example, you enter the payee and the amount you're paying out of the checking account. You then enter the amount again under the expense category you're charging against, say repairs and maintenance. That's all there is to it.

**General Accounting Programs**

One step beyond one-write systems are general accounting programs. These programs are suitable for a wide range of users, from the small-business owner whose main interest is the business, not the accounting, to a full-time bookkeeper or bookkeeping group.

The owner of a small business who has little time to devote to bookkeeping will like the all-in-one programs that combine in a single program the general ledger, accounts payable, accounts receivable, and, depending on the product, other segments such as payroll.

The best examples of this type of program are Monogram's Business Sense and Computer Associates' (formerly Bedford) Simply Accounting, both of which place graphic icons of the journals on the Mac's desktop. If you want to enter deposits, for example, you merely click on the icon labeled Money into the Bank, and a Receipts Journal appears on the screen ready for entries. Both programs offer a number of accounting features, and their reports should satisfy the needs of most small-business managers and their accountants.

Both business managers and bookkeepers should look at Chang Labs' Rags to Riches and CheckMark's MultiLedger. Rags to Riches has an excellent interface that lets you click into and out of different transaction cards quickly and easily. The program comes in separate modules that require you to pass data to the General Ledger through separate merge files. For instance, after posting Accounts Payable entries, you create a merge file, open the General Ledger, and merge those entries into it. This process is not difficult to learn, and in general working with these programs becomes fairly easy once you've gained a little experience.

MultiLedger includes General Ledger, Accounts Payable, and Accounts Receivable segments, as well as Inventory, which allows you to track inventory and sales commissions simultaneously. The program offers an attractive power-to-price ratio and is very easy to use. MultiLedger has some of the simplest and most logical menus and entry screens of all the programs I examined, and you'll never have to know the difference between a debit

---

**MULTIUSER FEATURES**

<table>
<thead>
<tr>
<th>Multiuser versions</th>
<th>Networksupported: AppleShare, TOPS</th>
<th>Maximum concurrent users: 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4</td>
<td>Cost: $2000 (unlimited users) plus cost of one copy of 4th Dimension</td>
<td>Networks supported: AppleShare, TOPS, Ethernet, 3Com, Novell</td>
</tr>
<tr>
<td></td>
<td>Maximum concurrent users: 3-18, depending on the network</td>
<td></td>
</tr>
<tr>
<td>FLEXWARE</td>
<td>Cost: $795 per module</td>
<td>Networks supported: AppleShare, TOPS, Macserver</td>
</tr>
<tr>
<td></td>
<td>Maximum concurrent users: 99</td>
<td></td>
</tr>
<tr>
<td>GREAT PLAINS ACCOUNTING SERIES</td>
<td>Cost: $795 for separate Network Manager Module</td>
<td>Networks supported: AppleShare, TOPS</td>
</tr>
<tr>
<td></td>
<td>Maximum concurrent users: No limit</td>
<td></td>
</tr>
<tr>
<td>INSIGHT EXPERT ACCOUNTING</td>
<td>Cost: $895 per module</td>
<td></td>
</tr>
</tbody>
</table>

**Networks supported:** AppleShare, TOPS

**Cost:** $5995 plus cost of WOS Database for data storage and reports

**Maximum concurrent users:** Limited by network

**Networks supported:** AppleShare, TOPS, Corvus Omninet

**Maximum concurrent users:** 45
and a credit unless you want to. The program also offers a reasonably full set of accounting capabilities that should appeal to bookkeeping-wise users.

Another of MultiLedger's great strengths is its optional, easy-to-use Payroll program, which posts checks and data directly to the main accounting program, thus eliminating the need to manually enter data. CheckMark's Payroll program is also excellent for businesses whose employees work different hours each pay period. All the hours can be entered quickly on a single screen; other payroll programs require you to enter hours for each employee separately. MultiLedger also offers flexible report formatting. For example, you can pull an income statement for March, April, and May and compare it with the statements from the previous year.

Satori's Components General Ledger, the first module of a promised series of object-oriented programs built around the Macintosh interface, lets you customize accounting ledgers and reports by combining various components (or objects). You can, for example, tailor-make a journal, or build a report with selected accounts, illustrations, and graphs. Components General Ledger links with data from Satori's Legal Billing II, and Project Billing packages. Shopkeeper's Point-of-Sale package, and Aatrix's Payroll Plus program.

Pro Plus Software's Pro Pac is a conventional, if unexciting, general accounting program that includes General Ledger, Accounts Receivable, Accounts Payable, and Inventory Control modules. Like an MS-DOS program, Pro Plus Accounting is text oriented, and therefore makes sparse use of icons and graphics, and its ability to customize reports is limited. The program does, however, print bar and pie graphs, and it offers a set of basic reports such as balance sheet, income statement, trial balance, and aged accounts payable and accounts receivable. It also performs payment calculations and loan amortizations. Pro Plus plans to expand Pro Pac's features so that it competes with high-end, multiuser packages. In its present single-user, multi-module configuration, however, Pro Pac is similar to Rags to Riches, but with a much more staid interface and a much higher price.

Two programs that follow standard accounting practices, Absolute Solutions' Computerized Classic Bookkeeping and Layered's atOnce, will appeal to managers and full-time bookkeepers with bookkeeping savvy. Computerized Classic Bookkeeping is a full-featured accounting program that runs under Microsoft Excel. It closely resembles manual bookkeeping journals and ledgers, and it also contains a wide range of customized reports and graphs designed to enhance the traditional bookkeeping environment.

AtOnce consists of General Ledger, Accounts Receivable, Accounts Payable, and Payroll programs. It offers features not found in other general accounting programs, such as automatic reversals and fully customized reports. It also comes bundled with a HyperCard tutorial, along with complete, well-written documentation, which should help to shorten the learning curve for those users who want to learn standard bookkeeping procedures and the program at the same time.

**General Accounting Program Recommendations**

If you don't want to spend more than a few hours per week keeping the books, I recommend that you consider, along with the one-writes, Simply Accounting, Business Sense, and MultiLedger. Working managers will like MultiLedger's simplicity, and bookkeepers will like its fairly full set of accounting features. The integrated Payroll program is an added advantage. Bookkeepers and those managers with the time to follow conventional accounting practices should look at Rags to Riches and atOnce. Of the two programs, I strongly prefer atOnce for its ease-of-use and wide range of excellent features.

**Specialized Applications**

If you bill on a per-job basis (as a repair shop might do), you should look at Peachtree's Back to Basics Professional and Brown/Wagh Publishing's Service Industry Accounting. Back to Basics Professional has been reshaped from a gen-

---

**MultiLedger has**

the most logical menus and entry screens

---

**Components**

Satori's Components General Ledger provides a tool box for creating custom graphics. The program also imports and exports graphics and prints reports on a PostScript printer.
### ACCOUNTING PROGRAM DETAILS

#### ONE-WRITING PROGRAMS

<table>
<thead>
<tr>
<th>Company</th>
<th>Insight</th>
<th>Plains &amp; Simple</th>
<th>atOne</th>
<th>Back to Basics Professional</th>
<th>BPI Entry Series Accounting</th>
<th>Business Sense</th>
<th>Components General Ledger</th>
<th>Computerized Classic Bookkeeping</th>
<th>Multil eger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>$125</td>
<td>$395</td>
<td>$395</td>
<td>$199</td>
<td>$89</td>
<td>$495</td>
<td>$395</td>
<td>$395</td>
<td>$395</td>
</tr>
<tr>
<td>Additional database required</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Maximum departments/profit centers</td>
<td>99</td>
<td>1</td>
<td>100/100</td>
<td>10</td>
<td>10</td>
<td>99</td>
<td>ld</td>
<td>ld/ld</td>
<td>9</td>
</tr>
<tr>
<td>Help screens</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Length of free telephone support (in days)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>0</td>
<td>60</td>
<td>45</td>
<td>0</td>
<td>90</td>
<td>unlimited</td>
</tr>
<tr>
<td>Toll-free support included</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Budgeting capability</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

#### GENERAL LEDGER

<table>
<thead>
<tr>
<th>Maximum # of transactions</th>
<th>ld</th>
<th>ld</th>
<th>ld</th>
<th>4500</th>
<th>ld</th>
<th>ld</th>
<th>ld</th>
<th>lm, ld</th>
<th>ld, lm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum # of bank accounts</td>
<td>1</td>
<td>ld</td>
<td>20</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>ld</td>
<td>60</td>
</tr>
<tr>
<td>Chart of accounts sample set provided</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>maximum # of accounts</td>
<td>58</td>
<td>ld</td>
<td>ld</td>
<td>245</td>
<td>8000</td>
<td>2000</td>
<td>ld</td>
<td>ld</td>
<td>ld, lm</td>
</tr>
<tr>
<td>alpha/numeric</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>a, n</td>
</tr>
<tr>
<td>Processing method</td>
<td>b</td>
<td>r</td>
<td>r</td>
<td>b</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>b</td>
<td>r</td>
</tr>
<tr>
<td>Automatic reversals</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Direct disbursements (from G1)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Flexible fiscal periods</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Enter future transactions (current year)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Enter prior-period transactions</td>
<td>•</td>
<td>•</td>
<td>if open</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Recurring/automatic entries</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Reconcile checking account on screen</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Reports screen, disk, graphs</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
</tr>
<tr>
<td>trial balance</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>balance sheet, income statement</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>transaction journals</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>forecasts</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>ratios, interpretations</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>custom</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

#### ACCOUNTS PAYABLE

<table>
<thead>
<tr>
<th>Maximum vendors</th>
<th>ld</th>
<th>ld</th>
<th>ld</th>
<th>115</th>
<th>2000</th>
<th>2000</th>
<th>n/a</th>
<th>ld</th>
<th>ld, lm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum transactions</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>1200</td>
<td>ld</td>
<td>ld</td>
<td>lm, ld</td>
<td>ld, lm</td>
<td></td>
</tr>
<tr>
<td>Enter prior-dated invoices</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Recurring/automatic transactions</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Stores transactions by invoice number</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>assigned document number</td>
<td>•</td>
<td>vendor</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>vendor</td>
<td>•</td>
</tr>
<tr>
<td>date</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

*a = alpha; b = batch; d = disk; g = graphs; ld = limited by disk space; lm = limited by memory; n = numeric; r = real time; s = screen*

1 Separate module. All packages offer a choice of either cash or accrual accounting methods, unless otherwise indicated in the Comments section.

2 For single-user modules: S195 for G/L, A/R, A/P, Billing; S1795 for G/L, A/R, A/P, Inventory, Purchasing, Order Entry and Invoicing. For multiuser information, see "Multiuser Features."
<table>
<thead>
<tr>
<th>Pro Pac</th>
<th>Regs to Riches</th>
<th>Service Industry Accounting</th>
<th>Simply Accounting</th>
<th>a4</th>
<th>Flexware</th>
<th>Great Plains Accounting Series</th>
<th>Insight Expert Accounting</th>
<th>Multi-User Accounting</th>
<th>SBT Mac Series</th>
<th>WOS Fund Accounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>$995</td>
<td>$499.95</td>
<td>$995</td>
<td>$349</td>
<td>S2000</td>
<td>S795/module</td>
<td>S795/module</td>
<td>S695/module</td>
<td>999/36</td>
<td>999/256</td>
<td>33</td>
</tr>
<tr>
<td>unlimited</td>
<td>99</td>
<td>1</td>
<td>1000</td>
<td>ld</td>
<td>99</td>
<td>999/36</td>
<td>999/256</td>
<td>33</td>
<td>99/999</td>
<td>ld</td>
</tr>
<tr>
<td>30</td>
<td>90</td>
<td>0</td>
<td>60</td>
<td>14 months</td>
<td>0</td>
<td>30</td>
<td>30</td>
<td>0</td>
<td>unlimited</td>
<td>0</td>
</tr>
<tr>
<td>ld</td>
<td>lm</td>
<td>ld</td>
<td>lm</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>ld, lm</td>
<td>ld</td>
<td>ld</td>
<td>5</td>
<td>ld</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>lm</td>
<td>ld</td>
<td>99,999</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>99,999</td>
<td>ld</td>
</tr>
<tr>
<td>a, n</td>
<td>a, n</td>
<td>a, n</td>
<td>n</td>
<td>a, n</td>
<td>n</td>
<td>a, n</td>
<td>n</td>
<td>a, n</td>
<td>a, n</td>
<td>a, n</td>
</tr>
<tr>
<td>r</td>
<td>b</td>
<td>r</td>
<td>r</td>
<td>b</td>
<td>r, b</td>
<td>b</td>
<td>b</td>
<td>b</td>
<td>r</td>
<td></td>
</tr>
<tr>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\* Maximum two years open at once.

\* Where only one number is given, the program offers up to that number of either departments or profit centers.

\* Price is for single user modules. For multiuser information, see "Multiuser Features."
## ACCOUNTING PROGRAM DETAILS

### ONE-WRITE PROGRAMS

<table>
<thead>
<tr>
<th>Company</th>
<th>Insight OneWrite</th>
<th>Plaist &amp; Simple One-Write</th>
<th>a1One</th>
<th>BPI Entry Series Accounting</th>
<th>Business Sense</th>
<th>Components</th>
<th>Computerized Classic Accounting</th>
<th>MultiLedger</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Layered</td>
<td>Great Plains</td>
<td>Layered</td>
<td>Peachtree Software</td>
<td>Computer Associates International</td>
<td>Monogram Software</td>
<td>Satori Software</td>
<td>Absolute Solutions</td>
</tr>
</tbody>
</table>

### ACCOUNTS PAYABLE (continued)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Insight OneWrite</th>
<th>Plaist &amp; Simple One-Write</th>
<th>a1One</th>
<th>BPI Entry Series Accounting</th>
<th>Business Sense</th>
<th>Components</th>
<th>Computerized Classic Accounting</th>
<th>MultiLedger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allows one-time vendors</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carries over unpaid invoices</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batches invoices for payment</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calculates discount</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allows memos on checks</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reports</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>screen, disk, graphs</td>
<td>s</td>
<td></td>
<td>s, d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>detailed yr.-to-date vendor transactions</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aged A/P</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>custom</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prints mailing labels</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ACCOUNTS RECEIVABLE

<table>
<thead>
<tr>
<th>Feature</th>
<th>Insight OneWrite</th>
<th>Plaist &amp; Simple One-Write</th>
<th>a1One</th>
<th>BPI Entry Series Accounting</th>
<th>Business Sense</th>
<th>Components</th>
<th>Computerized Classic Accounting</th>
<th>MultiLedger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum # of customers</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>400</td>
<td>2000</td>
<td>2000</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Maximum # of transactions</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>2000</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>ld, lm</td>
</tr>
<tr>
<td>Enter prior-dated invoice</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recurring/automatic transactions</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calculates finance charges</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer credit limits</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tracks by salesperson</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tracks sales commission</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separate bill to/ship to</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reports</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>screen, disk, graphs</td>
<td>s</td>
<td></td>
<td>s, d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>detailed yr.-to-date customer transactions</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aged A/R</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>customer invoices</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>customer statement</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>custom</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prints mailing labels</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prints dunning message</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### OTHER MODULES INCLUDED

<table>
<thead>
<tr>
<th>Feature</th>
<th>Insight OneWrite</th>
<th>Plaist &amp; Simple One-Write</th>
<th>a1One</th>
<th>BPI Entry Series Accounting</th>
<th>Business Sense</th>
<th>Components</th>
<th>Computerized Classic Accounting</th>
<th>MultiLedger</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTIONAL MODULES</td>
<td>n/a</td>
<td></td>
<td>payroll</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### COMMENTS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Insight OneWrite</th>
<th>Plaist &amp; Simple One-Write</th>
<th>a1One</th>
<th>BPI Entry Series Accounting</th>
<th>Business Sense</th>
<th>Components</th>
<th>Computerized Classic Accounting</th>
<th>MultiLedger</th>
</tr>
</thead>
<tbody>
<tr>
<td>cash method</td>
<td></td>
<td></td>
<td>balance forward in A/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*a = alpha; b = batch; d = disk; g = graphs; ld = limited by disk space; lm = limited by memory; n = numeric; r = real time; s = screen*
<table>
<thead>
<tr>
<th>Pro Pac</th>
<th>Rags to Riches</th>
<th>Service Industry Accounting</th>
<th>Simply Accounting</th>
<th>o4</th>
<th>Flexware</th>
<th>Great Plains Accounting Series</th>
<th>Insight Expert Accounting</th>
<th>Multi-User Accounting</th>
<th>SBT Mac Series</th>
<th>VOS Fund Accounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro Plus Software</td>
<td>Computer Associates</td>
<td>Softtek Design</td>
<td>Microfinancial Corporation</td>
<td></td>
<td></td>
<td>Great Plains</td>
<td>Layered</td>
<td>Logisoft</td>
<td>SBT Corporation</td>
<td>Fairall Computing</td>
</tr>
<tr>
<td>s, d</td>
<td>s, d</td>
<td>s, g</td>
<td>s, d</td>
<td></td>
<td></td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td>s, d</td>
<td></td>
</tr>
<tr>
<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>ld</td>
<td>ld</td>
<td>ld</td>
<td>lm</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>ld</td>
<td>16 million</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ld</td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Many multiuser accounting programs for the Macintosh originated in the MS-DOS world. Microfinancial Corporation's Flexware, which provides connectivity to MS-DOS- and VAX-based systems, offers a complete set of modules covering most aspects of small and medium-size businesses. Great Plains Accounting Series is another program with MS-DOS roots that has been well adapted for the Mac. Great Plains offers easy-to-use data-entry screens, and prides itself on its client support. The program is geared to the full-time bookkeeper and follows traditional accounting practices.

SBT Corporation, which has offered a wide-ranging series of modules in both the MS-DOS and Mac environments for several years, recently released its SBT Mac Series Six Plus accounting series, which runs on the FoxBase+/Mac database. The series was formerly set in dBase; the new series not only runs much faster, it also sports a better Mac interface with pull-down menus and pop-up windows. You can purchase the Series Six Plus source code so that you can customize your modules. And, if you don't want to purchase FoxBase+/Mac separately, SBT will sell you a compiled program with a run-time version of the database program.

Three more multiuser programs, Logisoft's Multi-User Desktop Accounting (MDA), Layered's Insight Expert Accounting, and Softek Design's a4 are each designed around the Macintosh interface, and they make much better use of it than do the MS-DOS–originated programs.

MDA is built around an Omnis-3 database engine, a run-time version of which is supplied with the software. Any Mac user should feel comfortable with the very competent (though somewhat dull) Omnis interface, and MDA offers a good range of modules. Logisoft does not offer a payroll program that
Ray Johnston, the owner of Hardwood Center in Santa Ana, California, uses Great Plains’ accounting modules in his retail building-supply business. Johnston runs Great Plains’ multiuser modules on AppleShare, and uses the system for inventory control and point-of-purchase sales and billing, in addition to basic bookkeeping functions.

moves data directly to MDA, but a separate program, Software Bridges’ Payroll Bridge, integrates with MDA’s General Ledger. MDA also sells the Omnis source code, so the programs may be customized.

Layered’s Insight Expert Accounting is a very polished and thoughtfully designed program that has been built around the Macintosh from the bottom up. Unlike MS-DOS–originated programs, it uses the Mac interface effectively by offering the user icons and palettes for choosing journals and ledgers. In the Accounts Payable ledger, for example, you can slide through a horizontal deck of vendor cards. Each card contains complete vendor information, pending invoices, and all year-to-date transactions with that vendor.

Softek Design’s new a4 is the first accounting program to use the 4th Dimension database as its engine (you’ll need either 4th Dimension or a run-time version in order to use a4). In addition to the basic accounting ledgers plus Inventory and Order Processing/Invoicing modules, a4’s distinctive features include mail merge for form letters and a tracking program for sales prospects. a4 also allows a wide range of custom-built reports and can be customized even further by any 4th Dimension programmer, or by Softek.

These high-end multiuser programs pose more competition to the minicomputer market than do the general accounting programs. Because of its potent 4th Dimension engine, a4 in particular offers an attractive deal for minicomputer users who are looking for significant cost reductions with a moderate trade-off in performance. To use a4 to its fullest, however, you’ll need a 68020 or 68030 server, plus 2MB of RAM in each user’s machine.

MULTIUSER PROGRAM RECOMMENDATIONS

Which multiuser program you choose is largely a matter of your (and your accountant’s) personal preference and the amount of support you’ll need. If you lean toward solid, conventional programs, you should look at the MS-DOS adaptations such as Flexware and the sets from Great Plains and SBT. If you prefer more effective use of the Mac interface, you can choose among MDA, a4, and the Insight series.

My own preference is the Insight series, because of its sophisticated use of the Macintosh interface. But if I had just come to the Mac from a minicomputer or mainframe environment, I think I’d feel most comfortable with Great Plains, which has a wide range of solid, conventional programs; strong support; and screens that are not radically different from what I was already used to.

CHOOSING AN ACCOUNTING PACKAGE

In terms of accounting procedures, all the programs I reviewed are on solid ground. But you had better involve your accountant in your selection, because he or she may have strong feelings about the features you should have. Also, find out what kind of support you can expect, both from the dealer and the publisher, and how much this support will cost.

Any of the general accounting programs should give you room enough to grow. Don’t be hasty, however, in eliminating the higher-end modular programs. They cost more than the general accounting programs, but users with bookkeeping experience may feel more comfortable with the more traditional accounting procedures. The modular programs will also save you a lot of cost (and grief) in conversion and retraining should you eventually need a multiuser system.

No matter which type of accounting program you purchase—one-write, general, or multiuser—you’ll be getting accurate and up-to-the-minute information that will help you do a better job of managing your business. And as a bonus, your checks, invoices, and statements will look as good as (or better than) the ones the big guys produce on their impersonal mainframes.

See: Where to Buy for contact information.

Insight Expert

Accounting is a polished and thoughtfully designed program

Alan L. Slay is a free-lance writer based in Saint Louis; he specializes in financial and accounting software.
Can Excel Be Beaten?

Analyzing Three Hot Spreadsheets

By Charles Seiter
Excel was the first full-featured Macintosh spreadsheet, and it dominated the market so completely that Microsoft offered only minimal updates for several years. Then Ashton-Tate introduced Full Impact and Informix released Wingz, both high-end products that went beyond Excel. Now Microsoft has answered these challengers with Excel 2.2, a product which has finally had its 1MB spreadsheet-size limit increased to 8MB. Is Excel still king? I'll compare these three feature-heavy products in five key areas: number crunching, graphics, macros, connectivity, and auditing.
The whole point of spreadsheets, of course, is to automate calculations. Microsoft, Ashton-Tate, and Informix have done their arithmetic homework well: each program includes a good function set for its intended audience, and recalculation speeds are impressive. In each case, a half-megabyte budget spreadsheet loaded with typical text, data, and a mix of basic math operations (×, ÷, +, -) recalculates in less time on an IIX than a screen refresh on a IIX. Recalculation speeds for all three programs running on a stock SE are nearly equal. Recalculating a 100-by-100-cell block that contains floating-point multiplication shows the programs running close to the hardware speed limit for each type of Mac—that is, comparable to the rate you would find for 10,000 multiplications of numbers in an array programmed as an assembly-language loop.

Speed differences do show up when you use specific functions, such as EXP or PMT, and when you use a math coprocessor chip (see “Testing Spreadsheets”). Wingz, and to a lesser extent Full Impact, shows an advantage on Macs that have a 68030 CPU and a 68882 math coprocessor. For complex statistical calculations on an SE, Excel usually beats Wingz by a moderate amount, but for complex statistical tests on a 68030-based Mac, Wingz beats Excel by a good distance. Full Impact never disgraces itself, placing close to the top (or even first) on all machines and on most types of math functions. There are minute differences in numerical accuracy among the three programs in function calculation, although the accuracy of basic arithmetic is the same (see “Function Accuracy”).

**Excel 2.2** With a full set of business and science/engineering functions, including calculation of arrays and matrix arithmetic, Excel’s wide range of numerical manipulations is a strong point. The implementation of some functions, however, seems unsophisticated these days: the RAND routine always gives you the same “random” number the first time you call it, and the entire function set is contained in one long scrolling list (functions are grouped as Business, Statistical, and so forth, in the other spreadsheets).

**Full Impact 1.1** Full Impact is just a shade faster than its competitors on standard recalculation arithmetic in most tests. The function set is smaller, however, you will have to do some programming, for example, to solve linear equations. Business users are well served by a deliriously complete date function and all the expected financials. In short, Full Impact is optimized most effectively for users who produce budgets and quarterly reports.

**Wingz 1.0** Wingz has all the standard functions and a good assortment of exotics, such as hyperbolic trigonometric functions. Many items that are functions in Excel are commands in Wingz—matrix facilities and linear equation solving facilities, for example. Commands are easier to use than functions, but they force you to use HyperScript macros for repetitive analysis of data sets. Recalc speed of basic arithmetic on the SE equals that of the other spreadsheets, except for a few calculations. Wingz’s speed at math functions on 030/882 systems, however, gives it a serious advantage over Excel in engineering applications.

### Function Accuracy

<table>
<thead>
<tr>
<th>Function Set</th>
<th>Full Impact 1.1</th>
<th>Wingz 1.0</th>
<th>Excel 2.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG/EXP benchmark</td>
<td>15</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>SORT benchmark</td>
<td>15</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

Numbers reflect accurate decimal places

All three programs displayed the same decimal place accuracy when performing basic arithmetic. When calculating functions, Full Impact consistently had 15 decimal places of accuracy. Wingz and Excel did comparably well on the logarithm/exponent benchmark but dropped off three places in the square root.

**Graphics**

How easy is it to create a basic chart in each program? In Full Impact, you select an area in your spreadsheet to graph, click on an icon bar to pick a chart type, and type the title directly on the resulting chart. You can’t get much simpler than that. Second in simplicity, Excel includes a couple of extra steps—you must open a separate charting window to begin, and you must use menu choices to add a title. In last place, Wingz forces you to select a range, choose a graph tool, and open a view of the chart—no problem so far—but then it presents you with a nonintuitive five-step procedure for adding a title.

Redrawing on an IIX for all three is practically as fast as a mouse click, as tested on 50-element 2-D charts (3-D charts in Wingz take longer). On an SE, representative times for standard redraws give the speed edge to Wingz, followed by Full Impact, and then Excel.

**Excel 2.2** The awkward charting interface of the original Excel is still present in version 2.2—charts are individual documents, created and managed separately from spreadsheets. If you want to print a single page containing charts, Excel tables, and text, you have to export the elements to Word 4.0 and adjust the layout. The exported table is still linked to its spreadsheet and can be automatically updated when you change the figures in the spreadsheet. For small documents, the integrated approach in Full Impact and Wingz is easier to use, but for a 40-page document with a dozen tables, Excel’s links have the overwhelming advantage.

Excel offers columns, bars, lines, areas, pies, scatterplots, and a handful of combinations. Arrows and text overlays can be added. It also gives you detailed control of element line and fill styles, including mixed-color cross-hatching. You can automate chart production with macros.

**Full Impact 1.1** Full Impact offers the same set of chart types as Excel, but has fewer subtypes. Nicely proportioned, properly scaled charts can be prepared quickly, with almost no practice, and arranged on the spreadsheet for an integrated business presentation. Full Impact includes some simple drawing tools and can import scanned graphics—but that’s all you get for enhancing graphs. You’d better be sure you are happy with Full Impact’s default graphs before you buy this program.

**Wingz 1.0** Wingz offers a wide range of chart types that are comparable to those in a stand-alone graphing package and are far beyond anything offered by other
### TESTING SPREADSHEETS

#### DELETE/INSERT

<table>
<thead>
<tr>
<th>Program</th>
<th>Delete 15 columns in a 500K spreadsheet (llx)</th>
<th>Insert 1 column in a 500K spreadsheet (llx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Impact</td>
<td><img src="chart1" alt="Bar Chart" /></td>
<td><img src="chart2" alt="Bar Chart" /></td>
</tr>
<tr>
<td>Wingz 1.0</td>
<td><img src="chart3" alt="Bar Chart" /></td>
<td><img src="chart4" alt="Bar Chart" /></td>
</tr>
<tr>
<td>Excel 2.2</td>
<td><img src="chart5" alt="Bar Chart" /></td>
<td><img src="chart6" alt="Bar Chart" /></td>
</tr>
</tbody>
</table>

To test each program’s interactivity I deleted and inserted columns of data—Wingz is the hands-down winner. Excel does a respectable job of inserting information, but bogs down on deletes. Full Impact is disgracefully slow.

#### IMPORT

<table>
<thead>
<tr>
<th>Program</th>
<th>Tabbed text, 300K file (SE)</th>
<th>WK1, 300K file (SE)</th>
<th>WKS, 300K file (llx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Impact</td>
<td><img src="chart7" alt="Bar Chart" /></td>
<td><img src="chart8" alt="Bar Chart" /></td>
<td><img src="chart9" alt="Bar Chart" /></td>
</tr>
<tr>
<td>Wingz 1.0</td>
<td><img src="chart10" alt="Bar Chart" /></td>
<td><img src="chart11" alt="Bar Chart" /></td>
<td><img src="chart12" alt="Bar Chart" /></td>
</tr>
<tr>
<td>Excel 2.2</td>
<td><img src="chart13" alt="Bar Chart" /></td>
<td><img src="chart14" alt="Bar Chart" /></td>
<td><img src="chart15" alt="Bar Chart" /></td>
</tr>
</tbody>
</table>

When importing tabbed text, Excel files past its competitors. But when importing WK1 or WKS files, Excel becomes painfully slow; Full Impact definitely has the speed advantage.

#### STATS SE

<table>
<thead>
<tr>
<th>Program</th>
<th>Simple statistical function</th>
<th>Statistical function</th>
<th>Large RAM/EXP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Impact</td>
<td><img src="chart16" alt="Bar Chart" /></td>
<td><img src="chart17" alt="Bar Chart" /></td>
<td><img src="chart18" alt="Bar Chart" /></td>
</tr>
<tr>
<td>Wingz 1.0</td>
<td><img src="chart19" alt="Bar Chart" /></td>
<td><img src="chart20" alt="Bar Chart" /></td>
<td><img src="chart21" alt="Bar Chart" /></td>
</tr>
<tr>
<td>Excel 2.2</td>
<td><img src="chart22" alt="Bar Chart" /></td>
<td><img src="chart23" alt="Bar Chart" /></td>
<td><img src="chart24" alt="Bar Chart" /></td>
</tr>
</tbody>
</table>

The speed of recalculation for each spreadsheet depends on which functions are used and on which Mac the tests are run on. In my tests, simple statistical functions are recalculated at about the same rate for each program, no matter which Mac is used. When computing a statistical function such as the variance for large tables of numbers on an SE (left), Full Impact is the fastest.

#### STATS IIX

<table>
<thead>
<tr>
<th>Program</th>
<th>Simple statistical function</th>
<th>Statistical function</th>
<th>Large RAM/EXP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Impact</td>
<td><img src="chart25" alt="Bar Chart" /></td>
<td><img src="chart26" alt="Bar Chart" /></td>
<td><img src="chart27" alt="Bar Chart" /></td>
</tr>
<tr>
<td>Wingz 1.0</td>
<td><img src="chart28" alt="Bar Chart" /></td>
<td><img src="chart29" alt="Bar Chart" /></td>
<td><img src="chart30" alt="Bar Chart" /></td>
</tr>
<tr>
<td>Excel 2.2</td>
<td><img src="chart31" alt="Bar Chart" /></td>
<td><img src="chart32" alt="Bar Chart" /></td>
<td><img src="chart33" alt="Bar Chart" /></td>
</tr>
</tbody>
</table>

Excel is close behind, and Wingz trails by a long distance. The same computation on a Mac IIX (right) results in a nearly dead heat. In a repetitive computation with RAN and EXP on an SE (left), Wingz is almost twice as fast as Excel; Excel is almost twice as fast as Full Impact. On a Mac IIX (right), Wingz is still fastest, but Full Impact is more than twice as fast as Excel.
CAN EXCEL BE BEATEN?

SPREADSHEET STATS

<table>
<thead>
<tr>
<th></th>
<th>Full Impact 1.1</th>
<th>Wingz 1.0</th>
<th>Excel 2.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Ashton-Tate</td>
<td>Informix Software</td>
<td>Microsoft Corporation</td>
</tr>
<tr>
<td>Price</td>
<td>$395</td>
<td>$399</td>
<td>$395</td>
</tr>
<tr>
<td>Requires</td>
<td>1MB</td>
<td>1MB</td>
<td>512K</td>
</tr>
<tr>
<td>SPREADSHEET DETAILS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum memory</td>
<td>16MB</td>
<td>limited by RAM</td>
<td>8MB</td>
</tr>
<tr>
<td>Maximum number of R x C</td>
<td>2048 x 256</td>
<td>32,000 x 32,000</td>
<td>16,000 x 256</td>
</tr>
<tr>
<td>Background recall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security/passwords</td>
<td>2 levels</td>
<td>2 levels</td>
<td>1 level</td>
</tr>
<tr>
<td>NUMERICS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of functions</td>
<td>89</td>
<td>146</td>
<td>129</td>
</tr>
<tr>
<td>Matrix math</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRAPhICS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed graphics/text</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-D charts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colors</td>
<td>8</td>
<td>16 million</td>
<td>8</td>
</tr>
<tr>
<td>Use PICT files</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drawing tools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotate graphs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale graphs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chart formats</td>
<td>7</td>
<td>20</td>
<td>7*</td>
</tr>
<tr>
<td>MACROS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Custom menus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Custom dialog boxes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONNECTIVITY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>File translation</td>
<td>WKS, SYLK, DIF,</td>
<td>WKS, DIF,</td>
<td>BIFF, WKS, SYLK,</td>
</tr>
<tr>
<td></td>
<td>dbase II, III, IV</td>
<td>SYLK read-only</td>
<td>dbase II, III</td>
</tr>
<tr>
<td>Maximum number of linked sheets</td>
<td>8</td>
<td>limited by RAM</td>
<td>limited by RAM</td>
</tr>
<tr>
<td>Active links to other programs</td>
<td>none</td>
<td>none</td>
<td>Word, Mail</td>
</tr>
<tr>
<td>DATABASE FUNCTIONS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extract</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUDITING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell notes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify circular references</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select precedents/dependents</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Each type offers approximately 6 variant charts.  * Excel format for IBM PC.

Macros enable ambitious users to customize their working environment and automate repetitive tasks. They also enable developers to produce stand-alone applications. All three programs let you automatically record keystrokes and mouse moves to create a macro. The programs differ greatly, however, in the case with which you can edit these macros.

**Excel 2.2** Unlike Excel 1.5, Excel 2.2’s macros can include charting functions and call externally compiled code blocks. The macros when listed look more like assembly language than Pascal or C; they can be modified only with significant training and experience. Hundreds of macro examples and a small collection of books are available for newcomers.

Still, Excel’s macro primitivism hasn’t stopped developers from creating scores of applications. Because third-party applications usually demand modification of the spreadsheet interface, Excel offers a Dialog Editor for designing custom dialog boxes, as well as commands for modifying menus. The 225 macro commands, which include provision for direct manipulation of external files (besides use of external code), are also compatible with the IBM PC version of Excel, a great attraction for developers.

**Full Impact 1.1** Full Impact macros produce neatly formatted and indented transcripts that look like Pascal programs. This makes Full Impact macros easier to read and modify than Excel macros. When you are editing a macro; you have available on a Commands menu all possible Full Impact actions collected by subgroups. This set of 164 commands constitutes an independent programming language called Full Talk. Several third-party applications that are fancier than any yet created with Excel or Wingz have already appeared.

You can define macros as global tools are available, but many of Wingz’s charts are already flashy enough.

On a 128k, in particular, Wingz’s computational speed combined with its 3-D chart variety makes it suitable for types of analysis that just can’t be done with the other programs. Very often, plotting data in 3-D and rotating through various viewpoints can highlight interesting trends in data or a computation. Simple finite-element modeling of structural cross-sections and analysis of thermal or mass flows—these too are natural tasks for Wingz. For basic “Sales by Five Regions” charts, Full Impact’s quick-and-easy style is compelling, but for turning complex sets of numbers into visual information, Wingz is the unchallenged leader.

Macros
Winging It

Besides calculational prowess, Wingz offers a dazzling array of charts, including 3-D types, with a reasonable set of format defaults. If you are willing to invest some time in mastering Wingz's large array of presentation tools, you can make pictures that are worth more than 10,000 cells.

Impact Is Easy
To create a chart in Full Impact, simply select a range and click on a chart icon. Adding a text note takes only a click on the text icon. For business users who want to create slick presentations at warp speed, Full Impact is the best choice.

Excel's New Look
Better late than never, Excel 2.2 offers most of the presentation enhancements of its rivals, such as variable row height and any mix of fonts, sizes, styles, and colors. One of Excel's real strengths, however, is MS-DOS compatibility: the macro shown here will run, unmodified, on an IBM PC. This gives Excel an important edge in business over Full Impact and Wingz.
DOS world. Special spreadsheet formats, charts, and even macros can be exchanged between the Mac and IBM PC versions of Excel with no modification. Thus Excel has an impressive edge in mixed PC-and-Mac environments. Excel 2.2 supports interspreadsheet links that are limited only by RAM, and lets you track and modify links in a special dialog box.

Full Impact 1.1 Ashton-Tate has connected Full Impact to the world of data stored in its own dBase formats, the de facto IBM PC database standard, as well as to other formats. A handy brochure on file translation (the only document of its kind offered by any of the three vendors) spells out exactly what will be saved and what will be lost when translating a document between formats. Interspreadsheet linking, however, is basic, undocumented, and limited to 8 spreadsheets at a time, which can be a nuisance if you do monthly budget consolidations.

Wingz 1.0 Wingz has the smallest set of translators of the three products. It can, for example, read files in SYLK format, (Excel 1.5 and earlier), but it can't export files to SYLK. And, since Wingz offers more commands than other spreadsheets, it's difficult to translate a fully loaded Wingz spreadsheet into the format of a product that lacks Wingz's options. Linking facilities are limited only by RAM and are simple and flexible—you can enter a name such as CostData:J23 in your budget spreadsheet and Wingz will copy cell J23 in the CostData spreadsheet into your budget spreadsheet.

**Auditing**

For spreadsheet applications that go beyond simple budgets, a program should provide facilities for documenting formulas and tracking down errors—a process called auditing. The usual documentation aid is the cell note, a box for text, attached to a given cell, which explains a formula or cell entry. Cell notes are most useful if a program contains convenient commands for finding, hiding, displaying, organizing, and printing the notes you have attached to a spreadsheet.

Error-tracking facilities, as shown in the Features table, differ greatly from product to product. At the most basic level, the spreadsheet makes an error flag such as EVAL or CIRC appear in a cell that can't be properly evaluated or contains a circular reference (that is, tries to use its own value in a formula). At the next level of assistance, the program points out the part of the formula or reference that causes the problem. The most sophisticated type of facility lets you trace all cells that depend on a selected cell or all other cells the selected cell references. For complicated formulas referencing dozens of cells across linked spreadsheets, this level of error tracking is essential.

Excel 2.2 Excel finally has a note facility, but the notes are managed almost as separate documents, with note references in a scrolling list. If you identify a note-containing cell with a color or a special border, however, you can find notes easily and double-click to open them, thus bypassing Excel's clunky interface.

For serious error-tracking Excel provides a Select Special command, which can be used for mundane chores, such as showing only cells with an error reference, or for highlighting all dependents and all precedents of a given cell. Select Special can also highlight row differences and column differences, a fast way to check if blocks of formulas have been properly copied and positioned. Excel has six error-evaluation functions and a complete set of usually understandable error messages. Finally, a status bar at the bottom of the screen reports circular references and names the offending cell.

FullImpact 1.1 Full Impact has a superior note facility but offers almost no auditing help. The spreadsheet uses a layer called the annotation surface, superimposed on the spreadsheet, to store notes, graphs, or even pictures that might help explain a spreadsheet's design. Paragraphs created in graphic annotation blocks can be sized, moved, and printed separately, and the paragraphs themselves can employ function references for self-labeling with document name, date, and time. In contrast to this advanced annotation scheme, auditing is primitive. Twenty-four simple error flags and three error-evaluation functions constitute the active error-tracking facility—there's simply no equivalent of the modern dependents/precedents tracing offered in other programs. It's one of the few core spreadsheet areas in which Full Impact seems lacking.

Wingz 1.0 This program has a note facility as good as Full Impact's and auditing aids as good as Excel's—it's certainly helpful to have both in a single package. Notes can be created, sized, and arranged as floating elements on the spreadsheet, or they can be created specifically as cell notes, to be displayed or hidden with menu commands. Auditing help includes display of cell dependents/precedents; selection of unreferenced cells; formatted blank cells; and error cells by type (Wingz includes nine types of error function). The set of 66 error messages is unusually complete, and Wingz's manual has an exemplary discussion of auditing. The HyperScript language provides access to all the standard types of error function (ISER, for example) and some of its own (ISCIRCUIT). Like graphics, auditing is a Wingz strong point.

**What's Best**

Wingz is the clear leader for graphics features, programmability, and high-end computational performance. Full Impact, in contrast, is the clear leader for ease of use—a complete beginner can learn to make an attractive tables-and-graphs report within minutes. Unfortunately, Full Impact is feature-poor compared to the other programs.

In release 2.2, Excel has brought its features list and capacity up to current standards; it has done this so thoroughly that it would be hard for many longtime Excel users to justify a switch. Excel occupies, still, a broad middle region of the market, despite the undeniable appeal of Wingz for advanced graphics applications and the lure of Full Impact's convenient just-click-the-icons interface.

See Where to Buy for contact information.

Charles Seiter has been a long-term beta tester for most Mac spreadheets, with a primary interest in macro programming for scientific applications.
Mail call during a *Macworld* contest is always amazing. Bearing postmarks from around the world, entries begin to arrive in ones and twos. Soon they are delivered in boxes. Near the contest deadline, we watch them stack up (no pun intended) with a dazed expression on our faces.

Judging over 400 excellent entries may not measure up to such Herculean tasks as stealing the golden apples of the Hesperides or killing the Hydra, but we thought it was a lot to ask of a group of mere mortals. Luckily, our judges performed like epic heroes.
HyperComposer makes it easy to write music for stacks. Selecting the note on the lower right, for instance, transforms the musical notes on the staff to HyperTalk text. Changing the voice, tempo, or duration of the notes is as simple as selecting from pop-up menus. You can export your song to another stack using the Export tool on the palette at left.

HyperComposer—Commercial

With HyperComposer, our winner in the Best Commercial Stack category, you can compose, edit, view, play, and print music without being a HyperTalk programmer. Developers Randy McCallum and Lloyd Bernhardt initially developed HyperComposer as an in-house tool for adding music to corporate presentations. Once it was in beta form, however, they realized that it had larger commercial potential. The publishing house of Addison-Wesley agreed and together they now have a hit on their hands.

To write music into a HyperCard stack, users must ordinarily type in a play command, complete with a specified voice, tempo, pitch, and duration for each note. HyperComposer lets you compose music by placing notes on a staff, clicking on the piano keyboard graphic with the mouse, or (if you insist) typing in the notes as text (see “Mac Bach”). Better yet, HyperComposer can automatically convert a HyperTalk score (text) into a printable musical score (notes on a staff).

“Our goal,” said McCallum, “was to make the power of HyperTalk available to people who aren’t programmers. Everything HyperComposer can do has always been available in HyperCard, but there was just no interface for it.”

Animation Help—Noncommercial

Using Animation Help, Jeremy Ahouse’s winning noncommercial stack, even a novice HyperCard author can make snakes slither, balls bounce, helicopters fly, Macs rotate in space, and the starship Enterprise come in for a landing. Best of all you can examine the scripts behind these examples and learn how to animate your own work.

Each screen of Animation Help illustrates a specific animation technique—card-to-card, icon, font, cursor, and so forth. You simply click on the Show icon for a demonstration of it (see “Unattended Flight”). “I was teaching classes on animation techniques,” said Ahouse, “and I wanted to create something that was fun
1989 WINNER'S CIRCLE

Here are the 10 categories and 34 winners for the 1989 SuperStacks HyperCard application contest—co-sponsored with Apple Computer.

BEST COMMERCIAL STACK

First Place
HyperComposer—Motion Works, published by Addison-Wesley Publishing Company
Second Place
The Electronic Whole Earth Catalog—The Point Foundation, published by Braderbund Software
Honorable Mention
Golf Doctor—Nathan L. Tennies, Bootstrap Enterprises, 1 Step Software

BEST NONCOMMERCIAL STACK

First Place
Animation Help—Jeremy Ahouse
Second Place
Letter Learner—Robert Orenstein
Honorable Mention
If Monks Had Macs—Brian Thomas and Philip A. Moore Jr.

BEST EDUCATIONAL STACK

First Place
Alias—Brodie Lockard, CAT Project, Stanford University
Second Place
Vivo II—Bernard Lavie, Educational Computing Consortium B.V.
Honorable Mention
The Family Life Education Stack—Steve Hambleton, Marigold Elementary School
Honorable Mention
KanjICords—Clate Sanders, Dezzo Benedek, and Junko Majina, University of Georgia

BEST CUSTOM STACK

First Place
Basics of Digital Voice Technology—Codex Educational Services and Butler, Riala and Company
Second Place
Movies on Video—Bruce Charonnat, Clement Mok Designs
Honorable Mention
MacLife—Eric Azarcon, HeartBeat Software Solutions

BEST DEVELOPMENT TOOL

First Place
HyperSound 2.0—Dan Callaway and Joe Sensendorf, Forallon Computing
Second Place
HyperComposer—Motion Works, published by Addison-Wesley Publishing Company
Honorable Mention
Dartmouth XCMD’s, Volumes I–III—Roger Brown and Kevin Calhoun, Dartmouth College
Honorable Mention
The Voyager Videostack—The Voyager Company

BEST MULTIMEDIA APPLICATION

First Place
The ’88 Vote: Campaign for the White House—David Bohrman, Larry Wood, and William E. Lord, ABC News Interactive
Second Place
Cardiac Imaging—Patrick Lynch and Carl Jaffe, Yale University
Honorable Mention
Vincent van Gogh Laserguide—The Voyager Company

BEST INTERFACE DESIGN

First Place
Movies on Video—Bruce Charonnat, Clement Mok Designs
Second Place
Basics of Digital Voice Technology—Codex Educational Services and Butler, Riala and Company
Honorable Mention
Cardiac Imaging—Patrick Lynch and Carl Jaffe

MOST ARTISTIC STACK

First Place
Signs of Type—Zuzana Licko
Second Place
Passing Notes—Brian Thomas and Philip A. Moore Jr.
Honorable Mention
The Family Life Education Stack—Steve Hambleton, Marigold Elementary School
Honorable Mention
3Com—David Donaldson, HyperPro

SPECIAL RECOGNITION: BEST STACK FOR UNDER $20

Honorable Mention
Conservation Biology Questions—Jeremy Ahouse
Honorable Mention
Freedom Trail—BCS Mac, MacStackGroup, Boston Computer Society
Honorable Mention
HyperCard and History—Steve Grass

SPECIAL RECOGNITION: INTERNATIONAL ENTRIES

Honorable Mention
Doko Kara Kitano? (Where Is the Cot From?)—Masayo Ohashi, Japan
Honorable Mention
ManagerSpot—Andreas W. Vichr, West Germany

For a close-up look at the winners, Macworld and Apple Computer are pleased to announce that the winning stacks will be available on CD ROM.

Return this coupon for more information.

MACWORLD • NOVEMBER 1989 189
and accessible enough to draw people into doing simple programming."

With this stack, he clearly achieved his goal. Besides cataloging HyperCard's animation options in a clear and stimulating manner, the stack is a wonderful tool kit that can be torn apart and studied.

**ALIAS—EDUCATIONAL**

Imagine yourself as the noted eighteenth-century explorer, Captain James Cook, recently appointed to the command of the *Endeavour Bark* by the Lord High Admiral of Great Britain. To accomplish your task, you must hire a crew, plan your itinerary, captain your vessel, juggle several hidden agendas, and deal with various disasters (see "That Sinking Feeling").

This scenario describes a simulation stack that allows students to make decisions and take actions based on their knowledge of history. The stack was created using Alias, this year's Best Educational Stack winner.

Brodie Lockard created Alias at Stanford's CAT (Course Authoring Tools) Project, to make historical, cultural, and social simulations easy for instructors who have no formal knowledge of computer programming. To use Alias, instructors enter information—including text, graphics, sounds, and even video—about the world they are simulating.

Then, as students move through the simulation, they must make decisions about each event; each choice creates a unique path through the material. Instructors can also create commodity exchange rates and social relationships with ranked status levels, adding complexity to the social and political worlds being re-created.

"The point," says Lockard, "is to let student experience with situations that are otherwise too expensive, too dangerous, too inconvenient, too time-consuming, or altogether impossible."

**BASICS OF DIGITAL VOICE TECHNOLOGY—CUSTOM**


The stack allows the user to learn through solving problems, presented as increasingly difficult demands from a distant boss, in a simulated environment that encourages self-paced learning.

All the information necessary to complete the course is available in the stack (see "At the Office"), and there are clearly identified objectives associated with each of the four challenges you must meet. Self-tests are available to gauge your progress and a certification test at the end rewards the diligent student.
At the Office
This desk is your home base as you try to solve the problems that the boss throws at you. The company library, the T-1 Seminar, the Digital Technology Trade Show, the file cabinet, and the glossary of terms all contain the information you’ll need. There is (of course) a Mac for sending the boss your results.

Try Me
To expand your HyperCard sound engineering capabilities, HyperSound offers 11 XCMDs and XFCNs that you can easily place in your own stacks. The Sound Toolkit explains and demonstrates each of them. Here, the InputLevel XFCN allows you to create custom input sliders for your stacks.

20/20 Hindsight
The icons along the bottom of each screen in The '88 Vote make it easy to travel through complex information. The party symbols, for instance, link you to the biography of that party’s candidate for president. The Atlanta and New Orleans banners take you to detailed content menus for each convention.

HyperSound—Development Tool
HyperSound 2.0, the winner for Best Development Tool, is an update to the software that ships with Farallon Computing’s MacRecorder Sound System. Designed by Dan Gullaway and Joe Sensendorf, version 2.0 adds the ability to play and record sounds in 3:1, 4:1, 6:1, and 8:1 compressions and offers 11 external commands and functions (XCMDs and XFCNs) that simplify sound editing and recording in HyperCard. HyperSound displays the type, size, and length of a sound resource, and supports the Clipboard, making it easy to cut and paste sounds into your own stacks.

HyperSound also comes with the Sound Toolkit, which explains and demonstrates the external commands and functions that come with HyperSound 2.0 (see “Try Me”). Our judges picked it as this year’s best development tool because they felt it lets HyperCard do something that it simply can’t do otherwise.

The '88 Vote: Campaign for the White House—Multimedia
The '88 Vote: Campaign for the White House, winner for Best Multimedia Application, lets you explore the presidential campaign by navigating through a stack that contains detailed information about the election and controls a videodisk full of clips from the ABC archives.

You could begin using The '88 Vote by looking up the biographies and background information on each party’s candidates. Or you could watch excerpts from each party’s national convention. For further research, you could read the transcripts or watch highlights of the key speeches. You can even hear expert political commentaries on voice-overs if you want to get the inside scoop on the action.

Critical campaign issues are presented in a point-counterpoint fashion and some of the more infamous political commercials of 1988 are available, as well. For a wrap-up of the whole affair, you can take a detailed look at the results on a state-by-state basis (see “20/20 Hindsight”).

Besides providing everything a student of the political process might need, The '88 Vote lets you play network producer. With the Documentary Maker you can select up to 15 video clips at a time and cue them up for your own portrait of the race for the White House.


Movies on Video—Interface Design
When The Good Guides asked graphic artist Bruce Charonnat to design a stack based on their guide to movies available on videocassette, Charonnat designed the buttons and indexes that allow you to search for movies in ways that a book...
** Signs of Type—Artistic **

Zuzana Licko developed Signs of Type, this year’s winner for Most Artistic Stack, as an educational and promotional tool for her design business. (Her stack also took top honors in the Business and Informational Graphics category in this year’s Macintosh Masters art contest.) Licko creates custom Macintosh PostScript typefaces, and her stack complements a booklet of the same name that displays her fonts. She decided to convert the booklet to stack form because she can update it easily and add animation to her work.

It took her three weeks to design and develop Signs of Type. The electronic catalog showcases her fonts while teaching the principles of PostScript font design through elegant animation and succinct description (see “O Is for Outline”). Signs of Type includes samples of each of Licko’s custom fonts and an order form that makes it easy to order your favorites.

