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We interrupt this magazine for

Microsoft Chart, business graphics.

Central Sales Region
Sales Performance vs. Quota

Microsoft Multiplan, electronic spreadsheet.

Sales Performance vs. Quota

MacProject, project management.

Dow Jones Straight Talk, data communications.

FileVision, database management.

OverVUE, database management.

MacWrite, word processing.

Hayden-Base, database management.

Microsoft Word, word processing.

Front Desk, appointment scheduler.

MegaForm, business form processor.

MacLink, IBM* PC file transfer.

The programs above are just a few examples of business software available for Macintosh.* Available March 1985 © 1985 Apple Computer Inc. Apple and the Apple logo are registered trademarks of Apple Computer Inc. Macintosh is a trademark licensed to Apple Computer Inc. IBM is a registered trademark of International Business Machines Corporation. For an authorized Apple dealer nearest you call (800) 538-9696. In Canada call (800) 268-7796 or (800) 268-7637.
some important programs.

Every business day, a new software program is being developed for the Macintosh™ Personal Computer.

Software for word processing, spreadsheets, business graphics, project management, database management, and data communications.

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For the average consumer, close to $3000 is a high price to pay for a computer system, so if Apple Computer intends to sell millions of Macintoshes, the Mac will have to make significant inroads into the business market. Apple is aware of the importance of the white-collar crowd and has begun to court the corporate realm with sales teams and slick advertising campaigns. Chances are slim that the Mac will become the personal computer of choice on Fortune 1000 desks; however, it has the ability to become a major competitor in the remaining business market.

Despite the IBM Personal Computer’s apparent dominance in the corporate world, Apple still has the opportunity to present the Macintosh as a viable alternative to the PC. Although the Fortune 1000