** Special Recognition: Under $20 **

The good news is that many of the best SuperStacks entries are available for under $20. The bad news is that the judges were simply unable to identify a clear winner for this category—the competition was just too close. Three of the best, however, were singled out as outstanding stacks for an outstanding price and all received an Honorable Mention.

- Jeremy Ahouse, author of Conservation Biology Questions, says that this stack was compiled “with the conviction that it is questions that focus our pursuits and that the clearer our questions are, the better our solutions will be.”
- The Freedom Trail was created by members and friends of the BCS MacStack Group to show off both the potential of HyperCard and the historic richness of Boston.
- Steve Grass wrote HyperCard and History as an aid to teaching social studies. It explores the facts, myths, theories, and legends that surround the assassination of John F. Kennedy.

** Special Recognition: International **

This year we received SuperStacks entries from Canada, West Germany, England, Japan, and the Netherlands. Two international stacks stood out.

- ManagerSpot, by Andreas W. Vichr of West Germany, was designed as a HyperAd to promote a customized 4th Dimension application.
- Doko Kara Kitano? (Where Is the Cat From?), by Masayo Ohashi of Japan, is an adventure tale of a girl and a cat journeying through time and space.

We hope you’ve enjoyed this glimpse at the winning stacks of the 1989 SuperStacks competition. Watch these pages for next year’s deadline.”

See Where to Buy for contact information.

SuperStacks 1989 was made possible by support from the following companies: Apple Computer, Jasmine Technologies, National Semiconductor, and Sony Corporation.
Full Page Buffering

Your Assurance of Quality and Performance in Imagesetting

When you see this seal on Varityper® Series 4000 imagesetters, it's your assurance that the equipment you're buying has been engineered with a distinct advantage... Full Page Buffering™. This feature, which allows a full page to be processed and printed without interruption, provides the highest output quality and system performance. With Full Page Buffering, you get better quality and improved performance over other Adobe PostScript® imagesetters, which periodically halt printing to process more data only to then resume printing.

Full Page Buffering makes Varityper imagesetters:

#1 in Quality—Continuous imaging eliminates the problems associated with start/stop schemes and provides greater long term reliability.

#1 in Speed—Varityper has the fastest image recording systems. Full Page Buffering allows them to run without interruption. It's just that simple.

#1 in Performance—Offering the broadest line of imagesetters with Adobe's PostScript interpreter. From the 4300P and the 4200B-P for photomedia, to the VT600W and VT600P for high resolution on plain paper, Varityper is the name to remember for imagesetting quality and performance.

Call now for details.
Toll Free:
1-800-631-8134
In N.J.: 201-887-8000, Ext. 999

Varityper
a Tegra Company

Varityper is a registered trademark of Varityper, Inc. PostScript is a registered trademark of Adobe Systems, Inc. Full Page Buffering is a trademark of Varityper, Inc.

Circle 93 on reader service card
The fact that you own or are considering a Macintosh II, IIx, IIcx or SE/30 shows you're serious about computers. That you want to reach as far as a great system will let you. So you can reach your potential.

Well, now there's a way to go even further. By giving your system a MacSync color monitor from NEC.

Or, if you prefer, the MultiSync GS2A monitor, its gray-scale sibling.

Designed for the Macintosh II Video Card and compatibles, they are the direct result of some meaningful conversations with Mac users. So they have all the features you've always wanted in a monitor.

Like easier-to-use up-front controls. A 14" non-glare screen to reduce
the Macs.

fatigue. Plus a smaller footprint and a tilt-swivel base, for more comfortable viewing. What’s more, we give you a cabinet that looks as good from the back as it does from the front. As well as a HyperCard stack on-screen user reference guide called Valet.

All at no extra cost. And if you don’t mind us saying so, that’s the least you and your Macintosh deserve.

MacSync and MultiSync

Designed and optimized just for the Macintosh II Video Card and compatibles.

GS2A monitors. We’ve taken everything we’ve ever learned about making great monitors. And applied it to the Macs.

For literature, call 1-800-826-2255. For technical details, call NEC Home Electronics (USA) Inc. 1-800-FONE-NEC.
REVIEWS

COLORBOARD 264

24-bit Color Board

**Pros:** Inexpensive; provides 24-bit color; easy to install; fully compatible with 32-bit QuickDraw; can run two monitors; can output 8-bit gray-scale video to VCRs; can output NTSC video.

**Cons:** Drives only 640 by 480 monitors.

**Company:** RasterOps. Requires: Moc II. System 6.03. List price: $995.

Every so often I receive a product that is so well-conceived and well-executed that it makes me smile. RasterOps’s ColorBoard 264 made me do more than smile—it made me grin.

The ColorBoard 264 drives any 640 by 480 resolution monitor (read, Apple’s 13-inch color monitor). For about $300 more (list price) than Apple’s 8-bit video board, the ColorBoard 264 lets you display 24 bits of color as well as the 2, 4, and 8 bits of color that the Apple board supports. Thus, with the ColorBoard 264 you can opt for 2, 4, 16, 256, or over 16 million colors on screen simultaneously.

You’ll want to run the ColorBoard 264 in 2-, 4-, or 8-bit mode when working with spreadsheets, word processors, or databases, since 24-bit mode quite noticeably slows down screen refresh and scrolling. For instance, if you type text in 24-bit mode, letters appear to jump as they are entered. But when viewing photographic images, such as 24-bit scanned graphics, you’ll really appreciate being able to view up to 16 million colors at once.

When you work in, say, 16-bit mode, if you need any colors not available on the 256-color palette, the software produces them by dithering—that is, it arranges several colored dots so that the eye sees them as one new color. However, dithered images look grainy, like a bad photograph. With the 24-bit mode, each dot in the 16-million-color display can be the exact color, thus images appear to be at a higher resolution.

**Design Award**

Installing the ColorBoard 264 is straightforward. First, you install System 6.0.3 and Apple’s 32-bit QuickDraw INIT (if they’re not already present). Then you pop the ColorBoard 264 into any empty NuBus slot. That’s it—but remember, if you are currently using an Apple color board you’ll need to remove it first. Otherwise you run the risk of making the Mac think you have two monitors attached. In this situation your cursor will often disappear from the screen and move onto the other “monitor,” forcing you to move the mouse around trying to get the cursor back on screen.

The ColorBoard 264 is also nicely designed. Because the chips are surface mounted instead of socketed, the leads will not become bent or the contacts dirty, which can cause the board to malfunction. The board has many fewer chips than the Apple color board, making it not only cheaper to manufacture but also more reliable because it produces less heat. In addition, the board draws only 1 amp at 5 volts of power through the NuBus slot (much less than the Apple board’s recommended 2.1-amp maximum), so you won’t have to give up one of the Mac II’s NuBus slots.

The Mac SE/30 version of the ColorBoard 264 is more expensive ($1295) than the Mac II version, mainly because the SE/30 uses a direct slot instead of a NuBus slot. The board must be hooked to the back of the Mac SE/30 via a special bracket assembly and cable. Also, one of the custom chips the Mac II version uses to

---

**BENCHMARKS**

<table>
<thead>
<tr>
<th>Scrolling</th>
<th>Screen redraw</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All times in seconds</strong></td>
<td><strong>8-bit mode</strong></td>
</tr>
<tr>
<td><strong>RasterOps</strong></td>
<td>14.1</td>
</tr>
<tr>
<td><strong>Apple</strong></td>
<td>14.5</td>
</tr>
</tbody>
</table>

**Scrolling** When scrolling through a 100-row spreadsheet in 24-bit mode, the ColorBoard 264 is painfully slow, taking more than twice as long as it does in 8-bit mode. Compared to the Apple board in 8-bit mode, however, the ColorBoard 264 is actually a hair faster.

**Screen redraw** The Apple board doesn’t support 16 million colors and it doesn’t have a 24-bit mode, but both the Apple and RasterOps color boards can display a 24-bit image in 8-bit mode. Although the RasterOps board draws the image faster than the Apple board in 24-bit mode, the ColorBoard 264 draws the image even faster.
control NuBus logic had to be replaced on the SE/30 version with several separate chips, increasing the cost for parts and manufacturing.

**Complete Compatibility**

I used the ColorBoard 264 with a wide variety of applications, including some not-so-common utilities such as the Color Cursor INIT, which paints the cursor in the Apple logo colors, and Big Pat, which gives you a large grid for creating detailed background patterns. Only Adobe Illustrator and an old copy of LaserPaint Color II (version 1.9.2) refused to run in 24-bit mode (although they work fine in 8-bit mode), and there the compatibility problem lay with the software, not the ColorBoard 264. Adobe is updating Illustrator, and the latest version of LaserPaint Color II (2.0) works fine in 24-bit mode.

Since Apple has made 32-bit QuickDraw its color standard, many applications will begin to take advantage of the 16-million-color palette. Assuming they are well-behaved applications, you should still be able to run them on an 8-bit board, meaning that you won't have to have a 24-bit board in order to work. But if you regularly view 24-bit images and have an Apple 13-inch color monitor, you should buy the ColorBoard. Even if you rarely need its 16 million-plus colors, you should still give the ColorBoard 264 serious consideration. It costs only a bit more than the Apple color board, is better designed, and you won't be left viewing grainy images in future applications.

—Cheryl England Spencer

**See Where to Buy or circle 730 on reader service card.**

**STUDIO/1 1.0**

**Paint and Animation Program**

**Pros:** Easy to use; ingenious interface. **Cons:** Janky paintbrush operation. **Company:** Electronic Arts. **Requires:** Mac Plus; second disk drive. System 6.0 and Finder 5.1. **List price:** $149.

Only the most crotchety curmudgeon would fail to have fun using Studio/1, a black-and-white paint and animation program from Electronic Arts. In a world of copycat software design, interfaces cluttered with dialog boxes, and high-priced business programs, Studio/1 is a breath of fresh air.

Half of Studio/1 is a monochrome version of its powerful color-paint brother, Studio/8; these two programs share a number of innovative and creative touches. The other half is a full-fledged animation program, giving Studio/1 its own distinct personality.

**Studio Lines**

Plenty of paint (bitmapped graphics) programs have attempted to improve upon the original MacPaint's straightforward interface—usually with only partial success. The modifications to MacPaint tools that Studio/1 offers, however, are truly enhancements, actually making your graphics better-looking and easier to create than they would be in MacPaint.

For example, the ability to stretch, distort, and rotate a selected part of your drawing is nothing new. But the added ability to apply these special effects to a selection you've made with the lasso (instead of just the marquee) is welcome. Also, Studio/1 is the only paint program that lets you apply more than one transformation to the same selection. You can rotate something, then enlarge it, then distort it—without having to reselect the object.

Another example is Studio/1's Last Object -> Brush command; immediately after you draw an object, use this command to transform it into a paintbrush that you can use to paint, to create "rubber-stamp" copies, and even to save separately (for use in other documents, for example).

The quintessence of Studio/1's devotion to creativity, however, is an idea so obvious that its absence from other graphics programs suddenly seems like a startling omission: Use the keyboard! In most paint programs, you use the keyboard so rarely you might as well remove it entirely. In Studio/1, however, you can select a tool by pressing a key: L for lasso, B for brush, E for eraser, and so on. Because you can switch tools this way, you can use the full screen for drawing, without having to play hide-and-seek with the tool palettes every time you want to change tools.

Studio/1 makes ingenious use of other keys too. There are no key combinations to memorize for enlarging your drawing—just press the number key corre-
sponding to the view you want: the 2 key for 2x magnification, the 4 key for 4x, and so on. As you’re drawing you can also select patterns in the palette by pressing the arrow keys (even if the palette isn’t visible). Furthermore, you can make these modifications in midstroke; for example, if you hold down one of the arrow keys while you’re using the paintbrush, you paint a cheerful, variegated trail.

There is much more to be said about Studio/1’s paint-program identity (see “Text Studio”). The interface is ideal: it includes tear-off palettes; superb radial and gradient fills (even within paintbrush strokes); a movable, resizable, hideable inset window (the actual-size-view miniview that appears when you zoom in or out); editing at up to 300 dpi; and the most intuitive solutions yet to such perennial interface dilemmas as line-thickness selection and copy modes.

**Animatronics**

While you’re painting, you might not even notice the menu discreetly tucked at the right side of the screen, titled simply Anim. In this menu, however, are all the commands you’ll need to access Studio/1’s second half—its animation mode. If you’ve ever made a movie by drawing a little stick figure on each page of a penny pad and then flipping the pages, you already understand the principle. You simply choose the number of frames you want in your movie, tell Studio/1 how fast to flip them, and you’re in business.

Studio/1 offers a number of tweening functions to help you create animations. You specify the status of an object in the first and last frames of a certain sequence, and the program computes the object’s status in all intermediate frames. For example, Studio/1 can move an object smoothly from one position to another; it can apply any of a number of special effects to an object (spin it, distort it, or zoom it in or out, for 3-D effects). It can even transform one object into another; the dots that make up one shape visibly melt and re-form into a second shape.

Studio/1 also lets you create an animated paintbrush—a short sequence that runs over and over—that you can drag across the screen as Studio/1 flips pages. In other words, you might create a short animation of a woman taking one complete step, then make it into a paintbrush; as you drag this paintbrush across the screen, Studio/1 cycles through the step sequence repeatedly, leaving one image on each frame. You’ve just created a convincing animation of a woman walking across the screen.

For many desktop media purposes—slide shows, animated bar graphs, scrolling credits—these tweening features may be all you’ll need. You have to wait a minute or so after using any of the tweening commands while Studio/1 performs the necessary calculations, but it’s possible to generate professional animated slide-show presentations.

Studio/1 doesn’t eliminate as much drudgery as it could, however. If you want to create true animated movies or storyboards, you’ll have to draw one frame at a time, like a real animator (see “Bee Plus”). Studio/1 will copy static elements of your drawing (such as the background) to the appropriate frames, leaving you to complete just the portions that move, one frame at a time. (It won’t show you what you drew on the previous frame, but you can flip back and forth easily.) If Studio/1’s animation mode were as thoughtfully designed as its painting mode, you’d have the option of seeing your previous or next frame—perhaps as a dimmed image.

Depending on your ambitions, your creativity, and the number of objects that actually change from frame to frame, you (continues)
Moving Write Along...

PLI has been making Macintosh drives since 1985 and we're moving write along with next generation drive technology. PLI features award winning solutions for your storage and connectivity requirements, with performance software to improve productivity.

**Infinity 40 Turbo**

Of all the removable storage systems, there is only one that gives you what you need... The PLI Infinity 40 Turbo.

With winning advances in Winchester drive technology, all the benefits of hard disk drives and floppy diskettes... plus unlimited storage and high reliability...the Infinity 40 Turbo is the “Best New Storage Device of 1989.”

Get a better connection using PLI DOS Transfer to read MS/DOS files on your Mac!

With the Infinity 40 Turbo's unlimited storage capacity, you can write again and again and again...

**Infinity Optical**

Fitting a non-standard optical disk into another drive is like fitting a square peg in a round hole. Luckily, the removable experts at PLI have introduced the Infinity Optical according to the ISO standard.

The Infinity Optical combines unlimited storage capacity and Sony reliability with optical rewritability and the convenience of removability.

Interface kits are available for the Macintosh, IBM-XT, AT, PS/2, compatibles and A/UX. With a 650 MB single or 1.3 Gigabytes twin, you can write a lot again and again and again.

**TurboFloppy 1.4**

TurboFloppy 1.4 a breakthrough in drive technology enabling unequalled flexibility for MS-DOS file integration with a dramatic increase in floppy disk capacity.

TurboFloppy 1.4 reads, writes and formats high-density 3.5” Macintosh and MS/DOS diskettes for 1.44 MB capacity (twice the capacity of conventional floppies). Turbo Floppy 1.4 will keep you moving write along.

**TurboWare**

**TurboCache**
Upgrade and increase the speed of your system by up to 300%, depending on the system or application.

**TurboOptimizer**
Defragment data and speed up retrieval. Files you access the most are put where they can be retrieved the fastest.

**TurboBack**
This is the back-up utility designed for people who don’t like to back-up. Back-up is as easy as dragging an icon.

**TurboSpool**
Get the fastest print spooler available. Turbo Spool lets you get back to work while your documents print.

Call 415-657-2211 for more information, or the PLI dealer nearest you. Don't wait to Move Write Along, see the full line of PLI products today.
Easier Done.

1. It's easy to get your hands on Adobe Type Manager at your nearest Adobe Authorized Dealer. And at $99, it's hard to pass up.

2. It's even easier to install Adobe Type Manager. Just a few mouse clicks and your Macintosh display will look better than ever.

3. But the easiest part of all is seeing how Adobe Type Manager improves your ImageWriter text. Just command it to print and watch what happens.

Introducing Adobe Type Manager.

These unretouched photographs make it easy to see what a difference Adobe Type Manager makes.
If you haven't read the page on the left, please do. We'll wait.

Welcome back. You now know everything you need to know to use Adobe Type Manager.

But if you still need to know more, allow us to elaborate; although it's not going to be as easy as one, two, three.

Because to understand how and why Adobe Type Manager was created, you'll have to understand what came before it.

To say this new technology was completely transparent to both you and your software applications. So all you'll see is a better image.

When it comes to improving your image, it doesn't get any easier than this.

Adobe, the Adobe logo, PostScript and the PostScript logo are registered trademarks of Adobe Systems Incorporated in the U.S.A. Apple, Macintosh, LaserWriter and Macintosh are registered trademarks of Apple Computer, Inc. Times Roman, Times New Roman, Helvetica are registered trademarks of Linotype AG and/or its subsidiaries. 1984 Adobe Systems Incorporated. All rights reserved.

---

No longer is it simply enough to generate different type styles and sizes on your Macintosh display and printed pages. You now want the text on your displays to be clear, smooth and legible.

When added to your system software (System 6.0 or later), it builds individual characters at any size from PostScript outline fonts—

Before Adobe Type Manager, if you had a low-cost printer, you had to settle for low-quality output. But now this is just a page from the past.

Adobe Type Manager satisfies all those demands.

And, at just $99, it's very affordable. In fact, at that price, Adobe Type Manager probably offers more value than any other Macintosh software.

It's also very easy to install and operate.

You see, Adobe Type Manager is completely transparent to both you and your software applications.

Simply stated, PostScript stores descriptions of font characters as smooth outlines comprised of modified mathematical formulas.

Before Adobe Type Manager, you had to set for the PostScript language's capability to create and scale fonts to different sizes. So it's very fast and very compact.

Socially, you'll have to understand why Adobe Type Manager was created, you'll have to understand what came before it.

Prior to 1984, most people thought of computers as excessively complicated, overly technical and, in most cases, far too intimidating.

But all that changed with the computer called Macintosh.

The introduction of the Macintosh was followed a year later by the arrival of the LaserWriter, the first laser printer to rely on a completely new "page-description language." The PostScript language from Adobe Systems.

But that all changed with the computer called Macintosh.

Suddenly, the desktop publishing revolution was born.

Adobe Type Manager includes high-quality outline versions of some of the most popular Macintosh fonts. You can also add any PostScript outline fonts, including those from the Adobe Type Library.

Adobe Type Manager is actually based on the PostScript language's capability to create and scale fonts to different sizes. So it's very fast and very compact.

And, at just $99, it's very affordable. In fact, at that price, Adobe Type Manager probably offers more value than any other Macintosh software.

It's also very easy to install and operate.

You see, Adobe Type Manager is completely transparent to both you and your software applications. So all you'll see is a better image.

Once it's installed in your System Folder, Adobe Type Manager intercepts QuickDraw™ font requests and generates the screen bitmaps (at the requested size) from a PostScript outline font. So, whether your text is regular, bold or italic, it looks smooth and readable from the largest point sizes to the smallest.

Then, when you print to your Apple ImageWriter or Hewlett-Packard DeskWriter, Adobe Type Manager automatically generates the requested printer font bitmap to produce beautiful, letter-quality text from any application. That's because Adobe Type Manager is compatible with virtually all major Macintosh software—from programs for word processing and spreadsheets to page layout and presentations.

Which means it won't change the way you work.

And every Macintosh user can look better, because Adobe Type Manager requires just one megabyte of memory. That way, every Macintosh from a Plus to a Iicx can take advantage of its unique outline font technology.

Speaking of fonts, every copy of Adobe Type Manager includes high-quality outline versions of the 13 most popular fonts. They'll enable you to produce the kind of high-quality text from your ImageWriter or DeskWriter you thought only came out of a laser printer.

If you want to add more fonts, you can pick up the ATM™ Plus Pack, giving you the 22 additional outline fonts from Apple's LaserWriter.

Adobe Type Manager includes high-quality outline versions of some of the 13 most popular Macintosh fonts. You can also add any PostScript outline fonts, including those from the Adobe Type Library.

Adobe Type Manager also works with other Adobe PostScript language fonts, including the more than 500 typefaces from the Adobe Type Library. We could go on, but you probably have the picture by now. Suffice it to say, Adobe Type Manager is a lot better to look at than it is to read about.

Because, quite frankly, words don't do it justice.

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

When it comes to improving your image, it doesn't get any easier than this.
may have to keep an eye on the on-screen memory gauge while you work. With a 2MB Mac, for example, it is possible to run out of memory after creating only 300 complex frames. (If you set the playback speed to 24 frames per second—a standard speed for smooth, convincing animation—such a movie would last for about 12 seconds.)

Seconding the Motion
Still, there’s no debating the fact that Studio/1’s animation features are easy to learn and fun to use. You don’t have to be concerned with sprites, casts, and scores, as you do in the comparatively tedious VideoWorks II, for example; Studio/1’s approach is far more intuitive. Yet you can create simply spectacular effects, including sound and visual effects, gradual acceleration of objects, and images that spin, fly, recede into the distance, and leave dusty trails of pixels behind as they move.

You can export your animations to either a HyperCard stack (to make that corporate logo dance) or to a program called Gallery, that’s provided with Studio/1. In Gallery, you can chain either single-screen paintings or full animations together into a slide show. You can either conduct the show with the mouse or let it run automatically, much as you would with a presentation package—the difference is, of course, that a Gallery show can include animation and sound effects.

**Studio/1-derful**
There’s only one significant flaw in Studio/1. The paintbrush—that most fundamental of tools—moves in short bursts, so that it leaves a crooked, slightly segmented stroke instead of a smooth, continuous one. This oversight is strikingly out of place in a program that evidences so much loving attention to detail.

With that exception, however, Studio/1 is a splendidly crafted program with plenty of spirit. A case in point: if you ask the Electronic Arts spokespeople what the program was designed for, you might be surprised. “You can use it for almost anything,” they’ll say, “but really it’s just a lot of fun.” And you know, they’re absolutely right.—David Pogue

See Where to Buy or circle 878 on reader service card.

**Erasable Optical Disk Drives**

<table>
<thead>
<tr>
<th>Drive</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REO-650</strong></td>
<td>Solid, smooth, worry-free. Sony format holds extra 50MB per disk.</td>
<td>Industrial-looking; more expensive than other drives.</td>
</tr>
<tr>
<td>Company:</td>
<td>Company:</td>
<td>Company:</td>
</tr>
<tr>
<td><strong>JASMINE DIRECTOPTICAL</strong></td>
<td>Well-equipped back panel; solidly built.</td>
<td>No eject button; internal termination and SCSI address control.</td>
</tr>
<tr>
<td>Company:</td>
<td>Company:</td>
<td>Company:</td>
</tr>
<tr>
<td><strong>GENESIS 6000</strong></td>
<td>Superior, trouble-free software; external termination switch.</td>
<td>Inadequate manual; stand-alone model isn’t daisy-chained.</td>
</tr>
<tr>
<td>Company:</td>
<td>Company:</td>
<td>Company:</td>
</tr>
<tr>
<td><strong>SUMO OPTICAL DISK DRIVE RSSM 600B</strong></td>
<td>Flexible, friendly software; price includes Mac Plus.</td>
<td>Requires two-hour formatting process.</td>
</tr>
<tr>
<td>Company:</td>
<td>Company:</td>
<td>Company:</td>
</tr>
<tr>
<td>Sumo Systems.</td>
<td>La Cie.</td>
<td>La Cie.</td>
</tr>
</tbody>
</table>

Erasable optical disks are now available for the Macintosh, and they’re going to be terrific. Imagine 300 megabytes per side of a fast, sturdy, removable disk with a 15-year shelf life. Imagine optical disk drive units as small as hard disks, but quieter. Imagine working with huge graphics, music, and database files without ever having to worry about running out of storage room, because you can always buy another disk for 40 cents per megabyte (versus $10 to $20 per megabyte for a hard disk).

However, if you want to own an early optical disk unit (or floptical, as they’re sometimes known), you’ll have to pay an inflated price for the privilege. You’ll also have to endure the trials of shaky and still-evolving controller software. And perhaps worst of all, there’s a possibility that you’ll get caught in the crossfire of the major optical disk manufacturers, who are waging a war to establish their own drive format as the standard—a replay, some say, of videotape’s VHS/Beta format struggle.

Nonetheless, the technology itself is thrilling: the first five units that have been introduced—by Pinnacle, Sumo, La Cie, Jasmine, and Macsetra—are tantalizing previews of the quick, inexpensive, solid optical drives to come.

**Optical Options**
It’s entertaining to see each company’s conception of what a standard optical drive should look like. The La Cie and Macsetra units resemble stocky hard disks, and sit under the Mac SE. The Jasmine drive (being marketed for Racet) looks like an elongated shoe box; it fits neatly next to a Mac II but looks a little ungainly next to an SE. Sumo gives you a choice of format; you can get either an under-the-Macintosh or a stand-alone unit, a fascinating reincarnation of the case the Mac-Charlie (an IBM-to-Mac disk drive unit, no longer manufactured) used. The Pinnacle unit is square and massive-looking, making no attempt to blend in with the Macintosh beside it.

The erasable optical disk (cartridge) itself is an enlargement of a standard 800K floppy disk, complete with oversized sliding metal shutter and write-protect tab. Although each disk holds about 600MB, manufacturers’ claims for this much online storage per disk are somewhat misleading, since you must eject the cartridge and physically turn it over in order to access the data on side B.

Optical disk technology is extremely sophisticated; it involves a laser beam’s heating the surface of the disk as it spins at 1800 rpm. The access times of all of these units are perfectly acceptable—about 35 percent slower than a hard disk, but faster than floppy disks, and much (continues)
Make Your Mark, Together

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

71 rue des Atrebates
B-1040, Brussels, Belgium
32/2733.97.81
faster than CD ROMs. In other words, an optical disk drive provides the massive storage capacity of a CD ROM system without the associated sluggishness—and what's more, you can fill an optical disk with your own data. You can erase and rewrite data up to a million times (unlike WORM drive disks, which you can't erase once you've stored data on them).

OEM, ANSI, etc.
The optical disk industry operates much like the hard disk industry: only a few companies actually produce the high-tech inards of the drives. You can't buy a complete drive from an OEM (original equipment manufacturer); instead, you buy the unit from a vendor, who is responsible for adding the fan, housing, controller software, and manual.

Although Sony and Ricoh are currently the only OEMs in the Macintosh optical disk market, others are soon to begin production. When you buy a Pinnacle optical drive, you're buying a Sony mechanism. Ricoh provides the optical disk mechanism for the Macsetra, Sumo, La Cie, and Jasmine units.

Sony proudly claims that only its drives meet the ANSI standard—an optical disk format for which Sony cowrote the guidelines. Ricoh doesn't meet this standard; therefore, says Sony, as optical disks grow in popularity, owners of Ricoh-based units are likely to be stranded on an island of incompatibility.

The irony, however, is that the less expensive and more widely marketed Ricoh drives seem to constitute more of a standard. You can swap cartridges among the La Cie, Macsetra, Jasmine, and Sumo units—but only a Pinnacle can read a cartridge from a Pinnacle. Furthermore, Ricoh is reported to be considering a format change that would make its drives compatible with Sony-based drives after all—a change that would require current Ricoh drive owners to get their units upgraded (probably at no charge).

Pinnacle at the Top
The best optical disk drive of the bunch is the Pinnacle. You pay $500 more than for the highest-priced Ricoh drive (to cover the cost of an Orwellian-sounding Personality Adapter kit), but you receive a unit with more of the kinks ironed out.

You also get the Sony optical disk format, which offers certain advantages, including a slight overall speed advantage. Each cartridge, for example, gives you an additional 25MB of storage per side; though the actual cartridges are identical, a Sony-formatted cartridge holds 309MB per side, and a Ricoh-formatted cartridge holds only 284MB.

Even more important, the Pinnacle's controller software (a small INIT file) is smooth and intuitive. You put a cartridge in the machine—its icon shows up on the desktop. Drag the icon to the trash—the cartridge is ejected. Furthermore, a Pinnacle cartridge (and cartridges from some of the Ricoh units) comes preformatted and ready to use. That's a big plus, since it takes about two hours to initialize a brand-new optical disk.

Is the extra smoothness and solidity of the Pinnacle optical drive worth an extra $500? Probably, especially if you need to buy one soon. All optical disks will eventually drop in price; meanwhile, the software provided with the Pinnacle's competition is likely to improve. For the moment, however, the Pinnacle is at the top of the heap.

Ricoh Roundup
The four Ricoh-based machines are nearly silent and performed almost identically in benchmark tests. And all, except the Jasmine, can recognize data on cartridges that have been formatted in other Ricoh units.

The software for the Jasmine is a letdown, despite the fact that it can perform partitioning (a feature no other unit but the La Cie offers). You can specify which of your partitions appear on the desktop when you turn on the Mac. If you insert a cartridge after the Mac is already on, however, nothing appears on the desktop. To make the cartridge's icon appear in this case, you use an F-key for which no installation software is provided. To eject the cartridge, you drag the icon to the trash; the manual instructs you never to use the Eject command (8E-8E) in

---

### TOP OPTICALS

<table>
<thead>
<tr>
<th></th>
<th>800K Floopy</th>
<th>Jasmine Direct Optical</th>
<th>Macsetra Genesi 6000</th>
<th>Pinnacle REO 650</th>
<th>Sono Optical Disk Drive RSSM 600 MB</th>
<th>La Cie Cirrus 600</th>
<th>Quantum 80MB hard drive</th>
<th>Hard Disk Speed Advantage over Sony</th>
<th>Hard Disk Speed Advantage over Ricoh</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>800K Floopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ricoh</td>
<td>Ricoh</td>
<td>Sony</td>
<td>Ricoh</td>
<td>Ricoh</td>
<td>Quantum</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Meegabytes per side</td>
<td>0.08</td>
<td>284</td>
<td>284</td>
<td>309</td>
<td>284</td>
<td>284</td>
<td>84</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>SCSI Address</td>
<td>Pushbutton</td>
<td>Internal</td>
<td>DIP Switches</td>
<td>Pushbutton</td>
<td>Pushbutton</td>
<td>Pushbutton</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Terminator</td>
<td>External Block</td>
<td>Internal</td>
<td>External Block</td>
<td>External Switch</td>
<td>External Block</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Finder Duplicate 1MB file</td>
<td>46.9</td>
<td>9.0</td>
<td>10.1</td>
<td>7.6</td>
<td>9.4</td>
<td>9.3</td>
<td>3.7</td>
<td>51%</td>
<td>51%</td>
</tr>
<tr>
<td>Extract 1MB Stuff file</td>
<td>n/a</td>
<td>114.0</td>
<td>115.0</td>
<td>154.0</td>
<td>114.0</td>
<td>114.0</td>
<td>48.0</td>
<td>58%</td>
<td>65%</td>
</tr>
<tr>
<td>Launch Word file</td>
<td>9.6</td>
<td>9.0</td>
<td>9.7</td>
<td>9.5</td>
<td>9.1</td>
<td>8.7</td>
<td>7.5</td>
<td>18%</td>
<td>21%</td>
</tr>
<tr>
<td>Search in 200-page Word file</td>
<td>20.5</td>
<td>44.4</td>
<td>53.0</td>
<td>18.4</td>
<td>43.6</td>
<td>44.0</td>
<td>7.7</td>
<td>83%</td>
<td>58%</td>
</tr>
<tr>
<td>Scroll through 200-page document</td>
<td>113.0</td>
<td>104.0</td>
<td>131.0</td>
<td>88.0</td>
<td>110.0</td>
<td>110.0</td>
<td>71.0</td>
<td>37%</td>
<td>19%</td>
</tr>
<tr>
<td>Save as</td>
<td>72.0</td>
<td>39.0</td>
<td>41.0</td>
<td>32.0</td>
<td>39.0</td>
<td>39.0</td>
<td>24.0</td>
<td>39%</td>
<td>25%</td>
</tr>
</tbody>
</table>

All times are in seconds.
The best 32-bit Color QuickDraw card that you can buy: The ColorBoard 224.

This board sets the standard for 24-bit Macintosh® color. Drive a variety of monitors, from Apple's® affordable 13" up to our professional, 19" Trinitron. Accelerate your work with selectable bit modes — from 1-bit to 24-bit. Use the full 1024 x 1024 in 24-bit mode resolution with our built-in pan and zoom features — no matter what size monitor you choose. And when you get ready to move into desktop video, just add our SFX™ Video System to the built-in adaptor, and you have a video studio.

**Power Draw**
Power and heat. Your board draws its power through the NuBus. Apple specifies a maximum of 2.1 Amps per slot at 5 volts. Other boards often violate the 2.1 restriction set by Apple. Amps mean heat, which is deleterious to your Macintosh, and a drain on the power supply. The RasterOps ColorBoard 224 needs less than 1.9 Amps. Your system runs cooler. You can use other slots without fear of overloading your power supply.

**SetGamma and DirectSetEntries**
Your ColorBoard 224 directly supports Apple's DirectSetEntries and SetGamma QuickDraw instructions in hardware. Instantly see the effect of changes to your color image. You can watch the color tones change as you move the mouse. Without this dynamic support, you have to guess at the color correction, enter the new value, and wait for the new screen to repaint. No waiting with the 224.

**Pan and Zoom**
Utilizing the advanced circuitry of the 224 Chip Set, the board is capable of instantaneous hardware pan and zoom. This function takes no CPU time or processor RAM and allows users to zoom in 2x and 4x while in any application in the blink of an eye. The panning rate is user-selectable and is initiated automatically when your mouse nears the edge of the screen. No more waiting for the screen to redraw to see the details of your work.

**Triple Oscillators**
Three separate oscillators. One for use at a resolution of 1024 x 768 with the RasterOps 19" color Trinitron monitor. The second oscillator for use at a resolution of 800 x 600 with the RasterOps 16" color Trinitron Monitor. And a third for use with Apple's 13" color monitor at a resolution of 640 x 480 pixels.
The Sumo Optical Disk Drive RSSM 600B (upper right) and the RE0-650 from Pinnacle Micro, Genesis 6000 from Macsetra Technologies, the Cirrus 600 Magneto Optical Drive from La Cie and the Jasmine Direct Optical (shown clockwise).

the Finder since you risk losing data (a particularly unfortunate bug for an ejectable-disk system).

For some reason, documentation seems to be a low priority for every early manufacturer of optical disks, and the Racet manual provided with the Jasmine drive is no exception. You get a series of pages that seem to have been photocopied from a hard disk manual and have little to do with the optical disk. In fact, at one point you're referred to an illustration that turns out to be a blank rectangle containing only the words paste art here.

In spite of these shortcomings, the Jasmine unit works as smoothly as any of the other Ricoh units. The back panel has all the premium features: you can set the SCSI address easily, add an external terminator, and even plug in the Macintosh (a switched outlet is provided). The Jasmine unit is the only one that comes with a free cartridge, too. For the moment, however, you can buy a less expensive unit with equivalent performance and much better software.

6000 Disappointments
Although the software provided with the Macsetra Genesis 6000 doesn't share the inconveniences of the Jasmine software, the drive itself is somewhat lacking. Unlike every other optical drive on the market, for example, there's no eject button on the face of the unit itself. Furthermore, its termination and SCSI address controls are internal; you have to dismantle the drive to change either of those settings.

There's something peculiar about Macsetra's formatting, too. Even after the disk had been prepared with the two-hour "certification" process recommended by the manual, the Macsetra unit was slower in every benchmark—sometimes substantially so—than the other Ricoh units. (The figures in the table reflect postcertification benchmarks.) Despite its smooth and worry-free software, this speed deficiency and the drive's poor hardware design make it look weak next to the other Ricoh units.

Optical Nerves
There's something peculiar about seeing "250,000K available" at the top of a Finder window that makes working with any of these drives a giddy experience. But both the industry and the marketplace are still budding. So if you need an optical drive now, be prepared to suffer the hazards of poor documentation and rudimentary controller software.

If your color graphics, digitized sound, or database files require massive amounts of inexpensive storage, however, an optical disk drive may be a necessity. But consider both the price and the OEM of the unit you want, because the actual differences in the mechanisms are very slight. The Pinnacle is the premium optical disk drive, with a premium price tag—it's a Sony; both the Sumo and the La Cie units show promise as well-priced Ricoh-based products. If you buy one now, you'll be happy with any of these three models. And if you decide to wait until the prices drop and the market settles, be of good cheer—you have a lot to look forward to.—David Pogue

See Where to Buy or circle 866 (RE0-650), 801 (Jasmine Direct Optical), 778 (Genesis 6000), 879 (Sumo RSSM 600B), or 727 (Cirrus 600) on reader service card.
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.
If you don’t see exactly what you’re looking for, just ask.

- Mac II Stand and Extension Cables
  - Complete Kit $99.95, Separately $29.95 to $49.95

- Maccessories SuperBase $49.95
- Maccessories Tilt/Swivel $29.95

- System Saver Mac, $99.95

- Master Piece Mac II, $159.95

- Power Backer UPS’s, $399 to $1,599, Network Interface, $99.95

- Turbo Mouse ADB, Turbo Mouse Plus, $169.95 each
Chances are, we'll have it. Because, at Kensington, we're always finding ways to make your Macintosh® quicker and more convenient.

Our award-winning Turbo Mouse trackballs will make your Mac quicker with their automatic acceleration and advanced button features.

Our best-selling System Saver Mac will keep your Mac Plus cool, calm and collected with its quiet cooling fan, surge protection, and extra outlets.

And everything you see here will make your Mac more comfortable. Our Mac II Stand and Cables will get your Mac II off your desk and out of your way. And our Anti-Glare Filters are a sight for sore eyes — in every shape and size.

In fact, we've got so many good ideas, we couldn't fit them all in one ad. But we did manage to fit them in a free 20-page brochure, so call for yours today. Or ask about a dealer near you. 800-535-4242 or 212-475-5200. Or write to Kensington, 251 Park Ave. South, New York, NY 10010.

KENNINGTON

Setting new standards of performance.
The software that helps Federal Express deliver buildings overnight.

Ric Honey, a project manager of new construction for Federal Express, knows a little about deadlines.

"People say to me, 'We need this building next month.' I say, 'But that's a 1-year project.' They say, 'OK, 3 months.'

"Managing 4 or 5 projects like that can mean a paper trail of over 600 forms at a time. All with pen and paper. I knew I had to do something."

So Ric looked into a database program for his Macintosh®. "I chose Double Helix® because I didn't want to learn a programming language.

"I had a spreadsheet, and I knew it could do 'macros.' But I couldn't. If I could tell it in English what I wanted, fine. But I'm an awful typist. One finger. Try doing macros with that!"

"When they told me about Double Helix, I said 'You mean I don't have to read anything?' All I do is drag around icons, pictures? This is great!"

Now Ric and his team run the Double Helix multi-user application he created. He reports it's already cut 25% off his paperwork time.

"I just tell Double Helix what I want. And I get it.

"I wish my whole life was like that!"
**Expressionist 2.0**

**Pros:** Excellent balance of features and simplicity; good ImageWriter support; DA version included.  
**Cons:** Not for casual users; leisurely local database performance.  
**Company:** Allan Bonadio Associates.  
**Requires:** Mac 512KE.  
**List price:** $129.95.

**Formulator**

**Pros:** Easiest for occasional use; intelligent interface implements standard typesetting conventions.  
**Cons:** No macros; no DA version; lacks some symbols.  
**Company:** ICOM Simulations.  
**Requires:** Mac 512KE.  
**List price:** $149.95.

**MathType 2.0**

**Pros:** Most capable for heavy-duty publication chores; good macro support; DA version included.  
**Cons:** Longer learning curve; no built-in TEX translator.  
**Company:** Design Science.  
**Requires:** Mac 512KE.  
**List price:** $149.

The Mac has always been considered an ideal tool for producing documents in mixed text and graphics, such as those for mathematics and chemistry. Compared to other techniques for producing typeset-quality equations (the TEX language or the command scheme in Microsoft Word), all three equation editors reviewed here are delightfully straightforward and almost fun to use. Each has a remarkably different personality—surprising for applications devoted to nearly identical tasks.

**Expressionist**

Expressionist, in its earlier versions, was the best-selling equation editor. Version 2.0 fixes the handful of complaints mentioned in an earlier review (Macworld, April 1988) without complicating its self-explanatory interface. You simply find and click on the symbols you want in the palette, but now the palette scrolls (see “Expressly for You”). The updated palette also has space for ten user-defined icons that control macros for complex expressions. A Tweak function supports micro-positioning of characters and groups of symbols, and a Preferences menu allows you to modify program defaults for spacing and other actions.

With a little practice, you can learn to write equations in Expressionist with dazzling speed. It’s also particularly convenient for use with Microsoft Word, since you can invoke Expressionist as a desk accessory and it does a creditable job of translating its own typesetting directly into Word commands. Although the translation to Word commands or to TEX isn’t always perfect, the manual gives some reasonable guidelines for ironing out occasional problems. Extra attention given to such details as printing with ImageWriters is probably another reason for the popularity of this program among students. The manual is eccentrically organized but highly informative and packed with tips. Telephone support is almost fanatically competent, replete with apparently irrepressible suggestions about more effective use of the program. As an equation editor for frequent personal use, Expressionist 2.0 is an excellent choice.

**Formulator**

Formulator was available in England before being imported recently by ICOM simulations, developers of the TMON debugger and assorted games. Formulator features the plainest opening screen of the three programs reviewed here; most details are hidden in menus. Fortunately, a well-organized tutorial explains how to find palettes of math symbols, Greek characters, and grouping and alignment functions (see “Learning to Formulate”).

A key feature of Formulator is the Auto Style function, which adjusts symbols in accordance with math typesetting conventions. The program knows, for example, that variables in function expressions are typically italicized, that operators need different spacing from function names, and that all sorts of spacing and positioning are context dependent. Formulator has a long list of typographical rules that set defaults for equation layout. You can override these, but they give harmonious, professional-looking printed output, even in the hands of users with a manifestly deficient aesthetic sense.

These are Formulator’s strengths: with the tutorial you can learn the program in 10 to 15 minutes, and the intelligent defaults let you produce decent output without much practice. It also gives error-free TEX output.

(continues)
EXPRESS YOURSELF WITH BETTER GRAPHICS

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.
Formulator is the editor of choice if you work with equations only occasionally, since you can relearn it in a few minutes. If you do lots of equation editing, you will find it slower than Expressionist and lacking some expected high-end touches found in the other two products (tensor symbols, for example—a remarkable omission in a program endorsed by Stephen Hawking's famous general relativity research group at Cambridge University). You can also establish four user-defined complex commands, but the lack of a proper macro facility will dismay advanced users.

MathType
MathType 2.0 is designed for more advanced equation editing. It would easily be the first choice for the secretary of a large mechanical engineering department in a university, but it's a bit complex for an undergraduate in the same department trying to write a term paper in a hurry. This complexity is reflected in its size—265K (it can be used as a bulky DA) compared to Expressionist's 136K. As further evidence of its professional orientation, MathType files can be saved in encapsulated PostScript format, converted for use with Design Science's MS-DOS MathType, and transferred to Mathematica format with ease.

In Sum
Six years ago, a graduate student in physics would have thought any such program an utter miracle, so if someone gives you one of these programs as a graduation present you'll be fortunate to have everything you are likely to ever need in equation editing. If you're spending your own money, consider how often you need to do this work and select friendly newcomer Formulator, mainstream choice Expressionist, or professional MathType as your needs dictate.—Charles Selter

See Where to Buy or circle 756 (Expressionist), 768 (Formulator), or 831 (MathType) on reader service card.

XTREEMAC 1.0

Hard Disk-Management Utilities

Pros: Easy-to-understand, tree-structured file display; multiple selections can include any files and folders on the same disk; comprehensive online help. Cons: Many file-management functions outperformed by other utilities; requires at least 512K under MultiFinder; crashes occasionally under MultiFinder. Company: XTree Company. Requires: Mac 512KE. List price: $99.

As with the fabled search for a better mousetrap, the search for better hard disk/file-management software has proven irresistible to many developers. Only a few such programs, including CE Software's DiskTop DA and Fifth Generation's highly customizable PowerStation, have caught on with Mac owners. Now comes XTreeMac, from the publisher of one of the most widely used disk-management programs for IBM PCs and compatibles.

A Tree of Folders and Files
The two parts of XTreeMac's main window feature some of the program's major file-management functions. One section on the left displays the contents of the currently selected disk volume as a structured tree (much like the display in competitor MacTree Plus from Go Technology). Lines branch to folders, files, and applications from the folder that contains them, providing a more graphic view of disk organization than that offered by the Finder (see "A Tree Grows").

Like the outline created by an outline program, the file tree can be expanded to a selected level, or selected portions can be expanded or collapsed as desired. You can elect to hide documents or applications, show invisible files (such as the Desktop file), or create special file filters that hide everything except word processing files, for example. XTreeMac lists applications, files, and folders at each level in alphabetical order only; you cannot rearrange them by size or date, nor can you create an arbitrary order, the way you can with icons in the Finder.

You rename or trash files and folders much as in the Finder. Moving or copying items is often much easier than it is in the Finder, since you can drag items from folder to folder, or even volume to volume, without opening, closing, or moving windows. (You can also copy or move files using menu commands, which allow you to select a destination from a standard Save dialog box.) You can also select any

(continues)
Thousands of people just like you have put their heads together to form one of the world's most advanced data processors—CompuServe's Mac® Forums. And they'd like you to join them.

Forum members share problems and solutions on our bustling message center. They access and contribute to huge data libraries teeming with the best shareware and public domain software anywhere. And they take on the latest computing topics in live, online conferences.

Nothing can make your Mac as intelligent or as friendly as CompuServe's Forum members.

To join CompuServe, see your computer dealer. To order direct or for more information, call 800 848-8199. If you're already a member, type GO MACINTOSH at any ! prompt.
A Scratch Pad for File Management

Only one file tree, and thus only one disk volume, can be displayed at a time. If you wish to view files or folders from several different disks or partitions at once, you must use the Deskpad, the scrolling file list on the right side of the XTreeMac window. Any item from any file tree can be dropped into the Deskpad; the original file or folder actually stays where it is, while an image of the file appears in the Deskpad. The files and folders in the Deskpad can be sorted in ascending or descending order by name, date, size, kind, color, or volume. The Calculate Size command tells you the total disk space occupied by all the files in the Deskpad.

As a temporary holding and sorting shelf for files and folders you want to move or copy, the Deskpad works well. But it has drawbacks. The Find On Tree command should help you relocate a selected Deskpad file's position, but it doesn't always work. And once you open a folder in the Deskpad, there's no easy way to put all its files back.

Beyond File Management

XTreeMac's Get Info window displays, in addition to the usual information, the file type, creator, and other file attributes, and allows you to change them (if you dare). There's extensive online help. And a feature called Revive-a-File, which must be installed on each disk you want to use it with, makes it easy to retrieve files thrown in the Trash—even after you've emptied the trash. On the other hand, although XTreeMac's Find File command is more discriminating than Apple's Find File desk accessory, it is far less powerful than the file-finder portion of CE Software's DiskTop. And a number of procedures, including creating a new folder, can get unnecessarily complex. Also, XTreeMac searches a hard disk only one partition or volume at a time; you must select each volume to be searched.

XTreeMac incorporates most other Finder functions, including Restart and Shut Down, and can be used as a Finder substitute as well as a file manager. Double-click on an application appearing in the file tree to launch it; XTreeMac returns when you quit. Commonly used applications and documents can be added to a menu for quick access. To use XTreeMac as an application under MultiFinder, however, requires at least a 512K partition: a high price to pay for file management. And you must beware of a few bugs that can cause XTreeMac to quit unexpectedly under MultiFinder.

Making the Choice

Ultimately, XTreeMac's shortcoming may be that it tries to do too many things and fails to excel at any one of them. For sophisticated file-finding features, DiskTop does a better job and uses less memory. For a Finder replacement emphasizing quick application access and launching, PowerStation is a better choice. And there are disk labeling programs that offer much more than XTreeMac. XTreeMac's major asset is its tree-structured way of looking at disk organization, but that alone is not worth spending $100. When XTreeMac out the bugs, makes all file-management procedures equally easy, puts some punch in the file-finding function, and figures out what the Deskpad is for, then XTreeMac may be worth the price.

—Robert C. Eckhardt

See Where to Buy or circle 892 on reader service card.
So It Is Written...
So It Shall Be.

Means that OmniPage can read virtually any font, in sizes that range from 8 pt. to 72 pt.

This unique landscape feature means that spreadsheets and financial documents are only a scan away. A great addition to your royal granary if storing and accessing numerical data really counts!

Multiple column feature means that complex, compound pages of text and graphics can be handled—automatically.

Transitional Editor™ lets you review scanned text before exporting it to a file. Cut, copy, paste, insert and delete text—or take advantage of the powerful search and replace tools which allow you to modify a page.

Reads and outputs underline, bold faces and italics.

Supports the most popular word processing programs for the Macintosh, including Microsoft Word and MacWrite.

Supports all of your favorite Indo-European languages, including French, German, and Spanish.

YYSI Scan™ interface takes full advantage of Macintosh's incredible ease-of-use.

OmniPage 2.0 has even more features than ever before—this translates into the most comprehensive page recognition software available—anywhere—for any dynasty—at any price.

The bottom line in page recognition software—eliminating excessive key strokes* for all time.

*Egyptian scribes had a real time of it when it came to excessive key strokes. Each letter, or hieroglyph, had to be individually etched into stone. And we complain today about writer's cramp?

OmniPage is a registered trademark of Caere Corporation. Transitional Editor and YYSI Scan are trademarks of Caere Corporation. Apple and Macintosh are registered trademarks of Apple Computer, Inc. Microsoft Word is a trademark of Microsoft Corporation. MacWrite is a licensed trademark of Claris Corporation. Egyptian bust of Ramses II courtesy of the Rosicrucian Society of San Jose, California. ©Copyright 1989 Caere Corporation. All rights reserved.
Manhole. My imagination wasn't stimulated enough to fill in the gaps.

What's worse, I quickly exhausted the story. Within three hours no stone was left unturned. My seven-year-old son Miles accomplished the same result in less than five hours, virtually losing interest in the game after that (this seems remarkable considering that Miles often reads the same story night after night). Familiarity is not a cause for lack of interest if a story captures a child's imagination. And that is Cosmic Osmo's fatal flaw—it doesn't capture the imagination; the story goes flat after only a few hours.

The creators of Cosmic Osmo and The Manhole have put months of care and effort into these stories to make them as rich as they are in imagery and effects. The difference between the two stories is that The Manhole is pleasurable and intriguing to revisit, while Cosmic Osmo exhausts itself because it never gives the impression that there is much more than meets the eye. Why does The Manhole succeed where Cosmic Osmo fails? It could be that the images in The Manhole have a magical quality that makes the story seem mysterious, while the amusing images in Cosmic Osmo are only silly. Cosmic Osmo also suffers from overdesign. Everything is exactly where you expect it. This is ordinarily a good feature in software, but in an interactive storybook it gives the story a cut-and-dried feel. Although creating a captivating microcosm is obviously no small challenge, I'm convinced that interactive stories remain an innovative and appealing idea.—Adrian Mello

See Where to Buy or circle 735 on reader service card.

Educational Geography Games

ATLAS EXPLORER 1.0

**Pros:** Easy to use; provides feedback for both student and teacher; detailed coverage of some areas of world. **Cons:** Not very stimulating. **Company:** Springboard Software. **Requires:** Mac Plus; second disk drive; hard disk recommended. **List price:** $49.95.

WHERE IN THE USA IS CARMEN SANDIEGO? 1.0

**Pros:** Entertaining; challenging. **Cons:** Key-disk copy protection. **Company:** Broderbund. **Requires:** Mac Plus. **List price:** $49.95.

GLOBAL TRESPASS 1.0

**Pros:** Inexpensive entertainment; clues encourage player to do research. **Cons:** Overly complicated; requires more luck than skill. **Company:** Mysterium Tremendum. **Requires:** Mac Plus. **List price:** $19.95.

Three new educational games, ATLAS EXPLORER, WHERE IN THE USA IS CARMEN SANDIEGO?, and GLOBAL TRESPASS, attempt to make learning about geography both fun and exciting.

ATLAS EXPLORER, from Springboard Software, is basically a tutorial and a drill-and-practice program built around simple outline maps. It works in three different modes. In Explorer mode you move around the world by highlighting different areas and focusing on various regions; by moving from map to map you can select an area of study, or hone your map-identification skills. When you are in Tutorial mode, a scrollable window appears at the bottom of each map screen with data about the highlighted area (see "Tutorial Mode"). You can test your knowledge about a region or country in Quiz mode. A Record-Keeping feature keeps track of which maps you have mastered and where you need more practice; it can also be used by a teacher to chart a class's progress.

Unfortunately, there is nothing about Atlas Explorer to stimulate the student who isn't already curious about geography. The maps are excruciatingly plain, and there are no goals except to score points by responding quickly and correctly to multiple-choice questions and to earn special icons that testify to your ability to identify countries. Atlas Explorer may eventually get students to distinguish between Brazil and Argentina, but it is likely to gather dust on the shelf unless an imaginative teacher can think of an exciting way to integrate it into a geography curriculum.

WHERE IN THE USA

In contrast, Broderbund's WHERE IN THE USA IS CARMEN SANDIEGO? is a lively and challenging way to practice map-reading skills. Played exactly like its precursor, WHERE IN THE WORLD IS CARMEN SANDIEGO? (Reviews, Macworld, November 1988), this game lets you explore the 50 states and the federal District of Columbia as you collect clues that reveal your suspect's identity and where he or she is headed next. As in the earlier version, you move from city to city by clicking on a map, and you question witnesses by clicking on places in each city, like a library or sports stadium (see "Witnesses").

There are more levels of play than in WHERE IN THE WORLD and more suspects, and clues are often more subtle. Elusive clues may discourage younger children from playing on their own, but they make the game more interesting for older children and adults. As with WHERE IN THE WORLD, you have ample time to catch the suspect before the clock runs out.

Where in the USA comes with a copy of Podor's USA, a travel guide, for deciphering clues about the suspect's destination, and a clever scrapbook, ostensibly stolen from Carmen Sandiego, that contains information about gang members. Accompanying documentation gives hints about how to use the travel guide and other reference works to solve the mystery. Once again Broderbund has produced a learning tool that is not only educational but also loads of fun and not the least bit stodgy.
In Seawood's early days, we had to do everything ourselves. We even designed our own logo on our new Macintosh®. Silicon Beach's SuperPaint, with its combined Paint and Draw features, was just the solution we needed.

When the bank wanted profit estimates, we walked in with these and walked out with the loan. Once again, SuperPaint and Silicon Beach provided the solution.

The next stage of growth required a more professional image. SuperPaint 2.0 gave us the features we needed to create our new look.

For our first newspaper ad, we wanted something clean and simple. But every photo at our disposal had different lighting and backgrounds — it was tough to combine them in one ad. That's when we discovered that Silicon Beach had again provided the solution. Digital Darkroom's basic image enhancement capabilities and sophisticated tools automated the process for us.

For our mail-order catalog, we sat down with Digital Darkroom again, but this time we let our imaginations run wild and created this composite image. Digital Darkroom made short work of the seemingly impossible task of getting the dog and cat to sit still for a photograph.
Provides Solutions. And Again.

When we started to produce our own instruction sheets, we quickly discovered Super 3D. This 3-D modeling and animation software from Silicon Beach made it easy to build vivid 3-D models and then "explode" the pieces. Then we exported the image into our tried-and-true SuperPaint to add arrows, dashed lines and text.

Display and output: Super 3D 2.0

Here we are designing the first piece of our very own line of furniture. Super 3D was a perfect visualization tool for the ideas bouncing around in our heads.

From a simple logo to an inspiration for a whole new aspect of our business — that's how Silicon Beach Software provides solutions. Again. And again. And again.

Okay, okay... Kyle and Judy and Seawood Sun Furniture aren't real. But any resemblance to real Macintosh customers is purely intentional. We made them up by abstracting from the stories of our own customers to present you a scenario you could identify with.

Silicon Beach offers you the same benefits we offered Seawood... Software so easy to use that you can pick it up and produce quality work on day one. Yet software so powerful it continues to surprise and amaze you as your sophistication grows. A family of products with a consistent approach to user interface and documentation. And a company that will continue to provide solutions for your growing needs with innovative new products, powerful new versions, and some of the best technical support in the industry.

Whether you use one or all of these products, you'll find each to be a powerful graphics tool and an exceptional value in its own right.

Visit your local software dealer and discover for yourself why we say, "Silicon Beach Software Provides Solutions. Again. And Again. And Again."

SuperPaint 2.0 $199.
Digital Darkroom™ $395.
Super 3D™ 2.0 $495.

System Requirements: Macintosh Plus, SE or Macintosh II. For color viewing, a color monitor is required. For Super 3D color, 58681 math coprocessor required. Hard drive recommended.

Digital Darkroom, Super 3D and the Silicon Beach Software logo are trademarks of Silicon Beach Software, Inc. All other trademarks and registered trademarks are the property of their respective owners.
Players fly from city to city searching for clues to a suspect's physical description, gang affiliation, and next destination. Clues are found by clicking on different locales in each city and questioning innocent bystanders (see "Locales"). The hints indicating where a culprit is headed next may require you to consult an almanac, an atlas, or someone with a very good memory. (Where did Al Pacino want to go in the film Dog Day Afternoon?) Determining the suspect's description, however, is extremely confusing. Witnesses, for instance, either always tell the truth or always lie, but often they are not sure about what they saw and sometimes they use double negatives.

Although Global Trespass is not in the same league with Carmen Sandiego, it can provide some inexpensive entertainment for people who aren't interested in arcade-type games and who want more challenge than Carmen and her gang can offer.—Gerry Lukes

Where to Buy or circle 712 (Atlas Explorer) on reader service card.

**TABLETOOLS 1.01**

**Table Production Program**

*Pros:* Excellent cell handling (sizing, grouping, alignment, and fills); spreadsheet-style numeric formatting; From Within Shuttle links graphics and spreadsheet programs; extensive style sheets (including cell styles). *Cons:* Difficult interface for advanced features; no usable graphics scaling; little typographic control; no EPS save feature; huge (600K, 750K under MultiFinder) and somewhat volatile. *Company:* Mansfield Systems. *Requires:* Mac Plus. *List price:* $395.

Tables, along with equations, have always been the traditional typesetter's nemesis and bailing-wick. They're full of minute details and just plain tough to get right. Mac programs let you create basic tables but fall short with complex ones—especially those with running text. TableTools is designed for creating complex tables, and it does a very creditable job.

Microsoft Word 4.0's new table features, however, address many of the same problems. Both programs lack some key table-production features, but TableTools in particular overcomes many of the big impediments.

First and foremost, both programs allow for text wrap within tabular columns. Second, you have control over the size of table cells and their associated lines and (with TableTools) fills. Neither program, however, gives you good control over line thickness, color, and style. Neither lets you set type vertically or diagonally. And neither offers much typographic control—over letter spacing, word spacing, hyphenation, or justification. Bad typography really glares in narrow columns, so this control is important with tables.

**General Approaches**

Tables in Word are distinct objects, like graphics, different from normal text matter set up with tab stops. Word's Insert Table command creates a basic table with the number of rows and columns you specify; you can add or delete rows and columns later.

TableTools acts like a more powerful version of Word's table mode, with features reminiscent of Excel and PageMaker. TableTools' cell handling and type formatting are similar to Word's. The From Within Shuttle, which works much like Word's QuickSwitch feature, lets you include and update material from other programs. TableTools has number formatting like Excel; and its zooming, paste-board rulers, and drag-'em-out ruler guides are much like PageMaker's.

TableTools is more robust, though less accessible, than Word's table mode. There are Beginner, Intermediate, and Advanced modes, which provide power or ease of use, but not both. Like Word, TableTools has text styles, but it also has styles for tables, column widths, row heights, and—especially useful—cell formatting (specifying object alignment, fill percentage, style for contained text, and so forth).

TableTools lets you group two or more cells together as a single cell containing one object—a text block, number, or graphic. You can align the object at the
Any way you look at it...
E-Machines still gives you more.

Monochrome

**More Choice**
E-Machines gives you more with a Complete Family of monochrome, gray scale, color. Even stereo 3D displays. More choices in full page screen sizes. More compatibility with all Mac models.

**More Features**
Only E-Machines gives you QuickView, special features that let your Mac do more. Features like definable virtual screens with panning, multiple viewing resolutions, tracking menus, virtual screen previewing, software controls for brightness and contrast, plug-in memory upgrades for more room and more image definition.

**MoreCare**
E-Machines leads the industry

Gray Scale

in quality, warranty and support with MoreCare. By getting the details right we build in quality. And, we back our display systems with unsurpassed service, a full year warranty and the industry's best available extended warranty.

**More Innovation**
Look to E-Machines when you want more innovative display power than you can get from Apple, or anywhere else.

Find out where to buy an E-Machines display. Call us today at 503-646-6699. Or, write to us at 9305 SW Gemini Drive, Beaverton, OR 97005.

Color

E-Machines 1989. E-Machines, QuickView and MoreCare are trademarks of E-Machines, Inc.

© E-Machines 1989. E-Machines, QuickView and MoreCare are trademarks of E-Machines, Inc.
Text Ruler

TableTools gets almost every aspect of text formatting onto a single ruler. Settings can apply to any group of lines—not just to a paragraph. You can also have multiple ruler extents in a paragraph.

top, middle, bottom, left, center, or right of the cell (independent of text alignment within a text block).

You can put a diagonal line (NW to SE) in a TableTools cell; you can specify a hairline, 1-point, 3-point, or 5-point dashed or solid rule for any of the four cell borders and/or the diagonal line; and you can fill a cell with grays from 10 to 100 percent. (Here’s a tip: use the Shadow type style to put white type on dark backgrounds.) You can also give numeric cells a variety of formats: dollars-and-cents, exponential, date.

Word has three major cell-handling limitations: You can’t specify a fill for cells without PostScript commands, you can’t automatically align objects at the center or bottom of a cell, and you can’t group a cell with the cell above or below it. You can merge cells next to each other, however.

Word does let you expand the width of any cell arbitrarily, not necessarily matching the width of the cells above and below it (it must match in TableTools). Word’s normal border tools allow you to put lines around cells, but not hairlines; and again, there’s no Fill command.

Type Handling

Word’s formatting controls provide basic control over type, including rudimentary letter spacing. Paragraph controls within cells work just as they do within column margins; you can set left and right indents for each paragraph, first-line indents, tabs, leading, and so on. Using decimal tabs, you can align columns of figures followed by parentheses or footnotes.

TableTools (excluding its letter spacing and dot leaders for tabs) offers type control almost identical to Word’s, but with a couple of convenient extras. TableTools’ Autoindent feature lets you set the left and first-line indent, and the program adjusts the right indent to match.

The interface is the greatest problem with TableTools’ type handling. You have to drag on the ruler to adjust indents and tabs, for instance; there’s no dialog box for typing in the specs. Paragraph and character formats can both be set from the ruler, which gives rise to TableTools’ unwieldy and confusing use of ruler extents—groups of one or more complete lines to which ruler formatting applies. You can have multiple ruler extents in a paragraph, and anything overriding the format within a ruler extent (such as a word in italics) is called a local exception.

TableTools’ style sheets offer about the same text-formatting powers as Word’s, but mastering the interface is frustrating, even for a style-sheet veteran. You can create styles by example in TableTools, but its hierarchical style sheets with multiple types of styles are difficult to set up. You can specify a text style within a cell style, so you can format the cell and the contained text all at once, but you must plan things in advance to take advantage of it. You can’t select text across multiple cells for formatting, so if you don’t start out with cell styles that contain text styles, applying text formatting becomes a repetitive, select-then-apply process.

Importing Graphics and Spreadsheets

Both programs support the major graphics formats—PICT (objects and bitmaps, including color), TIFF (including color and gray scale), EPS, and MacPaint—but Word wins this one hands down. Word lets you include as many graphics as you want, but TableTools allows only a single graphic per cell, and TableTools’ cells don’t expand to contain graphics, as do Word’s. You can use TableTools’ hand tool to position an oversize graphic within a cell; you can then click on the cell with a cropping tool to permanently eliminate areas outside the cell boundaries.

Original Size and Cell Size are your only choices for scaling graphics in TableTools, and scaling to cell size is virtually useless; TableTools ignores aspect ratio and stretches graphics to fit proportionally. You can’t specify a scaling percentage or scale by dragging, so you have to scale images in the source program before pasting them into the table. With Word you can crop and scale by dragging, and you can scale proportionally.

Both programs let you switch into a source graphics program to edit a graphic and jump back to the table with the new graphic pasted in. TableTools’ From Within Shuttle works with MacDraw I and II, Illustrator (1.1 and 88), MacPaint, Full-Paint, Cricket Graph, and Excel (1.5 and 2.0), whereas Word’s QuickSwitch only works with SuperPaint (1.1 and 2.0) and Excel (1.5 and 2.0).

Both Word and TableTools let you import spreadsheets, although with Word you simply paste them in. Both let you switch into Excel to modify the data, then come back into the updated table. TableTools provides a Lock Cells Against Spreadsheet feature, so if a cell contains something that Excel can’t handle, you can lock the cell and Excel ignores it. For QuickSwitch purposes, Word limits you to what Excel can handle (no multiple-paragraph cells, for instance, or font changes within a cell).

You can convert tables from either program into PICT format, though you face all the problems that accompany PICT transfers. Expect problems with fractional character widths, pasted PICT and EPS graphics, and line widths. TableTools is somewhat better than Word in this regard, and the TableTools manual has an
Introducing the new EMAC. Complete with new products, new programs, and a new attitude. A dynamic new attitude that’s reflected in our new logo and products.

We’re committed to giving you more for your Macintosh. More value. Value that stretches your computing dollars. Value that’s built on quality, performance, and support.

To prove it, we’ve intensified our research and development efforts to make you more productive today and tomorrow. We’ve beefed up our quality-assurance programs, so you can be confident that your EMAC products will work right the first time and every time. And we bolstered our support group to help you get the most out of your EMAC products.

If you liked EMAC products before, you’re going to love them now. If you haven’t tried EMAC, now’s the time. Because we’ve got serious products for serious productivity.

To see how much more value is in the new and improved EMAC, call 1-800-821-0806, Ext.2222. We’ll give you more for your Mac.
appendix showing examples of moving tables into a variety of programs—very useful in avoiding PICT pitfalls. A Save As EPS option would be an even better solution.

**Cards on the Table**

TableTools still has the hallmarks of a young program—an ungracefully adolescent, to be precise. It's huge, at almost 800K, and it sometimes quits without saving when you exceed available memory (though it usually manages to warn you before doing so). Save often. The program wants 950K under MultiFinder, but you need more with complex tables. TableTools also has problems dealing with nonstandard Open dialog boxes created with INITS (it crashes).

Mansfield Systems says that version 1.1 will include a spelling checker DA: will allow 1-degree incremental rotation of objects within cells; and will offer custom line widths (but still no white lines), tab leaders within cells, an accents feature for placing one character directly on top of another, alignment of dollar signs in columns of figures, alignment of figures followed by footnotes, and foreign currency number formats.

TableTools offers several reasons to go beyond Word's table mode—cell fills, cell styles, noncontiguous cell selection, locking cells against an Excel spreadsheet, top-and-bottom cell grouping, vertical alignment, hairlines, numeric formatting, zooming, pasteboard rulers, and ruler guides. You have to overcome TableTools' obtuse interface to get to the program's advanced features, though, and you must deal with the lack of usable graphics scaling. You'll probably want more typographic savvy (though you won't find it in Word, either), or the general features of a good word processor. You might also be frustrated by the uncertainty of PICT transfers.

If you produce complex tables more than a few times a year, though, and if TableTools' failures won't prevent you from producing the tables you need, TableTools can save you a lot of time and let you do things you can't do with Word alone.—Steve Robb

See Where to Buy or circle 880 on reader service card.

---

**4TH & INCHES 1.0**

**Arcade-Style Sports Game**

**Pros:** Easy to learn; smooth graphics; two-player capability. **Cons:** Lacks variable skill levels; defense too bland; offense too easy. **Company:** Accolade. **Requires:** Mac 512KE (does not run on Mac II, IIx, or SE/30). List price: $44.95.

Several strategic football simulations have been introduced for the Mac, but no arcade-style football games. 4th & Inches, from the creators of the highly addictive Hardball, fills this void. Unfortunately, despite the fact that both games were designed by Bob Whitehead, 4th & Inches doesn't live up to the legacy.

**Runnin' and Gunnin'**

On offense, you're given a choice of 5 formations from a group of 11, based on the down and yardage situation (see "Scramblin' Man"). After choosing a formation, you're presented with 5 plays from a total of 23 runs, passes, and kicks. The choice of plays is based on the down, yardage, and formation selected. After you have called your formation and play, you can choose any one of five players to whom the play can be directed.

Once you've selected the play, you take control of the quarterback. If you've called a run, the QB hands off the ball automatically, and control switches to the player receiving the ball. If you've called a pass, you control the QB until you throw the ball, at which time control switches to the receiver—if he catches it.

Playing offense is the most enjoyable part of the game. Not only does it offer the widest choice of plays and formations, but you really feel in control. On defense, things just seem to happen.

I did run into some problems playing offense, however. First off, it's too easy. I quickly progressed to the point where I could connect with a 50- to 50-yard bomb about three times out of five. The offense is also unbalanced; it's much easier to play the pass than the run.

Another problem with the passing game is that once you select a receiver, you're locked into throwing to him, regardless of how the play breaks. It's not uncommon to see two or three receivers downfield while your man is covered. Your only option is to scramble, but this seldom results in gains of more than a yard.

There are five defensive formations. You choose one, then have the option of blitzing with a defensive back or dogging with a linebacker.

Although the various plays and formations are supposed to work better against certain plays, I found little difference among them. In fact, I felt that defensive play in the game was weak and bland. QB sacks are nearly impossible, and interceptions are more a matter of luck than skill. The kick defense also has problems; there is no way to block the kick.

**Post-Game Wrap-Up**

Because the on-screen athlete moves in the direction that you last moved the mouse, I found it difficult to control that athlete's movement using the mouse. The keyboard works better, but when two human players go head to head, you need to use the mouse.

4th & Inches gives you a team roster, with two choices for each position, so that you can transform your team's lineup to suit your playing style (your choices are essentially speed or strength). Nevertheless, I still found the game to be generally disappointing, neither the level of strategy nor the arcade action were challenging. And while I improved rapidly, my computer opponent did not.—Jeffrey Sullivan

See Where to Buy or circle 770 on reader service card.
Three NEW ways to keep your data from getting into the wrong hands.

**QuickLock**

Automatic Password Screen Protection

QuickLock password-protects your screen and your network connections with the touch of a key or stroke of the mouse. It prevents others from viewing or altering your work, but allows background processing. QuickLock darkens the screen, protecting your screen from phosphor "burn-in," and remains active even if the system is restarted. QuickLock's automatic lock-out feature allows it to invoke after a preselected period of inactivity.

**The NightWatch**

Password Protection for Hard Disks

The NightWatch securely shuts down your hard disk. NightWatch stands guard, preventing unauthorized access or erasure of your hard disk, or even the introduction of a virus. The authorized user enters their name and password to unlock the hard disk, and every attempt to unlock is recorded. The Administrator application includes an override function in case a user has forgotten their password or lost their User disk. It even has the ability to dynamically update itself when it encounters new systems or machines.

**MacSafe® 2.0**

Security for Documents and Applications

MacSafe creates the functional equivalent of safes on the Macintosh desktop. You can restrict access to documents, applications, or whole folders of information across shared Macintoshs by moving your material into a "safe." New features give you Administrator override, Control Panel access, "Project Sets," the ability to move multiple files in simultaneously, and our new LightningCrypTM encryption - now the fastest in the industry.

You can count on these three products to work independently or hand-in-hand to give you peace of mind that your important work is secure, you determine what level of security you need. Call 1-800-325-3587 today for all the facts, to locate the dealer nearest you, or to order.

Kent Marsh Ltd.

1200 Post Oak Blvd. • Suite 210
Houston • Texas • 77056

Security Software You Can Count On.
QUICKMAP

Map Creation Software


ELECTRONIC MAP CABINET

Map Creation Software


About a year ago John Sculley noted that the next big development in personal computing would be desktop map making. The right software could link statistical or demographic data to areas on a ready-made or custom-made map to create a graphic representation of data distribution. QuickMap and Electronic Map Cabinet attempt to make this vision a reality, but I doubt that they are exactly what Sculley had in mind.

QuickMap, produced by the makers of MacAtlas and HyperAtlas, lets you import maps and numerical data; divide the data into ranges, or classifications; and produce printed maps that use screen patterns to denote the different ranges of data. The HyperCard interface makes QuickMap relatively simple to use, but it also severely limits the size of maps that the application can produce.

Importing, Analyzing, and Mapping

The QuickMap USA stack has a built-in map that you can use to plot data on a state-by-state basis. On the data import screen, you can import two sets of numerical data, such as census counts for different years. The next screen prompts you to load one of these data sets into the stack to perform various types of analysis using a sort of on-screen calculator. You can, for instance, subtract the older census count from the more recent one to create a third set of changes in state populations.

The classification screen lets you specify the ranges into which you want to divide the data. You then select fill patterns to represent each range of data, produce the finished map on screen, and save or print it. If you don't like the results, you can always backtrack to an earlier screen.

The companion stack, Custom QuickMap, lets you make your own QuickMap application with a map of your choosing. The first time through, it prompts you to import a MacPaint-type file and a text file containing the names for each area on your map. You then link the text file to the map by clicking on each area as the program displays the name. Using a map that you create or modify in another program may call for some trial and error, because QuickMap does not provide any means to position the map on the screen.

Easier Said Than Done

Actually, producing any output with QuickMap can take practice. The sparse documentation is not always clear, and it neglects to explain many of the buttons. Moreover, it assumes a familiarity with data mapping that belies the program's simple interface. The brief paragraph that explains the normal distribution option, for instance, offers no advice as to when such a classification should be used. While mapping the distribution of my Macintosh user group's membership, which is heavily weighted toward one state, I tried the normal distribution option and got meaningless negative numbers in the middle of the data range.

Taken one by one, the problems I had using QuickMap are minor, but together they indicate a lack of careful troubleshooting. If you inadvertently click during the creation of a custom map, for instance, the stack is corrupted, and if you decide to use the default patterns after you've already selected a custom pattern, the program appears to hang, although it is actually producing a map behind the current card. Some of QuickMap's potential trouble spots could have been avoided with more thoughtful programming; others could at least be covered in the documentation.

Creating a Custom QuickMap

To create a custom QuickMap you link a text file to areas in a MacPaint-format file by following QuickMap's prompts. Here I am linking New Hampshire to the region indicated by the paint bucket.

Megabytes of Maps

For people who need to import maps into their applications, Highlighted Data's Electronic Map Cabinet is a CD ROM that generates detailed maps of United States cities, states, and regions. The software that accompanies the CD lets you select an area of the country or one of hundreds of cities and produce a map to any of a wide range of scales. You can show just the features you choose, including highways, local streets, waterways, county lines, and park land, and display them in either color or black and white. Maps can be saved in PICT format for export to other programs.

Electronic Map Cabinet is a fascinating product with many potential uses, nevertheless, a lot of rough spots remain to be smoothed out in the next version. An inactive menu item suggests (and conversation with a company representative confirms) that a future version will enable you to search for streets by name. For now, however, once you have a city map on the screen you have to hunt for the street you want by trial and error. The program's biggest shortcoming, however, is its documentation. A mere two pages, it does not do justice to a program of this sophistication. The product, which draws each new map based on data stored on the CD, is by nature slow, and the paucity of instructions almost guarantees that you will make mistakes and have to wait while the program draws maps you don't really want.—Gerry Linkos

See Where to Buy or circle 863 (QuickMap) or 743 (Electronic Map Cabinet) on reader service card.
New Forms of Business.

Paperwork. The essential inconvenience. Whether it's invoices, travel expenses, office memos or tax returns, Informed® and Macintosh® computers can help you change mountains of paperwork into well-organized forms of information.

It's a new way to draw, fill out and manage forms.

**Design and Draw.** Informed Designer® comes packed with high performance drawing features. All to help you draw crisp, professional looking forms in no time at all.
- Grids, guides, rulers, tables, fields, combs, lines, ovals, rectangles, arcs, polygons, type — plus a whole lot more. With over 1/1000th of an inch accuracy.
- Draw or scan. Make revisions in minutes. No more obsolete forms.

**Fill Out.** With Informed Manager,® filling out forms becomes an effortless, error free task.
- Add intelligence to your forms so they can think for themselves. Eliminate repetitive typing with powerful calculations, choices and automatic lookups. Create customized on-line help to answer common questions.
- Just imagine the results. Assured accuracy on picture perfect forms.

**Store, Sort, Search, Retrieve.** Since Informed Manager is actually a database, you can organize and manipulate forms like never before. Search and sort at blinding speeds. Print single forms or group them for batch printing.
- And because forms are stored electronically, you print less. The bottom line is less paper, less cost.

So it's time to think about forms the new way. Just give us a call. We'd be happy to tell you more.

Then form your own conclusion.

Get Informed.

For more information, please call or write:

**Shana Corporation**
Advanced Technology Center
105, 9650 - 30 Avenue
Edmonton, Alberta Canada T6N 1G1
Tel. (403) 463 - 3330 FAX (403) 428 - 5376
AppleLink CDA0004 MacNet SHANA

Copyright © 1989 Shana Corporation. Informed, Informed Designer and Informed Manager are trademarks of Shana Corporation. Macintosh is a registered trademark of Apple Computer, Inc.

Circle 297 on reader service card
NOW SHIPPING!

DirectServe by Jasmine
There it sits... your Macintosh. Alone, tied to your network — utilized at only a fraction of its capability. It's your dedicated file server — a painful but necessary investment...

Now you can liberate that Macintosh and put it back to work as a full purpose computer. Jasmine is pleased to introduce DirectServe™, the industry's first dedicated AppleShare-compatible file server.

DirectServe is a combination of hardware and software that was designed specifically to be a high-performance, low-cost file server. Its Motorola 68010 processor and 1 MB of cache memory (expandable to 8 MB) is dedicated to fast data transfer.

By eliminating the need to support a keyboard, mouse, and monitor, DirectServe provides performance comparable to a Macintosh IIcx — at a price that's less than a Mac Plus with AppleShare software!

DirectServe will support up to 255 workstations and plugs right into your LocalTalk™ or twisted-pair network. Plus, it's 100% AppleShare/AFP 2.0 compatible. So it looks and works just like an AppleShare file server.

Everything you need is included for $1795. You get the DirectServe file server, plus the Installer and Administrator software. The installation and administration process is easily handled at any Macintosh on the network. And if you need storage for your file server, we’ll be happy to introduce you to the Jasmine DirectDrive Series; our award-winning line-up of external hard drives.

**Special Introductory Offer**

For a limited time, you can purchase a DirectServe bundled with our highly reliable (70,000-hour MTBF) DirectDrive 130 or 180 hard drive at a special introductory price.

- **DirectServe** $1795
- **with DirectDrive 130** $2499
- **with DirectDrive 180** $2799

DirectServe, like all Jasmine products, carries a 30 day money-back guarantee and a two year parts and labor warranty.

So whether you want to liberate an existing Macintosh, or install your first file server, DirectServe offers a cost-effective alternative to a dedicated Macintosh. Why wait? To order, call (800) 347-3228 in the U.S., or (415) 282-5053 outside of the U.S., Monday through Friday, 6AM to 5PM (Pacific Time). MasterCard, Visa or American Express accepted.

©1989 Jasmine Technologies, Inc., 1740 Army Street, San Francisco, CA 94124. + Offer expires December 31, 1989. International Sales FAX (415) 285-7953. DirectServe and DirectDrive are trademarks, and Jasmine is a registered trademark of Jasmine Technologies, Inc. LocalTalk is a trademark, and Macintosh and AppleShare are registered trademarks of Apple Computer, Inc.
600 Typefaces

They just won't fit on one page. This is the Image Club PostScript Typeface Library. 600 licensed "brand name" typefaces covering your Mac or PC and any PostScript printer. The typefaces are available on floppy diskettes, appropriate families as illustrated below or the entire library on CD-ROM, available for the Mac only.

Desktop Publishing
The Desktop Publishing CD-ROM features a special program developed by Image Club that unlocks typefaces that are only required on the CD-ROM. The Desktop Publishing CD can be obtained for as little as $39.99 including 30 fonts. Purchasing additional fonts from your desktop publisher is easy as making a phone call. We will provide a key number that is used to unlock the new typefaces from the disc.

PostScript Art File
Associated with every font is a PostScript file that you can use with Adobe Illustrator or Aldus FreeHand. Modify, combine, duplicate, rotate, zoom, resize & more and create your own headlines, logos and type-based artwork.

Prices & Discounts
Whether you buy fonts for desktop publishing or from the Letterpress CD ROM, our pricing and discount schedule will make it easy.

Each font $25 Minimum purchase $50

PostScript Art File
Letterpress CD ROM full disc (all 600 fonts) $4999
Letterpress full disc with NEC CD ROM drive $5599
Letterpress Type Vendor $1999

Ordering
At the bottom of each page, you will find price and discount schedule. Each font $25 Minimum purchase $50

For a free catalog or to order, call Image Club at 800-661-9410.
After playing Maxis Software's city simulation game, I am humbled by the task of planning and running a city. When I took over Isle de Perche I was an experienced mayor, and I had more power than any real-life city planner or mayor. Yet I created a town with pollution problems and traffic jams, with citizens who complained about taxation, and with reserve funds inadequate to rebuild the city after a tornado demolished the downtown. All I could think about was how much it would cost to bulldoze the ruined areas, restore power, and rebuild. Admit bankruptcy and resign from office? Never. I resorted to embezzling city funds.

Although you may end as an embezzler you can begin with a clean slate—just land, trees, and water. Instead of using one of the prebuilt cities, I chose an island environment in the Terrain Editor. I then customized my Isle de Perche by adding trees, deepening inlets, and opening shipping lanes. Instead of creating the geography, I could have chosen one of the prebuilt cities that come with the program, or I could have let SimCity generate a random 10-by-10-mile terrain with trees, rivers, and water. You can also use the Terrain Editor to modify a prebuilt city or random terrain.

If you choose a prebuilt city, you take over one that has already been developed. Pick your city with care, however, because many come with incipient disasters. As mayor of San Francisco, for example, you may have to save the city and rebuild it after a 1906-size earthquake.

**Pave It Over**

Whether you begin with fresh terrain or a preexisting city, the first decisions you make usually concern zoning decisions—where to place commercial, industrial, and residential areas. You also locate power plants, fire and police departments, airports, seaports, stadiums, parks, and other amenities. It is important to link each of these zones and facilities with roads, public transportation and bridges.

As you zone areas and build power lines and roadways, the citizens move in and build houses. A simulator turns all of your decisions into animated realities, so that as the city progresses over months and years, it assumes a life and direction of its own. As the community grows, condors, hospitals, and churches appear, factories belch smoke, and office buildings reach skyscraper proportions. The color version of SimCity uses 16 colors to make the game even more enjoyable.

As mayor you must pay attention to all this activity, because as the population grows the city's needs change. For example, a road that once adequately served a residential district now causes traffic jams. A message board alerts you to these and other problems. It also warns you of natural disasters, and notifies you when the citizens want something like more roads or a stadium.

**Keeping the Sims Happy**

All this development costs. The game periodically displays the budget and requests confirmation on the tax rate and the percentage of the budget allocated for the fire, police, and transportation departments. The different zones generate taxes, but you need to discover the correct combination. Mistakes in the placement of housing developments, industry, or transportation requirements make for a miserable citizenry. When they are mired in pollution, overtaxed, and caught in traffic jams, the people leave. Then you have the problem of a deteriorating urban base. Your condors turn to slums and terrible little bombs appear, representing decay.

SimCity gives you a set of reference maps that let you separately view each of the zones, services, and facilities. For example, you can determine whether the fire department provides adequate coverage for the city, where it doesn't, you need to build another station. You can also check population density, land value, crime rates, power grids, and traffic density. A set of graphs gives you a time line to evaluate the health of the city according to different indicators.

Natural disasters—earthquakes, tornados, monsters, flooding, and so forth—make this already complex game even more unpredictable. You can't set the number of disasters, but you can invoke one just to spice up the game, or eliminate them with the No Disasters option.

I heartily recommend SimCity. It is an intricate and intriguing game in which you are continually challenged to take the actions needed to foster a city's growth, respond to the citizens' and city's needs (which are not always identical), balance a budget, and cope with natural disasters. It's involving and a lot of fun.

—Janet McCandless

*See Where to Buy for contact information.*
The soaring prices of video cards can keep you from getting the highest graphics performance from your Macintosh.

That's why at Micron, we've brought the high price of brilliant color and outstanding resolution down to earth with our Xceed video cards. Now you can exceed the graphics limits of your Macintosh II, IIx, IIcx or SE/30 without exceeding your budget.

Xceed video cards give you all the performance features you expect such as 1, 2, 4 and 8 bits per pixel, 256 simultaneous colors from a palette of more than 16 million, 640 × 480 or 1024 × 768 resolutions and full Macintosh software compatibility. Plus we include 8/24-bit MacroPaint software and a gamma color correction desk accessory — a package worth $149.00 — absolutely free!

In fact, the only feature we don't offer is the high price tag.

And like all Micron memory products, Xceed video cards are supported by our comprehensive customer service program and toll-free hotline.

So call us today at 1-800-642-7661 for the name of your nearest Micron dealer. And enjoy brilliant color graphics without the high flying price.

Micron. Working to improve your memory.

Xceed and MacroPaint are trademarks of Micron Technology, Inc. Macintosh is a registered trademark of Apple Computer, Inc.
HARMONY GRID 1.02
Program for Exploring Harmonic Theory


By visually displaying harmonic relationships as you play and listen, Harmony Grid helps you see the patterns underlying music. This software provides an entertaining way for nonmusicians, music students, and inveterate noodlers alike to experiment with and learn about musical harmonies.

Music by the Numbers
Not surprisingly, the business end of Harmony Grid is an on-screen grid, in which each square holds the letter name and octave number of one pitch (see "The Harmony Grid"). To play Harmony Grid via MIDI or the Mac's internal synthesizer, all you do is mouse over the squares. As the pointer passes over a square, one or more notes sound in response, their number and pitch depending on how you've defined the grid.

Typically, you set things up so that only notes in a desired scale will play; you're thereby assured that your improvisations sound harmonious. The current scale's playable pitches are circled on the grid; the other squares remain silent. The notes you trigger are simultaneously highlighted on a graphic representation of a piano keyboard at the bottom of the screen, and you can play on this piano directly if you like. Harmony Grid handles rhythm for you as well, making sure that each new note begins on the beat of an adjustable metronome.

You can't really control Harmony Grid well enough to play planned note sequences with much accuracy: it can he tough to intentionally skip notes that the current scale does allow, and you can't play the same note twice in a row. Instead, the idea behind the program is to let your mouse's meanderings turn up interesting musical patterns serendipitously, and to learn something about harmonic relationships in the process.

You can explore harmonic structures by controlling the properties of the grid: the notes included in a scale, the harmonic notes that chime in when you trigger one of the squares, and the structure of the grid itself. The grid's structure is defined in terms of the chromatic intervals that separate adjacent squares. If you set the horizontal grid axis to 1, for instance, and start on the C square of the grid, the row to your right would read chromatically: C, Db, D, Eb. If you set the vertical axis to 3 chromatic intervals, you would jump a minor third with every square up or down a column. With a range of settings from 1 to 12 in either direction, you can create 132 different grids, each with a unique harmonic geography.

There's nothing conceptually complicated about picking out the notes you want to include in a scale or mode. However, it's a little trickier to figure out how to select the harmony notes (they're referred to as chords by the program). When you build a chord, you're instructing Harmony Grid to add a fixed set of intervals every time you trigger a square on the grid, and these intervals will stay the same no matter how you've defined your scale. This would normally result in some very strange chords, since human musicians must follow more complex rules to create standard chord progressions. But the program recognizes when a note called for by these fixed intervals isn't in the scale being used and simply leaves out that pitch. This way, the harmony may get a bit thin, but it's never wrong.

In most situations, you can get around Harmony Grid's tendency to drop notes by defining chords that include pairs of intervals a half-step apart: one member of the pair will almost always play. Or you can consider this characteristic a feature, and put it to good use. By playing an augmented triad on a major scale, for example, you can get two-part simulated counterpoint, with the harmony voice sometimes moving in contrary motion to the lead.

While you're playing, you can switch from mode to mode and chord to chord instantly. A set of ten modes and ten chords, along with a grid configuration, constitute an instrument in Harmony Grid's lexicon, which can be saved as a file and reopened whenever the musical mood strikes.

The Lost Chord
Although you play only one square on the grid at a time the program highlights the names of every triggered pitch, including the harmonies, every time each pitch appears in the grid. On a piano keyboard, the physical arrangement of notes in say, a minor seventh chord, is different for each key. In contrast, an Em7 in Harmony Grid has the same characteristic shape on the Harmony Grid as an Fm7. What's more, once you're familiar with the shapes of the basic chord types, you can pick out component chords within more complex ones—a quick glance will convince you that a minor seventh chord includes both major and minor triads. Similarly, scales have characteristic shapes that are easy to pick out by tracing the circled squares.

If you have a MIDI keyboard, you can use it instead of the mouse to trigger the Harmony Grid. In this case, each triggered pitch lights up the appropriate square on every octave, which means the chord shapes you see aren't affected by your keyboard voicings and inversions. By checking your voicings against the resulting chord shapes, you should be able to easily figure out the harmonic essence underlying most any cluster of notes.
SMART ART EFFECTS
NOW IN THREE VOLUMES*

Bring custom effects to your favorite
word processor, desktop presentation or page
layout program quickly and easily. Without
leaving your application, select the effect
you want...

Customize it with powerful yet simple
controls. Change the font, size, gray and
more. Then get a perfect on-screen preview
from your PostScript® printer.

Paste or place the finished effect into your
document. You will see a precise on-screen
image which will be printed at the highest
resolution of your printer. (Shown here in
Microsoft® Word.)

*Works with any PostScript font, including the entire Adobe
type library. Requires PostScript printer.

Volumes I and III each contain fifteen text effects. Volume II
contains fifteen 2D and 3D graphic effects. Suggested retail price for
each volume is $149.95.

Emerald City Software, 1040 Marsh Road, Suite 110, Menlo Park, CA 94025
Contact your dealer or call 800-223-0417, in CA 415-324-8080

Requires: Macintosh® Plus, SE, or II, LaserWriter® Plus, LaserWriter II NT, LaserWriter II NTX, or other PostScript Printer
Compatible with: Microsoft Word, MacWrite, WordPerfect, WriteNow, FullWrite, PageMaker, QuarkXPress, Ready Set Go!, Microsoft PowerPoint, MORE, Aldus Persuasion, Cricket Presents, Adobe Illustrator 88, Aldus FreeHand, Microsoft Works and most other applications.

SmartArt is a trademark of Emerald City Software. PostScript is a registered trademark of Adobe Systems, Incorporated.
Microsoft and PowerPoint are registered trademarks of Microsoft Corporation. Macintosh and LaserWrite are registered trademarks of Apple Computer, Inc.
All other brand and product names are trademarks or registered trademarks of their respective holders. Copyright ©1989. All rights reserved.

Dealers Circle 212 on Reader Service Card
End Users Circle 18 on Reader Service Card
HIDDEN AGENDA 1.0
Geopolitical Simulation Game

Pros: Good perspective on what it might be like to run a strife-ridden South American country; excellent graphics. Cons: Some encounters leave no option other than to agree; you cannot make proposals of your own; some proposals are made over and over again, even after you've accepted them. Company: Springboard Software. Requires: Mac 512K; second disk drive. Hard disk recommended. List prices: $59.95.

Following the coup that led to the overthrow of the corrupt dictator Farsante, the dominant members of the Junta have appointed you as Chimerica's new Presidente. And it's your task to try to lead the country into an era of normalcy—prosperity is out of the question. In Hidden Agenda you must juggle many agendas (most of them hidden) as you grapple with the daunting problems facing your country.

Disease and poverty are widespread in the tiny South American country. Most of the land and wealth is held by less than 5 percent of the people. Government corruption remains an issue, as well as the question of what to do with the murderous members of Farsante's Guardia (which eventually became his personal army and death squad).

During the three years you have to rule Chimerica—if you aren't voted out of office or removed in another coup—you can enact any proposal that is brought before you by the members of your cabinet or influential people from Chimerica and abroad. In addition to taking charge of internal affairs, you are also responsible for international relations. You must decide which countries to accept military and financial aid from—and determine how much interference in Chimerican policies the aid entitles them to.

Read All about It
Hidden Agenda's documentation may seem a bit overwhelming at first glance. The User and Reference manuals together contain over 150 pages. However, reading just the four-page Quick Start section provides enough information to start the game. If you want more detail, it's not a bad idea to read the User Manual from cover to cover. The Reference Manual gives a historical perspective to Chimerica's current situation. Springboard also includes a nice color map of the country, although it's not necessary to game play. Online help is available if you need it.

Picking a Cabinet
The game begins with a brief press conference during which you must select three priorities for your term as Presidente from among the nine choices offered. Your next task is to appoint the Ministers of Agriculture, Internal Affairs, External Affairs, and Defense.

The Junta comprises three radically different political parties, each with its own priorities and preferred way of handling situations. In choosing a cabinet, you can read a brief biographical sketch of each candidate, as well as a party dossier that explains more about each party (see "Selecting Your Cabinet"). The ministers' appointments—like yours—are temporary. If they displease you, or appear to be following their own hidden agendas more faithfully than yours, you can request their resignation.

Playing the Game
Play is controlled from the Presidente's office. On your desk are objects labeled Contacts, Consultations, Encounters, Reports, and Logbook. Clicking on one of these either provides you with information or sets up a meeting between you and a cabinet member or what the program calls an influential (banker, peasant, teacher, United States Ambassador, and so on).

Each meeting you hold results in a proposal that you can accept or reject. If it is unclear how best to proceed, you can ask the opinions of your cabinet members. Proposals raised by influentials can also be placed on the agenda of the appropriate cabinet minister, delaying action temporarily or—if not acted on within the year—tabling the issue indefinitely.

You may refer to two types of reports: news excerpts and progress charts. The latter graphically depict your progress (or lack of it) in the areas of military and social spending, infant mortality, land reform, food and export crops, agricultural earnings, cash reserves and debt, and foreign loans and aid.

History's Verdict
Unless you are assassinated, or ousted from office before the end of your three-year term, Hidden Agenda lets you judge your performance from the perspective of history. The game concludes by displaying several pages from a historical account of your reign.

Doing well requires sharply honed diplomatic skills. You must know when to initiate difficult policies, when to compromise, and when to give in. Diverting funds away from exports and using them for health care and education, for instance, may anger the IMF, and Chimerica may lose its aid. Even meeting with representatives of certain factions (such as the USSR or Cuba) can endanger other relations. In Hidden Agenda, making one group happy usually results in making someone else unhappy; finding a workable balance is the key. —Steven Schwartz

See Where to Buy or circle 788 or reader service card.
Few things last as long as information on BASF.

Your information couldn’t be safer carved in stone. At BASF, we mold the rigid plastic jacket of our 3.5” Micro Diskette to our own specifications for unsurpassed protection. And our clipping level is 44% higher than industry standards.

And here’s an offer that won’t last long at all. Get a free nylon travel wallet, including a free preformatted BASF 3.5” Micro Diskette, just by calling 800-346-6552, between 9AM and 5PM, EDT. Ask for the BASF Diskette offer. Hurry, supplies are limited.

Try it. Depend on it.

BASF Corporation
Crosby Drive, Bedford, MA 01730

Circle 479 on reader service card
SHOWCASE F/X 1.0

Title Animation and Slide Presentation

**Pros:** Quickly creates presentation slides and smoothly animated titles and graphics; works with genlock device for titling videotapes and titping slide shows.

**Cons:** Inconvenient, counterintuitive interface; lacks basic drawing features, such as grouping; inadequate editing tools; poor manual.

**Company:** Aegis Development. **Requires:** Mac II; 2MB; color or gray-scale monitor; hard disk; System 6.0.2, Finder 6.1. **List price:** $395.

Showcase F/X is a program for animating titles and graphics that also provides text-over-graphics effects for enhancing slide shows and videotape presentations. Video titling requires a standard NTSC television-signal compatible video card, genlock for synchronizing a Mac II and video signals, and either a camcorder and a VCR or two VCRs.

**The Import Business**

Showcase F/X documents have a top layer for text and a bottom layer for creating color backgrounds, patterns, and fills. You can import color PICT files from paint and draw programs or from programs such as Cricket Presents, Microsoft PowerPoint, and Wingz. You can import and animate graphed spreadsheet information, for example, making an arrow descend a column to point out the bottom line.

Scanned and captured digital images can also be directly imported as backgrounds, displayed in 8-bit format but retaining any 24-bit information. Rather than rely on the limited shape and fill tools in Showcase F/X, however, you should use a gray-scale editing program like Digital Darkroom to work with digitized images.

To enter text in the foreground, you select the font, size, style, effect, and shadow options from the fonts in the System Folder or Showcase F/X's seven Polyfonts. The fonts can easily be restyled, distorted, mirrored, and resized (although you cannot adjust kerning). Your choices are limited, though: some style options work only with certain fonts, and some look almost identical in the smaller sizes.

To animate text, you select the Script Editor and begin by typing in the total number of frames you want to have. You can enter text one frame at a time or use the Key Frames option, in which Showcase F/X automatically completes the animation between any two Key Frames (interpolation). To create an animation with the word ZAP!, I started with 9-point text in my first Key Frame, selected a second Key Frame, and changed to 12-point text 50 frames later. I then stretched the Polyoxygen letters out even more by their handles. The result was a 12K script that I used to create a 3.5MB Aegis-format Anim file (see "ZAP! Animation"). To locate a particular frame in Showcase F/X, you flip through a stack of transparencies, unlike VideoWorks where you must look at the frames displayed in separate rows.

The background and text colors in each Showcase F/X document can be customized with the Mac II's Color Picker, and you can blend colors when assigning pen colors in the color palette editor. Palettes can be saved for use in other Showcase F/X documents. Any Macintosh font or laser font can be converted to a color font, then formatted with any of Showcase F/X's styles. The program does not have a paintbrush, paintbucket, eraser, or magnifying capability, and the spray can has only one size nozzle.

Unfortunately, editing with Showcase F/X is slow. To see a frame as it will actually appear, you must use the Preview command and wait from two to three minutes for something as complex as ZAP! to be displayed. You cannot edit frames separately, and there is no revert and (for most functions) no undo.

**Good Compressions**

Showcase F/X's best feature is Anim. Anim files consist of compressed images that you can decompress and play back at various speeds. The program compresses Anim files by a factor of 40 to 50, enabling you to store a 10MB Anim file in 400K to 500K. Showcase F/X is most impressive when playing back a 256-color Anim file at 60 frames per second. There are seven preset playback speeds (ASAP, and 60, 30, 15, 10, 5, and 1 frame per second).

Included with Showcase F/X, Aegis Player plays the Anim files, and Aegis SlideShow lets you integrate slides and animations with timed wipes and fades, and select which slide or animation to preload into RAM. With its demanding neon style, my animation's 122 frames (2 seconds running time) required 1 hour and 6 minutes of processing time. Aegis recommends a minimum system configuration of 2MB to run Showcase F/X; I recommend a minimum of 5MB to 8MB.

The Showcase F/X tutorial contains no illustrations of on-screen results. It takes almost 10 minutes for a Mac II to process the tutorial's 50 frames of animation, a valuable lesson in itself. The manual contains numerous typographical and syntactical errors. Menus are shown, but little else about the program is illustrated. Despite the program's being designed for the Mac II family only, Showcase F/X's manual is entirely in black and white—including an 8-page section on color, with repeated illustrations of solid black palettes and color wheels; and the brief section on pen colors is inadequate. Also included with the program is a 15-minute VHIS video demonstration tape.

Showcase F/X simply misses with its interface. Even with a text object selected, for example, the program doesn't display the font, style, or pen colors. Making identical changes to multiple objects in the same frame is repetitious because you can't group objects. Despite its drawbacks, however, you can learn to work with Showcase F/X to create the simplest

(continues)
Desktop Video Production
Showcase F/X's video-titling capabilities are well beyond the standards of consumer video equipment. I experimented with standard VHS recorders, with a Mass Microsystems ColorSpace II video graphics board in my Mac II, viewing the results on both an Apple color monitor and a standard 19-inch color TV. The titles and graphics lost their Apple-monitor crispness in the dubbed results on a standard screen, and rich saturated colors; but low-saturation colors such as pastels look good on real TV, as does 24-point or larger text. A camcorder produces a better signal than a VCR for animated graphics-over-video effects, and the results are professional looking.

Showcase F/X is a costly proposition for titling home video productions, even if you already have a Mac II (NTSC genlock video boards start at about $1600). But it could be a cost-saving enhancement for professionals who frequently shoot camcorder video and who lack the time or money for studio titling and slide production.—Keith McCandless

See Where to Buy or circle 872 on reader service card.

BERNOULLI BOX II 44
Bernoulli Removable Media Drive

Pros: Quiet; infinite storage capacity; dual purpose as online and backup device; toll-free phone and 24-hour BBS tech support. Cons: Expensive; sluggish backup software; needs MultiFinder fixes.
Company: Iomega Corporation.

Now that the Bernoulli Box II 44 with version 3.11 software boasts access times as fast as some popular medium-speed hard disks (32 ms) and a cartridge capacity of over 40 megabytes (double the previous capacity) Iomega is marketing the system as an alternative solution to the problem of escalating online storage needs and floppy or tape archiving. The 80MB online storage of the dual drive unit and the infinite storage capacity of the Bernoulli removable flexible 5½-inch disk make the Bernoulli system a viable alternative to those 100MB-plus hard disk and tape drive configurations.

Set-up
I tested the Bernoulli Box II 44 on a Mac II with 2MB of memory and System 6.0.2. My first problem was where to put the box. Although it would fit under a IIcx or an SE, the Bernoulli is too narrow to go under the II's CPU; you can put the Bernoulli on top of the CPU and thereby raise the screen by 3 inches. Otherwise, you'll have to allocate an extra 14 inches next to the Mac II.

Although the Quick Setup Instructions are clearly written, setting the SCSI ID is a little like performing microsurgery. You need an ¼-inch flat-blade screwdriver and a magnifying glass. Mysteriously, there are ten positions on the SCSI ID dial, even though there are only eight possible SCSI devices; it turns out that 0 through 7 are the normal SCSI assignments, and on this Bernoulli position 8 equals SCSI address 0, and position 9 equals SCSI address 1. Termination is relatively straightforward, but it too requires using tools.

Iomega provides an INIT that lets the Mac recognize a Bernoulli cartridge. After copying this INIT to the System Folder and restarting, the Bernoulli's slots appear and act like additional external drives attached to the Mac. Even though it is considerably slower to start-up than an internal hard disk, you can set the Bernoulli to be the start-up device, which would be handy if you regularly use different system configurations (such as switching between Finder and MultiFinder, or using different start-up application combinations).

Workshop and MegaCopy, Versions 3.11
Since the Bernoulli cartridge looks just like a big floppy disk to the Finder, you can format a new one either from the desktop or from within the Workshop utility software. Workshop also offers a Short Format option (it just rewrites the directory header of a previously formatted cartridge in seconds instead of taking 13 minutes to completely reformat it), tests both drives and cartridges, gives you information on the life expectancy of cartridges, and sets cache preferences. But it doesn't offer hard disk maintenance or recovery capabilities.

MegaCopy is back-up software that can be opened either as a separate application or from within Workshop. Copying from cartridge to cartridge is relatively fast because MegaCopy performs a mirror-sector copy rather than the Finder's file-by-file copy. The main drawback of this copying technique is that there is no verification, as there is in the Finder. Using MegaCopy for hard-disk-to-Bernoulli backups, however, is relatively slow (a 17-minute backup with MegaCopy took 10 minutes with DiskFit 1.5). MegaCopy also offers fewer features than more developed backup utilities like DiskFit and Redux, or dedicated tape backup utilities, such as general preferences for backup options, file lock-out to allow writing to the source during backup, and scheduling software for unattended backups. How—(continues)
No Mac is an island.

Especially if you're hooked up with a copy of WordPerfect®.

Because with WordPerfect, the Mac not only stands alone, but works as part of a greater business team.

Macintosh, MS DOS, VAX, DG, and UNIX systems are all trying to connect. And WordPerfect offers more common ground than any other word processor.

Through your network, WordPerfect makes it easier to use the same document on different machines. That's because WordPerfect shares compatible file formats on these different systems.

So once you've transferred a file, you'll find that most of your format settings—like columns, margins, bold, and underline—remain intact from system to system.

And because the WordPerfect commands and functions are similar from one computer to another, you'll feel comfortable using WordPerfect no matter what system you're on.

So if you need to share your work, putting WordPerfect on your Macintosh is a smart decision. Because with WordPerfect, you'll never work alone again.

Unless you want to.
ever, the Bernoulli's transfer rate of 1MB to 2MB per minute (depending on your choice of software and use of MultiFinder) places it well within the competition's tape drive performance and capacity as a back-up medium (see “Smart File Copy”).

Even though Workshop and MegaCopy ostensibly support MultiFinder, there are still such serious bugs that I would suggest limiting yourself to the Finder. The Bernoulli Box’s performance under MultiFinder is almost half that under the Finder, whether or not the cache or verification is on. Worse, selecting MegaCopy from a Workshop menu while under MultiFinder results in an error message. And if you try to write anything to a given file while you’re backing up that file, the backup announces a fatal error and screeches to a halt, rather than locking the altered file out of the current backup set, as other products do.

Almost consistently under MultiFinder, cartridges formatted using Workshop's Short Format option appear to the Bernoulli as still full, and you are asked whether or not you want to overwrite the current data (although the Finder correctly recognizes these to be “empty”). Occasionally, unformatted cartridges are not recognized at all, and therefore can’t be written to, read, or ejected using the normal software tools. Instead, add to your trusty Mac toolbox of jumbo paper clips that same screwdriver you needed to set the SCSI ID, and a pencil with a new eraser. In order to eject a lost cartridge, you must pry off a panel, peek inside the box (you might also need a flashlight), rotate the disk with the eraser until two dots on the drive line up with one another as if you were setting the timing on your car, and then eject it with the clip.

Like the Syquest-based removable hard disks, the Bernoulli Box's chief selling point is its infinite storage capacity (see “Why Say No to Backup,” Macworld, November 1988). While the initial cost seems a bit pricey at $35 per megabyte (retail price of the hardware storage capacity), by the time you've stored your first 160MB, you’ve already matched the average per-megabyte price, $16 to $19 per megabyte, for 40MB to 80MB standalone hard disks. If your needs climb to 400MB or more, you’ll reduce your cost to about $2.25 per megabyte. Still, several competing Syquest-based removable storage systems offer the same storage dimensions and faster access times at equivalent prices.—Nancy Canning

See Where to Buy or circle 723 on reader service card.

THE ANCIENT ART OF WAR AT SEA 1.0

War Strategy Game

Pros: Three levels of play; combines strategic planning and arcade-like play; game generator; excellent manual. Cons: Specific information from manual required to start up. Company: Broderbund Software. Requires: Mac 512K (does not run on Mac II). List price: $44.95.

Broderbund’s The Ancient Art of War at Sea is the seafaring sequel to the classic strategy game The Ancient Art of War. The action encompasses commanding an entire fleet, directing individual ships in battle, and leading hand-to-hand combat on boarding rafts. Eleven prearranged campaigns, based loosely on famous sea battles, are included, as well as a game generator that enables players to design an unlimited number of campaigns on their own.

After you load the game, the program prompts you for information from the manual. This rather benign form of copy protection permits making backups but discourages piracy (no pun intended). Just don’t lose the manual.

You can fine-tune the rules of each campaign, such as whether your crew is crack (experienced) or green (novice). Finally, you choose between six different opponents, each with unique strengths, weaknesses, and strategic styles. The same campaign can turn out differently depending on which commander is in charge of the enemy fleet.

Views to Victory

From a vertical scrolling map showing the entire campaign area, you might develop a strategic plan, sending your squadrons of ships into battle or bringing them into port for supplies and repairs (see “Getting the Picture”).

An info box tells you the names and types of ships in a squadron, whether they are at anchor, in port, at full or half sail; and the condition of the individual ships. When opposing squadrons encounter one another, you can zoom in and toggle between a near and far view to command the battle. Finally, when two battling ships come close enough for one crew to board the other’s vessel, you can zoom in to direct hand-to-hand combat. To be victorious, you must capture or destroy all of the enemy’s flagships, destroy its entire fleet, force a surrender (not likely), or capture its crown port.

The map view includes a number of features. Time controls speed up or slow down the passage of time. A message window alerts you when an enemy has been sighted or when an encounter has begun. A Zoom button lets you zoom into a battle to direct the action. If you need to take a break from the pressure of command, a Pause button will freeze the action.

An Engaging Enemy

Upon zooming into a battle, you can toggle between a long view, showing you the entire battle area, and a close-up for precise maneuvering and combat. In the close view, crisp animation depicts the ships as they tack to and fro (see “Crossing the T”). You try to steer your ships into positions that allow you to fire at enemy
Why Ralph Volk cancelled Linotype for a Varityper PostScript Imagesetter

"I made head-to-head comparisons between Linotype® and Varityper® PostScript imagesetters for the same jobs. What I found, more often than not, was that Linotype produced a 1 point miss or overlap at what looked like uniform intervals on the page. I'm told this banding is a result of their start/stop scheme and that it will only get worse as the equipment gets older. Whatever it is, the results are unacceptable for my work, particularly my color work. On the other hand, Varityper produced flawless, high-quality output at speeds much faster than those other guys. And when I found out that I could get the Varityper for substantially less money, there was no contest... I said, buy the Varityper."

"My advice to anyone looking for a high quality PostScript imagesetter. Do yourself a favor. Consider Varityper and make your own comparisons."

Mr. Ralph Volk, President, Sun Graphics & Publications, Inc., Waynesville, Michigan, 49128, a leading art services company that specializes in graphic arts, design, prepress, advertising, marketing and direct mail. Sun Graphics & Publications - a design and production art studio employing professionals electronic systems for high quality color images, data entry and design. Designing services to service image professionals.

See for yourself. Just call and we will send you output samples from Varityper imagesetters. You'll see the quality difference for yourself!

Give Varityper a Call Today
1-800-631-8154
(In New Jersey 201-867-8000 x 999)

Circle 483 on reader service card

The Varityper advertisement reproduced above appeared in the June, 1989, July, 1989 and August, 1989 issues of MacWorld. The advertisement inaccurately portrayed the comparisons conducted by Varityper's customer, Ralph Volk, in his evaluation and purchase of a PostScript imagesetter. Mr. Volk neither had nor cancelled a purchase/license agreement for a Linotype PostScript imagesetter. He did test Linotype's current PostScript imagesetter, the Linotronic 300 recorder with RIP 3 processor, and he made no head-to-head comparison of that imagesetter with the Varityper 4300P PostScript imagesetter. We regret these inaccuracies and any confusion they might have caused.

Varityper's message, then and now, is that before you conclude the purchase of a PostScript imagesetter, make your own comparisons. We urge you to speak with representatives of Varityper and Linotype and accurately evaluate each company's products.
enemy crew automatically makes minimal repairs to allow the enemy ship to rejoin the action, but as part of your fleet. To repair a ship that is severely damaged, it must have over 20 percent of its original supplies, and it must be brought to a repair port. If a ship has less than 20 percent of its supplies, you must bring it to a supply port. Once a ship's condition improves, you can return it to action.

When two battling ships get close enough, one will attempt to take control of the other by capturing its flag or by defeating its crew (see "Flying across the Breach"). It is possible to take an enemy ship that's undamaged, but this is far from easy. When you do win a grapple, you may let loose a rousing "hooray" along with your animated crew.

Meet the Fleet
Three types of ships are involved. Frigates are light, fast, and highly maneuverable ships, useful for patrolling shallow waters—but they are much more vulnerable to damage by cannon fire and will sink in rough water. Ships-of-the-line have twice the firepower of frigates and can sail in rough seas, but they sink in shallow water. Flagships are similar to ships-of-the-line, but can deliver and take even more punishment, and they also have more strategic value than the other ships.

The Ancient Art of War at Sea comes with a game generator that you can use to re-create historic battles or cut loose and design your own scenarios. The documentation takes you through this feature step-by-step, but the game generator functions so logically, you may not need it.

Pass the Grog, Matey
The Ancient Art of War at Sea's challenge combines the strategic planning of conventional war games with original arcade-like sequences that will keep your adrenaline pumping. Its authors Dave and Barry Murry have succeeded in creating an exciting and elegant window into another age. The game is both simple to play and challenging to win. The manual is instructive, educational, and entertaining to boot.

—OttO Waldorf
See Where to Buy for contact information.
Uninterruptible Power and Reliability

Your Macintosh deserves the 110SE Uninterruptible Power Supply from American Power. The 110SE is the **first** UPS designed specifically for the Macintosh user.

Features include:
- Complete protection from blackouts, brownouts, spikes, sags, surges and noise.
- Extremely small footprint and light weight.
- Specifically designed for Mac SE, SE/30, Plus and 512.
- Solutions for Mac II and Mac IIcx also available.
- Supports APC's exclusive PowerChute Interface Kit for automatic, unattended shutdown of AppleShare networks.

American Power Conversion

350 Columbia Street/P.O. Box 3723/Peace Dale, R.I. 02883/Tel. (800) 541-8896

Circle 417 on reader service card
input for high-precision work; trimming, aligning, filleting, grouping, joining, adding and subtracting objects, custom crosshatching, and multiple-line definition; complete use of Mac fonts with unrestricted text positioning; creation of reusable symbols; and a programmable Duplicate feature, to make scalable copies of objects according to user-defined arrays or rotations.

The scope of these features list puts MiniCad+ in the ranks of the most thoroughly implemented 2-D CAD programs, well ahead of Generic CADD, MacDraw II, and MacDraft, and a bit ahead of Dreams. Version 2.0 extends the program's drawing aids significantly, with a Constraint Palette for specifying user-defined snaps and drawing rules—both of which are useful for drawing concentric or parallel objects, objects distributed along angles, or tangents to curves. Mirroring and Smart hatching to keep hatch lines from intersecting objects have also been added.

The program also handles standard paper sizes A through E, although to get full-scale hard copy you must purchase either a basic (A, B) or professional (A–E) plotting package; these are basically custom variants of MacPlot, from Graphsoft. DXF format translation is now included, linking MiniCad+ to the world of AutoCAD—the dominant IBM PC program. (MiniCad+ also imports text, MiniCad 3D, and PICT (object or picture) files, and exports PICT, EPS, and text.)

The MiniCad+ core could stand a few minor improvements. Except for the section on MiniPascal, MiniCad+’s documentation is fairly basic. Also, there’s no help facility; there is a HyperCard tutorial, but it is an extra-cost option. Misuse of commands can occasionally make the program hang instead of generating a beep. There’s no way to escape from the middle of most operations, and the program could use a multilevel Undo (the industry seems not to have noticed that all drafting programs need this feature).

Should you find you require a drafting tool not provided by the program, Graphsoft has included a programming language called MiniPascal (which is actually more useful as a high-level macro toolkit than a from-scratch programming language) for writing custom routines. This is not as difficult as it sounds, since MiniPascal has a rich set of graphics procedures (apparently a generous chunk of the source code of MiniCad+ itself) and an exceptionally clear manual with enough examples to get you started. Programs developed in MiniPascal can be named and entered under the CMD symbol menu and used as standard menu items. Although users with no previous programming practice will probably need a good beginning Pascal book for reference, experienced programmers will find MiniPascal allows easy construction of simple, but useful, combinations of other MiniCad+ operations.

On the Grid
The spreadsheet in MiniCad+ is really a specialized graphing-data aid. To link it to a drawing, you select the gridlike tool at the bottom of the Tools palette. Although each spreadsheet holds only 254 cells, you can do some nice things within this limit. For example, when you select an object in the drawing, a function called Count determines the number of times the object appears. The use of this function in automatic bills of materials is obvious, and you can export this data via the Clipboard to real spreadsheets. The spreadsheet is also handy for computing drawing-linked areas and volumes, and calculating keyboard-entered dimensions.

3-D without Glasses
MiniCad+ does not offer an assortment of 3-D solid objects like In-CAD, or 3-D shading like MicroStation Mac, but those programs cost more and call for high-end hardware. In MiniCad+, wire-frame 3-D objects are generated by first defining a 2-D object and then sweeping it around a locus or extruding (stretching) it (see “Living 3-D”). The Render function removes hidden lines and gives you a solid view of the 3-D object. Rotating, redrawing, and rendering 3-D objects takes from just a few seconds to a few dozen seconds, depending on an object’s complexity. To be fair, removing hidden lines in making a pseudosolid from a wire frame is a complex calculation, but for MiniCad+ to compete in the 3-D big leagues would require that the 3-D parts of the program be rewritten in assembler, bypassing QuickDraw and effectively eliminating user access via MiniPascal. Graphsoft has chosen ease of use and modifiability over screaming 3-D performance, a choice that’s quite appropriate for many architectural and engineering users.

You get a lot for your money with MiniCad+. The program competes with high-end 2-D drafting programs that cost as much or more, and offers solid additional features in its MiniPascal language, drawing-linked mini-spreadsheets, and 3-D object generation. Additionally, MiniCad+ will run on any Mac having at least 1MB of RAM. For users who don’t require full-blown workstation-style 3-D solids modeling but would like a nicely enhanced, complete 2-D package, MiniCad+ is highly satisfactory.—Charles Seiter

See Where to Buy or circle 835 on reader service card.
Microtek presents the MSF-3002. The one scanner that can do it all: color, gray-scale, drawings and text. All for a price that until now, could barely buy you gray-scale capabilities.

Hard to believe, but it's true. You can scan vivid color images into your computer for desktop publishing, presentation graphics or pre-press work. A full 16.8 million colors at a time.

If you don't have a color application yet, this unique scanner captures gray-scale as well as black and white. So you can start working today.

Images can be scanned in 256 gray-scale mode and then retouched, scaled or rotated. And printed on a laser printer or phototypesetter with outstanding results.

Charts and drawings are quickly scanned in single bit-per-pixel mode then imported into your favorite publishing or word processing program. You can even bring words into your computer without retyping by adding OCR software.

Interface kits include sophisticated color, gray-scale and black and white image editing software and are available for the Macintosh ($500) and the IBM PC or PS/2 ($400).

If you need a scanner for your personal computer, you need Microtek's MSF-3002 Color/Gray scanner. Call (800) 654-4160 or in California (213) 321-2121 today to find your nearest Microtek dealer.

After all, at this price, you can hardly afford not to.
Trade secrets revealed...

How To Save Money
On Hard Drives
and Other Macintosh
Products!

Would you like to save money?
A lot of money?

If so, before you go through the
pain and expense of buying a hard
disk drive for your Macintosh,
there's something you should know.
It's a trade secret that Apple and
others would rather you didn't
know.

Just listen to this. Apple only
offers three hard drive choices. But,
when you know how, you can have
an almost unlimited selection.

You can select a 20 megabyte or
600 megabyte—or more—all from
major brand name drive manufac­
turers. You can even purchase the
same drive that Apple sells!

What's the secret? Everything
that you need to know is explained
fully on a diskette titled—BYOM.

BYOM is published by UniMac.
And, it's yours for just seven bucks!
A small price to pay for inside trade
information. Wouldn't you agree?

But, that's not all. Included is
information on hundreds of prod­
ucts you can buy from other compa­
nies that will enhance the value and
performance of your Macintosh!

Now, here's the best news of all.
We guarantee that this $7 invest­
ment will save you money or we'll
double your money back! No kid­
ding. If BYOM doesn't show you
how to save money on your next
hard drive using any of our internal
or external kits, we will cheerfully
refund you $14.00!

So why wait? All you have to do
is send us your request along with
your $7. Send in your order today—
and learn the trade secrets that
we've dared to share!

Universal MacProducts, Inc.
942 Calle Amanecer, Bldg. A
San Clemente, CA 92672

Oh, by the way, a full-size poster of
this illustration is available from our
dealers. Details included with your
order. Thank you.
PC MACTERM/NETWORK
1.2
Software for Macs to Control Networked PCs

Pros: Good way to provide MS-DOS capabilities to networked Macs; conversation mode useful for collaborative work; password security for controlling access to PC; support for routing PC PostScript output to Mac. Cons: Only one file can be transferred at a time; PC program supports either AppleTalk or modem access, not both; only CGA graphics supported; might conflict with RAM requirement of some PC programs. Company: Dynamic Microprocessor Associates. Requires: Mac Plus; IBM PC or PC clone; AppleTalk interface card for PC; LocalTalk wiring or equivalent. List price: $395.

PC MacTerm/Network is a Mac program that provides a window for mimicking a PC's display. Anything you type in that window is sent to a networked PC and is processed by the PC as if the data had been typed on the PC's keyboard. The result of your typing, such as the execution of a DOS program, is transmitted back to the Mac's window as well as being displayed on the PC's monitor.

Speaking MS-DOS on the Mac
In order for all this to work, you need to have a PC with an AppleTalk card and its companion program, PCAnywhere. When you open PC MacTerm/Network on the Mac, you can select any networked PC running PCAnywhere and execute MS-DOS commands on the selected PC (see "Making the Selection").

Version 1.2 of PC MacTerm/Network supports the CGA graphics mode as well as the PC character display. PC MacTerm/Network also maps the function keys of a PC keyboard to the Mac keyboard. You can then use the Mac's mouse to select any of the PC function keys and PC cursor keys from the Keypad Menu. You can also control the PC's cursor movement with the Mac's mouse; if you click a location, PC MacTerm/Network sends the appropriate cursor keystrokes to move the PC's cursor. You can also use the Mac mouse to copy and paste selected text.

Central Control
Running on the PC's PCAnywhere allows you to set options for the PC's name (for identification purposes), keyboard mode (both keyboards active, only host keyboard active, or only remote keyboard active), and time-out periods for logging off inactive users. In addition, with PCAnywhere you can create a list of allowed names and passwords for users who wish to connect to the PC. This list also includes an option that allows PCAnywhere to log any caller's session. Once you have configured PCAnywhere to your liking, you can set it up to stay active in the background.

PCAnywhere is the latest generation of a program originally designed to allow PC users with modems to dial in to a PC and control it, much as Macintosh users can with Farallon's Timbuktu/Remote. Now that PCAnywhere supports Mac access over an AppleTalk network, the new program provides other PCs that are part of the same network with similar capabilities (the PC program is called ATERM). Thus one PC running PCAnywhere can store and run special programs, such as Lotus 1-2-3, available to Macintosh users and PC users alike.

Moving Data
ASEND is included in PCAnywhere for transferring files. Unfortunately, you can only select Mac files one at a time; the file-selection dialog returns after a file is transferred and you stop the transfer process by selecting the Cancel button in the dialog box. I would much rather have a way to select multiple files (for example, shift-clicking or selecting a folder) for transferring files from the Macintosh. PC MacTerm/Network's gauge roughly shows the file-transfer progress. Background file transfers with MultiFinder are fully supported.

You can also use PC MacTerm/Network to redirect PC printing jobs to any printer, including a LaserWriter, attached to the Mac. Output directed by PCAnywhere to the PC printer port LPT1 is converted by PC MacTerm/Network to a file called PC Printer on the Mac. If PC Printer file already exists, you are asked to assign a different name to the new file. If your DOS applications can generate PostScript files, those files can also be directed to the LaserWriter via this LPT1 mechanism. Once the output has been spooled to the PC Printer file on the Macintosh, PC MacTerm/Network asks you which font, font size, and tab setting you want to use.

PC MacTerm/Network supports a conversational mode that allows remote and host users to type messages to each other on the screen—a good way for Macintosh and PC users to collaborate without the excessive transfer of files between machines.

The Right Choice?
At $395 PC MacTerm/Network and PCAnywhere is a nice way for Mac users to run MS-DOS programs without having to buy a coprocessor card, but it's considerably more expensive than a competing program called MacChuck from Vano Associates ($100). PC MacTerm/Network's advantages lie in password-controlled access to the PC and password support for both PCs and Macs, while MacChuck transfers files faster over the network.

If you occasionally want to run MS-DOS programs in a window on the Mac, I'd recommend MacChuck. On the other hand, if you have a combination of Macs and PCs and want to run DOS programs on either a Mac or a particular PC, or are concerned about security to that PC, then PC MacTerm/Network is your best choice.—David Kosir
See Where to Buy or circle 853 on reader service card.
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.
**FOR THE RECORD 1.0**

**Personal Record-Keeping Program**

*Pros:* Extremely well documented.  
*Cons:* No data import or export.  
*Company:* Nolo  
*Pros:* Requires: Mac Plus, HyperCard 1.1.  
*List price:* $49.95.

**FAMILY MATTERS 1.0**

**Personal Record-Keeping Program**

*Pros:* Fully customizable; easy data import and export.  
*Cons:* Slow; distracting graphics; bore-bones manual.  
*Company:* Springboard Software.  
*Requires:* Mac Plus; HyperCard  
*List price:* $49.95.

For the Record and Family Matters are two competing electronic answers to the ancient problem of how to organize important home and family information. Both programs have main menus that offer sections on topics such as family records, medical records, financial information, employment history, insurance, trusts, vehicle information, child care, pet care, and home inventory. They also both offer submenus for most of the main categories. Under vehicle information, for example, they list vehicle identification numbers, license plates, insurance information, and repair and service records. Both products have places in which to record employment records, birth records, and family tree information. They also treat home inventory, savings accounts, and emergency contacts similarly.

The most important difference between the two products is documentation. The 200-page manual included with For the Record is rich in detail, and its contents are presented with a good sense of humor. Full of practical advice about family legal and financial matters, For the Record's manual offers considerably more information than you'll probably ever use. Family Matters' 50-page booklet, on the other hand, simply explains the software and lists category information.

For the Record

For the Record is a stand-alone application, with a database dedicated to family record keeping. It offers 27 categories, including emergency information, pensions and retirement, securities, objects of value, locks, personal documents, death plans, and wills. In addition, 200 subcategories appear according to which main category is selected. For instance, Child Care and Living Will show when you select Emergency Information (see "Just in Case").

For the Record is not programmable, so you cannot create your own categories or modify either the data displays or the organization of categories. The program does, however, allow you to post miscellaneous notes on any record in the database. It also offers a simple cross-referencing system. I particularly liked the way For the Record compensates for the fact that you probably won't want to keep all your records in the computer, by including space for listing the physical locations of documents like address books and birth certificates.

Family Matters

Because Family Matters is a set of HyperCard stacks, it is easily customizable. You can create your own links between the pieces of information you enter, and you can use HyperTalk to easily import and export data. One stack provides a database for listing the same kind of basic information that's included in For the Record. It divides data into five categories (family members, household, financial, vehicles, and pets), which in turn are divided into several dozen subcategories. Family Matters dresses up a simple database application with some nice graphics, but it's slow.

In addition, the buttons are sometimes confusing. For example, the main menu card hides the category buttons in the picture (see "All in the Family"). You must click on the car to go to vehicle information, the dog for pet information, and one of the kids for family members. By pressing Option-#, I was able to see where the buttons are hidden; otherwise I would have been forced to read the manual or use the main menu. Another problem with the interface is that the Search button icon promises an information map, but delivers nothing more than a simple HyperCard find routine. What's more, all of the information screens lack navigation buttons for returning to the main menu, a glaring omission in any HyperCard application.

A Wealth of Information

Unless you're already well organized and on top of the legal and financial implications of personal record keeping, For the Record has a lot to offer. Family Matters offers essentially the same features as For the Record, plus the added advantage of HyperCard flexibility and programmability, but nothing like the same wealth of documented information.—Tim Berry

See Where to Buy or circle 769 (For the Record) or 757 (Family Matters) on reader service card.
Wherever your Apple LaserWriter II is now perched, we offer this attractive alternative: The Organizer;™ from CoStar.

You may have a hard time determining where one ends and the other begins (as some Macintosh experts did), but that's not so surprising. The Organizer was created by a member of the design team responsible for the LaserWriter. It is the exact same color. And has the exact same finish.

It is Apple to the core. In form. And function.

Take those shelves for instance. Think of the reams of paper you could store there. The extra paper trays. And toner cartridges.

There's even a special place in back for a hard disk drive. And a wire management system that keeps everything nice and neat.

And those hefty wheels. They make it easy to move the whole operation down the hall. Or to park it in a closet overnight for safekeeping.

The Organizer from CoStar. We think it could do wonders for your organization.

The Organizer comes with a lifetime warranty.

To order one, or to find out the dealer nearest you, call 1-800-426-7827. (In Connecticut, call 661-9700.)

CoStar Corp., 22 Bridge Street, Greenwich, Connecticut 06830 Fax: 1-203-661-1540  Circle 487 on reader service card
Acta Advantage, adus a stand-alone application; below these are daughter hierarchical, top-down structure. A family easy as pointing to a topic, clicking the location; and keyboard commands are still intuitive and easy. Its latest incarnation, Acta Advantage, adds a stand-alone application and several impressive outlining features. Reorganizing topics is still as easy as pointing to a topic, clicking the mouse, and moving the topic to its new location; and keyboard commands are still plentiful and logical.

A Powerful Family Tree
Outlines in Acta Advantage, like those of the original Acta, are organized in a hierarchical, top-down structure. A family metaphor is used to describe the relationship of each level. At the top level of the outline are mother topics; below these are sister topics; below these are daughter topics. Each of these levels is indented further to the right.

The Best of Both Worlds
Two new additions to Acta are the ability to mix type styles within a topic and to set page breaks to differentiate topics in an outline. While including everything that the desk accessory offers, Acta also includes several new printing options. You can add headers and footers, place rectangular boxes around an outline, and create custom topic labels. You can also view these labels on screen, open up to nine windows at once, search and replace items in an outline, and sort daughters as well as sizers.

The difference between the DA and the application is simply one of working style. If you want to do most of your outlining while in the middle of other projects, the DA is for you. You’ll need the application if you want to open up outlines from the desktop, have a to-do list, phone list, or do extra formatting on your outlines. Either way Acta is a flexible, easy-to-learn outlining environment. Files created in either the DA or the application are accessible to both.

A Versatile Tool
Acta can store graphics as well as text. You just enter a few keywords as the mother topic and paste in a graphic as a daughter. To locate what you’ve stored, use the Find command to search for keywords and the graphics are readily available.

One of Acta’s nicest features is its ability to import and export data in various formats. The program provides format drivers for Microsoft Works, More, WriteNow, ThinkTank, Microsoft RTF, Scrapbook, and MailMerge (tab- or comma-delimited text). Text output and MacWrite formatting are built-in, so no extra driver is required.

In case you use an application for which Acta doesn’t have a format driver, Smart Paste allows you to import text from any application through the Clipboard, separating each line that ends with a return character as a new topic.

Although some competing programs offer more features, Acta’s easy reorganizing of topics, support for custom labeling, built-in sorting and searching, and easy-to-learn hierarchical structures make it the outliner of choice. —John Gillett

See Where to Buy or circle 701 on reader service card.

SIMULATING REAL-WORLD EVENTS

Simulating real-world events is one of the pet dreams many people have for their computers. High Performance Systems’ program, STELLA, lets you hook together interrelated icons—representing tanks, pipes, and valves—to simulate any situations you can cook up—be it economies, ecologies, factories, or whatever. The content level of the tanks rises and falls as the simulation progresses. While STELLA’s plumbing metaphor is very functional, its raw, back-room flavor doesn’t make the simulations very presentable to the uninitiated. STELLAStack solves this problem by giving the STELLA user all the software needed to create a HyperCard front end in which sliders, dials, animated pictures, and displays hide STELLA’s plumbing, making simulations dynamic and fun to watch.

First Things First
Anyone who wants to use STELLAStack must first be familiar with building a simulation with STELLA. The process is not difficult. You just represent the variables in your world as tanks. You program the way the items interact by hooking pipes between tanks and mathematically describing how the two levels in the tanks interact. STELLA sets the initial levels of the tanks to your choice of values, runs the simulation, and lets you watch as the simulated world changes. The STELLA manual gives plenty of examples of good models for everything from eighteenth-century France to the corporate job market.

STELLAStack comes with a boilerplate stack; different generic input and output (continues)
Traditional Typesetting vs. 1000 dpi Plain-Paper Typesetting

What you see in the top photo is a traditional typesetting shop, complete with a bulky developing system, toxic chemicals, long rolls of expensive photo-sensitive paper, clean-up supplies, the works. In the second picture, you are also viewing a complete typesetting system. But with this system, you compose your type with a Macintosh, and you output your type on a LaserMAX 1000 plain-paper typesetter.

MAXimum Resolution
What’s so phenomenal about the LaserMAX 1000 is 1000 x 400 dpi resolution on plain paper. This means that you can create to your heart’s content and print as many variations as you want, at only pennies per page. And with resolution this good, you use plain-paper pages for final copy—not just for proofing copy. (Say good-bye to all the toxic chemicals and bulky developer and cluttered clean-up supplies. And to the expense of all those things!)

MAXimum Speed
The LaserMAX 1000 isn’t simply GOOD. It’s also extremely FAST. Because our engineers don’t believe in sacrificing print speed—EVER. Most pages print in just SECONDS, even when they contain complex graphic images or unusual layouts. Or lots of typefaces. Or lots of type sizes. (As low as 2 point. As high as 2000 point. Or even higher.)

MAXimum Affordability
The LaserMAX 1000 costs less than you would think. At a complete price that’s under $8,000, you pay less than HALF of what Variatype charges for its 600 x 600 dpi printer, the VT600P. (And remember: the LaserMAX 1000 provides higher resolution and is 10 times faster.) If you’ve been waiting for a plain-paper typesetting solution that you can enjoy right now with your Macintosh II, IIx, or IIcx, there’s simply NOTHING that comes close to the LaserMAX 1000. It out-performs them all, at a price that can’t be beat.

7150 Shady Oak Road, Eden Prairie, MN 55344
(612) 944-9696 Fax: (612) 944-9151

Circle 342 on reader service card
Stack manual assumes that you already know how to use STELLA, because it still performs the actual simulations. The STELLAStack manual assumes that you already know how to use STELLA, teaching you while corruption and evil meet their just ending.—Peter Wayner


After being bashed over the head, you awake in a Las Vegas hotel room to find your life in disarray. Mobster and casino boss Tony Malone is convinced you have swindled $18,000 from his bookie operation—and has given you just a few days to set things right. With only $17.25 to your name, you must wind your way through a thicket of deceit and amass enough evidence to convince Malone of your innocence—before he sends his hired thug Stogie Martin to settle the score for good.

To succeed, you'll need to uncover secret rooms, deal with cops—and even find enough dough to support your travels. Along the way, letters, keys, books, and other objects that may provide clues will be unearthed. You'll need to decide which things to keep and which lines of inquiry to pursue. You'll probably die a few times, too.

By using the commands listed along the top of the screen—Examine, Open, Close, Speak, Operate, Go, Hit, and Consume—you'll be able to manipulate objects and situations. Simply clicking the mouse shows you what you are carrying. Need to pay for a train ticket? Just drag some money out of your wallet and give it to the conductor. Want to examine something? Double-click on the object and a window at the bottom of the screen describes what you have seen. Need to leave through a door? Just point to it and click twice. As long as it's open or unlocked, out you go.

Gentle Reminders

In describing Déjà Vu II it is difficult to give many hints without spoiling the fun. A standard rule is to examine everything and collect anything that might remotely help you. It might also be prudent to save things even after they have been successfully used. Never know when you might want to backtrack a bit.

Déjà Vu II is not the perfect interactive game, but it is a superior effort. By keeping your wits about you, and not consulting the hint book too often, you should enjoy hours of solid fun and adventure with Déjà Vu II. Remember, the problem with all adventure games is that once you've solved them you can't really go back, so take your time, don't cheat, and enjoy the challenge of saving your own life.—Bob Buderi

See Where to Buy or circle 747 on reader service card.
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.

McWorld / 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

Now we have 3 easy-to-learn, easy-to-use accounting programs created especially for the Macintosh.

**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 employer and employee taxes and deductions. All state and federal tax tables and parameters are included and all 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.

...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 busi-
nesses 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.

CheckMark
Software Inc.

1520 East Murbury / Suite 201
Ft. Collins, Colorado 80524

Phone: 903-494-3541  FAX: 903-494-3429

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.
This month I look at a tool to help create flowcharts, a hard disk security system, a HyperCard stack that can help organize Mac tools, and another stack that will store HyperTalk scripts.

**Flower 1.03**

Flower ($39.95 from iota) provides a quick way to create programming flowcharts using 18 standard flowcharting symbols. While Flower looks like a standard Mac drawing program, it doesn't require artistic skill. Instead of drawing flowchart symbols, you place them by clicking on the symbol tool and then clicking where you want the symbol to go.

Once a symbol is on the screen, you have some editing options similar to those in drawing programs, but there are also a number of restrictions. For example, you can relocate an object, but you can't resize it. You can enter text either inside or outside a symbol, but to edit the text you have to delete by backspacing from the end of the text. You can connect symbols with the line tool, but once a line is drawn, you can't eliminate just the line. To remove the line, you also have to eliminate the symbol to which it's connected. While these restrictions give you less control over the look of the document, they make it easier to create a uniform chart with no extraneous lines and with all the symbols the same size.

The OffPage Connector, an automatic feature, is a standard flowcharting symbol used to indicate that the chart continues on another page; it also allows you to link, through a dialog box, one Flower document to a second one. Once you've created the link, whenever you Option-click the OffPage Connector symbol, the current document closes and the linked page automatically opens.

Because Flower lacks drawing tools, if you need a flowchart symbol that is not included, you must create it in a drawing program and then paste it into Flower from the Clipboard. However, because custom symbols do not work as Flower symbols—for example, they are not automatically aligned or sized—they are difficult to work with. Another problem with Flower is that the entire screen gets redrawn whenever you select or move a symbol (if you select a symbol and then move it, the screen gets redrawn twice). This makes the program slow and cumbersome if you need to do a lot of editing.

A final problem is the fact that you can only have one window open at a time, making it difficult to edit multiple-page flowcharts.

Despite its shortcomings, Flower is much easier to use for flowcharts than, say, MacDraw or MacPaint. If you confine your flowcharts to Flower's 18 symbols, this program will speed up your flowcharting tasks dramatically (see "Flower's Symbols").

**HyperOne**

Despite the revolutionary technology in HyperCard, most commercial stacks are still take-offs on standard Mac applications. HyperOne from Hyperpress Pub.
lishing Corporation ($49.95), on the other hand, provides a totally new way of working with the Mac. It allows you to create a card from which you can easily access all the applications, DAs, documents, stacks, or notes you need for a particular project.

For example, suppose you are responsible for two separate tasks: creating brochures and billing clients. You would create two Sections, one for each task (HyperOne handles up to five Sections). In the brochure Section, you might create one card for each project (up to 16 per Section). In the billing section, you might create one card for each month of the year. You could then place buttons on each card in the brochure Section for a word processor, a page layout program, the alarm clock DA, a calculator DA, a drawing program, and each document you created for the brochure (see "Creating HyperOne Cards").

On the monthly billing cards you could, for example, place buttons for an accounts receivable application, a word processor, your HyperCard address stack, and notes in which you type the name of all the clients billed in the last month. You launch or view any of the items on the cards by clicking on its icon in the Home stack.

HyperOne saves you from having to go through layers of folders to find the items you need.

**Hard Disk DeadBolt 1.0**

Hard Disk DeadBolt from FWB ($89.95), available either bundled in a DA or by itself, can encrypt a file, a folder, or a set of files and folders that you specify and name. The program gives you three encryption options: DES (data encryption standard), a standard method of encryption; QuickBolt, which is not quite as secure as DES but is about six times faster; and AppLock, which is for applications only and takes about one second per application.

To use Hard Disk DeadBolt you need only specify the encryption method and click on the Encrypt button. You then select the files, folders, or combination you want encrypted, and type in a password.

Another handy feature of Hard Disk DeadBolt is Blackout, which you can use when you are leaving your computer for only a few minutes; you enter a password, and the program freezes and blackens the Macintosh's screen until the password is retyped.

In terms of user interface, there are basically two types of security applications. One type, like Hard Disk DeadBolt, requires that you enter a password each time you encrypt or decrypt a file (for the highest level of security you could use a variety of passwords). This is bothersome and time consuming, but it provides a high level of security. The other type of security programs simply require a password on log-in, which could put your files in jeopardy should someone discover your password or find your Mac on but unattended. If you choose the individual password method, Hard Disk DeadBolt works well and is a good value for the price.

**ScriptLibrary**

Another program from Hyperpress Publishing Corporation, Script Library ($49.95), provides the best way I have found to store HyperTalk scripts. There are two ways to place your scripts in ScriptLibrary: you can copy the script to the Clipboard and save the script in ScriptLibrary or you can use the Import button to have ScriptLibrary import all the scripts from any given stack. ScriptLibrary's Import function allows you to specify whether you want to import all the scripts of the stack or select only the background, foreground, button, card, or field scripts. After you import the scripts, you name them in the ScriptLibrary window.

ScriptLibrary also gives you two ways to reuse the saved scripts. When you are working in a stack, ScriptLibrary enables you to use the Shift-Option-Enter combination to get a dialog box listing all saved scripts by name. Then when you select the script, it is automatically copied into the Clipboard, ready for you to paste into a stack.

Alternatively, if you are in the ScriptLibrary window, you can find the script you want using HyperCard's Find function. Once the script is on screen, you can select the Copy/Paste button to place the script into a card, field, or button.

Most HyperCard developers keep their scripts scattered in stacks, stack fragments, and disorganized collections of cards. To locate an old script is often like hunting for a small piece of wire in a carton of discarded hardware. After spending several minutes searching, many programmers give up and rewrite the script. It does take a bit of discipline to use ScriptLibrary, but it will save you from hours of redundant work.

See Where to Buy or circle 767 (Flower), 790 (HyperOne), 782 (Hard Disk DeadBolt), or 869 (ScriptLibrary) on reader service card.

**Using ScriptLibrary**

The Script Author in the Script Information card automatically contains the HyperCard user name that was in effect when the script was placed in ScriptLibrary. The Date Created, Date Modified, and Handler Name are also placed automatically. You toggle between views by using the License To, Where Used, and Notes buttons in the Notes field. The Global button allows you to change the author's name, sort the library, or find a script. Speed Read lets you flip through the cards.
Read this, and paying for a new computer won't sound so great.

No one wants to pay for bells and whistles they don't need. But that's what most people do when they buy a new computer.

The vast majority don't need the latest technology—even for business. But they pay for it anyway. And end up with a bunch of high-priced extras that are unnecessary, such as music-making and color enhancements.

The truth is, the basic technology behind computers hasn't changed much since the PC and Macintosh were introduced several years ago. And the basic things people need computers for—communications, word processing, accounting—haven't changed much either. What's changed is the price.

A sound solution. A reconditioned Apple computer from Sun Remarketing has the performance, capacity, and power you need to execute all of your applications. The only thing it doesn't have is a big price tag.

Whether you need a single workstation or a whole network, Sun Remarketing offers a full line of Apple products from the Apple /// to the Lisa and Mac Plus; along with the necessary software and peripherals to tailor a system to your own needs.

A no-risk guarantee. We're confident in the quality of our extensively-tested products. In fact, we're so confident that we offer an unsurpassed 30-to-90-day money-back warranty* on everything we sell. If you're dissatisfied for any reason, just send the product back to us for a replacement or full refund. You won't find a more comprehensive guarantee anywhere on reconditioned or out-of-production computer products.

Apple authorized. Sun Remarketing offers a lot more than just low-priced computer equipment. As the only company authorized by Apple Computer Inc. to sell and service their used and out-of-production computers, Sun Remarketing gives you selection, service and support that no other dealer of reconditioned Apple equipment can match.

Free catalog. You can't buy Sun Remarketing computer products in any store. But you can order them directly through our free catalog. Just mail the attached card or call our toll-free number today, and receive the new Sun Remarketing catalog with our complete line of Apple products.

Because you don't have to pay for unnecessary bells and whistles to get a computer solution with a nice ring to it.

For a free catalog call 1-800-821-3221, ext. 366.
All of CDA's Complete Ready-to-Run Systems include the following:

- CPU, Keyboard and Mouse
- Hypercard Software
- All necessary cables & manuals
- Sony 3.5" diskettes (box of 10) (High Density Diskettes for SE/30 and IICx Systems)
- Mouse Pad
- CPU dust cover set
- Hard drive and memory size indicated in each package

Please Note—We can also customize a Macintosh system for your specific needs. Please call one of our sales representatives for more information.

**Mac Plus Entry System**
This affordable Mac Plus system includes 1 megabyte of memory, 1 internal 800K disk drive, 1 SystemGate 800K external disk drive and all of the listed items.*
Sugg. List $2135 CDA $1499
Delivery Charge $58 Package #8980
With a 30 meg hard drive instead of the SystemGate 800K drive...CDA $1899
Delivery Charge $70 Package #8981

**Mac SE/30 HD40 System**
This compact yet powerful SE/30 system includes Apple's 40 meg hard disk, the 1.44 meg disk drive, 1 meg of memory, and all of the listed items.*
Sugg. List $9356 CDA $3749
Delivery Charge $94 Package #8984

**Mac SE/30 HD 80/4 System**
This high capacity storage system includes Apple's 80 meg hard disk, the 1.44 meg disk drive, 4 megs of memory and all of the listed items.*
Sugg. List $6755 CDA $4999
Delivery Charge $102 Package #8985

**Mac IICx/40 Color System**
This system includes Apple's 40 meg Hard Drive, the 1.44 meg disk drive, 1 meg of memory, the extended keyboard, Apple's Hi-Res Color Monitor w/video card and all of the listed items.*
Sugg. List $9981 CDA $5295
Delivery Charge $131 Package #8986
With Apple's 80 meg hard drive and 4 megs of memory ...............CDA $6599
Delivery Charge $158 Package #8987

---

**Printer Packages**
Choose one of the printer packages below that will best suit your needs.

**ImageWriter II Package**
- ImageWriter II 220 cps Printer
- Printer Cable
- Extra ImageWriter Ribbon
- Printer Dust Cover
- Package of Computer Paper
Sugg. List $633 CDA $475
Delivery $39 Package #8940

**GCC Personal Laser Plus**
- GCC Personal Laser Plus
- SCSI Cable and SCSI Terminator
- Extra Toner Cartridge
- Laser Printer Dust Cover
- Package of Laser Paper
Sugg. List $2394 CDA $1749
Delivery $69 Package #8941

**LaserWriter IINt Package**
- LaserWriter IINt Printer
- Two LocalTalk cables
- Extra Toner Cartridge
- LaserWriter Dust Cover
- Package of Laser Paper
Sugg. List $5274 CDA $3795
Delivery $99 Package #8942
Apple Hardware

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macintosh Plus</td>
<td>$1329</td>
</tr>
<tr>
<td>Macintosh SE 2 Dr. w/ Keybd</td>
<td>$2239</td>
</tr>
<tr>
<td>Mac SE HD20 Meg w/ Keybd</td>
<td>$2749</td>
</tr>
<tr>
<td>Macintosh SE HD40/2MB w/ Keyboard</td>
<td>$3169</td>
</tr>
<tr>
<td>Macintosh SE 30 HD40 w/ Keyboard</td>
<td>$3749</td>
</tr>
<tr>
<td>Macintosh SE 30 HD80/4MB w/ Keyboard</td>
<td>$4999</td>
</tr>
<tr>
<td>Macintosh IIXx HD40 w/ Extended Keyboard</td>
<td>$4195</td>
</tr>
<tr>
<td>Macintosh IIXx HD80/4MB w/ Extended Keyboard</td>
<td>$5495</td>
</tr>
<tr>
<td>Macintosh IIXx HD80/4MB w/ Extended Keyboard</td>
<td>$5895</td>
</tr>
</tbody>
</table>

Printers

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>(prices include required cables)</td>
<td></td>
</tr>
<tr>
<td>Olympia NP-30APL</td>
<td>$289</td>
</tr>
<tr>
<td>ImageWriter II</td>
<td>$459</td>
</tr>
<tr>
<td>ImageWriter II Sheet Feeder</td>
<td>$189</td>
</tr>
<tr>
<td>LaserWriter II NT</td>
<td>$3695</td>
</tr>
<tr>
<td>LaserWriter II NTX</td>
<td>$5295</td>
</tr>
<tr>
<td>Apple Toner Cartridges</td>
<td>$109</td>
</tr>
<tr>
<td>HP DeskWriter</td>
<td>$995</td>
</tr>
<tr>
<td>GCC WriteImpact</td>
<td>$549</td>
</tr>
<tr>
<td>GCC Personal Laser Plus</td>
<td>$1699</td>
</tr>
<tr>
<td>GCC Business Laser</td>
<td>$3349</td>
</tr>
</tbody>
</table>

Monitors

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Hi-Res Color</td>
<td>$799</td>
</tr>
<tr>
<td>Apple 4 Bit Video Card</td>
<td>$399</td>
</tr>
<tr>
<td>Apple 8 Bit Video Card</td>
<td>$519</td>
</tr>
<tr>
<td>Apple Portrait Display</td>
<td>$829</td>
</tr>
<tr>
<td>Apple Portrait Video Card</td>
<td>$479</td>
</tr>
<tr>
<td>Apple Two Page Display</td>
<td>$1599</td>
</tr>
<tr>
<td>Apple 2 Page Video Card</td>
<td>$479</td>
</tr>
<tr>
<td>Radius Full Page</td>
<td>$719</td>
</tr>
<tr>
<td>Radius Full Page Interface Card</td>
<td>$479</td>
</tr>
</tbody>
</table>

Drives

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple 3.5 Disk Drive</td>
<td>$349</td>
</tr>
<tr>
<td>Apple 3.5 800K Internal (Mac II) (Limited Supply)</td>
<td>$99</td>
</tr>
<tr>
<td>SystemGate External 800K</td>
<td>$149</td>
</tr>
</tbody>
</table>

Hard Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMS MacStack 20 (32ms)</td>
<td>$489</td>
</tr>
<tr>
<td>CMS MacStack 30 (32ms)</td>
<td>$529</td>
</tr>
<tr>
<td>CMS MacStack 45 (32ms)</td>
<td>$609</td>
</tr>
<tr>
<td>CMS MacStack 60 (40ms)</td>
<td>$739</td>
</tr>
<tr>
<td>CMS MacStack 80 (28ms)</td>
<td>$859</td>
</tr>
<tr>
<td>CMS Platinum 40 (25ms)</td>
<td>$719</td>
</tr>
<tr>
<td>CMS Platinum 65 (32ms)</td>
<td>$959</td>
</tr>
<tr>
<td>CMS Platinum 80 (18ms)</td>
<td>$1399</td>
</tr>
<tr>
<td>CMS 45 Megabyte Removable</td>
<td>$999</td>
</tr>
<tr>
<td>EMAC 20D (65ms)</td>
<td>$469</td>
</tr>
<tr>
<td>EMAC 20 Impact (40ms)</td>
<td>$519</td>
</tr>
<tr>
<td>EMAC 40 Impact (28ms)</td>
<td>$629</td>
</tr>
<tr>
<td>EMAC 60 Tape Backup</td>
<td>$649</td>
</tr>
</tbody>
</table>

Input Devices

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DataDesk 101 ADB Keyboard</td>
<td>$137</td>
</tr>
<tr>
<td>Kensington Turbo Mouse ADB</td>
<td>$105</td>
</tr>
<tr>
<td>Apple Flatbed Scanner</td>
<td>$1349</td>
</tr>
<tr>
<td>Thunderscan 4.0</td>
<td>$189</td>
</tr>
<tr>
<td>Logitek Scan Man</td>
<td>$399</td>
</tr>
</tbody>
</table>

Upgrades

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Megabyte Simm Modules</td>
<td>CALL</td>
</tr>
<tr>
<td>Radius Accelerator 16</td>
<td>$639</td>
</tr>
<tr>
<td>Daystar 33/350 11x Accelerator</td>
<td>$4299</td>
</tr>
</tbody>
</table>

Need Software?

Call for our low prices on hundreds of popular software titles.

New Macintosh CPUs?

At prestime there were rumors about several new Macintosh computers. Please call for pricing & info.

Shipping Information & Policies

UPS Ground, add 3% ($3.50 min);
UPS 2-day service, add 5% ($5.50 min);
Alaska, Hawaii, PR, add 6% ($6.50 min);
APO/FPO shipping, add 8% ($8.50 min).
Overnight delivery——call for rates.

Charges quoted for systems are for DHL Door to Door Express Service to the continental US, Alaska, Hawaii & PR.
DHL to Canada add $20 to quoted charge. DHL worldwide call or fax for rates. All delivery charges include shipping, handling and insurance.

Visa, MC, Amex, Discover, Optima welcome. Personal checks are held 10 days for clearing. No CODs please.

Leasing now available to qualified businesses — call for details.

Apple Computers - CDA is not an authorized Apple dealer, therefore during the 90-day warranty period Apple items must be returned to CDA for warranty repair.

All prices subject to change. Apple, the Apple logo, Macintosh, HyperCard, ImageWriter, and LaserWriter are registered trademarks of Apple Computer Inc.

Why Should You Buy Your Macintosh from CDA?

Wide Selection, Low Prices, Prompt Delivery

CDA offers Macintosh computers, complete ready-to-run Macintosh systems, add-on hardware, software and accessories all at low prices you can't afford to pass up. At CDA we offer only top name brands you can rely on.

Need software? Pick a title, any title. Why not simplify your life — buy it all in one place.

30-Day Satisfaction Period

If you're not 100% satisfied with your purchase simply return the purchased goods within 30 days of shipment for a quick, courteous refund (Software, media, internal components, musical keyboards/accessories and freight charges excluded).

Service and Support

CDA offers a full 90-day warranty. After the 30-day satisfaction period we provide free repair services for an additional 60 days. With our trained technicians and excellent in-house service center we provide technical assistance and a speedy turn-around time for your convenience.

Yes! Please send me CDA's Free Catalog

featuring Macintosh computers, complete system packages, hard disks, modems, scanners, printers, software and a complete list of accessories.

CDA Computer Sales, 1 CDA Plaza
PO Box 533, Califon, NJ 07830

Hours: Mon-Fri 9am-10pm, Sat. 9am-5pm
Fax (201) 832-9740

Customer Service - Please call direct (201) 832-9007 between the hours 9am-11pm

CDA Computer Sales, PO Box 533, Califon, NJ 07830

US/Canada Call Toll Free 800-526-5313

Outside US/New Jersey 201-832-9004

CDA Computer Sales, 1 CDA Plaza
PO Box 533 Califon, NJ 07830

Hours: Mon-Fri 9am-10pm, Sat. 9am-5pm
Fax (201) 832-9740

CDA Computer Sales, PO Box 533, Califon, NJ 07830

CDA Computer Sales, Mailorder Exclusively Since 1980

CDA Computer Sales, PO Box 533, Califon, NJ 07830

CDA Computer Sales, Mailorder Exclusively Since 1980

CDA Computer Sales, PO Box 533, Califon, NJ 07830

CDA Computer Sales, Mailorder Exclusively Since 1980

CDA Computer Sales, PO Box 533, Califon, NJ 07830

CDA Computer Sales, Mailorder Exclusively Since 1980

CDA Computer Sales, PO Box 533, Califon, NJ 07830

CDA Computer Sales, Mailorder Exclusively Since 1980
Best Performer!

FoxBASE+ /Mac: The Most Celebrated Mac DBMS
Now Includes a Powerful Report Writer!

New FoxReport!
FoxReport lets you create virtually any columnar or free-form report—without any programming! FoxReport includes:
- **Page Layout**: Designate many layout settings for your report: number of columns, left margin setting, column width, space between columns, measurement size for each page, and more!
- **Report Layout Window**: Define the different areas within your report, using FoxReport's new "band" system. Start with the default bands: Page Header, Body, and Page Footer, then bring in other bands like Title, Summary, Column Headers and Footers, etc.
- **Object Menu**: Control the Type Font, Sizes and Styles of text objects. Fill and Pen options let you change the color and shading of almost every object!
- **Page Preview**: "What-You-See-Is-What-You-Get" design ensures that the report on your screen is exactly as it will appear in print!
- **Label Generator**: Create labels of almost any size and configuration. You can even include pictures anywhere on the label space!

New Features!
- **Enhanced XCMD/XFCN Support**: Load up to 16 external XCMD's and XFCN's, then access them directly from within FoxBASE+/Mac 2.00 programs!
- **Language Enhancements**: Other features include: support for custom hierarchical menus, new commands to help handle resources, new system functions to improve filename and screen management, and much more!

Perfect Connectivity!
FoxBASE+ /Mac 2.00's Multi-User version allows complete data and application sharing between networked Macs and PCs! (when used with FoxBASE+/LAN). It also runs on the most popular network systems: AppleShare, Novell and 3Com! ... And It's Faster Than Ever!

Order or Upgrade Now!
FoxBASE+ /Mac Version 2.00 is the new Leader of the Mac! And at only $495 ($695 for Multi-User), it's a phenomenal bargain! If you're already a FoxBASE+ /Mac registered user, you can upgrade to Version 2.00 for just $75!

To order your copy (or ask for a FREE demo disk), call (419) 874-0162. Or visit your local quality software dealer.
After all, when it comes to the Macintosh, Nothing Runs Like a Fox!

Fox Software
Fox Software, Inc. (419) 874-0162, Ext. 650
134 W. South Boundary Fax: (419) 874-8678
Perrysburg, OH 43551 Telex: 6503040827 Fox

Circle 152 on reader service card
NEW PRODUCTS

Edited by
Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

ClearVue/SE
Monochrome display system comprising a graphics board that plugs into the Mac/SE and a 19-inch monochrome monitor. Built-in CPU accelerator increases the CPU processing speed from 8MHz to 16MHz. $1995. RasterOps, 408/562-4200.

Cobra Hard Disk Drives

Gigapack Mac
Tape storage system that stores 1.2GB of data on 4mm backup tape cassette. Average file-access time is approximately 20 seconds. Has pulldown menus. $5950. GigTrend, 619/931-9122.

Gray-Scale Display Adapter
Gray-scale display adapter that gives Apple’s 21-inch monochrome monitor the ability to display graphic images in 256 shades of gray. Compatible with Apple’s interface guidelines. $1899. Sigma Designs, 415/770-0100.

Radius Full Page Display Interface for the SE/30
Full-page display system for the Mac/SE. Provides three levels of software functionality: AppleTalk over token ring providing Mac-to-Mac connectivity over token rings; compatibility with Novell netwave version 2.1.5 allowing users to make a PC a file server and share files with Macs on a token ring LAN; and 3270 Mac-to-mainframe connectivity over token ring. $795. h-three Systems, 919/549-8334.

Sampo Mac Monitors
Series of five monitors that are compatible with the entire Macintosh line. Series (continues)
NEW PRODUCTS

Sierra Drive
New series of nine portable, vertically standing hard disks. Capacities range from 20MB to 132MB. Units are small enough to fit inside a briefcase and require external power supply only for Macintosh Plus. $790 to $2490. Relax Technologies, 415/471-6112.

TravelPak Hard Disks
Removable external hard disks that come in 40MB, 80MB, and 100MB capacities. 40MB $929, 80MB $1379, 100MB $1499. Astro Systems, 408/727-5599.

ViewFrame II+2
Updated version of original ViewFrame LCD projection panel. Adds double-scanning circuitry and composite input jack that works with DEC VT 220 and Apple II series of computers. $1995. nView, 804/873-1354.

MathType 2.0
Equations for Word Processing

Create publication-quality results like this by using MathType 2.0 with your word processor or desktop publishing program:

\[
\left\{ \int_a^b \left( \sum_{i=1}^m \lambda_i(x) \right)^n dx \right\}^{\frac{1}{n}} \leq \sum_{i=1}^m \left\{ \int_a^b \left[ \lambda_i(x) \right]^n dx \right\}^{\frac{1}{n}}
\]

Unlike most other equation editors, MathType 2.0 automatically applies the spacing and formatting rules used by professional math typesetters as you build an equation using simple point-and-click editing. When used with LaserWriters and imagesetters, equations are output directly into PostScript, giving unprecedented quality and typographic control. MathType 2.0 features a new, customizable user interface and keyboard access to all functions. MathType 2.0 also includes a PostScript font containing characters used frequently in math and science but unavailable in standard fonts.

Let us show you how MathType 2.0 has set a new standard in equation editing. Ask for our brochure and free demonstration disk including mini-tutorial. MathType's suggested retail price is still only $149.

Design Science
Call or write for your FREE demo disk
6475-B E. Pacific Coast Hwy., Suite 392, Long Beach, CA 90803 • (213) 435-0685

Circle 403 on reader service card.
MACWORLD • NOVEMBER 1989

Circle 165 on reader service card.
HARD DRIVES

Hard Drives International is proud to carry the

POWERDrive™

Power You Want For The Drive You Need.

Power Up' and Go!

It's easy with the new external POWERDrive from Power Technologies, Inc. All units are factory-tested and pre-formatted for hassle-free setup. As an added benefit, POWERDrives are manufactured with quality Seagate hard drives featuring auto-parking heads and a super quick 28 millisecond access time. The POWERDrive case fits conveniently under your Macintosh and its contemporary design complements your entire system. Each case comes complete with power supply, cabling, partitioning software and a comprehensive reference manual. All this, plus Hard Drives International's 30-day "Worry-Free" Guarantee, Replacement Policy and, in the HDI tradition - the best buy anywhere. Guaranteed.

External Drives

for Macintosh Plus, SE & II

<table>
<thead>
<tr>
<th>POWERDrive</th>
<th>20</th>
<th>$349</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWERDrive</td>
<td>30</td>
<td>$399</td>
</tr>
<tr>
<td>POWERDrive</td>
<td>45</td>
<td>$449</td>
</tr>
<tr>
<td>POWERDrive</td>
<td>60</td>
<td>$539</td>
</tr>
<tr>
<td>POWERDrive</td>
<td>80</td>
<td>$588</td>
</tr>
</tbody>
</table>

POWERFUL Engineering.
POWERFUL Design.
POWERFUL Value.

UniMac for your Mac.

EXTERNAL DRIVES FOR MACINTOSH PLUS, SE & II

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Drive</th>
<th>40ms</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>20Mb</td>
<td>Seagate</td>
<td>40ms</td>
<td>$399</td>
</tr>
<tr>
<td>30Mb</td>
<td>Seagate</td>
<td>40ms</td>
<td>$449</td>
</tr>
<tr>
<td>45Mb</td>
<td>Seagate</td>
<td>40ms</td>
<td>$499</td>
</tr>
<tr>
<td>60Mb</td>
<td>Seagate</td>
<td>40ms</td>
<td>$599</td>
</tr>
<tr>
<td>80Mb</td>
<td>Seagate</td>
<td>28ms</td>
<td>$649</td>
</tr>
<tr>
<td>80Mb</td>
<td>Quantum</td>
<td>19ms</td>
<td>$875</td>
</tr>
<tr>
<td>160Mb</td>
<td>Micropolis</td>
<td>16ms</td>
<td>$1145</td>
</tr>
<tr>
<td>320Mb</td>
<td>Micropolis</td>
<td>16ms</td>
<td>$1795</td>
</tr>
<tr>
<td>600Mb</td>
<td>Micropolis</td>
<td>16ms</td>
<td>$2795</td>
</tr>
</tbody>
</table>

External drives include a pre-formatted, pre-tested hard drive, UniMac external case, power supply, cabling, How-To manual and formatting & partitioning software.

When we win... YOU WIN!

In U.S. & Canada

(800)-234-DISK

International orders: (602) 967-7435

24 hr. Order Status: (800) 776-3472

Never a Surchage
for Visa & MC!

Price and availability subject to change. All items are new with manufacturer's warranty. 3% surcharge for American Express and 300 orders. P.O.'s accepted from qualified buyers (51% N.F.E 25% corporation). 30-day Guarantee conditions. 30-day Guarantee conditions. All credit cards are accepted. All credit cards are accepted. Add $5 shipping for orders up to $49.99. Express delivery. Hard Drives International is a division of Insight Distribution Network, Inc. All trademarks are the properties of their respective owners.
**NEW PRODUCTS**

**Color Separation Module-TIFF**
Software that produces four-color separations from 24-bit TIFF files and provides the user with control over undercolor removal, color correction, gray-scale balancing, black generation for contrast control, dot shape, screen angle, and frequency. Produces output for PostScript image setters. 1MB min. memory. $495. Pipeline Associates, 201/751-7860.

**E-School Fonts**
Set of two bitmapped fonts for creating classroom materials in elementary schools using the ImageWriter. Michelle font has cursive characters, and GradeOne font has block letters. Set has special characters for guidelines, math symbols, and practice forms. 1MB min. memory. $25. Sands-Kidner Associates, 408/426-4417.

**FlexiGraphs**
Software made up of drawing tools for creating a graph that can be used as an input device for pasting numbers into any spreadsheet program. 512KE min. memory. $149. For Your Information, 805/733-2990.

**Fitness Bodies and Aerobic Exercises**
Health, physical fitness, and aerobic exercise clip art. Comes in black on white or white on black HyperCard and MacPaint formats. 1MB min. memory. $39.95. The Best Choice, 800/358-2984, 800/553-2188 in California.

**Gold Statkeeper**
Program tracks a golfer's performance in areas such as driving accuracy, greens in regulation, putting, chip- and trap-save percentages, and birdie conversions. Stores statistics for up to eight golfers on 24 courses. 512K (continues)

---

**THERE’S NO COMPARISON**

**JetLink EXPRESS**
The ultimate Apple® Macintosh® printer driver for the HP DeskJet™, HP LaserJet™, and HP compatible laser printers.

JetLink Express employs the same leading-edge outline font technology used by PostScript® laser printers. This allows you to generate outline fonts at any point size from 3 to 127. This flexibility enables you to have font sizes and styles that suit your document, not a document that suits your font sizes and styles.

The JetLink Express offers you four different graphic print resolutions up to 300 dots per inch (dpi). The printer’s draft mode allows you to use the printer’s internal fonts and font cartridges.

So if you’re looking for a printer driver with all the right features, we’ve got your number. Now all you have to do is dial ours.

GDT Softworks Inc.
P.O. Box 1855, Point Roberts, WA 98281
Suite 186-4664 Lougheed Highway, Burnaby, B.C. V5C 6B7
For inquiries: (604) 291-9121 For orders: 1-800-663-6222
JetLink Express and the GDT Standard logo are trademarks of GDT Softworks Inc. DeskJet and LaserJet are trademarks of Hewlett-Packard Co. Apple and Macintosh are registered trademarks of Apple Computer, Inc. PostScript is a registered trademark of Adobe Systems, Inc.

---

**Bibliographies in Word!**
Keep a database of up to 32,000 references. Create bibliographies automatically in the style you need. Access your database from your word processor using the EndNote DA. Works with Microsoft Word (including Word 4.0!), MacWrite, WriteNow and WordPerfect. $129.

EndNote
A REFERENCE DATABASE AND BIBLIOGRAPHY MAKER
Niles & Associates, Inc. (415) 655-6666
2000 Hearst Street, Berkeley, CA 94709

---

Circle 439 on reader service card

Circle 399 on reader service card.
The generation of AMIE carries on our family tradition.

Air Land Systems' Apple Macintosh Interface Emulator lets you connect the Macintosh to your Unisys/Sperry host.

Now you can have the tremendous capabilities of the Macintosh running on your Uniscope network with AMIE, the newest generation of Air Land Systems' family of interface emulators. AMIE is a hardware/software package that emulates the UTS 20, 30, 40, or SWT 1120 terminals, allowing the features of the Mac to be retained and interactively used in the Unisys environment. AMIE supports various forms of connectivity and handles the communication line protocol. The software emulator is fully compatible with a Sperry terminal and includes a multitude of features, such as file saving and printing, color capability, menu selections, help screens, and cut/copy/paste to and from other applications. Models are available for the Macintosh II or IIx, SE, and SE/30. For more information on sales and service for this product, contact Air Land Systems.
The Gantt chart scheduling program that replaces DRAW programs and CPM programs for creating Gantt charts quickly and easily. FastTrack Schedule™ allows you to draw charts like these right on screen. Your scale may be viewed in hours, days, weeks, months, quarters, years, or generic units; you may compress your colorful multi-level schedules as summaries; create your own palette of start points, end points, bars, and milestones; paste wrap-around text and graphics anywhere. You’re in charge! Call your local dealer or call us directly at (800) 346-9413 or (301) 428-3694. Lists for $195.

AEC Management Systems, Inc. • (301) 428-3694

min. memory: $49.95. 1 Step Software, 800/669-1555.

Hydro Mac
Rational hydrographics program for civil engineers to use in designing detention ponds. 1MB min. memory. $395. Applications Design Group, 201/285-5160.

Keep in Touch
HyperCard-based correspondence software that helps users to create customized letters and greeting cards. Contains a database in which to store information about friends’ birthdays, anniversaries, special holidays, and news, which can then be used to compile letters. 1MB min. memory. $30. Howard Henry Software, 801/277-7851.

MacDendro
Tree-ring measurement system used by foresters to evaluate tree growth, measure effects of insect-borne diseases, quantify the decline of maples, study climatology and dendrochronology. Uses image processing to automatically find rings and emphasize their contrast. Requires Mac II, IIX, or IILx and high-resolution scanner. 2MB min. memory. Without scanner $9999, with scanner $18,518. National Optics Institute, 418/657-7006.

MacRaf
Mac-to-VAX integration software that lets Mac users access a remote VAX without using remote computer commands. Provides seamless file service, print service, automatic log-on capabilities, and file-transfer speeds of up to 120,000 bytes per second. Works with Mac/SEs and Mac IIs. 1MB min. memory. $295 per Mac for the Mac side; $395 per Mac user per VAX host for VAX side. Datability, 800/342-5377.

Mahogany Introductory
Expert-system development tool for the Mac that uses an IF-THEN rule format, has optional ELSE and UNKNOWN clauses in rules, and supports knowledge bases with several hundred rules. Rules may contain more than 50 clauses. 1MB min. memory. $149. Emerald Intelligence, 313/663-8757.

Math Castle
Mathematics game for ages 3 and up in which you defend your castle by answering math problems correctly. Stresses addition, subtraction, multiplication, and division, and contains more than 6000 preset math problems with 40 levels of difficulty. $34.95. Envision Software, 206/874-4044.

Monster Fonts
Ten-disk collection of Macintosh ImageWriter and LaserWriter fonts. All fonts are in the public domain. Proceeds go toward the fundraising efforts of the Mug News Service’s MacUser Grant. 512K min. memory. $49.95. Showker Graphic Arts & Design, 703/433-1527.

(continues)
Make Irwin® do it.
An Irwin tape backup system, that is. So go home early.
Because an Irwin system will back up your data, your programs, your breakthrough ideas—all automatically.

No complicated commands.
No sloppy floppies.
Our EzTape® software makes it easy to store whatever data you want. Whenever you want.

It doesn't matter whether you're backing up a Macintosh® or a PC.

An Irwin backup system works with them all. Along with all the popular local area networks. Providing up to 150 megabytes of reliable storage.

In fact, with its patented AccuTrak® precision tracking technology, you can transfer data from a Mac to a PS/2® to a PC and back again. Something that would throw a floppy right off its track.

All in all, that's why more people rely on Irwin minicartridge systems to do their backup than all others combined.

Just call 1-800-BACKUP1 for the dealer nearest you. Because the best way to make backups is to avoid it.
IF YOU WANT FREEDOM OF CHOICE,

Monitor: Sony® 1271
Resolution: 768 x 486
NTSC, Interlaced
Bits per Pixel: 16

Monitor: Electrohome® 1910
Resolution: 1024 x 768
Interlaced
Bits per Pixel: 32

Monitor: Apple® RGB
Resolution: 640 x 480,
Non-interlaced
Bits per Pixel: 16

Monitor: Electrohome® 1210
Resolution: 768 x 576
PAL, Interlaced
Bits per Pixel: 8

Monitor: Sony® 1302
Resolution: 1024 x 768,
Interlaced
Bits per Pixel: 32

Monitor: Mitsubishi® CS-2060R, Super VHS
Resolution: 512 x 380,
Interlaced
Bits per Pixel: 8
THERE'S ONLY ONE OPTION:

The Nu Vista card was honored by Mac User Magazine as the Best New Image Processing product for 1989.

THE NuVista® SERIES FROM TRUEVISION.

You won't find many display restrictions with Truevision, because we work with any standard Apple, multisampling, or NTSC and PAL-compatible monitor. So you're free to choose the best solution for you. And since the NuVista cards can be easily programmed to display a wide range of resolutions, as your needs change, your hardware won't have to. More freedom for you, and with our three different cards, more choices, too.

NuVista 1M
The Desktop Presenter
The NuVista 1M($2995) is the ideal multi-media card. It combines overlay, capture and 32-bit display all into one card. With the NuVista 1M and a VIDI/O™ Box, you can videotape any standard Macintosh™ desktop application, such as MacroMind Director™. You can even use our free software to overlay text or graphics from applications onto live video. Or you can capture images from any standard video source like a VCR, laser disk or video camera. And of course any image captured with NuVista can be placed into PageMaker® or other desktop publishing programs, in monochrome, 8-bit color or true color at a full 32-bits. It's your choice.

NuVista 2M and 4M
Professional Power
For the ultimate in multi-media, the NuVista 2M($4495) and the NuVista 4M($6495) provide maximum flexibility and performance. With broadcast-quality NTSC and PAL video output, overlay, capture, zoom and pan, and 32-bit display, these are the choice for professionals in video, publishing, CAD and presentation graphics. The NuVista 2M displays a 32-bit image at 640 x 480 pixels, while the NuVista 4M displays 32-bit images up to 1024 x 768 pixels, interlaced.

More Ways To Save
The NuVista series saves you money and slots. If you already have a multisampling monitor, just connect it to the NuVista and you're ready for multi-media. Or look into the monitors shown here, they're all less expensive than the special monitors which some manufacturers force you to buy. If you have a Mac IIcx and are short on slots, don't worry. A NuVista card only occupies one slot, yet it provides you with more functionality than some manufacturers can claim in a three-slot configuration. Best of all, our new lower prices reflect savings up to $1000 on a NuVista card!

Freedom of Choice—it's what the Macintosh is all about to begin with. And when it comes to videographics, it's what only Truevision gives you. So no matter which path your choose, you'll find a NuVista at your destination. To contact us for more information, or to locate your nearest Authorized Reseller, call 800/858-TRUE.

NuVista from Truevision
The Videographics Cards of Choice

Circle 445 on reader service card
The Orange Micro® Mac286® "brings the power of an IBM® AT" to your Mac286, the highest performance MS-DOS compatibility solution available for your Macintosh II™. Multiprocessing of MS-DOS and Macintosh applications faster.

Transport files from your Mac286 or Mac86 window through the TOPS network. The Mac286 and Mac86 open up new windows of opportunity by insuring system performance.

Upgrade your SE with the Mac86 to get the optimum performance of an IBM® XT™ and Macintosh in one system.

PERFORMANCE THROUGH APPLICATION COMPATIBILITY
The Mac286 and Mac86 open up new windows of opportunity by insuring compatibility with all major MS-DOS application packages. In fact, you can use MS-Windows®, AutoCad®, Lotus 123®, Lotus Symphony® or Flight Simulator® while simultaneously executing your favorite Mac program. Fortran, Pascal, and C language compilers can be run in the Mac286 or Mac86 windows. You can now turn your Macintosh II into a full development system.

PERFORMANCE THRU FILE SHARING
Transport files from your Mac286 or Mac86 window through the TOPS network to another Macintosh. Copy and Paste graphics from an MS-DOS charting program directly into Microsoft Word®. PageMaker® or MacWrite® on your Macintosh. Transport files easily back and forth between Macintosh and MS-DOS formats by using the Mac286 file utilities. With two quick steps, files as complex as AutoCad designs or as simple as text files can be transferred back and forth between the Mac286/86 and the Macintosh.

Movies, Movies, Movies

Name That Chord
Desk accessory text font that supplies chord names for use with Mac music notation applications or word processors. Lets music writers transpose chord name symbols. Available with options for writing and transposing for laser printing, bitmap printing, and a combination of all options listed. $12K min. memory, $59.50 to $59.50 depending on options. Note Ware, 213/822-1300.

NetStream
Software that performs unattended network backup for AppleTalk networks. Backup times may be scheduled in advance. Backs up all servers and nodes on the network to a single device. Compatible with AppleShare, TOPS, and Multifinder. 512K min. memory. Administrative package of five nodes $495; each additional node $89; site license available. Personal Computer Peripherals, 813/884-3992, 800-622-2888.

The New Electronic Encyclopedia
Macintosh CD ROM version of the 21-volume New Electronic Encyclopedia originally released for the PC. Contains more than 3000 updated or new entries.

OutSpoken

Pediatric Telephone Protocols
Software tool to assist health care professionals who give phone advice for children's medical problems. User can modify the supplied protocols to conform to individual practice and create new protocols to deal with additional complaints. 1MB min. memory. $199. Health-Tek Medical Software, 303/420-7438.

Personal Hotline
Technical analysis software for stock, commodity, and option investors. Provides daily and weekly bar charts, pinpoints exit and stop-loss prices for trading, gives option pricing (continues)
Neither Comes With Your Mac.

Celebrate! Because you can choose your keyboard when you buy a Macintosh® computer. And the choice is obvious: the new Professional Series MacPro™ by Key Tronic. Now you can have a keyboard with a mile-long list of features, plus a three-year limited warranty and unlimited technical support. And at no extra charge, the MacPro comes with the most powerful Macintosh macro package, Tempo II™ by Affinity Microsystems (a $149.95 retail value). Compare apples to apples, and see why the Key Tronic MacPro is the keyboard of choice. For a free brochure, or for the name of the MacPro dealer nearest you, call toll-free:

Key Tronic® and Key Tronic Professional Series® are registered trademarks, and MacPro™ is a trademark of Key Tronic. All other names are trademarks ™ or registered trademarks ® of their respective companies. Made in USA.

Circle 410 on reader service card
and analysis based on Black-Scholes model, and imports
data from services or via data entry. 1MB min. memory.

The Phrase Thesaurus

HyperCard stack designed as a writing tool. Provides
phrases to help students develop ideas in writing. Contains a help section. 1MB min. memory. Site license $249.
individual copy $69. Intelligance Active/Research Design
Associates, 800/344-0571.

Poslm

Point of sale and inventory software that creates bar code
labels and reads them at point of sale. Has a reports genera-
tor and allows you to physically inventory with portable
bar code readers. Combines use of hardware applications
such as bar code readers, printers, and light pens with
inventory-software capability. 1MB min. memory. $3995
multiuser version, $2495 single user. AnaMatrix,
801/546-1616.

Project Blocks

Project-management scheduling software that exports to
word processors and spread-
sheets; has four independent calendars for project schedul-
ing. 512K min. memory. $38. Priori Systems, 612/871-7519.

SuperAnova

Analytical software used to perform general linear models.
Lets users access post-hoc tests; specify contrasts; displays
means tables and plots; view residuals and create, modify,
and save model designs. 1MB min. memory. $495. Abacus

TypoCalc

Typographic calculator desk accessory that adds columns
of picas and points. Written for desktop publishing and
phototypesetting professionals. 512K min. memory. $35.
Peter Adamson, 512K min. memory. 8 Avenue de la
Reine Astrid, 13100 Aix-en-Provence, France.

PREVENT MACINTOSH THEFT!

MacKahil Security System

Heavy duty 10' steel cable secures and locks computer, printer, other equipment,
up to 4 components. The unique MacKahil system includes 2 brackets that
snap into existing slots on the Macintosh or its peripherals. Additional hardware
included for other peripherals that can be secured using existing screws in the
equipment. Internal component security: Kabilt™ fasteners secure rear panel
of CPU preventing unauthorized removal of internal boards and hard drives.
When the cable is passed through the fasteners the screws are concealed. When
the cable is passed through all the fasteners the Macintosh system can be
secured to the desk.
List price $39.95 plus shipping. Please specify Mac, Mac Plus, Mac SE, or
Mac II. Quantity pricing also available. Money back if returned in 30 days.
Purchases orders accepted. Send for catalog.

Kabilt security systems also available for most computers.
Secure-It, Inc. 18 Maple Court • East Longmeadow, MA 01028
1-800-451-7592 Dealer inquiries invited.

Circle 239 on reader service card.
Now Macs grow on Trees.

The world's leading disk management software comes to the Macintosh.

Add a hard disk, and suddenly your user-friendly Macintosh® starts to turn a little mean. Files become hidden beneath stacks of folders. And finding your way through them becomes a time-consuming ordeal.

Now there's XTreeMac to keep your Macintosh friendly. It simplifies disk management by displaying disk files contents within its unique Directory Tree.

XTreeMac finds, launches, and retrieves deleted files. Even after you've emptied the trash. It copies or moves files from multiple drives simultaneously. Everything that Finder® does, and more. All from a single Macintosh window.

Call 800/634-5545, (in CA: 800/551-5353, or 805/541-0604) for the dealer nearest you, or for a listing of our international distributors.

And let XTreeMac keep your Macintosh hard disk from giving you a hard time.

Macintosh and Finder are registered trademarks of Apple Computer. XTree and XTreeMac are trademarks of XTree Company, a subsidiary of Executive Systems, Inc. Programs are not copy protected. © 1989, Executive Systems Inc., 4330 Santa Fe Road, San Luis Obispo, CA 93401.

The world leader in disk management.

Circle 470 on reader service card
How do you explain the magnitude of Microsoft Works?

Whether you run a small business or your knowledge about computers happens to be less than monumental, Microsoft® Works 2.0 has you covered.

Microsoft Works 2.0 is actually five tools in one: word processing, spreadsheet, database, drawing and communications. But as far as you're concerned, it's one integrated program—so it's easy to move between the different productivity tools and use them together.

In fact, from the moment you take it out of the box, Microsoft Works 2.0 is easy to use. It comes with an animated training program written in HyperCard® format. As well as on-line help and unlimited phone support to help answer any questions you may have about Works' features.

No matter how varied your projects are, Microsoft Works 2.0 can handle the job. Its newest feature, the drawing module (with page layout), can take an otherwise dull, fact-filled document and turn it into one full of compelling graphics.

The word processor can create everything from a simple memo to a detailed report—and it even includes a spell-checker aimed at eliminating typos.

Of course, if your document needs to be supported with numbers, you can always jump over to the spreadsheet to compute and analyze data. And then transform it all into easy-to-read, easy-to-understand charts.

As for information that keeps your business going, the database is indispensable for keeping track of clients and orders. And you can count on the communications module to bring information to your desktop through a modem.

If you'd like to learn more about Microsoft Works 2.0, just call (800) 541-1261, Dept. 176 for the name of your nearest dealer.

No wonder Microsoft Works 2.0 is the best selling application in its class. Aside from being a great value, Microsoft Works 2.0 is one program that can handle a myriad of business needs.

It's that simple.

Microsoft®
Making it all make sense
Everything you see above was created using some combination of the five tools within Microsoft Works 2.0: word processing, spreadsheet, database, drawing and communication. As you can see, the real power of Microsoft Works 2.0 comes into play when all the tools are used together.
World Class LaserType
Six-volume font set available in NFNT and FONT formats. 512K min. memory. $79.95 per volume. Dubl-Click Software, 818/700-9525.

XPrint
XFCN (external function) that adds 33 new printing commands to HyperTalk. Provides control over appearance and positioning of text, optional page numbering, four kinds of tabs, and the ability to mix text with PICT graphics from external files. 1MB min. memory. Personal-use license $29.95 plus s/h. annual developer's license $79.95. Stak-x, 402/726-2310.

ACCESSORIES

Banner Roll
Computer printer paper that comes on a nonperforated roll. Tears down to 8½-inch width and can be trimmed to any length. Comes in four colors and a variety of designs. $12.95. BriteLine, 800/366-6800.

Design CAD Stand
Personal computer stand designed to fit over any drafting table or large format digitizer. Has variable height selection and a monitor shelf with adjustable tilt. $395. Engineer Data Products, 303/465-2800, 800/525-0193.

Macimare/IICx
Carrying case designed to carry the Macintosh IICx system including the standard or extended keyboard, $129.95. IO Design, 215/524-7277, 800/241-2122.

MouseCat
Plastic mouse holder that attaches to the computer monitor or other flat surface with a velcro-type fastener and is designed to resemble a kitten. Comes in light gray or white with pink ears and paws and green eyes. $6.95. H&H Enterprises, 800/242-6292.

Rollermouse
Trackball controller based on optomechanical design for precise point-and-click action on X and Y axes. Four-button design with access to cursor controls for either right-handed or left-handed users. $169.95. CH Products, 619/744-8546.

(continues)
Only Tecmar Can 
Back Up All Three 
With One Tape System.

It's what you told us you need. A single tape backup system to work with your PS/2s™, your classic-bus PCs and — here's the clincher — your Macintosh® IIs. Three very different architectures supported by one high-speed, high-capacity tape system.

Tecmar's not only done it, we've made it easy! Any external Tecmar QualityTape™ drive from 60-to-150MB capacity, including the ones you may already own, can now be shared between PCs, PS/2s and Mac IIs. The QT drives easily connect to a Tecmar host adapter board inside the computer — including the brand-new NuLink™ Host Adapter for Mac II. If you have more than one architecture, then this is the solution that makes sense! And only Tecmar has it.

More companies choose Tecmar tape systems than any others — for our speed, reliability and support. And now, one drive fits all. For more information, call Tecmar at (216) 349-1009 or (800) 624-8560. Or write Tecmar, Inc., 6225 Cochran Road, Solon, Ohio 44139-3377.
TypeXpress fonts are the largest available collection of professionally crafted PostScript typefaces. Designed for optimal reproduction at small point sizes, ProFonts work well in body copy or display type applications.

ProFonts have been created by a professional typographer – every font has more than a thousand kerned pairs for the ultimate in typographical appearance and control.

ProFonts will scale to any size your application supports, automatically download to your PostScript printer and come with 12, 24 and 48 pt. screens. 140 ProFont families are available now. Until November 30, 1989, you can buy them for only $99.95 (plus shipping) per family – about one third the cost of the competition.

Free ProFont Catalog. For a complete ProFont catalog, call 1-312-982-6080

TypeXpress
1-800-343-4424

World class PostScript ® Typefaces and Graphics
A marketing unit of ZIPATONE, Inc.
150 Fenc Lane Hillside, Illinois 60162

Circle 211 on reader service card.

100 Display Typefaces
A complete PostScript display type library for only

$99.95

A complete collection of 100 popular PostScript display typefaces. A must for every graphic designer, artist, publisher – anyone who wants to add punch and emphasis to their work. Until November 30, 1989, you can own the whole TypeXpress DisplayFont collection for only $99.95 plus $5.00 shipping.

TypeXpress is a marketing unit of Zipatone, manufacturers of dry transfer lettering for more than 30 years. Order your TypeXpress DisplayFont library today!

920 PostScript Text Faces
$99.95

For a complete ProFont catalog, call 1-312-982-6080

POSTSCRIPT

TypeXpress ProFonts are the largest available collection of professionally crafted PostScript typefaces. Designed for optimal reproduction at small point sizes, ProFonts work well in body copy or display type applications. ProFonts have been created by a professional typographer – every font has more than a thousand kerned pairs for the ultimate in typographical appearance and control.

ProFonts will scale to any size your application supports, automatically download to your PostScript printer and come with 12, 24 and 48 pt. screens. 140 ProFont families are available now. Until November 30, 1989, you can buy them for only $99.95 (plus shipping) per family – about one third the cost of the competition.

Free ProFont Catalog. For a complete ProFont catalog, call 1-312-982-6080

1-800-343-4424

TypeXpress
World class PostScript ® Typefaces and Graphics
A marketing unit of ZIPATONE, Inc.
150 Fenc Lane Hillside, Illinois 60162

Circle 211 on reader service card.

Mail Order on the Kitchen Table
Mail Order on the Kitchen Table
Book for beginners who want to make a profit in the mail-order business. Gives overview of mail-order process, includes charts, sample letters, and sample forms. Charts, letters, and forms included on disk. Written by Marilyn Smith Schultz. $19.95 plus $2.50 s/h. Tribute, 800/544-8191.

Space Center
Four-module home office furniture. Ready-to-assemble work center with hutch that holds a computer monitor, double-door cabinet, and space for accessories. $129.95. SoundDesign, 212/686-2666.

ToughPad
Rubbermaid brand plastic, ⅛-inch thick mouse pad with slight texture to improve mouse ball grip and glide across the surface. $12. Master Manufacturing, 213/694-6861.

Books & Videos

Inside PostScript
Book about the inner workings of PostScript written by Frank Braswell. Includes a discussion of error handling, printer control, job execution, file input/output, and other PostScript topics. $37.50. Peachpit Press, 415/527-8555.

Mail Order on the Kitchen Table
Mail Order on the Kitchen Table
Book for beginners who want to make a profit in the mail-order business. Gives overview of mail-order process, includes charts, sample letters, and sample forms. Charts, letters, and forms included on disk. Written by Marilyn Smith Schultz. $19.95 plus $2.50 s/h. Tribute, 800/544-8191.

Mail Order on the Kitchen Table
Mail Order on the Kitchen Table
Book for beginners who want to make a profit in the mail-order business. Gives overview of mail-order process, includes charts, sample letters, and sample forms. Charts, letters, and forms included on disk. Written by Marilyn Smith Schultz. $19.95 plus $2.50 s/h. Tribute, 800/544-8191.

The Makeover Book

Speaking of Networks: A Glossary for Network Users
Alphabetical glossary that defines terms and provides background information on networking terminology and acronyms. Third in Apple Communications Library series. $14.95. Addison-Wesley, 617/944-3700.

To have your product considered for inclusion in New Products, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number (and two copies of software) to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107. We reserve the right to edit press releases.
WORLDWIDE SALES

To make a strong impression, you need to combine the right information with the right presentation tools. And that includes the best overhead transparency film you can buy — 3M computer-generated transparency film.

At first glance, most transparency film appears the same. But when projected onto a large screen, 3M film really stands out. Colors are vibrant and true. Characters are sharp and defined. So your polished presentation doesn't lose its shine. Whatever type of plotter or printer you use, rely on 3M film for feeding reliability and a clearer image. 3M transparency films, projectors and accessories are available at your local 3M AV dealer or stationery store. For the name of your local source call us at 1-800-328-1371. In Canada 1-800-268-9696.

FREE 3M Film & Flip Frames

Return this coupon for a free trial package of 3M laser film. We'll also include Flip Frame™ Transparency Protectors for easy film handling, filing and storage. Offer good in U.S. and Canada only.

The tools to take charge.
Your one-stop Mac shop.

Whether you need the latest word processor, a hard disk, a scanner, a hot new game, diskettes, an accelerator board, or just about anything else for a Mac, go no further. And if you don't see what you want listed here, call.

C.A.T. .......... $228

Denroba Software
Drawing program for professionals in architecture, design, graphics, and engineering. Includes all the tools you need to create professional quality graphics.

Canvas .......... $158

Layered
Next generation in accounting software. Professional accounting and bookkeeping firms can now use the Mac as their platform for handling numerous companies and volume data.

atOnce! .......... $293

Preferred Publishers
DAtabase, full featured desk accessory database for use at any time. Exposure: CEVE graphics display, screen capture, painting and formatting of color and grayscale images.

DAtabase ....... $45/Exposure ...... $63
We're so excited about carrying the new Colby WalkMac that we're giving them away.

Actually, we're giving one away. The rest we're selling at terrific prices. You see, MacZone is the only mail order company offering Colby's WalkMac. The only one. And we're pretty proud of that.

Why did Colby choose MacZone? For the same reasons you should—because no mail order company knows Macs better than we do.

Our Mac expertise means we can help you with everything from selecting the right products to installing a network. Have questions about a product before you buy? Give us a call. Need help installing the SIMMs you bought from us? Dial us up. You'll get the kind of in-depth assistance you can only get from people who know Macs inside and out.

You'll also get cheerful acceptance of qualified purchase orders (such as from a university, college, school system, or government agency), $3 overnight shipping, and convenient hours.

So if you want to go portable, place an order and we'll automatically enter your name in our WalkMac SE30 contest. If you'd rather not wait for the drawing, simply order your WalkMac SE30 now. Available by mail order exclusively from the MacZone.

Fuji Diskettes: $5 Rebates!
Now's the time to stock up on diskettes. This special offer from Fuji saves you up to $10 on two boxes of high quality disks. Limit two $5 rebates per customer.

<table>
<thead>
<tr>
<th>Type</th>
<th>Rebate</th>
<th>Final Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-sided</td>
<td>$5</td>
<td>$8</td>
</tr>
<tr>
<td>High Density</td>
<td>$8</td>
<td>$23</td>
</tr>
</tbody>
</table>

DataStor 8000 Personal Organizer $98
Microlytics offers the portable, pocket-sized information manager that reminds, notes, files, transfers, calculates and organizes your life. Uploads and downloads directly into and out of your Macintosh.

Product Guarantee:
If you are not completely satisfied with a purchase, many of the products we sell come with a 30 to 60 day money back guarantee. Ask for details when you place your order.

1-800-248-0800
Intl: (206) 883-1975 Canada: 800-248-0344 FAX (206) 881-3421
Our savings are huge. Our advice is free.
Choice Awards: The Mac Zone

MacTech 2400 ...$139/2400M ... $245

Taxan Eddy Award Runner-Up in the Fourth Annual MacUser Editor's Choice Awards: "A superb monochrome system at a very affordable price." (Monitor and card included)

Crystal View 19" Monitor ....$1395

Omicon Technologies Mac Best lets you put your most important data in a reliable drive for a great price. Available in sizes from 20 to 600 meg. internals and externals for all your hard disk storage needs.

MacBest Hard Disks ....see listings

Dolphin Our best line of storage devices, including: Integra External hard disk drives, Flipper tape backup & 44mb removable drives, Sonor 600 removable optical read-write disk drive, and many more.

Dolphin Hard Disks ....see listings

Great Hours

8am-1am EST, 5am-10pm PST, M-F
9am-9pm EST, 6am-6pm PST, S&S

MacTech Intelligent data communications system. MacTech 2400 package comes complete with 2400 baud modem cable and software. 2400M includes the same AND MNP Class 5 error correction.

MacBest 2400 ...$139/2400M ... $245

Scaners

Name

Scanner 300/GS (8 Bit) ... 1495.
Scanner 300/S (4 Bit) .... 1198.
Logitech Scan Man ........... 239.
RasterOps TrueCapture 324 ....... 1995.
TrueCapture 324 with Video Option ........ 2398.
Sharp JX 300 Color Scanner ... 3995.
JX 450 Color Scanner ....... 6995.
Thunderware Lightning Scan .......... 405.
ThunderScan 5.0 ............. 187.
Xerox - Datasync Scanner Datasync 720GS .......... 1498.

HARD DISKS - EXTERNAL

Dolphin Flipper 44 Removable .... 975.
Flipper 150 Tape Backup ...... 995.
Integra 20 External ........... 415.
Integra 20 External ........... 415.
Integra 45 External .......... 595.
Integra 60 External .......... 695.
Integra 60 External .......... 695.
Integra 100 External .......... 935.
Integra 170 External .......... 1195.
Sonar 600 Mb Read-Write Optical Disk Drive .......... 1995.

Dolphin (Speed Drive Line)

Integra 40 External .......... 665.
Integra 80 External .......... 1045.
Integra 105 External .......... 1178.

Everex - EMAC Hardware

EMAC 200 .................. 495.
EMAC Impact 40 Plus ....... 755.
EMAC 60/960mb Deluxe ....... 1495.
EMAC Impact 80 .............. 1095.
EMAC 600 (Tape Backup) .... 698.
EMAC Impact 150 Meg (Tape Backup) .......... 1199.

NEC

CD P/CM Drive .............. 845.
Gulcom Technologies

MacBest 200ext .......... 430.
MacBest 300ext ....... 525.
MacBest 400ext .......... 585.
MacBest 600ext .......... 685.
MacBest 800ext .......... 695.
MacBest 1000ext .......... 1695.
PFL (Peripheral Land, Inc.) Infinity 44 Removable .......... 1135.

Seagate - Hard Disks

Zone 30-SEII ........... 365.
Zone 45-SEII .......... 415.
Zone 60-II .......... 555.
Zone 81-II .......... 790.

NETWORK HARDWARE

Dell systems

Twisted Pair Ethernet Easy to install. Please call for information & current prices.

Daystar Digital File Server Boards

FS 100 MC ................. 548.
FS 100 PC ................ 458.
LocalTalk Boards

LT200 MC .................. 298.
LT200 PC ................. 179.

Dove

FastNet III ................. 355.
FastNet SE ................ 365.
FastNet II Int. Controller .... 545.
FastNet SCII Cheapernet .. 759.

MouseStick .................. $69.
U.S. Robotics

MouseStick (ADB) ....... $84.

Advanced Gravis Programmable joystick for gamers & power users.

Contest Rules: 1) Entries must be received on or before 12/31/90. 2) Winners selected in random drawings by attorneys for Multiple Zones, Inc. (MZ), whose decisions are final. 3) Colby computer subject to availability. MZ reserves the rights to substitute wholesale cash value up to $6,000. 4) Winners responsible for taxes. Odds of winning depend on number of entries. All prices will be awarded. 5) MZ will announce the winners date of around 2/28/91. Winners will be notified by mail. Contest subject to change at discretion of MZ. If unable to contact any winner, an alternate will be selected by random drawing. 7) Contest is open to U.S. Residents, except where prohibited by law. Employees of MZ and suppliers not eligible. 8) Prizes - One Mac Colby SE/30 computer.
Talk to a Macintosh expert, free.

Not sure which product will do what you need to do? Talk to us before you place your order. You'll get the benefit of the most knowledgeable Mac people in mail order, at the only company in the business that runs entirely on Macs.

Cricket Draw...$167/Presents...$285

Simply Accounting ................. $178

Dantz

Archiving and backup software for Macintosh. Provides a complete solution for achieving files from any Mac to disks, tapes, optical cartridge drives, file server volumes, etc.

Retrospect ......................... $154

Trendware Corporation

Assists you to easily integrate calculations into new or existing HyperCard stacks. Create formulas similar to those found in most other stand-alone spreadsheet applications.

XCAL ......................... $89

Boost software

Cricket: Cricket Draw
Complete Post-Script graphics package for excellent, high quality output. Cricket Presents: Total graphic presentation environment for business professionals.

The Mac Zone

FastNet SC/SC Thickwire Ethernet 649
FastNet R+1 Ethernet LAN 68020 Accelerator SE 895
FastNet SE 1249
Kinetics
EtherPort II 469
EtherPort SE 469
EtherSE 320 469
Fast Path 1845
Noveltech
Turbo Bridge 345
TurboConnect 21
Turbo RF ST - 99 or 199 29
National Semiconductor
Macellate A/U 469
Shiva Corporation
NetBridge 345
NetSerial 289
TeleBridge 348
TOPS
TOPS FlashBox 123
TOPS Repeater 128
TOPS Tel/Connector 9 or 199 29

MONITORS & BOARDS

HEC
MacSync 14" Color Monitor 675
MultiSync 20" Color Mon 2695
RasterOps
CharView 15" SE Monitor w/EMIC Accelerator 1595
RasterOps Colorboards ColorBoard 108+ 1249
ColorBoard 204 2695
ColorBoard 264 795
ColorBoard 264 SE 1654
RasterOps Tel/monitor 19" Color Monitor 3308
Sony
14" 1301 HG Color Multiscan Monitor 795
Crystal View II 1395
Crystal View 5E/59 1395

MISCELLANEOUS

Abatan
Quickstep Page Printer 3259
Dayna Communications
Daynafile - Single Drive 525
Daynafile - Dual Drive 605
Daynafile - Dual Drive 204 605
Daynafile - Dual Drive 729
Daynafile - Dual Drive 729 204 810
Daynafile - Dual Drive 729 444 689
Eastman Kodak
Extalter 1-L 449
PLI (Peripheral Land, Inc.)
TurboPoppy 1-4 325

Entertainment

Access Software
World Class Leader Board 27
Accelade
4th & Inches 27
Hardball 27
Mean 18 27
Activision
Cosmic Osmo 45
Marmalade 30
Marmac CD Version 35

Silicon Beach Software
Apache Strike 31
Beyond Dark Castle 31
Dark Castle 31
Sir Ted
 Wizardry 35
Software Toolworks
Chessmaster 2100 31
Cribbage King/Gin King 38

Bullseye Software
Ferrari Grand Prix 31
P-51 Mustang Flight Sim 31
Cassidy & Greene
Crystal Quest 2.2 25
Crystal Quest 2.2 w/Critter Editor 41
Centro
Casino Master II & W 44
Casino Master Color 49
DataEast
SuperHangOn 26
Discovery Software
Arkonoid 26
Electronic Arts
Bert's Tale 32
Chuck Yeager's Advanced Flight Trainer 31
Panzertratte 28
Patton Vs Rommel 14
Epyx
Sub Battle 29
Mediagenic
Might & Magic 35
Might & Magic II 38
Quartz Studio 29
Shanghai 19
Universal Military Sim. 29
MicroPace
Pirates! 32
Microsoft
Flight Simulator 1.02 32
Miles Composing 32
Fool's Errand 31
Harrier Strike Mission II 31
Puzzle Gallery 26
Mindscope
Aussie Jockey Poker 26
Balance of Power 1900/Colony+Corswod Magic 26
Deja Vu 26
Quintessence 26
Battles & Betrayal 26
FBI Software
NetTrek 34
Strategic Conquest 2.0 34
Shindan
Leprechaun 36

Education

Bible Research Systems
The Word (KJV, NV, NKJV, RSV) 164
Berlitz International
Eureka: The Solver 127
Bright Star Technology
Alphabet Blocks 30
Talking Tapes 29
Breathband
Calculus, Geometry, or Physics each 58
Type! 19
Davidson & Associates
MATH Blaster 26
Great Wave Software KidosTime 25
Number Maze 26
Learning Company
MATH Rabbit 32
Reader Rabbit 2.1 31
Mindscape
S.A.T. Perfect Score 45
Nordic
Alphabets+BodyWorks+ClockWorks+CardWorks+EarthWorks+FlashWorks+Lemonade Stand+Naval Battle+Preschool Disk 1+Preschool Disk 2+Turtle Math+Word Search each 27
Simon & Schuster
Tying Tutor IV 34
Software Toolworks
Mavis Beacon Teaches Typing 32
Spinaker
Typing Made Easy 25
True Basic
Algebras + Arithmetic + Calculus + Discrete Mathematics + Pre-Calculus Trig + Probability Theory + TrueSTAT 33

Hunt For Red October 31
Life & Death 31
Sphere
Falcon 2.0 31
Galaxian 4 26
PT 109 26
Solitaire Royale 19
Tetris (Black & White) 19
Tetris (Color) 49
Spinaker
Sargon IV 28
Strategic Simulations
A&D: Pool Of Radiance 32
Three Stly.
Witslock 28
XDR Corporation
Lunar Rescue 33
Mac Racquetball 26
MacGolf Classic 52
MacGolf 34
MacCourses 20
NFL Challeges 54
Pro Challenge 28
Read Racer 36

1-800-248-0800

Our savings are huge. Our advice is free.
### Music

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santam Boone</td>
<td></td>
</tr>
<tr>
<td>Mastering Waves</td>
<td></td>
</tr>
<tr>
<td>The Complete HyperCard</td>
<td></td>
</tr>
<tr>
<td>Handbook (2nd Ed.)</td>
<td></td>
</tr>
<tr>
<td>DataDesk</td>
<td></td>
</tr>
<tr>
<td>Mac 101 Keyboard</td>
<td></td>
</tr>
<tr>
<td>Datashield</td>
<td></td>
</tr>
<tr>
<td>Nemesis Go Master</td>
<td>$47</td>
</tr>
<tr>
<td>Nemesis Jekse Tuto</td>
<td>$28</td>
</tr>
<tr>
<td>Toyo, Inc.</td>
<td></td>
</tr>
<tr>
<td>The only game rated in</td>
<td></td>
</tr>
<tr>
<td>human Go tournaments.</td>
<td></td>
</tr>
<tr>
<td>MacDirector</td>
<td>$99</td>
</tr>
<tr>
<td>Ergotron</td>
<td>$88</td>
</tr>
<tr>
<td>Mouse Cleaner 360°</td>
<td>$10</td>
</tr>
<tr>
<td>Fuji Disk</td>
<td></td>
</tr>
<tr>
<td>Double Sided - 10 Pack</td>
<td>$13</td>
</tr>
<tr>
<td>Double Sided - Bulk</td>
<td>$15</td>
</tr>
<tr>
<td>High Density - 10 Pack</td>
<td>$28</td>
</tr>
<tr>
<td>High Density - Bulk</td>
<td>$32</td>
</tr>
<tr>
<td>Golden Ribbons</td>
<td></td>
</tr>
<tr>
<td>IW II - Multi Colored</td>
<td></td>
</tr>
<tr>
<td>ImageWriter II - Black</td>
<td></td>
</tr>
<tr>
<td>Goldstein &amp; Blair</td>
<td></td>
</tr>
<tr>
<td>Macintosh Bible</td>
<td></td>
</tr>
<tr>
<td>Keilman Designs - Disk File</td>
<td></td>
</tr>
<tr>
<td>Holds 45 Disks</td>
<td>$14</td>
</tr>
<tr>
<td>Holds 90 Disks</td>
<td>$21</td>
</tr>
<tr>
<td>Holds 135 Disks</td>
<td>$31</td>
</tr>
<tr>
<td>Kensington Microwave</td>
<td></td>
</tr>
<tr>
<td>Mac II Stand With Extension</td>
<td></td>
</tr>
<tr>
<td>Cables</td>
<td>$13</td>
</tr>
<tr>
<td>System Saver Mac Fan</td>
<td>$12</td>
</tr>
<tr>
<td>Turbo Mouse</td>
<td>$110</td>
</tr>
<tr>
<td>Kraft</td>
<td></td>
</tr>
<tr>
<td>QuickStick ADB</td>
<td>$49</td>
</tr>
<tr>
<td>QuickStick (512K &amp; Plus)</td>
<td>$39</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+ Mouse</td>
<td></td>
</tr>
<tr>
<td>A+ Mouse ADB</td>
<td>$79</td>
</tr>
<tr>
<td>Orange Micro</td>
<td></td>
</tr>
<tr>
<td>Grappler C/MacGS</td>
<td>$78</td>
</tr>
<tr>
<td>Grappler Mac LQ</td>
<td>$102</td>
</tr>
<tr>
<td>Grappler Mac LS</td>
<td>$102</td>
</tr>
<tr>
<td>Grappler Sponder</td>
<td>$21</td>
</tr>
<tr>
<td>Sony Disks</td>
<td></td>
</tr>
<tr>
<td>DC 2000 40 Msp. Tape</td>
<td>$23</td>
</tr>
<tr>
<td>Double Sided - 10 Pack</td>
<td>$14</td>
</tr>
<tr>
<td>Double Sided - Bulk</td>
<td>$15</td>
</tr>
<tr>
<td>High Density - 10 Pack</td>
<td>$29</td>
</tr>
<tr>
<td>High Density - Bulk</td>
<td>$32</td>
</tr>
<tr>
<td>Summagraphies</td>
<td></td>
</tr>
<tr>
<td>Bit Pad Plus (ADB)</td>
<td>$324</td>
</tr>
<tr>
<td>Targus</td>
<td></td>
</tr>
<tr>
<td>Deluxe Mac/SE Extended Bag</td>
<td></td>
</tr>
<tr>
<td>Black, Gray, or White</td>
<td>$72</td>
</tr>
<tr>
<td>ImageWriter Bag Black</td>
<td>$48</td>
</tr>
<tr>
<td>Mac/SE Bag Black</td>
<td>$56</td>
</tr>
<tr>
<td>Williams &amp; Macius</td>
<td></td>
</tr>
<tr>
<td>Labels, 216 (ImageWriter)</td>
<td></td>
</tr>
<tr>
<td>Labs, 216 (ImageWriter)</td>
<td>$18</td>
</tr>
<tr>
<td>myDiskLabeler (imageWriter)</td>
<td>$28</td>
</tr>
<tr>
<td>myDiskLabeler (LaserWriter)</td>
<td>$33</td>
</tr>
<tr>
<td>Sticky Business</td>
<td>$55</td>
</tr>
</tbody>
</table>

### Official Entry Form

| MacZone Goby Giveaway     | 18005 NE 66th St. Suite A110 |
| Redmond, WA 98052         |         |

When you order by phone, fax or mail, you are automatically entered in the drawing. You can also enter by mailing us this coupon.

| Name                      |         |
| Address Apartment         |         |
| City                      |         |
| State Zip                 |         |

### Order 8 a.m.-1 a.m., E.S.T.

Those are our exceptionally convenient phone hours (that's 5 a.m. to 10 p.m. Pacific time). And if they're still not convenient enough, you can always fax your order to us 24 hours a day at (206) 881-3421.

**1-800-248-0800**

Intl: (206) 883-1975 Canada: 800-248-0344 FAX (206) 881-3421

Our savings are huge. Our advice is free.
Feel free to compare Bitstream fonts to Adobe's. Absolutely free.

Right now, Bitstream is offering anyone who has purchased an Adobe font a free Bitstream typeface family for the Macintosh. One that Adobe doesn't offer. A $180 value. Plus a typeface that Adobe does offer, so you can compare. The design. The character spacing. The kerning. And the overall quality. We think you'll like what you see. And the fact that Bitstream offers the largest library of typefaces for both Adobe PostScript printers and clones. In fact, hundreds more faces than Adobe. Naturally, an offer this good is valid for a limited time only.

Call 1-800-848-8220 ext. 601 for your free typeface.
Lots of people complain about how the LaserWriter wastes paper by printing a test page every time it's turned on. Several methods for eliminating the test page have appeared here over the last couple of years. For instance, you can send the printer PostScript commands that semipermanently turn off the test page (check the June 1987 issue for details), or you can do the same thing more easily using the Widgets utility software from CE Software (as mentioned in the February 1988 issue). A tip last June suggested you just pull out the paper tray before switching on the LaserWriter, and push it back in when the green light stops flashing. You can also conserve paper without a test ban—an idea proposed by L. W. Boyer of Houston. Just insert a piece of scrap paper in the manual-feed guide before switching on the LaserWriter. The printer automatically uses paper in the manual-feed guide instead of the paper from the cassette.

**SIMPLE FRACTIONS**

Q: The article "Insights on Microsoft Word 4.0," which appeared in the June 1989 Macworld, tells how to create fractions like 36 ⅔ using Word's formula-type setting commands. When we use the sample formula from the article, however, the resulting fraction disrupts the line spacing. Are we doing something wrong?

A: Forget formula-type setting commands for simple fractions. You can create simple fractions in almost any word processor by simply reducing the font size of the numerator and denominator and superscripting the numerator (see "Fraction Type"). This technique works in Word, WriteNow, FullWrite Professional, and MacWrite version 5.0 and earlier. However, the method does not work very well in MacWrite II or Microsoft Works.

**NEW BEEP**

Q: When I use the Sound device in the Control Panel accessory on my Mac SE to select the Simple Beep alert sound, I get a beep like the start-up beep of a Mac SE or a Mac Plus. If I play the Simple Beep using Suitcase II, it sounds like a Mac II beep. Why doesn't the Control Panel use the Mac II beep on a Mac SE?

A: The traditional beep you dislike is produced by software built into the Mac SE and the Mac Plus. The Sound Manager software and Sound CDEV (Control Panel device) software included with System 6.0 and later versions let an SE or Plus use other alert sounds. Those other sounds may be distorted on an SE or a Plus because the Sound Manager uses a timer that's also used by some application programs. The Sound CDEV guarantees a distortion-free sound by using the built-in beep when you select Simple Beep as the alert sound.

You can use the newer, Mac II-style Simple Beep by duplicating it and renaming and renumbering the copy. You can do that with various utility programs, including Apple's ResEdit and ALSoft's FKey/Sound Mover. The shareware utility Sound Mover version 1.4 doesn't work with Simple Beep—the Mac crashes when you try to use a copy of Simple Beep.

If you're going to use ResEdit, it's much safer to work on a copy of the System file (made with the Finder's Duplicate command). Then start ResEdit and use it to open the copy. Scroll through the list of resource types until you find the 'snd' type, and double-click to open it. From the list of specific 'snd' resources that appears, select the one named Simple Beep and choose Duplicate from ResEdit's Edit menu. ResEdit duplicates the selected resource, assigns the duplicate a new resource number, and selects the duplicate. Now choose Get Info from ResEdit's File menu. In the information window that appears for the selected resource, change the resource name to New Beep or anything else you like. Next (continues)
Quick Tips

Roll Over Beethoven.

LightningScan. Thunderware's hand-held scanner for the Mac. Now with gray scale conversion.

Our new product roll-out is worth a little arm waving. That's because LightningScan lets you scan images up to four inches wide from books, mounted artwork, or anywhere else. You get switchable resolution up to 400 DPI. Software conversion to gray scale. A setting for text and line art. Plus three dither patterns that put limitless special effects right at your fingertips.

LightningScan comes with the application that helped make ThunderScan famous. Along with desk accessory software that works in concert with any Macintosh program. And to end this ad on an upbeat note, LightningScan can be yours for just $549 suggested retail. So get rolling to your dealer and pick one up today.

NEW CARD, COPY PICTURE SCRIPTS

In HyperCard, how can I write a script to create a new card when I reach the last card in the Address stack? How can I have that script copy a picture from an existing card and paste it on the new card?

Blaine L. Roberts
Houston, Texas

A

The following closeCard handler in the stack script will create a new card upon leaving the last card in the stack, but only if the stack user approves.

on closeCard
    if the number of this card is not the number of cards
        then pass closeCard
            answer "Create a new card?" with OK or Cancel
(continues)
**Fast Statistics.**

**Because you don’t have time to waste.**

You don’t have time to read a 1000 page manual, to play games, to wade through a pile of confusing menus.

You have lots of data. You need graphs, tables, financial projections, surveys. The report is due tomorrow and the stat package you thought had everything can’t do the job.

Now you can do it.
The company that brought professionals "the best statistics package on the Macintosh"* introduces the easiest: FASTAT.
Designed just for the Macintosh, FASTAT makes high-powered, accurate statistics easy.

You can do dependent and independent t-tests, time series analyses, factor analysis, two-way and n-way tables, correlations, nonparametric tests, regressions, analysis of variance and covariance, exploratory data analysis — even if you’ve never done them before.

You can also create full-featured graphics such as X-Y plots, bubble plots, line plots, histograms, box-plots, stem-and-leaf diagrams, autocorrelation and time series plots, as well as state-of-the-art displays, like scatterplot matrices.

Some of the graphs are only a click away. Click on a variable name, and you get a histogram or a box plot of the variable. Click on a regression output or a cell in a correlation matrix, and you get a scatterplot of the variables.

Need to customize a graph? With FASTAT’s MacDraw-like tools you can color, draw, add text, and move things.

Need help understanding a statistic? FASTAT’s “pop-up tutor” tells you what the numbers mean.

Need reports? FASTAT’s built-in text editor lets you scroll through results, cut and paste, change fonts, add explanatory notes, and save your work.

System requirements: 1 megabyte of memory and hard drive. Mac II version available. Unlimited free technical support.

For $195,** you can stop wasting time.

**Systat. Intelligent software.**

Call or write for further information:
SYSTAT, Inc.
1800 Sherman Avenue, Evanston, IL 60201
312 864.5670 FAX 312 492.3567

*MacWeek September 13, 1988
**Suggested Retail Price
**QUICK TIPS**

**HOW TO**

if it is “Cancel” then pass closeCard
doMenu “New Card”

--here, use any other commands you need to
--set up the new card, such as
--copying card script, buttons, fields, and picture

pass closeCard
end closeCard

Theoretically, you can copy and paste a picture with a script like this:

set cursor to watch
push card
lock screen
go back -- to previous card
choose select tool
-- select the whole card picture
drag from 0,0 to 512,342
doMenu “Copy Picture”
pop card -- to new card
doMenu “Paste Picture”
doMenu “Transparent”
choose browse tool

If you want the areas of the picture that aren’t black to be opaque (white) instead of transparent, then omit the doMenu “Transparent” command.

To copy and paste a picture that has both opaque and transparent areas, you must copy and paste the entire card—picture, buttons, fields, field contents, and script. The following stack script handler does that by intercepting the New Card menu command.

on doMenu menultem
  if menultem is “New Card” then
    lock screen
doMenu “Copy Card”
doMenu “Paste Card”
    put empty into field “Name and Address”
    put empty into field “Phone Number”
    put the date into field “Date”
    unlock screen
tabKey -- ready to enter 1st field
  else
    pass doMenu
  end if
end doMenu

Note that this handler takes over when you choose New Card from the Edit menu (or press F4-N) as well as when you use a doMenu “New Card” command. Also, it turns

(continues)
Now you can treat any Group III fax machine in the world as a remote printer for your Mac. With the Abaton InterFax™, you can print letters, reports, and memos in Los Angeles, New York, London, and Tokyo, even if your office is in Peoria.

And all your documents will look as good off the fax as they would off an ImageWriter. No blotchy letters, streaky lines, or dirty smudges like normal faxes. With the Abaton InterFax, even your fine print is perfectly legible.

And the InterFax gets your fax out fast. *MacWEEK* rated it the fastest fax for the Mac. That's because the friendly InterFax software compresses your file first, then sends it out. So it takes less time to transmit.

You can also use the InterFax as a Hayes-compatible data modem to communicate with other asynchronous devices. Which makes it a great deal as well as a great tool. But that's not the only way it saves you money. With the InterFax, you can schedule when faxes are sent—like right before a telephone conference, or after hours when the rates are lower. And because the InterFax receives as well as it sends, you can screen faxes before you commit them to paper.

Since the InterFax works in background—with or without Multifinder—you can continue working in PageMaker, Excel, Word, or most other Macintosh applications while you're sending or receiving faxes. Which makes you even more productive.

If you want to know why *The Macintosh Buyer's Guide* rated the InterFax 9.3 (out of a possible 10), call Abaton at 1-800-444-5321. We'll fax or mail you more facts about the InterFax. Then you can start faxing (and printing) all over the world.
The Ultimate Mac Mover™

Carry your Mac, Mac Plus or SE system, including all accessories in the Field-Pro Mac Mover, and get the ultimate in protection and convenience.

- Organizer section with pockets for mouse, mouse pad, cables, modem, dust cover, pens, pencils, business cards. A padded closure protects all.
- Free Disk Wallet is shielded against magnetic fields, holds 6-12 disks.
- Padded dividers are moveable to separate hardware & external drives.
- Padded Keyboard pocket holds extended or regular size.

AND MORE...

- Padded handles with leather grip
- Steel hardware
- 2 way system access - open just the top or entire side of case
- Offset shoulder strap for easier carrying
- Side Stabilizing Handle
- Hard board bottom reinforcement with rubber feet
- 3 way zipper locking system - all zippers lock at once (lock not provided)
- Self healing zipper rated for extra heavy loads
- 1000 lb test webbing

INTRODUCTORY PRICE $99.95
Lifetime Warranty

Field-Pro
AMHERST INTERNATIONAL
540 No. Commercial St.
Manchester, NH 03101
1-800-547-5600

Circle 244 on reader service card.

EVERYONE GETS FRONT ROW CENTER WITH PC VIEWER™

Project your Mac® or Mac II® information onto a wall or screen with a PC VIEWER LCD projection panel and an overhead projector. To find out how you can be sure that everyone gets a clear view of your next presentation, call for a free detailed brochure and the dealer nearest you.

In Oregon, (503) 692-4968

PC VIEWER and Memory Module are trademarks of In Focus Systems, Inc.
Mac and Mac II are registered trademarks of Apple Computer, Inc.

IN FOCUS SYSTEMS INC.
1-800-327-7231

Circle 63 on reader service card.

QUICK TIPS

HOW TO

out that copying and pasting a whole card (as this script does) is faster than copying and pasting a picture (as the previous script does).

LABELS OVER PHOTOS

TIP: White text with a black drop shadow shows up well over a photograph where either black or white alone would be hard to read (see "Shadow Label"). To get this effect in ReadySetGo version 4.5, follow these steps.

1. Create a text block, select it, and use the Specifications command from the Edit menu to set the Ignore Runarounds option. Type the label in the text box and set its font, size, and other type specs.
2. Duplicate the text block and offset the second block slightly. I use the Duplicate command from the Edit menu, specifying vertical and horizontal offsets of -0.03.
3. Select the top text and use the Color command from the Text menu to make the top text white.

ReadySetGo doesn’t display white text on the screen unless the text has a non-white background fill, but the white text does print properly.

Jim Alley
Savannah, Georgia

You can get the same effect in PageMaker 3.01 and in most paint and draw applications. Use the Copy and Paste commands to duplicate the text, and offset the duplicate by dragging.

MACRO DOES ALL FORMATS

TIP: Why write separate macros for specific formatting options in Microsoft Ex-

(continues)
Industry Figures Tell the Story...

the Manhole
Is a Breakthrough

"The first full-fledged interactive storybook available on a personal computer... a charming and engaging fantasy universe... proof that innovation in personal computing is alive and well."

- Mitch Kapor, founder of Lotus Development and chairman, ON TECHNOLOGY

"If you want a glimpse of what a computer program can be... see the Manhole."

- Jerry Borrell, editor-in-chief, Macworld

Get the Manhole and see for yourself.

© 1989 Activision, the Manhole ©1988 Cyan. MS-DOS version ©1989 Activision. the Manhole is a trademark of Activision. Distributed by MEDIAGENIC.
Quick Tips

Quick Tip 1

**HOW TO**

Multiply $1,000 by the total number of exemptions claimed on line 6.

Subtract line 34 from line 32. Enter the rest here.

Then income. Subtract line 36 from line 35. Enter the result (if less than zero, enter zero).

_TIP:_ Under age 14 and you have more than $1,000 of investment income, check here and see page 17 to see if you have to use Form 8615 to figure your tax.

Enter tax. Check if from:

- Tax Table
- Tax Rate Schedules, or
- Form 8615

Virtual Tabs

As a rule, spreadsheet applications don't support indentation and tabs, but you can simulate them by using narrow columns for spacing. The top window shows the effects of this technique. Gridlines in the bottom window show where the extra columns are.

cell? Nearly always there's a cell right on the worksheet that has the format you want. Just copy the source cell, select the target cell or cells, and execute the following two-line macro:

```plaintext
paste_format=opt/command/f
=PASTE.SPECIAL(4)
=RETURN()
```

It's not fancy, but it's the most useful macro I have. Much faster than schlepping up to the menu, selecting Paste Special, and so forth.

William Casey

Minneapolis, Minnesota

Spreadsheet Indents and Tabs

_TIP:_ Tabs and indents are essential to effective, well-organized spreadsheets, but spreadsheet applications generally don't allow for tabs, and the Mac's proportional spacing doesn't produce proper alignment. However, a simple trick will make spreadsheets act as if they have tabs. Basically, you insert extra columns to provide uniform horizontal spacing.

To set up an indent at the left edge of the spreadsheet, make the first column width the size of the indent and the second column wide enough for the widest entry. Put indented entries in the second column and nonindented entries in the first column. (The nonindented entries in the narrow first column will automatically extend into the second column.) For _x_ levels of indentation, set the widths of the leftmost _x_ columns to the size of an indentation space, and make the next column to the right wide enough for the widest entry. "Virtual Tabs" demonstrates the technique.

Robin Elizabeth Wolfson

Sacramento, California

Reprint Spoiled Print Job

_TIP:_ Ever wish you could intercept a spoiled print job and increase the number of copies, or perhaps reprint a job quickly? Such flexibility is especially desirable with reports that take a long time to generate. The SuperMac print spoolers—SuperSpool and SuperLaserSpool—don't let you reprint or change the number of copies. Neither does Apple's Print Monitor. However, you can get equivalent results by duplicating the spool folder immediately after a job begins printing. To do that in the Finder, select the folder and choose Duplicate from the File menu. You'll find the SuperMac spool folder, customarily named either SS Spool Files or SLS Spool Files, in the disk window. The Print Monitor spool folder is in the System Folder and is named Spool Folder.

To reprint the job, copy the icons in the duplicate spool folder (press the Option key while dragging the icons if the folders are on the same disk) into the real spool folder. Reprinting begins automatically.

Sometimes the spooling software gets confused by the sudden appearance of icons in the spool folder and so displays a spurious message describing an imaginary problem. Dismiss the message to continue the reprinting. You can reprint any number of times by recopying the icons. Duplicate spoiled print jobs can be
Introducing the first color PostScript printer priced to keep you in the black.

The QMS ColorScript 100 Model 10. Just $9,995.

Show-stopping presentations, powerful projections and crystal clear calculations in hard copy or transparency form. Everything your business needs to stand out from the crowd. All in a full spectrum of color for just $9,995. The QMS ColorScript™ 100 Model 10 easily connects to your Mac® or PC to add full color and the power of true Adobe® PostScript to your business — and, at this price, it helps you stay in the black! It's another first from QMS® and a breakthrough in color PostScript® printers.

Limitless Possibilities. The new QMS ColorScript 100 Model 10 allows you to have total control over the final appearance of your hard copies and transparencies. The Model 10 includes 35 resident typefaces that, thanks to PostScript, can be scaled to virtually any size and shape. Put that together with its ability to print over 16 million color variations and you'll see an entirely new dimension to composition.

Exclusive Advantages. The compact Model 10 gives you advantages you won't find with the competition. For example, PC users can put the Model 10 to work without adding any additional boards. And Mac users simply plug the Model 10 into the AppleTalk® port. The Model 10 prints at 300 dpi for near typeset quality presentations that spring to life in colors that adhere to PANTONE® Color Standards. If you need to expand your printing capabilities or memory, the Model 10 is designed to easily accept a 1 MB or 4 MB RAM upgrade. The Model 10 also features an SCSI interface that makes adding enough memory to store the entire PostScript typeface library as simple as plugging in a lamp.

1-800-523-2696. If improving your business edge is important to you, call our toll free number for the nearest Laser Connection® dealer. Your Laser Connection dealer can give you a demonstration and show you how the QMS ColorScript 100 Model 10 will add a colorful dimension to your presentations — and help keep you in the black.


©1989 Laser Connection

Circle 104 on reader service card
POWER DRAW
for people who have to be The Best.

Ease of Use: Instant editing access without command keys. Instinctive - no training intensive - spend your time working, not learning. Interactive snap puts you in complete control.

Accuracy and Standards: Tool and Die precision. Cartesian - Azimuth - Gradients - Bearing and Distance. ANSI - ISO - Metric and English units, scales, and sizes.

Power: Full auto-dimensioning. 256+ colors or gray scale. Handle up to 220,000 drawing objects. Lightning Speed.

File Compatibility: Exchange Pict (1 & 2), Bit Map and other CAD files including DXF, easily and quickly.

There are 2 kinds of Professionals. Those who are using PowerDraw and those who should be.

Engineered Software
In the USA Call (919) 299-4843
In Canada Call (204) 453-8111
For Our Distributors In Other Countries
Fax: (919) 852-2067

The Accepted Mac® CAD Standard

The CAD legend grows...

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.

LANGUAGE MASTER

$99

Franklin Software

The Copy Ruler and Paste Ruler commands do not copy character attributes such as font, size, and style. If you want to copy both character and paragraph formats, use the regular Copy and Paste commands with the appropriate sample paragraph from the end of your document.

We pay from $25 to $100 for tips published here. Send tips or questions (include your address and phone number) to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107. Send electronic mail to CompuServe (70370,702) or MCI Mail (addressed to Macworld). All published submissions become the property of Macworld.

Lon Poole answers readers' questions and offers advice in this monthly column. Many of the tips he's collected can be found in Mac Insights (Microsoft Press, 1986). His most recent book is the quick reference HyperTalk (Microsoft Press, 1988).
Mac users in Business and Graphic Arts have long found the superior graphics of Cricket alluring. Now, Cricket Presents, Graph, and Draw have something you'll find even more irresistible. It's the promise of greater innovation and long-term backing that comes with the name Computer Associates.

With the addition of CA-Cricket® to its roster of Macintosh products that already includes such renowned programs as Bedford Accounting software, Computer Associates makes yet a further commitment to all Mac users.

It's a commitment that goes beyond giving you the best service and support in the industry. It's a commitment to back your graphics products with the same kind of innovative graphics technology we've already made available to thousands of companies throughout the world.

For more information about CA-Cricket's graphics packages and our new support program, SupportPlus™, call 1-800-531-5236. (In Canada, 1-800-663-6904.) It's sure to be food for thought.

Circle 15 on reader service card
The Story Of Apple® & Eve.

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

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 for PC users who want to protect data files.

RAINDOW TECHNOLOGIES

18011-A Mitchell South, Irvine, CA 92714 • (714) 261-0228 • TELEX: 386078 • FAX: (714) 261-0260

©1989 Rainbow Technologies. All product names are trademarks of their respective manufacturers.
Have you heard computers are transforming the way we record and listen to sound. More and more, music is stored not in fragile vinyl grooves but in bits and bytes on silvery compact disks (CDs). Scratches, clicks, pops, and skips are becoming relics of the past.

And if you've explored the Sound option in the Mac's Control Panel desk accessory, you've noticed that you can choose from several digitally recorded beep sounds: a simple beep, a clanking sound, a monkey's squawk, and a springy "boing" that reminds me of the suspension on my first car. Compact disks and the Mac's monkey squawk may seem worlds apart, but the concepts behind them are similar.

When you combine digital audio with a general-purpose computer, suddenly the potential of digital sound goes beyond great-sounding Springsteen. The Mac's ability to record, manipulate, and play back sound opens doors to new applications in education, entertainment, music, business, and science.

This month, I examine the roles digital audio plays in the Mac world and I spotlight some of the sound-oriented products available for the Mac. "The Mac Sounds Off" explains how to modify your System file to add your own digitally recorded system beeps, and it reveals some sources for prerecorded sounds. And since the best way to appreciate the Mac's audio abilities is to hear them, I've created a HyperCard sound stack that auditorily illustrates many of the concepts discussed here. Details on how to get the stack appear at the end of this column.

**THE SOUND OF MAC**

Digital audio can play so many roles that it might help if I summarize each one before taking a closer look at just how digital sound is produced.

- Digital sound is used to teach concepts that are difficult to grasp through written words or pictures. What does a red-tailed hawk sound like? How are numbers pronounced in Spanish? What's the difference between *legato* and *staccato*? For explaining concepts like these, a sound is worth a thousand words.

- Digital sound enlivens games with realism that phony beeps and squawks can't match. In Silicon Beach Software's Airborne arcade game, for example, you hear the screaming of fighter jets and the wash of helicopter blades. In Microsoft's Flight Simulator, you hear a digitized airplane engine and the skid of your landing gear. Electronic Arts' Pinball Construction Set gives you the bells and mechanical *thunks* of a pinball machine.

- In music, digital sound plays three roles. On one level, it makes possible Broderbund Software's remarkable Jam Session, whose digitally recorded instruments turn the Mac into a six-piece band that can make even novice musicians sound good. On another level, the Mac's sound features enable musicians to alter sounds played by digital sampling keyboards such as Ensoniq's Mirage and E-mu Systems' Emulator series. On still another level, some additional hardware can turn the Mac into a professional audio workstation that can record and play back sound with the fidelity of a compact disk.

- Digital sound can enliven business presentations and training software. It also plays a specialized role in a unique sales product, Magnum's TFLX, whose hardware and software turn the Macintosh into a sophisticated system for recording telephone messages and taking orders.

- Scientists and medical researchers use Mac sound products to analyze brain waves and study heart rhythms. And at
THE MAC SOUNDS OFF

Regardless of the program you use, be sure to make a backup copy of your System file in case something goes amiss during the modification process. After you've added an SND resource, use the Control Panel's Sound options to select it as the current system beep.

Using a variety of shareware or public-domain INITs (small programs that load during start-up), you can make your Mac sound off at other times, too. Two particularly noteworthy sound INITs include SoundMaster (by Bruce Tomlin; $10) and Chime (by Robert Flickinger; free). SoundMaster lets the Mac play sounds when you perform any of 11 tasks (such as inserting or ejecting a disk). Chime plays up to four separate sounds on the hour and at 15, 30, and 45 minutes past.

Snapshots of Sound
Sound-editing programs graphically display sampled sounds and let you edit them. At top, 10 milliseconds of a sampled piano arpeggio have been selected in Blank Software's Alchemy. At bottom, Digidesign's Sound Designer II depicts how a sound changes over time using a sound-analyzing technique called a fast Fourier transformation, or FFT.

REQUIRED EQUIPMENT
Before digitally recorded sound can be played back, the discrete bits of digital data generated during sampling must be translated back into continuously varying volume levels. The Mac has an 8-bit sampling resolution; it can store and re-create only 256 volume levels. When a given sample's amplitude lies between two levels, it's rounded to the nearest one. This rounding of amplitude information, called quantization, is what causes distortion.

REQUIRED EQUIPMENT
Before digitally recorded sound can be played back, the discrete bits of digital data generated during sampling must be translated back into continuously varying volume levels. The Mac has an 8-bit sampling resolution; it can store and re-create only 256 volume levels. When a given sample's amplitude lies between two levels, it's rounded to the nearest one. This rounding of amplitude information, called quantization, is what causes distortion.

REQUIRED EQUIPMENT
Before digitally recorded sound can be played back, the discrete bits of digital data generated during sampling must be translated back into continuously varying volume levels. The Mac has an 8-bit sampling resolution; it can store and re-create only 256 volume levels. When a given sample's amplitude lies between two levels, it's rounded to the nearest one. This rounding of amplitude information, called quantization, is what causes distortion.
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.
GETTING STARTED

HOW TO

WIRED FOR SOUND

For better sound quality, connect a Mac to a stereo system. For monophonic Macs (the SE, Plus, and earlier machines), one cable has a ¼-inch miniplug on the Mac end, and a phono plug (Radio Shack catalog number 42-2444) on the other end (A). The other cable is a "Y" adapter with a phono plug on one end and two phono plugs (Radio Shack number 42-2435) on the other (B). For stereo Macs (the Mac II, IIt, and SE/30), all you need is a cable with a ¼-inch stereo miniplug on the Mac end and two phono plugs (Radio Shack number 42-2475) on the other (C). Important: Before turning your stereo on, turn its volume control all the way down and use the Mac's Control Panel to turn the Mac's speaker volume all the way down. Then turn the stereo on and adjust its volume and the Mac's to a comfortable listening level.

To record sound, the Mac needs an analog-to-digital converter, which measures the voltage levels coming from a microphone or other sound source and translates them into digital data. The most popular analog-to-digital converter for the Mac is part of Farallon Computing's MacRecorder package.

The MacRecorder hardware is a box slightly larger than a cigarette pack. Besides the analog-to-digital converter, it contains a filter that removes high frequencies that can't be accurately sampled at 22kHz. Completing the package are a small microphone, a volume control, and jacks for an external microphone, tape recorder, or other sound source.

The MacRecorder 2.0 software comprises three components: SoundEdit, a recording and editing application; HyperSound, a HyperCard stack that lets you record and play back sounds from within HyperCard; and HyperSound Toolkit, a potpourri of HyperCard external commands (XCMDs) and external functions (XPCNs) that stack authors can use to give any stack digital recording features. You could use the HyperSound Toolkit to create an appointment stack that recorded spoken reminders and then played them back at a specified time.

The SoundEdit application is your primary link to the MacRecorder hardware. SoundEdit displays a recorded sound as a waveform (see "Riding the Waveform"). You can zoom in on the waveform display to look at an individual cycle (one back-and-forth phase of the sound's vibration), or zoom out to see the entire recording. You can select part or all of the waveform and cut or copy it to the Clipboard to rearrange the notes in a musical passage or the words in a phrase. You can also modify the sound, adding reverb to simulate a concert hall, or filtering certain frequencies to improve the sound quality. You can even reverse the sound to make it play backwards.

With two MacRecorders you can record in stereo. (In theory, you can record in stereo using one MacRecorder by recording each channel separately, but synchronizing the channels is difficult.) You can play back stereo sounds on any stereo Mac—the SE/30, II, IIt, or IIX.

But be forewarned that digital sound devours memory and disk space. With a 22kHz sampling rate, one second of sound uses 22K of memory and the same amount of disk space (double that for stereo). A Mac with 2MB of memory has room for about 70 seconds of 22kHz audio. When you're willing to trade fidelity for longer recording times, SoundEdit lets you specify sampling rates of 11, 7, and 5kHz. On
To get the most out of this box, you need to get this box.

Now that you've had the good sense to put a Macintosh® in, may we suggest something sensible to put in your Macintosh.

The Microsoft Office. The essential tool set designed expressly for business professionals.

It's four of the most successful programs to ever light up a Macintosh screen, in one specially-priced box. Including Microsoft® Word 4.0, the best-selling word processor in Macintosh history.

Microsoft Excel 2.2, a powerful new version of the industry standard already used by 90% of Macintosh spreadsheet users.

Microsoft PowerPoint®, the program that lets you turn routine slides, overheads and audience handouts into visual masterpieces.

And Microsoft Mail, the smartest, most efficient route for office communications.

All of these applications work brilliantly alone. And even better together. Thanks to innovative features like Excel/Word warm links, shared user dictionaries and mail integration.

And since your work group will need all four of these programs sooner or later, you'll want to buy them sooner. Because for a limited time, The Microsoft Office is priced 35% below what the same products cost individually.

So now that you have the computer that has everything going for it, get it everything it needs to get going. The Microsoft Office.

For more information call (800) 541-1261. Or stop by your Microsoft dealer today.

Microsoft®
Making it all make sense®
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.

Circle 481 on reader service card.

GETTING STARTED HOW TO

Riding the Waveform

The graphic display of a sound is called its waveform. Here are two waveform displays of the same sound, displayed by SoundEdit (part of Farallon Computing's MacRecorder package). The bottom window shows the entire recording; the top shows a small portion of it.

a 2MB Mac, these slower sampling rates provide recording times of 136, 204, and 273 seconds, respectively. SoundEdit also lets you use one of several compression ratios, which decrease storage requirements (and fidelity) by assigning fewer bits to each sample. Using the 8-to-1 compression ratio, a 2MB Mac can accommodate about 530 seconds of sound.

THE FORMATS OF SOUND

Every program category has its standard file formats, and sound-editing software is no exception. Although the SoundEdit application has its own file format, it also supports two important standard formats: SND resources (also known as sound or 'snd' resources) and Audio Interchange File Format.

If there's a sound you'd like to use as a system-error beep in a HyperCard stack, you must save it as an SND resource. Technically, two types of SND resources exist. Format 1 resources are generally system beeps, while Format 2 resources are used by HyperCard and other sound-playing applications. In the early days of digital Mac sound, the distinction was more important; you couldn't use Format 2 SND resources as system beeps. Beginning with System 6.0.2, however, Apple made the Mac's Sound Manager a bit less picky. With System 6.0.2 and later versions, you can use either format for system beeps.

The Audio Interchange File Format (continues)
"Our business was going through the roof, but our old accounting system was holding us down.

"In the commercial roofing business, you have to be on top of things in the office, too. Accurate budgeting and planning are essential. "But in the last five years, our business has really grown. And our stand-alone computers and simple accounting software system just couldn't handle it. We decided to switch to the Macintosh. And fortunately, our dealer showed us the Great Plains Accounting Series at the same time. It was just what we needed!

"It was so easy to learn and use, we didn't lose any time putting the system into place. And since it is fully-integrated and expandable, we've been able to add modules as our business required them.

"Adding Network Manager was easy—no data re-entry was necessary. And it gave us multi-user capability. Now, our people at eight different work stations can use Great Plains at the same time. And the customer assistance from Great Plains is excellent—the most responsive we've ever dealt with.

"We haven't even begun to use all the capabilities that Great Plains provides us. And we feel good about that. Take it from me—after you've outgrown one system, you don't make that mistake again."

Macintosh is a registered trademark of Apple Computer Inc.

Please send me a free copy of "Great Plains Success Stories," featuring the #1 overall rated accounting package for small and medium-sized businesses.

Name ____________________________
Company __________________________
Address ____________________________
City __________________ State ______ Zip Code _______

Business Phone ______________________

Mail To: Great Plains Software
Attn: Information Center
P.O. Box 9739, Fargo, ND 58109
Or call Toll-Free: 1-800-345-3276

GREAT PLAINS SOFTWARE
GROW YOUR BUSINESS ON GREAT PLAINS

*Sheldon Needle survey, 1988

Circle 156 on reader service card
GETTING STARTED
HOW TO

SOUND AT THE HIGH END

MacRecorder is a superb way to get sound into and out of the Mac, but it isn't intended for professional audio applications. To reach the upper strata of Mac digital audio, you need more sophisticated hardware such as Digidesign's Sound Designer board, which is available for the Mac II and the SE (an SE/30 version is in the works). Sound Accelerator contains a Motorola DSP56001 digital signal processing chip, a microprocessor designed for the data-shuffling demands of digital audio. (Steve Jobs's Next computer also contains a DSP56001 for details on this remarkable chip, see "What's Next?, Macworld, January 1989). The Sound Accelerator board allows the Mac to play back stereo CD-quality audio; that is, sound sampled at 44.1kHz with 16-bit resolution. Team a Sound Accelerator board with Digidesign's AD in analog-to-digital converter, and the Mac becomes a CD-quality, stereo digital-audio recorder that lets you record and play back digital sound directly to and from a Mac's hard disk. Digidesign's Sound Tools system includes a Sound Accelerator board, the AD In adapter, and software that lets you visually edit digital recordings. Composer Philip Glass recently used the Sound Tools system to record a solo piano album for CBS Masterworks records. Like the MacRecorder's SoundEdit application, the Sound Tools software—called Sound Designer II—graphically displays digital recordings and lets you alter them. But Sound Designer II's capabilities go far beyond SoundEdit's. You can, for example, alter a recording's pitch without changing its tempo, or alter its tempo without changing its pitch. A composer working on a commercial jingle might use the latter feature to squeeze a 35-second jingle into a 30-second time slot.

These digital edits require the Mac to perform thousands—sometimes millions—of computations. The Sound Accelerator signal-processing chip helps there, too. In one test I performed, a Mac II took 14 minutes to change an 8-second recording into a 5-second one. Equipped with a Sound Accelerator, the Mac took only 55 seconds. Speaking of amazing statistics, get this: a one-minute Sound Tools recording requires 10 megabytes of disk space. And because Sound Tools swaps data between memory and disk during recording and playback, it requires a fast hard disk with an average access time of 28 milliseconds or less. (For a list of capacious drives that meet this requirement, see "High-Capacity Hard Disks," in this issue.)

Digidesign is working on a new board that will provide record and playback capabilities and is intended for multimedia applications. The company says it will be priced at less than Digidesign's Sound Accelerator.

SAMPLING SAMPLERS

Just as digital sound has made its mark in the Mac world, it has also significantly influenced the music industry. Musicians are embracing a new generation of keyboards called samplers. Like a Mac equipped with a MacRecorder, a sampler digitally records and plays back sound. But with a sampler, you can play the sound at different pitches simply by pressing different keys. Record just one pitch of a given instrument, and you can instantly "play" that instrument from the sampler's keyboard.

Actually, most samples sound artificial when transposed too high or too low. Therefore, most sampling keyboards divide the range of notes into multiple samples, each of which plays a range of only an octave or so. This technique, called multisampling, avoids having to transpose a sample too high or low.

Programs like Sound Designer II let you simultaneously view and alter a (continues)
When you need an Apple® Macintosh™ computer or peripheral for a short-term project, like a presentation, trade show or training session, shake our tree first. We have bushels of Apple, IBM, Compaq, and compatible PCs, as well as quality peripherals for rent. And, with our extensive inventory and overnight shipment, we make sure the equipment you want is available, gets there fast and works when it arrives. One free phone call is all it takes. Call 1-800-GE-RENTS, Dept. K.

**Catch This Special Offer, Too!**

Call today and get your FREE catalog of GE Rental/Lease products and services. Ask for your copy when you place your order, or call our special information number—1-800-345-2451.

---

*IBM is a registered trademark of the International Business Machines Corporation. Apple, the Apple logo and Macintosh are registered trademarks of Apple Computer, Inc. Compaq is a registered trademark of Compaq Computer Corp.*

---

To Order, Call 1-800-GE-RENTS, Dept. K.
For Information, Call 1-800-345-2451.
Or Mail This Coupon.

☐ Yes! I need to rent PCs and peripherals ASAP. Please have a representative call me immediately!
☐ Please send me your FREE catalog of GE Rental/Lease products and services.

Name:
Title:
Company:
Address:
City: State Zip:
Phone Ext. or Dept.

Send to: GE Rental/Lease, P.O. Box 105625, Atlanta, GA 30348

---

Circle 195 on reader service card
sampler's sounds. This capability is especially useful for setting a *loop point*, a portion of a sample that repeats as long as a key is pressed. Because few samplers display waveforms graphically, it's difficult to find the perfect loop point using a sampler's editing commands. When you can see the waveform, however, setting loop points is far easier.

Another popular sample-editing program is Blank Software's Alchemy, which performs much of the same magic as Sound Designer II. One of Alchemy's primary strengths is its ability to change the sampling rate of a recorded sound. This *resampling* capability allows you to transfer sounds between samplers that use different rates. Musicians can store all their sound samples on the Mac and use Alchemy to shuttle them between samplers as needed for more versatility. (Digidesign's Sound Designer Universal also has this capability.)

**NOW HEAR THIS**

There's no better way to learn about digital audio concepts than to hear them. If you subscribe to CompuServe or Connect, you can download a free HyperCard stack I created to complement this column. The stack is called, logically enough, Jim Heid's Sound Stack. On CompuServe, it is located in the HyperCard forum (GO APhyper). On Connect, it's in the HyperCard portion of the Macintosh Symposium. I've also encouraged its distribution through user groups, so you can probably copy it from someone else. But be advised: the stack occupies an entire 800K floppy disk and will take a considerable amount of time to download.

And that illustrates a problem: At present, digital audio requires too much memory and disk space to be practical for many applications that could benefit from it. A talking tutorial that explains a program's features might be valuable, but would you be willing to donate half your hard disk to it?

The Mac's System 7.0 software, due to be released sometime next year, will lessen the storage burden by allowing digital recordings to be stored in a compressed form and expanded during playback. System 7.0 will also allow the Mac to play multiple sounds simultaneously; with System 6.0, only one recording can play at a time.

These enhancements should allow sound to work its way into more types of applications—and to create entirely new application categories. Soon, you may be able to annotate documents with spoken comments and send voice-mail messages to other users on a network. You might protect sensitive documents with a password utility that recognizes only your voiceprint. Or you might enjoy stereo sound effects in your quest to save the galaxy.

In other words, the Mac's audio features are impressive now, but we haven't heard anything yet.

Jim Heid is a Macworld contributing editor who focuses each month on a different aspect of Mac fundamentals. His latest book is Inside the Apple Macintosh, an advanced user's guide to the Mac, published by Brady Books.
Our new program can take any form you like.

If your business is like most, it relies on forms to communicate, administrate and delegate.

Yet, while the thought of replacing your labor-intensive forms system with a highly-productive forms program sounds good, the thought of replacing your existing forms probably does not.

Which is why you should think about this.

Introducing TrueForm, the Macintosh program that automates all of your existing forms. With TrueForm software, you don't have to change the way you work, re-train personnel or replace your current stock of pre-printed forms.

Because, unlike other forms programs, you aren't constrained by the limitations of a few built-in design tools. Instead, you can scan-in forms exactly as they are. Or you can create new forms with your own drawing or page layout programs and easily import them into the TrueForm program.

TrueForm offers complete spreadsheet features, along with the most powerful set of data-sharing capabilities of any forms program. So you can link forms to databases, accounting applications and even computers on different platforms.

And, if you use 4th Dimension database software, for just $20 (refundable when you buy the program), we'll rush you a copy of TrueForm Try-Out, so you can actually see how TrueForm performs for you.

Along with one copy of the Set-Up and Fill-Out programs, you'll get templates for ten common business forms and the 4th Dimension printing module.

Because TrueForm compresses each of your scanned images to save valuable memory, you can use existing forms regardless of their size or complexity.

The unique QuickForm tool allows users to make important notes on individual forms, just as they would by hand.

TrueForm's extensive merging capabilities allow easy communication with virtually any database without modifying the data.

TrueForm supports all PostScript™ as well as ImageWriter™ and LaserWriter™ printers; it prints entire forms or just the contents on pre-printed forms.

TrueForm supports odd-sized forms, multipart forms, mailing labels and forms of unlimited pages.

With TrueForm you can easily import forms from any drawing or page layout program stored in TIFF, EPSF, PICT or MacPaint formats.

Looking at this symbol on computers, printers and other products that include PostScript software from Adobe Systems Incorporated, QuickForms and Desktop Product are trademarks of Adobe Systems Incorporated. Macintosh, ImageWriter and LaserWriter are registered trademarks of Apple Computer, Inc. MacPaint is a registered trademark of Claris Corporation. 4th Dimension is a registered trademark of ACUC, Inc. and ACI. © 1989 Adobe Systems Incorporated. All rights reserved.
MiniCad+™

Computer-Aided Design and Analysis comes of Age

MiniCad+ rises on the foundations of a groundbreaking Macintosh CAD program, MiniCad 2D/3D. Universal in aim, MiniCad Plus is a total design and analysis solution, the answer to time-consuming transfers between applications. This professional CAD system offers the following easy-to-use components:

- High precision 2D drafting environment which includes complex duplication with arrays, hierarchical symbol editing with both external and internal libraries, fillets, beziers & cubic splines, auto-join, auto-dimensioning, continuously variable zoom up to 1000x, double line tools with auto-clean up, 256 user-definable attributes, 8 line types, unlimited layers, full use of Mac II, and more...

- Active spreadsheet inside drafting area which can be hot linked with objects to perform area calculations, parts schedules, cost estimation and more. As easy-to-use as the spreadsheet you’re using now.

- All new integrated 3D that is so powerful and user-friendly we may change your mind about micro 3D.

- MiniPascal, a programmable macro language, will allow advanced users and 3rd party vendors to create reports, macros, and powerful extensions to MiniCad Plus’s capabilities.

Graphsoft • 870 Court Ave. Suite 101 • Ellicott City, MD • 21043
MiniCad+ $695 • Demo Available for only $19.00
MiniCad Plotter Drivers: Prof. $300 Stand. $150
U.S.: 1 (800) 461-9588 • Canada: 1 (604) 854-2151 • Australia: 61-7-360-1204
Visa & MasterCard Welcome
MacWrite II appeared in the spring of 1989, a flagship product of Apple’s software spin-off, Claris. The result of much careful market research, the new version of MacWrite satisfied most of the wishes of longtime MacWrite users, who were still faithfully using a program lacking most of the features expected in an office-quality word processor. MacWrite II brought the features list up to snuff, and it did so in a way that doesn’t require much retraining for old MacWrite hands. Here are some hints, suggestions, and productivity tips.

### SIGNING UP

Many registered users of MacWrite got their copies of MacWrite II as a result of an upgrade offer. However, according to Claris, this does not mean that they are registered users of MacWrite II. You must send in the MacWrite II registration or drift forever in ghostly unrecognized status. You won’t hear about upgrades if you don’t register as a MacWrite II user.

### WHOSE DEFAULT IS IT, ANYWAY?

You may want to set the ruler, spacings, and other text styles as a default. There is a standard way to save this information, as a MacWrite II Stationery file, but it requires you to find the Stationery document after MacWrite II starts. Here is a simpler way: first design a document that includes your choices from the Preferences dialog box, Ruler selections, and type styles; next choose the Save As command and select MacWrite II Stationery as the file format; then save the file with the special name MacWrite II Options in the System Folder. The key points to remember are that the file must be in the Stationery format and it must be saved in the System Folder. The next time you open MacWrite II, it will use the defaults you have selected and display them in the untitled document it puts on screen.

### MORE OPTIONS (AND COMMANDS, AND DOUBLE-CLICKS)

Although having your own preset defaults is a great convenience, it can become quite inconvenient if you simply want to return to MacWrite II’s presets. Instead of changing the Autostationery file, all you have to do is hold down the Option key when opening a document and MacWrite picks its own presets instead.

An option that actually saves time, especially for poor spellers, is the beep on questionable spellings choice in the Spell—>Options dialog box. The speed advantage is that, when the program beeps, it has already selected the questionable word. You just press ⌘-Y to check that word, and the spelling-checker dialog box appears. When you finish the document, all your typing has been corrected (and the beeping serves a conditioned-response pedagogical function for your favorite mistakes).

The Option key is also useful for deciphering fonts. MacWrite II shows fonts on its Font menu as they will appear in text—a fine choice for standard type-style selection but pretty cryptic for Belmont, Symbol, and other math or engineering specialty fonts. Hold down Option when you open the Font menu to see the fonts listed by name in plain Chicago.

You can use MacWrite II to change background colors. Holding down the ⌘ key when you open the Color submenu under Style makes your choice refer to the background. Before you do this, you will probably want to adjust background color choices in the Control Panel.

To double your speed, try these double-clicks. For fast access to the Page Format dialog box, double-click on the little page icon in the lower left-hand corner. To open the Go To Page dialog box, double-click on the page-number box. To see the Paragraph dialog box, double-click on any of the line-spacing icons in the ruler.

### WITH STYLE

Although MacWrite II appears to lack a style sheet feature, you can create a reasonable facsimile by judicious use of Stationery files and a few other tricks. The usual form of a Stationery file is a document containing a company logo, date stamp, and standard salutations and closings. In a more refined variation, a Stationery file can be saved with a variety of custom rulers (see “Moving Stationery”).

In this scheme you select the line or lines whose format you wish to copy; pick (continues)
Copy Ruler under the Format menu, and then Apply Ruler to a block of selected text. The labels for sections in the Stationery document are really just reminders to yourself, a code for the set of ruler settings. When you have used the rulers you need, just erase the part of the document with the custom rulers and save the rest as an ordinary MacWrite II file.

**HELP ON THE WAY**

The View menu contains some useful options, among them the Show Pictures/Hide Pictures command. Using this command you can construct a custom Help screen for yourself that shows your most frequently used (or most difficult-to-memorize) keyboard equivalents (see "Hidden Mysteries"). Type out the commands you need in MacPaint or another program that can save MacPaint or PICT format. Put this file into your documents with the Insert File command under Edit, and then use Hide It, preferably at the top of the document. To find and view your custom menu, use Show It (control+A). This pops you to the top of the document and shows the picture.

**TOC?**

Although you can’t really do automated table-of-contents work per se in MacWrite II, there is a way to accomplish something similar. The footnoting function in MacWrite II allows notes to be specified as endnotes, meaning that all notes are collected and numbered at the end of the document. As you compose the document, just select headings and subheadings, copy them, pick the Insert Footnote command under Format, and paste the headings and subheadings as footnotes. You will find all of these collected in a nice stack (see “Feet on the Table”) at the end of the document, and this scheme has the advantage of preserving the “table of contents” order even if you shuffle sections.

**ENVELOPES**

MacWrite II includes some prepared Stationery templates, but it doesn’t offer one for envelopes. You may want to experiment, but these settings for envelopes are a good place to start. Use a clean new document (no tabs or formatting). Pick US letter, horizontal mode, from Page Setup (under File). Put six carriage returns at the top. For formatting, in the Page dialog box set all margins to 1 inch, and in the Paragraph dialog box set the left indent to 5 inches and the right indent to 9.5 inches.
Big-league stats for the serious player.

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) 329-3323.

And get the knowledge to be first in your field.

When you want more data analysis power from your Macintosh®, the only game in town is SPSS.
Try typing in a sample address and printing it on an envelope. If the result is satisfactory on your envelopes, save this as a Stationery file called Envelope 1.

... AND MORE ENVELOPES
Call up Envelope 1, and erase your sample address. If you have a mailing-list database saved as tabbed text, choose the Open Merge Data File command under File. After you pick your mailing list file, you can select the Insert Merge Field command and identify the elements of the address. If you're careful, you can print all the envelopes and all your form letters in one session, collecting the envelopes and letters in exact mailing-list order (sorted, for example, by zip code) for efficiency.

LAUNDERING THE LISTS
You may be working with a mailing list that was saved as text with delimiters other than tabs. This happens with some lists ported from IBM PC or mainframe applications, for example. The merge facility is quite forgiving, at least on small, regular lists in which all fields are filled, but to assure trouble-free operation, you should replace those other delimiters with tabs. Just open the text document in MacWrite and use the Find/Replace command with a comma (one typical example) as the Find item and \#T (shown as VT on screen) as Replace With.

Under these circumstances, you may note that since you're replacing commas with invisible characters, you have to choose Unselect Text in the Set Attributes dialog box. Otherwise you end up with the literal combination VT as the delimiter in the records of your mailing list.

BANISHING THE SNAKES
The Columns function in MacWrite II (found in the Page menu item under Format) assumes that you will be typing text in snaking style—in which text flows from one column to the next continuously. If you want to produce newspaper-style columns, make up a Stationery document with multiple columns and fill it with carriage returns. You can then select positions at random in the columns and start typing, without seeing all your work collected into a single text-snake (see "Columns—Newspaper Style").

SLIDING WHILE YOU MERGE
Many mailing list databases contain omissions or irregularities—addresses can consist of many fields, some of which are blank. This can produce both form letters and envelopes with unacceptable aesthetics (continues)

---

**Computer Eyes**

Capture Video Images: $249.95!

Capture real-world images on your Mac. 512E, Mac Plus, SE, or Mac II from any standard video source (video camera, VCR).

- On the screen...
  - Computer Eyes includes several options for images display, and edit options such as shrink, expand, scroll, and more.
- Behind the scenes...
  - Computer Eyes acquires larger than screen images with 256 gray levels for desktop publishing and image processing.
  - On paper...
  - Computer Eyes saves images on disk in several file formats including TIFF, MacPaint, PICT, RIFF, and EPS for use with PageMaker, HyperCard, MacPaint—virtually all the popular graphics programs.
- Think of the possibilities!
- Computer Eyes is backed by a one year warranty and the success of over 20,000 systems sold. See your dealer or order direct.
- For more information, example images, or Demo Disk ($3), call (617) 329-5400.

To order call 800-346-0390.

VISA, M/C, COD accepted.

Digital Vision Inc.
66 Eastern Ave.
Dedham, MA 02026.

---

**Don't Forget!**

Send for the latest edition of the free Consumer Information Catalog. The Catalog lists over 200 selected federal publications of consumer interest on subjects like health, nutrition, federal benefits, money management. The Catalog is free and so are many of the booklets. Just send your name and address, no strings attached.

Write today:

Consumer Information Center
Department DF
Pueblo, Colorado 81009

A public service of this publication and the Consumer Information Center of the U.S. General Services Administration.
After centuries of practice, mankind perfects engineering calculations: MathCAD.

Announcing MathCAD: A Calculating Renaissance For Your Mac.

What the historians will call it, only time will tell. Perhaps the Century of Speed, or the Era of Ease. But whatever the name, this is the age of MathCAD, the only math package that looks and works the way you think.

MathCAD is the best selling math software in the world because it lets you perform engineering and scientific calculations in a way that's faster, more natural and less error-prone than the way you're doing them now—whether you're using a scratchpad, calculator, spreadsheet, or program that you wrote yourself. It gives you more control and more flexibility than ever before.

MathCAD's live document interface lets you enter equations anywhere on the screen, add text, and graph the results. Then print your analysis as a presentation quality document.

And it has over 120 commonly used functions built right in, for handling all kinds of equations and formulas, as well as exponentials, differentials, cubic splines, FFTs and matrices.

No matter what kind of work you do, MathCAD has a solution for you. In fact, it's used by over 50,000 engineers and scientists, including electrical, industrial, and mechanical engineers, physicists, biologists, and economists.

But don't take our word for it. Just recently MathCAD was reviewed as being "everything you have ever dreamed about in a mathematical toolbox." And when it was compared to the competition, it was "MathCAD by a mile."

And if you work with an IBM® PC or compatible, there's a MathCAD version designed exclusively for you. Or if you use both Macs and PCs, don't worry: MathCAD files are completely compatible between the two.

Look for MathCAD at your local software dealer. Or call MathSoft at 1-800-MATHCAD (in MA, 617-577-1017) for more information or for a free demo disk.

Speed, power and flexibility. Enter the new era of engineering and scientific calculations, with MathCAD.

System Requirements: Apple Macintosh Plus, SE or II, with a minimum of 2MB RAM. Supports all ImageWriters® and LaserWriters®.

MathCAD
MathSoft, Inc. One Kendall Square, Cambridge, MA 02139

Available for Macintosh and IBM compatibles. TM and ® signify manufacturer's trademark or manufacturer's registered trademark respectively.

Circle 34 on reader service card
NEW DISKEXPRESS II

HOW TO ELIMINATE HOLES IN YOUR HARD DISK FOREVER

DiskExpress II features ALSoft's revolutionary new Disk Optimatic technology designed to optimize hard disk performance forever. It's the newest, fastest, safest way to optimize. DiskExpress II automatically optimizes whenever you stop working on your Mac and lay down your mouse. Because it's fully transparent, DiskExpress II intuitively works around your busy schedule without tying up your computer. DiskExpress II constantly prioritizes and groups your frequently used files for maximum performance.

DiskExpress II also continually optimizes your disks one file at a time, so it can be interrupted at any time without scrambling any of your information. In fact, DiskExpress II can optimize even if there's virtually no free space left on your disk. DiskExpress II is also completely compatible with AppleShare™ and TOPS™, and it will dramatically speed up your network file server.

To reserve your FREE DiskExpress II (retailing for $89.95 when released in September) including a FREE bonus of ALSoft's MultiPartition™ disk partitioner for even better performance, simply order DiskExpress II today (suggested retail $69.95). You'll not only start optimizing right now and save at least $20, you'll be the first to receive your new FREE DiskExpress II to keep you optimized forever.

ALSoft, Inc.
P.O. Box 927, Spring, TX 77383-0927
713/353-4090

INSIGHTS

HOW TO

ics. Fortunately, MacWrite II's merge feature accepts conditional statements, so that, besides being able to pick out all database records with zip codes between 60000 and 70000 for a mailing, it can tidy up printing of records with blank fields, sliding some contents over the empty fields.

Here's an example of the selection logic needed to close up a set of address fields at the beginning of a form letter.

```plaintext
<Company>>IF Company <> "">RETURN
ENDIF>>Title>>IF Title <> "">RETURN
ENDIF>>First> Last> IF First <> "">RETURN
ENDIF>>Street-1>>IF Street-1 <> "">RETURN
ENDIF>>Street-2>>IF Street-2 <> "">RETURN
ENDIF>CityStateZip

Dear <First>>IF First = "">Sirs>ENDIF:

We are glad you have decided to subscribe to Macworld. We hope you find some helpful tips for streamlining your work.

Yours truly,

The merge won't budge until it hits a field that contains something. If the whole database record has only one "live" field, that's the only one that will print and there won't be any extra blank lines. Note that in this example the program is also looking for a first name to use in the form letter, inserting "Dear Sirs" instead of "Dear Harold" or something similar if no first name is available in the record.

SHARING THE WEALTH

If you've found a tip or shortcut not mentioned here, spread the word to other Macworld readers by sending it to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107.

See Where to Buy for contact information.

Charles Seiter is a Macworld contributing editor who regularly reviews word processing programs for the Macintosh.
Road Racer

The Ultimate Driving Simulation

Speed limit 200.
Strap yourself in for the ride of your life.

Road Racer's detailed graphics and digitized sounds simulate driving conditions in 5 environments ranging from high-speed desert flats to twisting mountain roads. So convincing you'll actually find yourself trying to look over the hills and around the turns.

The trees, rocks, telephone poles, and other graphics fly past your 1965 Corvette at breakneck speeds. Hear its thundering 350-horsepower engine and screaming tires as you come around wicked curves.

Steer and accelerate with the mouse, and use your keyboard for brakes and shifting.

Each level is tougher than the last with unpredictable road hazards and many courses to travel. You score points for fast, skillful driving. Road Racer is high performance you won't forget.

Lunar Rescue

A Strategic Space Adventure

Watch out! ... SMASH! ... A heat-seeking missile has just slammed into your ship.

The year is 2059. Raiders have stolen five controlling crystals that maintain the defense and supply network for the moon's 26 cities. With key commodities cut off, the cities are doomed.

Your mission is to recover the fiendishly hidden crystals while transporting vitally needed goods between cities. Traverse dangerous terrain and combat relentless attacks with your arsenal of lasers, cannons, bombs and shields.

Prepare yourself for an odyssey of furious action and strategic high stakes trading.

Lunar Rescue is an addictive adventure that challenges your imagination and sets your adrenaline on fire.

MacGolf Classic

A premium edition of the best selling Macintosh game in the world.

MacGolf Classic puts you into a full perspective 3-D simulation of realistic golf action. You match your skills against fairways, roughs, sand traps, water hazards and trees.

MacGolf's two courses are together with the four MacCourses for a total of 108 holes, all in vivid full screen color on the Macintosh II.

MacGolf Classic gives you a player's eye view and an aerial overview of each hole with close up options. You have complete control of your position, ball placement, ball speed and direction, and selection of all 14 clubs. Spectacular digitized graphics and sounds add to the excitement.

MacGolf Classic is so close to the real thing it will improve your golf game. Every challenge should be this spectacular.

XOR CORPORATION
7807 Bush Lake Road
Minneapolis, Minnesota 55435
(612)-831-0444

Circle 291 on reader service card
New Springboard Publisher™ II can turn ordinary pages into great looking pages. The same day you buy it!

Extend the power of your word processor.
Springboard Publisher II provides everything you need to turn ordinary pages into impressive, persuasive documents.

It's easy! Start with your word processor file and then add page layout, graphics, and special effects. Just point and click to put whatever you want wherever you want whenever you want.

EPS, PICT and paint graphics.
All the graphic tools you'll require are built right in...no need to buy extra programs or switch applications. The text tools are there, too including a speller, search and replace, hyphenation, and a unique typing window for speed.

There's more. Six SmartArt™ PostScript effects let you rotate text to any degree; add shadow or distance; make text arc or fade; even stretch text as big as your page. And you'll receive 500 pieces of clip art and 36 newsletter templates FREE when you buy—a $49.95 retail value!

Try before you buy. We'll send you a live, hands-on demo disk for just $9.95. refundable upon purchase. And remember all Springboard software is satisfaction guaranteed or your money back. Call 1-800-445-4780, Ext. 6101 and discover how quick and easy great pages can be. Only $199.95.
**UPDATES**

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

**Control** version 1.5 is a revision of this manufacturing and sales software. It has an optional built-in word processor and mail-merge feature; it automatically finds product information in a product file, keeps track of balances on invoices that have been applied to orders, and contains an expanded set of reports. Also includes a new user interface and hierarchical menus. Diamante Software, 11651 Plano Rd., #160, Dallas, TX 75243; 214/341-6711. Free; $1295 new.

**FAXstf** version 2.0 allows multiple users to share a fax modem on a network, exports received fax files, has the capacity to automatically generate cover pages, does landscape printing, and has a revised user interface. STP Technologies, 1817 Main, Higginsville, MO 64037; 800/426-1679. Free to owners who registered the product before July 15, 1989; $49.95 to those who registered later; $695 new.


**MacRecorder** version 2.0 has a new series of XCMDs and drivers that let you play compressed sounds, record directly into a stack, test volume input and play stereo sound on the Mac II. Has four different compression ratios. Spectrum-analysis tools have been added to the SoundEdit program. Farallon Computing, Inc., 2150 Kittredge St., Berkeley, CA 94704; 415/849-2531. $40 plus $10 s/h if originally purchased before January 15, 1989; $10 if purchased after that date; $249 new.

**Music Publisher** version 2.0.3 performs MIDI input from a keyboard and MIDI playback to various output devices. Runs 50 percent faster than previous version. Repertoire, 200 Seventh Ave., #225, Santa Cruz, CA 95062; 408/476-1753. Free; $495 new.

**Nisus** version 2.0 includes footnotes, endnotes, and hyphenation. Adds color and the ability to search for text marked with colors (with or without a color screen). Dialog screens have been redesigned and large macro files have been divided into smaller files for easier manageability. Has visible graphics anchor so you can see on screen where graphics are anchored. Paragon Concepts, 4954 Sun Valley Rd., Del Mar, CA 92014; 619/481-1477. Free; $395 new.

**Panorama** version 1.1 adds automatic phone dialing, financial and time functions, support for EPS pictures, relational reporting capability, additional chart functions, and the ability to store and play back sounds. ProVue Development, 15180 Transistor Ln., Huntington Beach, CA 92649; 714/892-8199. Free; $395 new.

**Personal Golf Stats** version 2.0 has more than 10 different graphs of game and hole-by-hole statistics; increased numbers of statistics. (continues)

---

**MacIIx-Compatible**

The MC2RAM/4 MB delivers up to 32 MB for the power-hungry MacIIx system running A/UX. Packed with 32 megabit SOJ DRAMS, the MC2RAM/4 operates with a PAL chip for logic control to store the 32-bit word required by the 68030 processor.

**Mac II, SE, SE/30 & Plus-Compatible**

The MC2RAM/1 series is Clearpoint's complete line of one megabyte Macintosh memory. •Version D features megabit DIP DRAMs for a high profile design recommended only for the Mac II and IIx installations. •Version S1 uses megabit SOJ DRAMs and is compatible with all Mac systems. •Version S1-10 is customized to match the higher processing speeds of third party accelerator boards.

**Call 1-800-CLEARPT**

Ask for our Product Catalog, Designer's Guide to Add-in Memory and applications video.
Insurance For Fried Apples?

When your surge protector fails, will your insurance save you? SAFEWARE’s computer insurance covers power surges, lightning, theft, fire, accidental damage and more! Full replacement of hardware, media and purchased software for as little as $39 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>$39</td>
</tr>
<tr>
<td>$2,001-$5,000</td>
<td>$69</td>
</tr>
<tr>
<td>$5,001-$8,000</td>
<td>$89</td>
</tr>
<tr>
<td>$8,001-$11,000</td>
<td>$109</td>
</tr>
<tr>
<td>$11,001-$14,000</td>
<td>$129</td>
</tr>
</tbody>
</table>

For immediate coverage, information and rates on higher coverages, call 1-800-848-3469. Locally 614·262-0559.

SAFEWARE, The Insurance Agency Inc. 2929 N. High St., P.O. Box 02211, Columbus, OH 43202

Circle 293 on reader service card

Having Problems With Your Subscription? Please let us know.

Phone toll-free 800/525-0643. From Colorado, Alaska, Hawaii and outside the U.S., please phone 303/447-9330.

Supports cut, copy, and paste, and undo and redo for all functions.

Creative Computer Resources, 135 Verona Dr., Goleta, CA 93117; 805/968-6247. Free; $79 new.

QuarkXPress version 2.11 adds an Open Prepress interface to send high-resolution color to output devices; supports additional printers: CG9000PS, Schlumberger 5232, and Monotype. Quark, 300 S. Jackson, #100, Denver, CO 80209; 303/934-2211. Free; $795 new.

Quick version 1.5 gives user access to information on trends in spending habits, credit policies, and cash requirements. Lets user record handwritten checks and ATM transactions, generates management reports, and allows up to seven splits per transaction. Intuit, 540 University Ave., Palo Alto, CA 94301; 415/322-0573. $8, if original purchased after May 8, 1989, $19.95; $59.95 new.

QuickLetter version 1.01 is a maintenance release that improves the pasting of an address from the address book into a letter (address now pastes at cursor location) and users’ ability to click and move text in Page Preview dialog. Working Software, 740 Front St., #318A, Santa Cruz, CA 95060; 408/423-5696. Free; $124.95 new.

Snap version 3.1 has stroked fonts, supports GTCO digitizers, and adds a Change Text command and Put Symbols on Active Level switch. Command key-ins can now be done from Snap menu buttons. This version also lets you cut, copy, and paste in the key-in window. Forthought, P.O. Box 32, Sunset, SC 29685; 803/878-7484. Free; $395 new.

Spellswell version 2.1 is now compatible with Microsoft Word 4.0 and Acta 3.0. Includes Word Choices feature and automatic guessing; checks for a space before a punctuation mark; can use more than one dictionary to check a document. Working Software, 740 Front St., #318A, Santa Cruz, CA 95060; 408/423-5696. Free if originally purchased before March 15, 1989; $25 if purchased after that date; $74.95 new.

SuperGlue II with GlueNotes version 2.1 prints to disk with full color, has font character and line lock, opens PICT files, allows user to append GlueNotes to images, has selection lasso, and opens and prints GlueNotes. Solutions, 30 Commerce St., Williston, VT 05495; 802/658-5506. $25 for owners of SuperGlue; $45 for owners of Glue; $119.95 new.

SynchroCity version 2.0 is a rewritten and more humorous version of the intuitive question-and-response software. Program size has been compressed from original. Visionary Software, P.O. Box 69191, Portland, OR 97201; 503/246-6200, 800/877-1832. $5.00; $49.95 new.

TextPert version 3.01 reads at an increased speed of 3000 characters per minute. CTA, 747 Third Ave., 3rd Fl., New York, NY 10017; 212/935-2280. Free; $175 new.

Timbuktu version 3.0 includes the ability to transfer files on a local area network, and lets two or more Mac users share screens over AppleTalk networks. Forthought, P.O. Box 32, Sunset, SC 29685; 803/878-7484. $40; $149 new.

To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, 501 Second St., San Francisco, CA 94107.
**DR MAC PRESCRIBES THE BEST**

<table>
<thead>
<tr>
<th>SOFTWARE</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adobe Systems</strong></td>
<td>$289</td>
</tr>
<tr>
<td><strong>EMERALD CITY SOFTWARE</strong></td>
<td>$248</td>
</tr>
<tr>
<td><strong>FOI SOFTWARE</strong></td>
<td>$248</td>
</tr>
<tr>
<td><strong>HAYES</strong></td>
<td>$199</td>
</tr>
<tr>
<td><strong>INFOSPHERE</strong></td>
<td>$249</td>
</tr>
<tr>
<td><strong>KINETICS</strong></td>
<td>$299</td>
</tr>
<tr>
<td><strong>MONITORTEC</strong></td>
<td>$199</td>
</tr>
<tr>
<td><strong>PARALLON COMPUTING</strong></td>
<td>$229</td>
</tr>
<tr>
<td><strong>SIMPLTEC</strong></td>
<td>$199</td>
</tr>
<tr>
<td><strong>SMARTSCRAP &amp; THE CLIPPER II</strong></td>
<td>$48</td>
</tr>
<tr>
<td><strong>TARGUS</strong></td>
<td>$249</td>
</tr>
</tbody>
</table>

**HARDWARE**

- **Adobe Illustrator**
- **Persuasion**
- **Adobe Photoshop**
- **Expresso**
- **PageMaker**

**SYSTEMS**

- **AGP**
- **Power Mac**
- **iMac**
- **PowerBook**
- **Power Macintosh**

**Pricing**

- **$99**
- **$199**
- **$299**
- **$399**

**Contact Information**

- **Dr. Mac**
- **1-800-825-6227**
- **Fax: 1-818-501-3760**

**Special Offer**

- **FREE OFFER! Basic Needs Laser printer stand with all laser printers purchased in October.**

**Information**

- **Check this symbol for Dr. Mac's special prescriptions.**

**Call Now!**

**Fax Your Corporate, Educational & International Orders Now**

- **30 Day approved credit**

**Policies**

- **Online orders only**
- **Credit card not charged until order is shipped.**
- **California residents add 6.5% sales tax.**
- **Call (818) 501-3760**

**Dr. Mac**

14542 Ventura Blvd., Suite 200
Sherman Oaks, CA 91403

---

**Security**

- **Fileguard**
  - $119
  - Provides integrated encryption utility that provides the most comprehensive & sophisticated solution to storing and protecting your files.
  - Contains the option to protect it.
  - Can be used to protect files.

**C.A.T.**

- **Version 3.0**
  - $219
  - Place a new definition on "personal productivity."
  - A.C.T. contains a relational database with an integrated word processor, driving program, forms generator, calendar, write a letter, a fill-in form, or a list.
  - D.A.T. files each document by person, type, and date/time of creation for instant retrieval.

**Electronics Arts**

- **Studio 9**
- **EMERALD CITY SOFTWARE**
- **FOI SOFTWARE**
- **HAYES**
- **INFOSPHERE**

**TimeWorks**

- **Cut & Paste Organizer**
- **TOPS**
- **Fox Software**
- **Hayes**
- **Wolfram**

**Wolfram**

- **Mathematica for SE**
- **Mathematica for Mac**

**WordPerfect Corp.**

- **Wordperfect Organizer**
- **XTREE**
- **Wordperfect Corp.**
- **XTreeMac**

---

**Examine Us!**

Dr. Mac provides new low pricing.

Check this symbol for Dr. Mac's special prescriptions.

**Free Offer!**

Basic Needs Laser printer stand with all laser printers purchased in October.

**Call Now!**
Affordable CADD. And it's only the beginning.
The CADD stands for Computer Aided Design and Drafting. With a suggested retail price of just $149.95, Generic CADD Level 1 makes the power of real CADD affordable. And it's just part of a family of Generic CADD products that will make you more productive than ever before.

Standard Mac interface for ease of use.
Now you can produce accurate drawings with real world scale on the Mac Plus, Mac SE, or Mac II. You can edit multiple drawings in separate windows and cut and paste between them. CADD Level 1 is also multi-finder compatible.

Symbol Libraries boost productivity.
From office furniture to specialized electronics symbols, our Symbol Libraries save you the time of redrawing repetitive elements every time you need them.

Add the power of real CADD to your Mac.
Move your Macintosh drawings into the real world. Call us at 1-800-228-3601 for your free CADDalog or the name of your Generic dealer. And find out why we say the only thing generic about us is the price.

1989 Generic Software, Inc. Generic CADD Level 1 is not copy protected and comes with a 60-day money back guarantee. Registered users get free technical support from Generic. Level 1 and Generic CADD are trademarks of Generic Software, Inc. Macintosh is a trademark of Apple Computer, Inc.

Circle 157 on reader service card.
WHERE TO BUY

This listing provides company addresses and phone numbers for products mentioned in this issue. Allow several weeks for responses to Reader Service Card inquiries. Asterisks indicate vendors who prefer to be contacted directly.

---

Reader Service

**701** Acta Advantage  
Symmetry Corp., 225 E. First St., #107B, Mesa, AZ 85201; 602/844-2199.

**702** Actinet SE  
Actinet Systems, Inc., 360 Cowper St., #11, Palo Alto, CA 94301; 415/326-1321.

**703** Actinet II  
Actinet Systems, Inc., 360 Cowper St., #11, Palo Alto, CA 94301; 415/326-1321.

**704** AdCom2:1  
Frontier Technologies Corp., 3510 N. Oakland Ave., Milwaukee, WI 53211; 414/904-8099.


**706** Alias Kinkos Academic Courseware Exchange, P.O. Box 8022, Ventura, CA 93080-8022; 800/235-6919, 800/292-6040 in CA, 305/652-4158 outside United States.

**707** AliasTalk/AlisaShare  
Alias Systems, Inc., 221 E. Walnut St., #175, Pasadena, CA 91101; 818/792-9774.

**708** The Ancient Art of War at Sea  
Broderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101; 415/924-3200.

**709** Animation Help  
BMUG PD Library-HyperCard Section, 1442A Walnut St., #62, Berkeley, CA 94709; 415/549-2084.

---

Reader Service

**710** AppleShare  
Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

**711** AppleTalk for VMS  
Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

**712** AppleTalk Internet Router  
Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

**713** AppleTalk Internet Router  
Xerox Corp., 225 E. First St., #107B, Mesa, AZ 85201; 602/844-2199.

**714** AppleTalk for VMS  
Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

**715** AppleTalk Internet Router  
Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

**716** AT PLUS LocalTalk Concentrator  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**717** AT PlusI LocalTalk Concentrator  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**718** ATW-1 Smart Wallplate (with CompuTalk connector)  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**719** ATW-1 Smart Wallplate (with CompuTalk connector)  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**720** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**721** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**722** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**723** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**724** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**725** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**726** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**727** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**728** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**729** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**730** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**731** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**732** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**733** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**734** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**735** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

**736** ATW-1 Smart Wallplate  
AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

---

Reader Service

**737** Cisco Routers  

**738** ColorBoard 264  
RasterOps Corp., 2500 Walsh Ave., Santa Clara, CA 95051; 408/446-6000.

**739** Color Mac II  
Maxis Software, Inc., 953 Mountain View Dr., #113, Lafayette, CA 94549; 415/376-6434.

**740** Components General Ledger  
Satori Software, 2815 Second Ave., #560, Seattle, WA 98121; 206/443-0765.

**741** CompuNet  
Trumur USA, Inc., 236 W. 15th St., New York, NY 10011; 212/615-7008; 800/872-4454.

**742** Computerized Classic Bookkeeping  
Absolute Solutions, Inc., 3142 Vista Way, #400, Oceanside, CA 92056; 800/635-7666.

**743** Cosmic Osmo  
Activision Entertainment, 3885 Bohannon Dr., Menlo Park, CA 94025; 415/329-0800.
WHERE TO BUY

Reader Service

C-Server Solana Electronics, 7124 Convoy Ct., San Diego, CA 92111; 619/573-0801.

DaynaNet LocalTalk Dayna 415/947-0998, 919/763-7918, 800/622-7627. 1101 Main Ave., Torrance, CA 90501.


DaynaTalk Dayna Communications, Inc., 50 S. Main St., 5th Fl., Salt Lake City, UT 84144; 801/531-0203.

DaynaTalk Dayna Communications, Inc., 50 S. Main St., 5th Fl., Salt Lake City, UT 84144; 801/531-0203.

DaynaTalk PC Dayna Communications, Inc., 50 S. Main St., 5th Fl., Salt Lake City, UT 84144; 801/531-0203.

Déjà Vu II: Last in Las Vegas ICOM Simulations, 648 S. Wheeling Rd., Wheeling, IL 60090; 312/520-4440.

DirectDrive 300 Jasmine Technologies, Inc., 1740 Army St., San Francisco, CA 94124; 415-282-1111.


Doke Koro Kitano? (Where Is the Cat From?) 2826 Lyon St., San Francisco, CA 94125.

The '88 Vote, Campaign for the White House Optical Data Corp., 30 Technology Dr., Warren, NJ 07059; 201/689-0022, 800/524-2491.

Electronic Map Cabinet Highlighted Data, 6628 Midhill Pl., Falls Church, VA 22043; 703/583-1919.

The Electronic Whole Earth Catalog Broderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101; 415/392-5200.

EtherLink/NB 3Com Corp., 3165 Kifer Rd., Santa Clara, CA 95052; 408/562-6400.

EtherLink/SE 3Com Corp., 3165 Kifer Rd., Santa Clara, CA 95052; 408/562-6400.


EtherPort SE Kinetics, a division of Exceed, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

EtherPort SE/L Kinetics, a division of Exceed, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

EtherPort SE/30 Kinetics, a division of Exceed, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

EtherPort SE/30L Kinetics, a division of Exceed, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

EtherPort II Kinetics, a division of Exceed, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

EtherPort III Kinetics, a division of Exceed, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.


EtherSC Kinetics, a division of Exceed, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

EtherTalk NB Card Apple Computer, Inc., 2025 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

Excel Microsoft Corp., 16011 N.E. 50th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-0400.

Expresslistian Allan Bonadio Associates, 814 Castro St., San Francisco, CA 94114; 415/282-5864.


FastPath 4 Kinetics, a division of Exceed, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

Fidit Shareware.

Fiber Optic AppleTalk Concentrator The Du Pont Company, 9316 Cove Dr., Myrtle Beach, SC 29572; 803/449-6123.

Fiber Optic AppleTalk Converter The Du Pont Company, 9316 Cove Dr., Myrtle Beach, SC 29572; 803/449-6123.

Flexware Microfinancial Corp., 1540 E. Valley Blvd., Industry, CA 91746; 818/961-0257, 800/527-6587.

Flower 1713 Shadow Hill Ln., Houston, TX 77072; 713/530-0542.

Formulator ICOM Simulations, Inc., 648 S. Wheeling Rd., Wheeling, IL 60090; 312/520-4440.

For the Record Nolo Press, 950 617/491-1999.

GatorBox Cayman Systems, Inc., 26 Land曙downe St., Cambridge, MA 01239; 617/491-1999.

GatorBox T Cayman Systems, Inc., 26 Land曙downe St., Cambridge, MA 01239; 617/491-1999.


Global Trespass Mystereum Tremendium, 3801 Washington, Oak Brook, IL 60523.

Golf Doctor 1 Step Software, Inc., 510 Griffith Rd., Charlotte, NC, 28217.

Great Plains Accounting Series Great Plains Software, 1701 S.W. 38th St., Fargo, (continues)
Don't Choke Your Macintosh With a 3.5" Hard Drive!

An 18 ms Imprimis Half-Height MacWren Hard Drive is 66% Faster Than a 19 ms Quantum 3.5" Hard Drive.

MicroNet Offers Imprimis 5.25" Half-Height Hard Drives That Are Power Matched For The Ilcx and Ilc.

105, 173, 303 and 404 MB

Don't be fooled by access time alone. The difference between 19 ms and 18 ms is only a 1000th of a second. The ability of a hard drive to sustain high data transfer rates is far more important than access time. MacWren drives are industry known for their performance!

The MicroNet series of internal half-height hard drives are the fastest storage systems available for the Macintosh Ilcx and Ilc. Excellent for network servers, virtual memory, graphics, sound and with color separation systems. Our internal systems are shipped with easy to install brackets, cables and powerful SCSI utilities. Each system is fully tested and includes a one year warranty and is rated at 40,000 hours MTBF.

MicroNet's SCSI software is maintained by our own engineering department to be fully compatible with the latest system releases from Apple Computer. It supports up to 36 MacOS or A/UX partitions on the same drive, as well as, password protection, bad block spare, media verify and our unique overlapped seek algorithm that cuts access time in half on twin Wren drive subsystems. External systems available.

"QUALITY YOU CAN COUNT ON"

Call for data sheets and the name of your nearest dealer. Dealer inquiries invited.

Manufactured By: MicroNet Technology, Inc.
20 Mason • Irvine, CA 92718 • Tel: (714) 837-6033
FAX: (714) 837-1164 • Connect: MicroNet
AppleLink: D1656 • Compuserve: 76004,1611

Distributed By: CAL-ABCO
6041 Varvel Avenue • Woodland Hills, CA 91367
Sales: (800) 669-2226 • (818) 704-9100 Ext. 311
FAX: (818) 704-7733 • Canada: (800) 387-4345

Circle 398 on reader service card
Introducing Desktop Programming From Serius.

Let's face it. Developing programs on a Macintosh® is not an easy, every-day task.

If only there were a way to quickly and easily create a custom application. Without having to learn complicated programming languages like C or Pascal.

Now there is.

It's called Serius 89™. An amazing new software package that gives Macintosh users the power to create their own custom applications. On the top of their desk and with the touch of a finger.

Now you can save countless hours of development cost with Serius 89 because you can develop your own applications without the need to hire a systems analyst.

With Serius 89, you simply “draw” applications using drag and click actions on a mouse.

Serius 89 is very much like your favorite desktop publishing program. It presents a pallet of programming components easy to identify, easy to use and HyperCard® compatible. As fast as you can select icons and link them together on the screen, Serius 89 Object Interaction Protocol™ connects the chains of functions and converts them into a bug-free application.

When the programming is completed, you can compile and save it as a stand-alone application. Even the icon that the Finder displays can be custom designed. The new program can be immediately used by anyone—not just the programmer, because it operates transparently with familiar Macintosh techniques.

So, whether you are an experienced Macintosh programmer or not, you now have the power to program even the toughest applications right on your desktop!

For more information, call us at 1-800-876-6847, or 1-801-977-9077.

Serius 89 eliminates almost entirely the task of building a graphic user interface. For the first time, you don't have to begin building every new application from scratch.

Serious 89 is now Serius. Programming For The Rest Of Us.

2607 S. Decker Lake Blvd., Salt Lake City, Utah 84129

circle 423 on reader service card
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 supertwit 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.

Cambridge Z88 Systems for Macintosh users from $699

TO ORDER OR FOR MORE INFORMATION
WEST & MIDWEST
800-366-0088
EAST COAST
800-888-3723
CAMBRIDGE NORTH AMERICA
424 CUMBERLAND AVE., PORTLAND, ME 04101

Circle 4 on reader service card
WHERE TO BUY


**878** Studio1 Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404-2497; 415/571-7171.

**879** Sumo Optical Disk Drive Sumo Systems, 1580 Old Oakland Rd., San Jose, CA 95131; 408/453-5744.

**880** TableTools Mansfield Systems Inc., 550 Hamilton Ave., #200, Palo Alto, CA 94301; 415/326-0803.

**881** TeleBridge Shiva Corp., 155 Second St., Cambridge, MA 02141: 617/664-8500, 800/458-3550.

**882** Terrain Editor Maxis Software, 953 Mountain View Dr., #113, Lafayette, CA 94549; 415/376-6434.

**883** 3-Share 3Com Corporation, 3165 Kifer Rd., Santa Clara, CA 95052; 408/562-6400.

**884** Timbuktu, Timbuktu Remote Farallon Computing, 2150 Kittredge St., Berkeley, CA 95709; 415/849-2531.

**885** TokenTalk NB Card Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

**886** TOPS FlashBox, TOPS FlashCard, TOPS/Macintosh, TOPS Repeater, TOPS TeleConnectors TOPS, Sun Microsystems Co., 950 Marina Village Pkwy., Alameda, CA 94501; 415/769-9669, 800/445-8677.

**887** TurboBridge, TurboNet, TurboNet ST, Turbo Star Nuvotech, Inc., 2015 Bridgeway, #204, Sausalito, CA 94965; 415/331-7815.

**888** u-Share Information Presentation Technologies, 23801 Calabasas Rd., #210, Calabasas, CA 91302; 818/347-7591, 800/233-9993.

**890** Wingz Informix Software, Inc., 16011 College Blvd., Lenexa, KS 66219; 913/492-5800.

**891** WOS Fund Accounting Farallon Computing, 2150 Kittredge St., Berkeley, CA 95709; 415/849-2531.

**892** XTreeMac XTree Company, 4330 Santa Fe Rd., San Luis Obispo, CA 93401; 805/541-0604. Public domain software, freeware, and shareware are available through online information services; user groups (call 800/538-9696 ext. 500 for information on a local user group); and mail-order dealers such as Budgetbytes (800/356-3551 for orders, 913/271-6022 in Kansas), EJucomp (800/843-9497, 619/259-0255 in California), and the Public Domain Exchange (800/331-8125, 408/496-0624 in California).

---

**America is worth fighting for.**

From the Atlantic to the Pacific, the Arctic to the Gulf, our land is constantly under attack from the polluters and despoilers.

That's why Sierra Club Legal Defense Fund attorneys are pursuing dozens of cases nationwide in defense of wildlife, rare habitats, the air we breathe and the water we drink.

Most of our support comes from individual contributors like you. Please help us win. Because America is worth fighting for.

I enclose my tax-deductible contribution to save what I love most about America. Send me your quarterly newsletters in return.

---

NAME

ADDRESS

CITY  STATE  ZIP

Sierra Club Legal Defense Fund
2044 Fillmore, San Francisco, CA 94115
What new accounting software is guaranteed to improve the way your company operates?

Mind Your Own Business!

From the people who developed two of the most acclaimed financial software products in Mac history:
Andrew Tobias’ Managing Your Money and Dow Jones Market Manager PLUS.
It costs $99. There’s a 30-day money-back guarantee. The demo disk is $5. What are you waiting for?
Call 1-800-322-M.Y.O.B.

TELEWARE

Dow Jones and Market Manager PLUS are trademarks of Dow Jones & Company, Inc.
Managing Your Money is a trademark of MECA Ventures, Inc. TELEWARE and M.Y.O.B. are trademarks of TELEWARE, Inc.

Circle 482 on reader service card
'

PRO DuCT INDEX
~

!

m=

==

Software

;

i:

;

ea
==

==
:!

==
e!

Adobe, 111
Adobe Systems, 200-201
Adobe Systems, 309
Advanced Gravis, 82
Aldus, 68--69
Altsys, 110
Berkeley Systems Design, 45
Berkeley Systems Design, 45
Casadyw=,8
Ceres Softw:ue, 290
Cricket Software, 297
Dcneba Software, 74-75
Emerald City Software, 234
Emerald City Software, 234
Generic Softw=, 322
Image Club, 230
Image Club, 294
l..asermax, 252
lctrasd, 28-29
Mansfield Systems, 40
Paracomp, 212
Qume, 2678
Qume, 2678
Raster Ops, 87
Raster Ops, 205
Shana Corporation, 227
Silicon Beach, 2111-219
Sprlnsboard Software Group, 318
Supermac Technology, 16
Timeworks. 70
TypeXpress, 278
Xerox Imaging Systems, 24-25

305 GCC Technologies, 63
11 GCC Technologies, 65
204 GCC Technologies, 67
343 Hewlett Packard, 83-85
102 Jasntine, 14-15
342 Lasermax, 252
104 QMS/loiser Connection, 295
Qume, 2678
353 Qume, 2678
143 Tektronix, IOI
480 Toshiba, 36-37
93 Varityper, 193
483 Varityper, 241

VERTIW

P£llSOllAI. BUSIKESS/llOMI

Checkmark Software, 254

lntu~.

101
63
361
109

474 Absolute Solutions, 2638
Adobe Systems, 309
329 Aldus, 68-09
Ashton-Tate, 36-39
10 Bedford Associates, 248
365 Ceres Softw:ue, 290
Checkrnark Softw:ue, 254
290 Computalabcl, 72
16' Design Science, 262
157 Generic Software, 322
156 Great Plains Softwore, 305
390 lnfonnlx, 20-21
Intuit, 33
128 Layc:ted, Inc., 96
94 Mainslay, 203
Microsoft, IFC-1
Microsoft, 98-99
Microsoft, 120-121
Microsoft, 303
Microsoft , 274-275
399 Niles a: Associates, 264
42 Personal Trainln8 Systems, 34
395 PMC Telesystems, 30
423 Serius, 327
297 Shana Corporation, 227
266 Silicon Beach, 2111-219
210 SPSS, Inc., 313
237 Symantec, 13
491 Systat, 289
492 Systat, 289
482 Teleware, 331
126 WordPerfect, 239

401
329
3S
381
187
16
365
IS
282
212
18
157

342
225
33
229
llS
353

297
266
185

309
418
211
376

YIDlO

PRINTERS

GIAPlll<S/DISITOP PllBUSHlllG

lltJSINESS

c

:::

us

46S MacProducts, 336-339
223 Perwnal Computer Peripherals
Corporation, 118
Raster Ops, 87
Rastu Ops, 205

IXPAllSIOllS/UPGUDIS
20 Connectix, 128
161 Micron Technology, 232

SOflWARE SE<UllRY oma
106 Rainbow Technologies, 298

l&ISCEIWIEOUS

BOARDS
403
375
242
124
342
161
427
196
26S
44S

American Micro Distributors, 262
Clearpoint Research. 319
Digital Vision, 314
GW Instruments, 73
Lasermax, 252
Micron Technology, 232
Mlcrotek , 245
National Semiconductor, 130
Orange Micro, 270
Truevision , 268A-269A

401 Advanced Gravis, 82
403 American Miao Dlslrlbutms, 262
Aruhto Corp., 290
4 Cambridge Nonh America, 329
61 Computer Friends, 340
63 In-Focus Systems, 292
21 Jasntine, 228-229
410 Key Tronlc, 271
186 Sun Remarketing, 257
118 Zericon, 2698
267 Zericon, 269B

DIGmZlllS/SWllllRS

Accessories

230 Caere Corporation, 216
427 Mlcro<ek, 245
481 Sharp, 304
176 Thunderware, 288

FlOl'PY DISllS/HOlDllS
479 BASF Corporation Information, 236
437 Fuji, 107

DISPlAY

395

33
PMC Telesystems, 30

DATA IWIAGBUlrJ
181 AEC Management Systems, 266
152 Pox Softw:ue, 26o
352 Odesta, 210
Oracle, 46
451 ProVue, 44
297 Shana Corporation, 227

WORD PROCISSUIG
16' Design Science, 262
Microsoft, 120-121
272 Proximity Technologies, Inc., 296
332 T/Maker, C3
126 Won:!Pcrfea, 239

DITIRTAlllMOO
444 Aalvlsion, 293
134 Casadyware, 64
391 XOR, 317

NDWORllNG
432 Alisa Systems. 2658
232 Dayna Communications, 207
ISO Farallon Computing, 112-113

WIGUAGIS/DMlOPllDll SYS1UIS
423 Serius, 327
88 Symantec, 9

CAD/WA
12
157
177
66
34

Engineered Software, 296
Generic Software, 322
Graphsoft, Inc., 310
lntergnaph, 301
Mathsoft, 315
229 1'2rzcomp, 212

<OllllUlllCATIOM
I
281

Air Land Systems, 265A
DataVlz, 103

llYPERCARD
39 Olduvai Corporation, 4

Bltstream, 286
16 Casadyw=,8
Image Club, 230

332

107
131
61
383

403
3
41
217
452
154

372
373

MISCBWIEOUS
Checkmark Software, 254
188 CODA Music Software, 308
439 GDT Softworks, 264
162 Odesta, 12

Hardware
Apple Computer, 42-43
361 MacFriends, 26
109 MacPriends, 302
48S Next Computer, 10-11

Abaton. 291
Abaton, 291
Computer Friends, 340
Hayes Microcomputer. 76-77

FURNITlllE

296

471
102
145
46S
207
275
398
243
424
214
149
321

American Micro Distributors, 262
Archive, 100
Braemar Corp, 41
Braetru1r Corp, 41
Elunan Engineering, 19
Ehman Engineering, 132
EMAC A Division of Everex, 223
FWD, 276
FWB, 276
Hard Drives International. 263A
Irwin Magnetic Systems, 267A
Jasmine, 14-15
La Cle, 22
MacProducts, 336-339
Mass Micro Systems, 27
MicroNet Technology, 78
MicroNet Technology, 325
Microtech International, 108-109
Mirror Technologies, 124-125
PU, 199
Rodime, 122
Seasate, 126
Tecmar, 277
Unimac, 246

MACWORLD • NOVEMBER 1989

Anthro Corp., 290
ScanCo, 2688

SllVKES
319 CompuServe, 214
195 GE Information, 307
293 Safeware, 320

M15alWEOUS
401
417
244
61

484

487

HARD DISllS/510RAG£

Al.Soft, 316
Berkeley Systems Design, 45
Berkeley Systems Design, 45
Central Point Software, 30
GOT Softworks, 264
Kent Marsh. 225
Symantec, 13
XTree, 273

COllPllTlll SYSlDIS

l'Gll1S

MODEllS

U1IU1IES
202
381
187
357
439
261
237
470

B>IJCATIOIW.
16' Design Science, 262
406 MacAcademy, 116
42 Personal Training Systems, 34

E·Machlnes, 221
In-Focus Systems, 292
MacPriends, 26
MacFriends, 302
466 Megapphlcs, 31
257 NEC, 194-195
223 Perwnal Computer Peripherals
Corporation, 118
46 Radius, 6-7
Raster Ops, 87
Raster Ops, 205

468

296
239

3M , 279
Advanced Gravis, 82
American Power Conversion, 243
Amherst lnlemational Corp., 292
Computer Friends, 340
CoStar, 104-105
CoStar, 250
Kensington Microware, C4
Kensington Microware, 208-209
NoRad, 66
ScanCo, 2688
Secure-It, 272

Mail Order
s

Beverly Hills Computer, 342
32 CDA Computer Sales, 2511-259
79 Diskette Connealon, 341
368 Dr. Mac, 321
77 Mac Discount Warehouse, 337
70 Mac Zone,The, 280-285
464 Mac-In-Stock, 86
MacConncc:tlon, 134-143
109 MacFriends, 302
361 MacFriends, 26
264 MacLand, 336
46S MacProducts, 336-339
222 MacSystems, 277
78 MacWarehousc, 47-00
44 Programs Plus, 88-95
2S8 Software Ubrary, 341
S4 USA Flex, 272
269 USA Flex, 340


Check box and fill in the appropriate information to subscribe to Macworld.

You will be billed $24.95 for a 1-year (12 issue) subscription (U.S. only).

<table>
<thead>
<tr>
<th>Phone</th>
<th>Area Code/Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(501-550)</td>
<td></td>
</tr>
<tr>
<td>(701-900)</td>
<td></td>
</tr>
<tr>
<td>(551-700)</td>
<td></td>
</tr>
</tbody>
</table>

FREE PRODUCT INFORMATION!

Get valuable information about the products which interest you. There's no cost; no obligation.

Simply print your name, title, address (with zip) and telephone number. Circle the numbers on the card for the products which interest you. Mail the card. We even pay the postage!

Numbers for advertised products can be found in the ad and in both the Product Index and the Advertiser Index. Product listings mentioned editorially can be found in the “Where to Buy” section.

Expire 2/28/90

Macworld.

FREE PRODUCT INFORMATION!

Check box and fill in the appropriate information to subscribe to Macworld.

You will be billed $24.95 for a 1-year (12 issue) subscription (U.S. only).

<table>
<thead>
<tr>
<th>Phone</th>
<th>Area Code/Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(501-550)</td>
<td></td>
</tr>
<tr>
<td>(701-900)</td>
<td></td>
</tr>
<tr>
<td>(551-700)</td>
<td></td>
</tr>
</tbody>
</table>

NOVEMBER 1989
MEET YOUR NEW MIS DEPARTMENT

Tomorrow's leaders are being shaped by two of the most powerful forces in America today: Computers and You.

In an unprecedented way, the computer industry is bringing technology and learning to neighborhoods more commonly associated with hardship than hardware. In San Francisco’s Tenderloin, kids have given up graffiti to study PC architecture, graphics and desktop publishing. They work in a learning center equipped with Apple® computers and IBM® PC-compatible systems, as well as an impressive and growing software library, all provided through donations. And they’re learning from volunteer instructors like David Bunnell and Adam Osborne.

The goal of Computers and You is to make a difference through technology. And it’s working. By the end of the first quarter, students had already found jobs. For some, their first ever. And it doesn’t stop with the Tenderloin. Our vision is to fully develop the San Francisco center and then recreate it in cities across the U.S.

A donation of equipment, time and especially money from you or your company can help make this vision a reality. To find out how, call us at (415) 922-7593.


Apple and IBM are registered trademarks of their respective owners.
Picture yourself at MACWORLD Expo

There are four good reasons why you should attend the MACWORLD Expo nearest you. First, attending MACWORLD Expo means you don't have to spend lots of time and money trying to find the best solutions to your computing problems. Second, you can see and try the latest Macintosh products. Demo hundreds of hardware, software and peripheral exhibits representing the future of computing. Third, whether you use your computer in the office, at home or at school, you'll learn how to use it better. Fourth, if you develop, produce or sell products, you'll have a unique opportunity to spot upcoming trends. And fifth, you'll be able to improve your skills, using one of the many workshops available, to practice what you've learned. So clip the coupon below, return it for more information. And this is the original Macintosh-exclusive show. Choose from these upcoming shows:

SAN FRANCISCO '90
April 11-13, 1990
Moscone Center
Brooks Hall/Civic Auditorium

BOSTON '90
August 9-11, 1990
Bayside Expo Center
World Trade Center

Just fill in below, clip and mail to: MACWORLD Expo, Mitch Hall Associates, 260 Milton St., Dedham, MA 02026. You'll receive complete information on each show as soon as it's available. No obligation of course.

I want to get the big picture.

I am interested in:  Attending  Exhibiting

Please send me details about the following MACWORLD Expos:

☐ San Francisco April 11-13, 1990  ☐ Boston August 9-11, 1990

Name ________________________________ Title ________________________________

Company ____________________________ Street ____________________________

City/State/Zip _________________________ Phone _________________________

Sponsored by MACWORLD, the Macintosh Magazine. An IDG Communications publication. MACWORLD Expo is an independent trade show not affiliated with Apple Computer, Inc. MAC, MACINTOSH and MACWORLD are trademarks of Apple Computer, Inc.
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.

Prices are good through November 1989

<table>
<thead>
<tr>
<th>Externals</th>
<th>Reg. Price</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Megabyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caché Systems 20 25ms</td>
<td>$549</td>
<td>$429</td>
</tr>
<tr>
<td>CMS Enhancements 20 22ms</td>
<td>$549</td>
<td>$428</td>
</tr>
<tr>
<td>Cutting Edge 20 65ms</td>
<td>$529</td>
<td>$419</td>
</tr>
<tr>
<td>MacBEST 20 40ms</td>
<td>$499</td>
<td>$429</td>
</tr>
<tr>
<td>30 Megabyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caché Systems 30 28ms</td>
<td>$659</td>
<td>$499</td>
</tr>
<tr>
<td>CMS Enhancements 30 22ms</td>
<td>$589</td>
<td>$489</td>
</tr>
<tr>
<td>Cutting Edge 32 30ms</td>
<td>$579</td>
<td>$484</td>
</tr>
<tr>
<td>MacBEST 30 28ms</td>
<td>$549</td>
<td>$499</td>
</tr>
<tr>
<td>40 Megabyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caché Systems 45 26ms</td>
<td>$689</td>
<td>$549</td>
</tr>
<tr>
<td>CMS Enhancements 45 22ms</td>
<td>$649</td>
<td>$539</td>
</tr>
<tr>
<td>Cutting Edge 47 30ms</td>
<td>$599</td>
<td>$569</td>
</tr>
<tr>
<td>MacBEST 42 28ms</td>
<td>$699</td>
<td>$599</td>
</tr>
<tr>
<td>Quantum 40 19ms</td>
<td>$699</td>
<td>$599</td>
</tr>
<tr>
<td>60 Megabyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caché Systems 60 28ms</td>
<td>$729</td>
<td>$579</td>
</tr>
<tr>
<td>CMS Enhancements 60 40ms</td>
<td>$749</td>
<td>$608</td>
</tr>
<tr>
<td>Cutting Edge 65 20ms</td>
<td>$699</td>
<td>$599</td>
</tr>
<tr>
<td>MacBEST 60 28ms</td>
<td>$729</td>
<td>$649</td>
</tr>
<tr>
<td>80 Megabyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caché Systems 80 28ms</td>
<td>$849</td>
<td>$679</td>
</tr>
<tr>
<td>CMS Enhancements 81 26ms</td>
<td>$789</td>
<td>$679</td>
</tr>
<tr>
<td>Cutting Edge 85 28ms</td>
<td>$725</td>
<td>$699</td>
</tr>
<tr>
<td>MacBEST 80 28ms</td>
<td>$749</td>
<td>$699</td>
</tr>
<tr>
<td>Quantum 80 19ms</td>
<td>$749</td>
<td>$699</td>
</tr>
<tr>
<td>90-400 Megabyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMS Platinum PO 90 16ms</td>
<td>$1,049</td>
<td>$799</td>
</tr>
<tr>
<td>MacBEST 105 25ms</td>
<td>$999</td>
<td>$799</td>
</tr>
<tr>
<td>Quantum 90 18ms</td>
<td>$1,099</td>
<td>$999</td>
</tr>
<tr>
<td>140-173 Megabyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caché Systems 150 16ms</td>
<td>$1,499</td>
<td>$1,299</td>
</tr>
<tr>
<td>Caché Systems 190/150 Tape 16ms</td>
<td>$2,499</td>
<td>$2,199</td>
</tr>
<tr>
<td>CMS Enhancements 170 18ms</td>
<td>$1,799</td>
<td>$1,599</td>
</tr>
<tr>
<td>MacBEST 180 18ms</td>
<td>$1,749</td>
<td>$1,659</td>
</tr>
<tr>
<td>300-600 Megabyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMS Enhancements PD 300 45ms</td>
<td>$2,349</td>
<td>$1,799</td>
</tr>
<tr>
<td>MacBEST 300 18ms</td>
<td>$2,499</td>
<td>$2,039</td>
</tr>
<tr>
<td>600 Megabyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMS Enhancements PD 600 16ms</td>
<td>$2,999</td>
<td>$2,779</td>
</tr>
<tr>
<td>MacBEST 600 16ms</td>
<td>$2,999</td>
<td>$2,779</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SE Internals</th>
<th>Reg. Price</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caché Systems 30 28ms</td>
<td>$425</td>
<td>$375</td>
</tr>
<tr>
<td>CMS Enhancements Pro 30 38ms</td>
<td>$479</td>
<td>$389</td>
</tr>
<tr>
<td>Cutting Edge 32 30ms</td>
<td>$479</td>
<td>$389</td>
</tr>
<tr>
<td>MacBEST 30 28ms</td>
<td>$449</td>
<td>$399</td>
</tr>
</tbody>
</table>

Removables Tape Back-Ups

<table>
<thead>
<tr>
<th>44 Megabyte Removables</th>
<th>Reg. Price</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caché Systems 44 26ms</td>
<td>$599</td>
<td>$499</td>
</tr>
<tr>
<td>CMS Enhancements Pro 44 22ms</td>
<td>$559</td>
<td>$449</td>
</tr>
<tr>
<td>Cutting Edge 47 30ms</td>
<td>$529</td>
<td>$444</td>
</tr>
<tr>
<td>MacBEST 42 28ms</td>
<td>$499</td>
<td>$466</td>
</tr>
<tr>
<td>Quantum 40 19ms</td>
<td>$599</td>
<td>$499</td>
</tr>
</tbody>
</table>

40 Megabyte Tape Back-Ups

| Caché Systems 45 26ms | $499 | $449 |
| CMS Enhancements Pro 45 22ms | $569 | $469 |
| Cutting Edge 47 30ms | $529 | $444 |
| MacBEST 42 28ms | $499 | $466 |
| Quantum 40 19ms | $599 | $499 |

50 Megabyte Tape Back-Ups

| Caché Systems 50 26ms | $699 | $599 |
| CMS Enhancements Pro 50 22ms | $769 | $669 |
| Cutting Edge 53 30ms | $729 | $649 |
| MacBEST 48 26ms | $699 | $599 |
| Quantum 40 19ms | $799 | $699 |

Mac II, IIX, IICX Internals

| 40 Megabyte | | |
| Caché Systems 45 26ms | $499 | $449 |
| CMS Enhancements Pro 45 22ms | $569 | $469 |
| Cutting Edge 47 30ms | $529 | $444 |
| MacBEST 42 28ms | $499 | $466 |
| Quantum 40 19ms | $599 | $499 |

50 Megabyte Internals

| Caché Systems 50 26ms | $799 | $699 |
| CMS Enhancements Pro 50 22ms | $899 | $799 |
| Cutting Edge 53 30ms | $879 | $799 |
| MacBEST 48 26ms | $829 | $729 |
| Quantum 40 19ms | $999 | $899 |

90-100 Megabyte Internals

| CMS Enhancements Pl 90 16ms | $1,049 | $799 |
| MacBEST 105 25ms | $999 | $799 |
| Quantum 90 18ms | $1,099 | $999 |

100-150 Megabyte

| Caché Systems 150 16ms | $1,499 | $1,299 |
| Caché Systems 190/150 Tape 16ms | $2,499 | $2,199 |
| CMS Enhancements 170 18ms | $1,799 | $1,599 |
| MacBEST 180 18ms | $1,749 | $1,659 |

150-173 Megabyte

| Caché Systems 150 16ms | $1,499 | $1,299 |
| CMS Enhancements 170 18ms | $1,699 | $1,499 |
| MacBEST 160 18ms | $1,499 | $1,299 |

300 Megabyte

| CMS Enhancements PL 300 16ms | $2,199 | $1,899 |
| MacBEST 300 16ms | $2,199 | $1,899 |

600 Megabyte

| CMS Enhancements PL 600 16ms | $3,299 | $2,779 |
| MacBEST 600 16ms | $3,299 | $2,779 |

For Ordering and Technical Support Call 1-800-333-3353

Visa, MasterCard, and American Express accepted NO surcharge. Your Credit Card will not be charged until your order is shipped. We accept COD orders, additional $5.00 charge. AZ residents add 6.5%. All shipments made by Federal Express Standard Air which is 1 to 2 day service. COD's shipped by UPS 2 day air. Call for shipping costs. Purchases purchased in error are subject to a 20% restocking fee. All prices subject to change without notice. All products subject to availability.
AMERICA'S SOURCE

UPGRADES

1MB SIMM's $119
Available now. Lifetime Manufacturer's Warranty!
256K SIMM's $69
Magic SCSI $69
128K-512K Upgrade $149
128K-1024K Upgrade $295
512K-1024 Upgrade $149
800K Drive and ROM's $299

MAGICNET

100% Flash Box, Phone Net, Local Talk compatible
SALE $19.00
STAR Controller $1149.00

MAGIC MODEM

100% Hayes Compatible - Auto Dial/Auto Answer
2400/1200/300 Band - 2-Year Warranty $99
Red Ryder $54

MAGIC DRIVES

<table>
<thead>
<tr>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 megabyte $389 $499</td>
<td>100 mb CDC $850 $950</td>
</tr>
<tr>
<td>30 megabyte $399 $599</td>
<td>150 mb CDC $1395 $1495</td>
</tr>
<tr>
<td>Quantum 40 $559 $639</td>
<td>300 mb CDC $1995 $2350</td>
</tr>
<tr>
<td>Quantum 80 $789 $879</td>
<td>600 mb CDC $3550 $3650</td>
</tr>
<tr>
<td>Quantum 105 $889 $979</td>
<td>60 mb Tape Backup $695</td>
</tr>
<tr>
<td>45 megabyte $519 $649</td>
<td>150 mb Tape Backup $895</td>
</tr>
<tr>
<td>45 mb Removable $999</td>
<td>600 mb Read/Write $1395</td>
</tr>
<tr>
<td>45 mb Cartridges, ca $95</td>
<td>Optical Drive $3750</td>
</tr>
<tr>
<td>60 megabyte $599 $699</td>
<td>1.2 gig Tape Backup $2995</td>
</tr>
<tr>
<td>80 megabyte $699 $799</td>
<td>2.3 gig Tape Backup $3995</td>
</tr>
</tbody>
</table>

DISPLAY SOLUTIONS

19" B&W Monitor - 2 Page Display. 72 dpi, 78 hz.
Includes card for +, SE, SE/30, II, IIx, IIcx $999
13" & 14" 100% Apple Compatible 8 bit color card $399
19" 8 bit color card $799
19" 32 bit color card $2995

SmartCACHE

- SCSI Disk Cache
- Tracks your history and optimizes using 64 caching algorithms
- Cuts 30-50% off the access time of any SCSI hard drive
- Write through cache for maximum data integrity

$99

ACCELERATORS

020/030

16 mhz 68020 $499
25 mhz 68020 $895
68881, 68882 Co-processors $199/$299
PMMU - 68851 $299

030 Coming Soon
Call For More Info

MacProducts USA
8303 Mopac Expressway • Suite 218 • Austin, Texas 78759 • USA • 1-800-622-3475
1-800-MAC-DISK
Mac Inker

Mac Inker™, the original, automatic ribbon re-inker. Mac Inker (model 234M) re-inks ImageWriter II black & single color cartridges. The Universal Mac Inker re-inks hundreds of cartridge types (including the ImageWriter LQ, one color and multicolor) with suitable adapters.

Proprietary, extra dark, dot matrix, lubricant ink yields better than new print quality and extends printhead life. New feltless reservoir for precise ink metering. Average number of re-inkings per cartridge is 60-100. With the optional Multicolor Adapter (model M422, $40) your Mac Inker re-inks 4-color ImageWriter II cartridges. Full range of accessories available (inks & cartridges, indelible ink, heat transfer etc). Colors: red, green, blue, yellow, purple, brown, orange, silver, gold. Free catalog.

$42.00

LightFax 9624

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 /graphics editor.

Software features include: Scheduled Sending, Broadcasting, NameCard Data Management, File Queuing, Choice of Standard or Fine Mode and many more.

Full front panel control lights display precisely the status of the communication and whether you are in fax or modem mode. Superb quality of transmitted fax, superior to conventional fax machines. Modem (100% Hayes compatible) available via software toggle switch, 2400/1200/300 baud speeds. Cable and software included for fax and modem.

Free "Facts on Faxes" bulletin available.

$499.00

Together At Last

EPSON® and Macintosh™

Macintosh Users Are No Longer Tied to Expensive ImageWriter Printers

Now Macintosh users can take advantage of the special paper-handling features and the affordable prices of Epson printers.

Macintosh Plus and LQ-510 or LQ-1050 create letter quality printing for a superior value!

The Epson LQ-510 or LQ-1050 offers Macintosh users superior value for **SIGNIFICANTLY LESS** than the ImageWriter II or ImageWriter LQ.

**NARROW CARRIAGE**

<table>
<thead>
<tr>
<th>LQ-510</th>
<th>24-pin</th>
<th>60 cps LQ</th>
<th>$369 new interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>ImageWriter II</td>
<td>9-pin</td>
<td>Letter Quality Not Available</td>
<td>$595 new interface</td>
</tr>
</tbody>
</table>

**WIDE CARRIAGE**

<table>
<thead>
<tr>
<th>LQ-1050</th>
<th>24-pin</th>
<th>90 cps LQ</th>
<th>$1399 new!</th>
</tr>
</thead>
<tbody>
<tr>
<td>ImageWriter LQ</td>
<td>27-pin</td>
<td>90 cps LQ</td>
<td>$1399 new!</td>
</tr>
</tbody>
</table>

USA★FLEX

135 N. Brandon Drive, Glen Ellyn, IL 60139

©Copyright 1989 Epson America, Inc. Epson is a registered trademark of Seiko Epson Corporation. Macintosh is a registered trademark of Apple Computer, Inc.
November Specials

80Mb HD/MacII: $599
Seagate ST296N int., 28ms, 1 yr.
Levco SpeedCard/SE: $499
Includes Mathco 69881, math calc up to 40X faster, 16MHz, 1 yr.
Canvas 2.0: $149
NCP, Pro graphics, 167 Mil. colors, Bezier curves, 3200% zoom

Join with Our Other Satisfied Corporate Customers:

Lockheed • General Dynamics • NASA •
Eastern Kodak • ABC 20/20 • Procter
& Gamble • Florida Power & Light •
Fingerhut • Texas A & M • Northern
Telecom • Trout Creek Architects • Purdue,
Rice, Clemson, Cornell, Penn State, Baylor,
Vanderbilt, Harvard, Yale, Notre Dame,
Texas, Johns Hopkins, & more Universities
and Colleges • Sears Roebuck & Co. •
Peet, Markwik & Mitchell • Prudential-
Bache • Norida Inkl. • Telecheck • AT&T •
Celestial Seasonings • Rio Grand Transit
Business Line • Lunar Radiation • State
of California • Consolidated Press
Schumlerwell Service • U.S. Sprint
Welex • Naval Aviation Supply • French
Trade Comm. • Century 21 Admiralty •
Mobil Oil • Aero/flow Industries • Amway
LA Dept. of Water & Power • NBC • Olan
Mills • Chevron • Texas Instruments
SYMEX Information Resources • Smith
Barney • Sailsbrad Design • Union Texas
American Express • Exxon Carribean
KRON Television • Kinko’s • Metro Intl.
Delta Airlines • United • Westinghouse
Holiday Inn • Aloca • Shearon Lehman
Apollo Computer • Lyondell Chemical
Arthur Anderson Co • General Mills Inc.
Digital Equipment Corp. • Honeywell
Inc. • IBM • and Many More.

There's not enough room here to list
our Vast Product
Line of Macintosh
Hardware and
Software... So Let Us
Send You Our Catalog...

Software Library

For Your FREE Macintosh
Business Solutions, CALL:
800-847-5775

MacSystems
1-800-942-6227 Ext. 25
FAX (405) 477-2329

Circle 222 on reader service card.

Circle 79 on reader service card.
20 MB External Hard Drive .... $398

Hard Drives
CMS
(External Subsystem for all Macs)
SD 20 Megabyte .................. $398
SD 30 Megabyte .................. $498
SD 45 Megabyte .................. $598
SD 60 Megabyte .................. $698
SD 80 Megabyte .................. $798
SD 140 Megabyte ................. $1198
Removable 44 Megabyte .......... $998
CMS Internal Subsystems
(For SE/SE 30/II/IIIX/IICX)
PRO 30 Megabyte .................. $398
PRO 45 Megabyte .................. $478
PRO 80 MB (Mac II/IIIX only) .... $698
PRO 100 Megabyte ................. $878
PRO 140 MB (Mac II/IIIX only) .... $998
*Tape for larger capacity drives
Everex/EMAC
External 20D ......................... $349
Impact 40 Plus ...................... $748
Tape Back-up System
CMS 60 Megabyte External
TS-60 .................. $698
Cutting Edge
800K External Drive ............... $149
Logitech
Hand-Held Scanner ............... $348
FAX Products
Abaton InterFax/4800 ............. $319
Orchid
Mac Fax/9600 ..................... $449
Hewlett Packard
DeskWriter ....................... $899

Dot Matrix Printer
Selkoshia
SP 1000 AP ....................... $215
Epson Imagewriter Compatible
EPSON LX-810
9 pin, 180 cps ...................... $199
Grappler C/Mac .................. $79
EPSON LQ-510
24 pin, 180 cps .................. $339
EPSON LQ-850 ..................... Call
EPSON LQ-1050 ................... Call
EPSON LQ-2550 ................... Call
EPSON LQ Printer Software ....... $68
*Interface for all LQ series printers
*Rearrange for larger capacity drives
Everex/EMAC
External 20D ......................... $349
Impact 40 Plus ...................... $748

Color Monitors
E-Machines
Big Picture T-16 color .......... $2598
Big Picture TX-16 color ........ $3398
Big Picture T-19 color ........... $4498
Rostor Ops
Colorboards ....................... Call
Monitors ......................... Call
Magnavox 14" Color Mac Display
640 x 480 Resolution ............ $509
Fine Dot Pitch, Tilt & Swivel Base

Monochrome Monitors
E-Machines
Big Picture 17" .................... $1298
Big Picture Z21 ................... $1798
Big Picture Z21 IQ ............... $2598
Moniterm
Viking 2 19" ....................... $1498
Viking 2400 24" ................... $1898
Sigma Design
Pageview SE 15" ................. $798
Silverview 21" ..................... $1598

Farallon
MacRecorder Sound System ...... $169
PhoneNet Connectors ............. $33

Modems
Beverly Hills 2400 ............... $129
Everex MD 2400 ................. $199

Computer professional
since 1975.

1-800-426-8166
From Beverly Hills
(213)273-3710
Fax Machine
(213)675-2522

279 South Beverly Drive, Suite 1200, Beverly Hills, California 90212

SHIPPING
All items in stock will ship in 24 hours. We offer daily service from Federal Express, UPS, U.S. Postal Service. Call for handling and shipping fees. Minimum shipping charge $4.00.

Circle 5 on reader service card
Now *Macworld* connects you with the world of Macintosh products instantly. And cost-effectively.

*The Macworld Catalog* is your immediate access to hundreds of Macintosh products, manufacturers, and services. Each month, this special direct response section brings you detailed product information arranged by category—so you can quickly compare prices and capabilities. Then pick up the phone and order!

For the best Macintosh buys, scroll through *The Macworld Catalog*.
The Macworld Catalog

Categories are subject to change

Advertising Rates & Information
The Macworld Catalog

The Macworld Catalog section is a monthly link-up for advertisers and volume purchasers of Macintosh-related products and services. The Catalog offers advertisers a low-cost marketing opportunity and provides readers with a timely, easy-to-use menu for product buying. Display ads are sold by column inches (2" minimum). Standard red is available as a second color. Text-only listings are available for a minimum of three issues at $399 per issue ($1197 total).

For more information, space closings, and material deadlines, please call toll-free 800/888-8622.

Instant Link:
Macintosh Products, Manufacturers, Services

The Macworld Catalog
901 Second Street
San Francisco,
CA 94107
800-888-8622

Account Managers
Niki Stranz,
Western U.S.
Carol Felde,
Eastern U.S.

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

Mouse Pads

Custom Printing Available
Cloth: Blue, Gray, Burgundy, Red, Brown, Green, Black, Navy & Platinum
Size: 8x7 1/2 x 8x1 1/2 x 8 1/2 x 11
12 Pads 3.25 3.50 3.75
72 3.00 3.25 3.50
144 2.85 3.10 3.35
PLASTIC: Blue, Platinum, Gray & Red
Size: 81/2 x 11
12 Pads 6.50 36.60
72-5.75 144-5.25
CALL AND ASK US ABOUT OUR PICTURE PAD.

Precision Line Inc., 14100 23rd Ave N., Minneapolis, MN 55441
1-800-328-0077, 612/557-1979

Supplies

Custom Printed Mouse Mats
Price each with one-color imprint
12 mats: 2.45 10 mats: 2.60 8 mats: 2.75
25 mats: 2.45 30 mats: 2.60 50 mats: 2.75
50 mats: 2.60 80 mats: 2.85 100 mats: 2.90
Prices include shipping
* Grey or Red Mats: 50 mats, 1.25
* Individual samples: $2.50 each
* Long-lasting prints will not rub off
* Custom colors, multi-color printing available
* Delivery—Approx. 2-3 weeks
* Rush service is also available

1-800-782-8628
Peak Products, Inc.
1243 Color Road, Covina, CA 91723-3929

Dust Covers

100% Cotton Canvas
MAC, SE, II, & PRINTERS
Boogie w/Grey Trim Breathable Static-Free
NEW! Seal-Skins For Keyboards
1-800-826-5761
Int'l: (415) 579-1486 Fax: (415) 864-6506
Complementary Computer Tote 1200-36th San Francisco, CA 94112

Computerwear

High Quality/100% Guarantee
3 1/2" DS/DD .95
3.5 HD $1.98

BULK RATE
Includes label, sleeves, and tabs
Minimum $4 for shipping and handling
MC/Visa accepted
CA residents add 6% sales tax

VNB: P.O. Box 42579
San Francisco, CA 94142
Phone 1-415-346-3913
FAX 1-415-346-2853

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

Chocolate Snackware™
Better than stackware!
MacSNACKS™ are solid chocolate floppy discs with your logo/message on each label.
Great for promos, shows, birthdays, etc. Available in 2 pack with reusable case (holds 5 real discs) $6. In bulk 10/box $25. (3.50 & $10) Qty discounts. Free catalog: 200+ items.
The Chocolate Galley, Inc., 5705 Calle Real, Goleta, CA 93117 800/426-4796 (outside CA), 805/967-4688 (in CA)

Exponent™ Media Management

Cassettes...store, back-up tapes and all types of media! The cabinets and mounting brackets let you build just the right system for quick access to your media in one stackable, lockable system.

Also available More Apple, IBM, Compaq, Misc Printer and others

Item No. Color

Name
City/State/Zip
Telephone

*MC/VISA # Exp. Date

Call for Free Mac Catalog

Stellar American Inc.
1040 Industrial Dr. #18 Berlin N.J. 08009 (800) 784-DISK
(509) 768-7950 Fax 768-7209 Call for FREE Mac Catalog

For your ad to appear on "The Macworld Catalog" screen, call 800/888-8622.
**The Macworld Catalog**

**Instant Link: Macintosh Products, Manufacturers, Services**

**LASER LABEL TECHNOLOGIES**

Labels • Paper • Envelopes • Transparencies

Free Catalog

800-882-4050

in Illinois call collect 312-243-9826

---

**Pack your Mac in seconds!**

Cordura case has internal padded pockets for mouse, keyboard and drive. Available in six colors. Extended Keyboard version also available. For a dealer near you call toll free 1-800-548-0053

West Ridge Designs

1236 N.W. Flanders

Portland, OR 97203

---

**Build your own Macintosh**

- Learn Secrets of Experts
- Break no Laws • Save Money
- Have Fun Anyone can build a new Mac work-alike from readily available catalog parts. Build anything from Mac 128 to Mac IIx equivalent. Save money over new or used sys. Read “Building your Own Macintosh” & learn all secrets. Photos, illustrations, & charts make it simple. $24.95 postpd. Visa/MC, chk.

Brant Associates, 4420 SE Mark Kelly Ct., P.O. Box 68708, Portland, OR 97268

---

**Portable Mac!**

Convert your Mac + or SE


Odyssey Systems

(208) 362-0023

call for free brochure Visa/MC

---

**Computer Systems**

**Mac Plus w/1 MB RAM, 20MB internal Hard Disk,**
(already includes keyboard and mouse)

$1799

**Mac II CX 1MB RAM,**

40 MB Hard Disk

$3925

---

**800 PC-RENTL**

Also Available:

- IBM PS/2 50Z, 70, 80
- Compaq Deskpro 386S, 386E, Portable III, SLT/286
- Mac SE, SE/30, Mac IICX
- Apple Laser Writer NT, NTX
- H-P LaserJet Series II

$189 per mo

---

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

We BUY Mac's & Mac Stuff!

Mac Parts

Call Shreve Systems

2421 Malcolm Street  Shreveport. La. 71108

Fax 318-865-2005  visa/m.c. O.K.  318-635-1121

Unbeatable Specials:

Abaton's 1200 Scanner $1195/2000S $1395

RasterOps' 24 bit Color/Board 264 (Mac11)$79

Apple LaserWriter II NTX $4895 (30% off list)

Unbeatable Specials:

Abaton QuickStep '300dpi LaserPrinter $2695

MacSE 103 Mac 3.5 Internal Hard Disk $89

MicroNet 292Mb Internal 3.5 HD $3149 14x1x

Orchid MacFax '9600 Bps Fax/Modem $439

SierraDesign's ColorMax-19' for Mac $379

Warranty on Apple

Most items in stock today.

All in software!

Run Apple II software on your Macintosh.

Convert Apple II files to Macintosh files.

$149.95

Add 3% or 5%

UPGRADES!

512Ke - Plus $295

512K - Plus $625

128K - Plus $695

We buy and sell new & used equipment also!

Peripheral Outlet

314 S. Broadway Ada, OK 74820

(405) 332-6581

Visa & MC okay add 3%

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Upgrade w/Accu-Simms
Upgrade your Mac Plus, SE or Mac II with our low profile one MEG SIMM modules. We assemble, test, and have strict quality control, and can give a lifetime warranty. $150 per meg. (Qty. discounts.) Full instructions come with order. (All SIMMS are 120NS or faster.) Prices may be lower by the time this ad comes out. Call for quote & info 1-800/662-SIMM.
Data Memory Systems Co., 15 Union St., Lawrence, MA 01840 Tel: 508/683-2325 Fax: 508/975-5232

HARD DRIVES
LIFETIME WARRANTY
20 MEG INTERNAL $349 Call
31 MEG INTERNAL $410
46 MEG INTERNAL $488 on
20 MEG EXTERNAL $495 Current
31 MEG EXTERNAL $549 Low
46 MEG EXTERNAL $639 Price
61 MEG EXTERNAL $690
80 MEG EXTERNAL $705
100 MEG UP - Call
Fits in SE+Mac II with 2 drives
Include PD+Backup Software
External fits under Mac
Segate-Minidesk-Quantum
WESTCOM COMPUTER
P.O. Box 154-Ayden, NC 28513
800-422-9591-919-746-4961

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
MEMORY UPGRADE

LOWEST PRICE !!!

- 1 Meg SIMMs
- 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

Technology WORKS
4030 Braker Lane West
Suite 350
Austin, Texas 78759

SIMM (Memory Modules)
Diamond-Pact™, Top Quality American made memory modules offer easy and economical expansion of Mac Plus, SE, II. DRAM by 1.2.4 or 8 megabytes. MC/VISA/AMEX
See display ad this issue!

AMDI
American Micro Distributors, Inc., 16897-D Algonquin, Huntington Beach, CA 92649,
714/840-5560,
Fax: 714/846-0570

MAC SIMMs
Add memory to your Mac Plus, SE or Mac II. One megabyte SIMM modules available in 2MB sets. We offer the lowest price you'll find anywhere. any quantity. Call for quote. MC/Visa. Immediate delivery. Product satisfaction guaranteed. We've been in the RAM business since 1982.
Palo Alto RAM, P.O. Box 50690, Palo Alto, CA 94303,
415/858-0125

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Don't be fooled. Get the truth about SIMMS. PSI manufactures all the RAM you need to upgrade your Mac Plus and higher (including the new Laptop) and LaserWriter IINIX.

(800) 622-1722 or (408) 559-8544
Call today to get the facts on memory upgrades

PSI - The Best Modules in Memory
2005 Hamilton Avenue • Suite 220 • San Jose, CA • 95125 • AppleLink: PSI

**SIMM MODULES**
For Mac Plus, II, or SE
Advance your Mac's capabilities with MACsimum memory:
4meg • 1meg • 256k SIMMs
80 & 100 NS
Special Offer for readers of MACWORLD:
Mention this ad and we will ship next day air at no extra charge!

American Scientific, Inc. • (702) 362-5353
3025 Sheridan Street • Second Floor Brookman Building • Las Vegas, NV 89102
CALL NOW... QUANTITY DISCOUNTS AVAILABLE! MasterCard or Visa

**Miscellaneous**
**Peripherals**
Motorola 68851 PMMU
$6851
200 Required for all '020 based Mac II's to run Virtual Memory with Sys 7.0 or A/UX
Bay Tech
1-813-360-8617

**9-Track Tape Subsystem For the Macintosh**
Exchange data files between your Macintosh and any mainframe or mini-computer using IBM compatible 1600 or 6320 BPI 9-track tape.
Unit can also be used for disk backup. Transfer rate is up to 1 megabyte per minute via your SCSI interface. Subsystem includes, tape drive, software, and complete documentation. For more information, call us today!

QUALSTAR
9621 Irondale Avenue
Chatsworth, CA 91311
Telephone: (818) 882-5822
Macintosh is a trademark of Apple Computer, Inc.

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Apple Daisywheel Printer
TRUE letter quality on all Mac's & Apple II's. Propor. spacing, boldface, 198 columns. Fast 40cps speed and full 130 character printwheel. NEW $449. RECONDITIONED $349 includes easy MAC point & click driver software & cable. New hi-dl tractor $99, sheetfeeder $49. All heavy duty with 90-day guarantee.

Quality Discount Computers, Inc., 135 Artist View Dr., Wellington, NV 89444, 702/465-2473, 415/487-8148

Qume. CrystalPrint™
- Postscript-compatible
- 35 typefaces
- 3MB memory
- 5 times faster than Apple LaserWriter INT

$3,165
"Best New Output Device" 1989 Eddy Award Winner

619-292-8066
9900 Coovernent Mesa Blvd.
San Diego, CA 92123

Powerfu! French Russian German Spanish!
MacFlash Cards: powerful, yet easy to use vocabulary stacks. 2000 words & up to 1000 synonyms. Save word sets to disk. Test noun gender. Use "Look Up" to find just the right word. Extensive user control. German I/II, French I/II, Russian I, Spanish I/II & III. S&H $3, CA Res add 7% tax. Available only from: The Language Quest Software Co.
101 First Street, Suite 428, Los Altos, CA 94022
VISA/Mastercard/COD /Info: 1-800-283-4080 X850

The most readers. The least cost. Immediate access. Just call The Macworld Catalog at 800.888.8622 and place your ad—today!

800.888.8622

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Instant Link: Macintosh Products, Manufacturers, Services

The Macworld Catalog

Data Conversion

WE CAN CONVERT DATAFILES TO/FROM OVER 1,500+ SYSTEMS IN VIRTUALLY ANY FORMAT!

- On disks or tapes!
- Data Conversion
- Conversions to/from over 2,000 computer systems:
  - Mainframes
  - Midrange systems
  - Minis
  - Microcomputers
  - Typesetters, etc.

Two VariType 4300PS

Typesetting from your Mac/PC, disk or modem, offers superior imaging using Adobe’s fastest PostScript RIP, 1200/2400 dpi, negs or paper; all Adobe fonts.
- Color PostScript Printing
- 24-bit Color Scanning
- Color Seps/Proofs
- OCR & Image Scanning
- 24 hr. Turnaround
- 9600 bps Modem
- Fax/Fed. Express
- Low Prices; M/C Visa; Try Us!

ImageSet™ Service Bureaus
111 W. Kingsley, Ann Arbor, MI
Voice: 313/668-7330
24 hr. BBS: 313/658-6319

Waldman Graphics

Printers + Typography

Desktop Designer’s Super Service Bureau
Maintain highest quality standards and lower your costs. We can accept any PostScript file for B/W and full color output. Original electronic art and PostScript affects our specialty. Complete Visionary Gateway and V.I.P services to powerful Scitex color center. Knowledgeable people, high resolution output, color proofing, quick turnaround.
- 1270 & 2540 dpi from
  - Linotronic L300s
  - Repro. Pos. & Neg. film
  - Disk Conversion
  - 24 hour Modem
  - QMS Color/Scitex 100
  - Scitex Color Imaging & Separations
  - Full Electronic Prepress
  - High Quality Color Printing
  - Mailing
  - 20 Messengers to NYC, Phila., N.J.
  - Discount Adobe Dealer

Call Mike Gladden or George Gunzelman for more information about our extensive DTP services.
609/662-9111 800/543-0955
Modem: 609/662-3788

LINO & COLOR
- L200P as low as $2.50/pg in qty
- COLOR PostScript laser prints!
- Canon 4-color laser copies
- Full-service type & graphics
- 24-hour BBS & turnaround
Don’t just image it ...
1-800-AVENIR-IT
800-283-8774
303-433-8000

Looking for great desktop output?
Now, with RIP III for accurate color separations, 2 Linotronic 300s for your Mac/IBM files. Ask us about special offer: FREE SCREEN FONTS Volumes 1-70. Printer fonts 30% off list. FREE UPS delivery.
High res 2540 dpi • Fast service.
Check the low prices on our 24-hour BBS at 201-530-4594. OCR, image scanning and disk conversions.
We offer a full range of pre-press services. How can we help you?

For your ad to appear in The Macworld Catalog, call 800/888-8622.

353
ATTENTION: TONER CARTRIDGE OWNERS
Save $$ Recharge Your Cartridges in America
Why Buy New?
Satisfaction Guaranteed • 24 hour turn-around
UPS your cartridge & dirty cleaning wand
with $44.00 (includes return shipping) to:
Atlantis Laser Printer Service
4340 S. Hopkins Ave., Ste. 218 • Titusville, FL 32780
1-800-633-4469
No Pooling • Cleaned • Fully Disassembled • No Holes Cut
High Density Toner Used • Tested

Toner Recharge

2 DAY AIR
Prepaid Return

100% Satisfaction

Get back your cartridge!
Every cartridge pretested!
Any spot or smear on cartridge, we'll recondition!
$5.00 surcharge per cartridge

24 Hours
800-777-8444

SOUTHERN CARTRIDGE SERVICE, INC.
High Tech Remanufacturers
1-800-442-6288
ABSOLUTE SAME DAY SERVICE
Nationwide Guarantee
We Buy Empties
33 Matthews Drive, Hilton Head Island, S.C. 29926

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Bar Code

Print bar codes directly from your Macintosh programs when you add PrintBar fonts to your System.

Use UPC PostScript fonts with LaserWriter and high-resolution printers such as Linotronic L-100, L-200, and L-300.

Print Code 39 bar code fonts on ImageWriter or LaserWriter. Use PrintBar with data base managers, label, page layout, and draw programs.

Print bar codes as easily as you print text!

COMPLETE Line MAC-COMPATIBLE BAR CODE READERS

FREE BROCHURES (916) 622-4640 / FAX 916 622-4775

RC 693 ON READER SERVICE CARD

Business

LOCATE HARD-TO-FIND SOFTWARE!

ECONOMETRICS SALES MARKET FORECASTING-PRICE TRENDS- QUALITY CONTROL- INSURANCE MANAGEMENT DECISION ANALYSIS CLUSTER ANALYSIS-PROJECT PLANNING-ECOLOGICAL COMMODITY SIMULATION-REGRESSION-GRADE ANALYSIS-TRANSPORTATION-RETAIL MANAGEMENT-QUALITY PARAMETERS-PLANNING- WIZARD - AND MANY OTHERS!

Lionheart analysis terminal analysis software of the least quality. Turn your personal computer into your potential C.I.A. a lifetime's worth of the right price. Don't an edge on the competition!

Prices range from $150 to $140 per title.

SEND FOR FREE PRODUCT GUIDE!

Lionheart Press, Inc.
PO Box 378, Alburtis, VT, 05448
Tel: (802) 523-4738 / Fax: (802) 523-3907

RC 700 ON READER SERVICE CARD

Mail Order Manager

SuperMOM-a complete database solution for catalog mail order businesses. • Easy order entry • Unlimited ship-to addresses • Inventory with multiple pricing • A/R • UPS • Credits & returns • Customer tracking by Group, Market, Promo & Salesman • Thorough reporting on sales, inquiries, & advertising response • Demo $15

National Tele-Press, P.O. Box 79
Menlo Park, CA 94022

RC 587 ON READER SERVICE CARD

MacTracker

Designed to support managers and professionals in their managing roles and functions.

MacTracker takes care of most everyday activities: reminders, follow-up, meeting scheduling and postponing, resource scheduling, record tracking, multi-projects and multi-resource capability. $185.

Call Now! Visa.

Magnimac, 230 St-Jacques, Suite 370, Montreal, Canada H4C3N4 514/937-1515

RC 588 ON READER SERVICE CARD

Do-it-Yourself Business Plan

Tim Berry's Business Plan Toolkit for PC or Mac, praised by Inc, Home Office, Bankers Monthly, Corporate Cash Flow: "... well thought out, clearly written ... includes all the spreadsheets you need, designed to provide all the standard analyses such as multiyear profit and loss, ratio analysis, sales forecasts and the like ... some impressive graphs ... a great buy." With fully-linked financials, sample plan text files, and manual. $99.95

Palo Alto Software

(415) 325-3190

RC 693 ON READER SERVICE CARD

Business Power Tools

BizPlanBuilder™

Intuitive business & marketing plan template for raising capital, launching new products or services. Over 90 pages of sales & marketing oriented outlines, headlines, ideas, written text, formatted into 33 MSWord/MacWrite files. For Macintosh (or PCs). Linked financial spreadsheets for Excel, Works. Proven successful with bankers, investors & corp. executives. Excellent for all businesses. Leverage your time & technology. $99.95

“We applied for a loan in early November and by Christmas we had $4,200,000.” — D.S., Lakeview, NV

“We apply highly recommends it.” — J.S., Fort Worth, TX

“The Macintosh's saving us about 907% of the work.”

Intuitive business tools exclusively for MacTracker PC or Mac, praised by bankers, investor, professionals in their management clearly written ... includes all the aging roles and functions. spreadsheets you need, designed to provide all the standard analyses such as multiyear profit and loss, ratio analysis, sales forecasts and the like. With fully-linked financials, sample plan text files, and manual. $99.95

Palo Alto Software

(415) 325-3190

RC 693 ON READER SERVICE CARD

MacEnvelope

Envelope/Label Printing

Version 4.1

...now I bar code all my mail with the Macintosh and MacEnvelope. Highly recommended.

— John C. Dvorak, San Francisco Examiner

MacEnvelope™ 4.1 prints envelopes or labels with addresses, graphics, messages, fonts, styles, sizes, imports lists, saves addresses, saves layouts and speeds your mail through the postal system with automatic bar coding.

(800) 447-9639 Check/Visa/MC $69.95 + $3 s/h (NY add tax)

FAX (718) 788-3997 SYNEX 692 10th St., B’klyn NY 11215

RC 694 ON READER SERVICE CARD

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

LOAN PROCESSING
Amortization Software
AmPock - $49.95
Balloons, GPMs, ARMs, Biweekly, Customized Reports, & more.
AmPock Plus - $89.95
All features in AmPock plus: Extra Principal, Skipped, APRs, On-screen Loan Comparison & more.

Tracking Software
LoanLease Library - $69.95
Tracks Loan, Lease, & Rental Payments. Generates Amortization Schedules for unique situations. Detailed rental activity summary statements.

Portfolio Management
Tracks groups of loans. Many report features. Will customize.

Softnall, Inc.
8753 Porkview • Milwaukee WI 53226
(414) 797-4490

Add $5 S/H MC/VISA

CADD/CAM
Professional CAD Symbol Library
Over 2,700 Symbols in One All-Inclusive Package
For All of Your CAD Needs:
Mechanical, Electronics, Architectural, Hardware, General Drawing Aids
And Much More, All for $119.95!
Comes with ClipArt™ and MacDraw II™
(303) 674-2222 to Order

Advanced System Design, Inc.
1010 Stagecoach Blvd. P.O. Box 351
Evergreen, Colorado 80439

CIRCLE 642 ON READER SERVICE CARD

Military Clip Art
ArmyArt™ NavyArt™ AirArt™
Orders: 800-441-1228
$89.95 ea + $4 s/h
Info: 513-626-3668

Storm King Technology • 37 Dragon • Leavenworth KS 66026

CIRCLE 657 ON READER SERVICE CARD

Color EPSF Art
5 New Volumes
- Flags of the USA
- Flags of the World
- Int'l Symbols
- Creative Theme Art
- Seasonal Art

$125 each
To Order Call
DiskArt™
800-333-3305
415-820-3734

CIRCLE 651 ON READER SERVICE CARD

Data Base

HELP!
With 4th Dimension
- Pre-written procedures and applications that you can use as templates or as examples to learn from.
- A desk accessory that enables you to copy and paste our procedures directly into your applications.
- Applications include Statistics, Communications, Invoicing, Graphics and much more.
- $129.00.

Ducsoft
376 Columbus Avenue
Southbury, CT 06488-8797
(203) 726-6797

4th Dimension is a registered trademark of Adat Inc.

CIRCLE 555 ON READER SERVICE CARD

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Japanese Word Processor

ByWord™

今、日本でうわさのByWord新発売!!

• Complete word processing function for both English and Japanese
• Supports Kanji/ASCII level I and II
• Compatibility with KanjiTalk

$299.

Distributed by:
Qualitas Trading Co.
6607 Norfolk Rd., Berkeley, CA 94705
Phone: 415-848-8080 Fax: 415-848-8009

Developed by Ministry of Software

Perfectstudy 3.05

• Study for exams
• Guarantees 100% recall accuracy
• Study up to 3 times faster than conventional methods
• Input your own information to study
• Automatic on-screen and hardcopy multiple-choice test generator
• It really works
• $12K, $6, SE, II, IIIcex.
• $39 + $5 S/H Visa/MC/AX

Powerware Systems, 755 Norb 100 West, Orem, UT 84057, 800/336-6644

ScreenShare

ScreenShare is a software product which enables an instructor to do demonstrations in a classroom of networked Macintosh computers. ScreenShare broadcasts the contents of an instructor's Macintosh screen to the screens of the students' Macintoshes while temporarily suspending the students' work.

ScreenShare for a classroom $249 ($295 Canada).

White Knight Software Corp., P. O. Box 564 - 810 West Broadway, Vancouver, B.C. Canada V5Z 4C9 (604) 290-4855

Road Design

MacRoad is a fully interactive road design program that allows you to:
• Design cross sections using a palette of edge & surface types
• Design vertical gradings graphically
• Produce a schedule of quantities
• Adjust the grading & immediately see the effect on the cross sections & quantities
• Produce drawings on a range of printers or pen plotters

Creative Engineering, 8 Antill St., Wilston Queensland 4051, Australia, +61 73566271

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

Electronic CAD
The powerful, easy-to-use Douglas CADCAM Professional System takes you from the schematic drawing to the final routed board with:
- Color support on Mac II
- Unlimited multilayers
- SMT capability
- 1 mil resolution
- Layout w/ parts-placement facility
- Schematic w/digital simulation
- Flexible, multi-pass router

Take your first step into the new age of electronic CAD by ordering a full-feature demo with all 3 programs included. Call or write to us today.

Douglas Electronic Inc.
Schematic $150
Layout $160
AutoRoute $250

Schematic/Plotter/Route System $700

Microwave Path Analysis
Engineering Demos
- Microwave Path Analysis
- Satellite Communications
- Systems Analysis
- Earth Station Antenna Pointing Angle
- Great Circle Calculations
- Intermodulation Analysis in Communications

For a Demo Disk and one working program send $5.00 to:
CASC0 Engineering, P.O. Box 2583, Titusville, Florida 32780

Entertainment
A Gift Made to Order

BirdSongs! only $45

This season reward your favorite Mac user with a gift that's sure to bring cheer from now on. Whether they've been naughty or nice, they'll love this tantalizing collection of authentic bird and wildlife recordings. Now your favorite birds, each professionally digitized in high fidelity, can be heard at random or by menu selection...and because it's MultiFinder friendly, you can also work in other programs. MacRecorder owners can play their own sounds too!

- 17 Champion Songbirds Included
- Each Song Typically Lasts 2 to 4 secs
- Volume & Interval User Determined
- Library of Exotic Animals Available

Order now: Visa, MasterCard or Personal Check
For Details: Write or call for a free Wildlife Info Kit

505-897-4024
Bringing Creative Software to the Computing Public

Corrales Software
P.O. Box 2730, Corrales, NM 87048

- NuBus IEEE board for Mac II
- Macintosh Products, Manufacturers, Services

IEEE 488 Interfaces
Mac488 • NuBus IEEE board for Mac II
MacSCH488 • Serial IEEE controller for Mac
MacSerial488 • IEEE plotter interface
MacDA488 • IEEE disk accessory
MacDriver488 • IEEE language driver

Call or send for your FREE Technical Guide
(216) 439-4091

RFDesigner™
...a powerful productivity tool for nodal analysis and gradient/random/yield optimization of complex RF/MICROWAVE electronic circuits. Full TEXT/GRAPHIC Mac interface.

Options: full-featured schematic capture, Network Analyzer interface, S-Parameter Library. Works on all Macs (1-5MB).

Strats at $1,500.

Schematic Rectangular/Planar Simulation
Schematic E Enunciator/Digital Simulation

DesignWorks
Fully integrated and fully functional schematic and simulation on the Macintosh, featuring:
- fully interactive digital simulation with logic/analyzer style timing display
- fully compatible with Douglas CADCAM™ PCB layout
- full 74LS, 4000, 6000, 51, 61, 818, 8500 logic libraries
- full high level language PLL simulation
- device library
- fully interactive device symbols with
- full simulations

DesignWorks: $495
LPC3: $55
Low-cost educational versions also available

Circuit Maker 2.0
- Professional digital logic design with full on-screen simulation
- Trace modes: single trace, all traces, none
- Schematic/plotter/ routes for MC68000
- Schematic/plotter/ routes for MC68000
- Flexible, multi-pass router

Take your first step into the new age of electronic CAD/CAM by ordering a full-feature demo with all 3 programs included. Call or write to us today.

E(E)PROM, MICRO & MEMORY CARD PROGRAMMERS
WITH INTEGRATED MAC USER INTERFACE
- Connections to modem port, Pull-down command menus.
- No personality modules for EPROMS and Flash Memories.
- All 24/25/29 pin Eproms to 1 Mbit (upgradeable to 32 Mbit).
- 80L, 8-4, -41, -43, -51, -52, -3551, FPEPROMs.
- Standard E(E)PROM and Memory Card duplication facility.
- Electromagnetic, Binary, Intel & Motorola, 16, 32 bit.
- Built-in Eraser/Timer option (500), Gang Module ready.
- Direct technical support. Full 1 year warranty.

B&C MICROSYSTEMS
355 WEST OLIVE AVE., SUNNYVALE, CA 94086
PH: (408) 730-5511 FAX: (408) 730-5521 TELEX: 944185

Go - meet your NEMESIS
Go has been a way of life in the Orient for over 4,000 years. As much a philosophy as it is a game, Go is considered by many to be the secret of Japanese success. "The leading Go game for the Macintosh...Using it is an improvement over learning the game from books or from all the wiser and wiser masters." - "This is without question one of the most extraordinary automated aids to go instruction developed." - Macworld

Toyogo, Inc.
76 Bedford Street, Suite 3C-L, Lexington, MA 02173
(617) 861-0488

579 NEMESIS Go Master $49
Noctis Tantum $59
Tactical Wazoo $69

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Tired of Arcade Games?

Try the challenge of battle strategy simulation. Nine original, unique games, including: Rommel's DESERT WAR, MIDWAY or SOLOMONS carrier actions, Rome's glory in BARBARIAN or EAGLES IN THE SAND. Call now to action in WESTERN CAMPAIGNS or ARMY OF NORTHERN VIRGINIA. Leaded edhines in SCENIC SEA or US Invasion in RED STARS. Coming Soon: Patton's Attack on Russia. Hannibal's War With Rome. US War In Vietnam.

$29.95 each - $33.54 (6 or Overseas). VISA & MC Accepted. $65K. Required: Specify machine.

Wartime Simulations

Circle 647 on Reader Service Card

Lotto Pro

$1,000,000.00

BECOME A MILLIONAIRE!

IT COULD Happen to YOU!

For those serious about winning MILLIONS OF DOLLARS

at the LOTTERY

*Priceless Information*

Lotto Pro™ $49.95 - s/h

Call: (408) 426-2766

Visa, MasterCard or Send Check to:

Market Maker

312 CENTENIAL BT • SANTA CRUZ, CA 95060

Circle 618 on Reader Service Card

STAMP, COIN & BASEBALL CARD COLLECTORS!

Three powerful, yet easy-to-use

collectible inventory programs.

• Built-in prices & descriptions.

• Prices updated annually.

• Demo $15. Call for FREE catalog.

COMPU-QUOTE

6914 Berquist Ave, Dept. CM

Carmichael, CA 95607

800/875-3675 ext. 39

In CA 916/348-3662 ext. 39

Circle 578 on Reader Service Card

Fonts

Beverly Hills

"Best Imagesetter™ font available!"

• "Typewriter" look, 11 sizes, 6-36 pts.

• Multi-digit fractions, horiz. lines

• Fine spacing, math/musical symbols

• Includes discs, 70-p. printed manual

• Two compatible versions available:

  v 2.0 (ImageWriter I or II): $29.95

  v LO-1.0 (ITV LQ, Mac+): $39.95

• Direct orders, add $3.00 S/H (plus

  $1.80 or $2.50 sales tax in Calif.)

• Site licenses; dealer inquiries invited

ADH Software

P.O. Box 67129

Los Angeles, CA 90007-0129

Circle 554 on Reader Service Card

Family Heritage File

Most powerful genealogy program on the Mac. Rated "Best" by Macworld. Lisc. ver. of Personal Ancestral File™ produced by the LDS Church. New enhancements for non-LDS. • Mac user interface • All Macs & hard disks except 128K

• Exports data to WP/data

bases/modems • Pedigree, Family Group, Individuals, Marriages, Surnames, Core., etc.

$49.95 + $5 s/h. Visa/MC Welcome. Call or write for a free brochure + sample printouts.

LEISTER PRODUCTIONS

14irl Blvd., Mechanicstown PA 17055

717-697-1378

Circle 613 on Reader Service Card

Family Roots™

Do it YOUR way! Huge variety and capacity for your family history. Make pedigree charts, descendant charts, person sheets, group sheets, indices and much more. Customize to your own preferences. Standard Mac interface. Call for FREE information. Satisfaction guaranteed MC/Visa/AE.

Quincept, Box 216, Lexington, MA 02173, 617/641-2930, 800/637-ROOT

Circle 695 on Reader Service Card

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
MacGene™
**LARGEST INSTALLED BASE**
Easy 4 Novice/Extras 4 Experts
100% Mac. Combines Data Entry, Search & Graphics: Group Sheets, Pedigree, Family Tree, HOT-key, Biography, Lists, Labels, History, no record limits, Auto-Link & Generation
Publish-Ready, FASTEST.
• Custom fields & reports
• Import/Export
• Nocopy protect
• $145-S bk guar. Demo $25.
Applied Ideas, Inc., P.O. Box 3225, Manhattan Beach, CA 90266, Free info: 213/545-2996

MacPerspective™
It’s simple and easy to construct accurate perspectives on screen with dimension coordinates input by relative commands. (Left/right - up/down - toward/back)

Knick Drafting, Inc. (407) 777-6275
1275 S. Patrick Dr. Ste P, Satellite Beach, FL 32937

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Instant Link: Macintosh Products, Manufacturers, Services

The Macworld Catalog

Office Management

MacPhonebook

(Office Management)

MacPhonebook

(Programming Tools)

Presentation

CaptGen

Produces a self-running presentation or capture a video without a dedicated CG machine. Using time-controlled sequences, CaptGen: • Displays PICT2 files • Can superimpose text over graphics • Displays special effects • Scrolling text over graphics • Fading text • Dissolving text and much more! $179.95 + $3.00 shipping and handling.

MacPhonebook

Keeps 1600 names, prints different formats. Black covers included. No special paper needed.

Power Development Tools

COLOR WINDOW WORKSHOP

From opening a single color window to opening, closing, moving and growing 10 windows, WINDOW WORKSHOP avoids the pitfalls of using color windows in Pascal application programs. This 800K disk full of well-documented, expandable application programs, MPW tools, and MPW shell scripts manage Window Manager quickly and painfully. Includes object-oriented custom ROM interface which cuts compilation time. $49.95. Call or send your order to:

Amplified Intelligence, 2810 Redding Ave. Suite E, Sacramento, CA 95820, 916/737-1550

MobyWords™

Unabridged English language databases on 3.5" diskettes. For the fully-powered developer, 30,000 screens of ASCII data. Can compile with System 7.0. Original MobyWords™ $79

CaptGen

Product of a running presentation or capture a video without a dedicated CG machine. Using time-controlled sequences, CaptGen: • Displays PICT2 files • Can superimpose text over graphics • Displays special effects • Scrolling text over graphics • Fading text • Dissolving text and much more! $179.95 + 3.50 S/H

MobyPronunciator™ $199

150,000 words with IPA marks

For pronunciation of English language printing

Color Window Workshop

FREE Smack-a-Mac

FREE SOFTWARE CATALOG

FREE! 288-Page Catalog of

Your best PD/Shareware values: only $19.95 per PAK!

• ArchitectPAK 250 (I & II) • GamePAK (I & II) 100

• BusinessPAK 100 • KidPAK 100

• DeskPAK 200 (I & II) • LaserPAK 100

• FontPAK 200 (I & II) • SoundPAK 150

• EPS PAK 100 • UtilityPAK 150

$ HyperPAK 100 (Volumes I thru VI)

FREE! 288-Page Catalog of

Public Domain Shareware Over 10,000 files. The largest, most up-to-date library.

EDUCORP

1-800-843-9497

FREE! 288-Page Catalog of

Public Domain Shareware

Over 10,000 Macintosh programs. An amazing variety of programs and accessory items for your Macintosh! At the lowest discount prices! Or send $3.00 (indicate a free order). All software tested virus-free. How our 3rd year of service to Macintosh owners!

FREE! 288-Page Catalog of

Public Domain Shareware

Your best PD/Shareware values:

only $19.95 per PAK!

• ArchitectPAK 250 (I & II) • GamePAK (I & II) 100

• BusinessPAK 100 • KidPAK 100

• DeskPAK 200 (I & II) • LaserPAK 100

• FontPAK 200 (I & II) • SoundPAK 150

• EPS PAK 100 • UtilityPAK 150

• HyperPAK 100 (Volumes I thru VI)

FREE! 288-Page Catalog of

Public Domain Shareware

Over 10,000 Macintosh programs. An amazing variety of programs and accessory items for your Macintosh! At the lowest discount prices! Or send $3.00 (indicate a free order). All software tested virus-free. How our 3rd year of service to Macintosh owners!

FREE! 288-Page Catalog of

Public Domain Shareware

Your best PD/Shareware values:

only $19.95 per PAK!

• ArchitectPAK 250 (I & II) • GamePAK (I & II) 100

• BusinessPAK 100 • KidPAK 100

• DeskPAK 200 (I & II) • LaserPAK 100

• FontPAK 200 (I & II) • SoundPAK 150

• EPS PAK 100 • UtilityPAK 150

• HyperPAK 100 (Volumes I thru VI)

FREE! 288-Page Catalog of

Public Domain Shareware

Over 10,000 Macintosh programs. An amazing variety of programs and accessory items for your Macintosh! At the lowest discount prices! Or send $3.00 (indicate a free order). All software tested virus-free. How our 3rd year of service to Macintosh owners!

FREE! 288-Page Catalog of

Public Domain Shareware

Over 10,000 Macintosh programs. An amazing variety of programs and accessory items for your Macintosh! At the lowest discount prices! Or send $3.00 (indicate a free order). All software tested virus-free. How our 3rd year of service to Macintosh owners!
New from RealData —
Real Estate Investment Analysis, Version 6.0

Real Estate Investment Analysis has been our best-selling product since it was introduced in 1982. Many software products have come and gone over the years, but RealData and our Investment Analysis have stood the test of time. Now Version 6.0 adds new power to this popular program.

What can it do? Real Estate Investment Analysis allows you to make ten-year projections of the income, expenses, cash flows, re-sale and tax implications of your property. It performs virtually all of the complex Tax Reform, financing and rate-of-return calculations for you in just seconds. It also includes a lease analysis and annual operating statement.

Real Estate Investment Analysis, Version 6.0 runs with Microsoft Excel™ or Works™ on the Mac S12 or greater — just $250.

To order, call or write today. MC, VISA, AMEX Welcome or send $2 for our catalog of real estate software for the Mac and PC.

Call Up Your Ad
On Our Screen.

The Macworld Catalog
800.888.8622

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
FAST, online access to scientific and technical information.

That's what you get when you use STN Express® software to search the 80 databases on STN International®.

Ask for your FREE preview package for Macintosh® by calling:

STN International
% Chemical Abstracts Service

1-800-848-6538 extension 3731

Spreadsheets

Spreadsheet Compiler

At last, you can convert your templates into royalty-free stand-alone applications. This means big savings and more sales because your users no longer need a spreadsheet to run your templates. SYLK compatible with Microsoft Excel and other spreadsheets. Just think, now you can protect your investment while quickly and easily creating professional quality applications. For only $495, I invite you to try at no risk with our 30 Day Money Back Guarantee.

To order or for more information call (714) 842-2492
Night Diamonds - (714) 842-2492

Statistics

CLR ANOVA
Analysis of variance program that can compute up to a 10-way design with repeated measures and unequal n. Marginal means, plots of interactions, simple effects, range tests, contrasts, and more. Full Mac interface. Can read text files w/entries separated by spaces, commas, or tabs. $100 + $3 s/h.

Clear Lake Research, 2476 Bolsover #343 Houston, TX 77005, 713/523-7842

Utilities

Plotter Utility...with professional fonts for Apple, HP, Houston; A-E sizes. $125

Terminal Utility...fast VT100, Tektronix, file transfer, color, large screens. $195

Mesa Graphics, Inc
P.O. Box 600
Los Alamos, NM 87544
(505) 672-1998

Mailing Lists

MAILING LIST of Mac Users
On labels, tapes, diskettes...or by modem.

Choose from hundreds of thousands of users! Only 5¢ per name, with no charge for selecting, sorting, media, or delivery.
Semaphore Corporation, 575 Granada Dr., Sunnyvale, CA 94086
(408) 688-9200 (voice) 662-2717 (modem)

Your Ad Gets More For Less.

Call The Macworld Catalog and see why.

800.888.8622

Millions of laser printers need toner cartridges!

If you have a small workbench or table, you can start your own toner cartridge recharging business — full or part-time!

Cash in on the exploding demand for recharged toner cartridges for laser printers and copiers. As a LaserCharge-trained entrepreneur, you will be able to offer companies in your area a long-life 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: $4,900 or $6,900.

LaserCharge
12115 Roxie Drive, Austin, Texas 78729
Call today! 800-223-8134 512-335-8191

Your Ad to appear on The Macworld Catalog screen, call 800/888-8622.
BEST-SELLERS

BUSINESS SOFTWARE

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>45</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>41</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>33</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>14</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>43</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

HARD DISKS*

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>28</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

ADD-IN BOARDS/MEMORY

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>23</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>23</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

EDUCATION SOFTWARE

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>21</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>34</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>31</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

ADD-IN BOARDS/MEMORY

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>23</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>23</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

PRODUCT WATCH

Editors' choice of other recent or forthcoming products of particular interest.

FoxGraph/Mac

Serius 89

Wallaby Laptop System

Source: Exclusive InfoCorp survey of more than 125 Macintosh resellers and selected mail-order vendors. Covers sales during July 1989.

*Does not include hard disks installed at the factory.
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 IICx.

<table>
<thead>
<tr>
<th>WriteNow 2.0</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>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>
</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>2 min. 21.1 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>
</tr>
</tbody>
</table>

COPY & PASTE
Copy & paste large area:
WriteNow 2.0: 6.7 sec.
MacWrite II: 45.9 sec.
MS Works 2.0: 1 min. 50.8 sec.
MS Word 4.0: 21.6 sec.

EASY-TO-LEARN, EASY-TO-USE
Copy & paste small area:
WriteNow 2.0: 2.9 sec.
MacWrite II: 40.2 sec.
MS Works 2.0: 35.7 sec.
MS Word 4.0: 11.0 sec.

SPELL CHECK DOCUMENT
WriteNow 2.0: 7.4 sec.
MacWrite II: 33.6 sec.
MS Works 2.0: 5 min. 13.4 sec.
MS Word 4.0: 3 min. 55.1 sec.

CHANGE INDENTS & DOUBLE SPACING
WriteNow 2.0: 23.3 sec.
MacWrite II: 44.7 sec.
MS Works 2.0: 2 min. 21.1 sec.
MS Word 4.0: 39.4 sec.

UNDO RULER CHANGES
WriteNow 2.0: 1.6 sec.
MacWrite II: 24.7 sec.
MS Works 2.0: 1 min. 14.5 sec.
MS Word 4.0: 25.8 sec.

For more information:
T/Maker Company
1390 Villa Street
Mountain View • CA • 94040
Telephone: (415) 962-0195
FAX: (415) 962-0201

Circle 332 on reader service card

ATTENTION—MACWRITE & MS WORD USERS!
T/Maker will honor your Mac Write
or Word purchase offer! This
is a limited-time offer—Call today for
details.

For more information:
T/Maker Company
1390 Villa Street
Mountain View • CA • 94040
Telephone: (415) 962-0195
FAX: (415) 962-0201

Circle 332 on reader service card

For more information:
T/Maker Company
1390 Villa Street
Mountain View • CA • 94040
Telephone: (415) 962-0195
FAX: (415) 962-0201

Circle 332 on reader service card

For more information:
T/Maker Company
1390 Villa Street
Mountain View • CA • 94040
Telephone: (415) 962-0195
FAX: (415) 962-0201

Circle 332 on reader service card

For more information:
T/Maker Company
1390 Villa Street
Mountain View • CA • 94040
Telephone: (415) 962-0195
FAX: (415) 962-0201

Circle 332 on reader service card
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 trackball and mouse on the market. (Not to mention joysticks, keyboards and graphics tablets.) The winning secret? Simple.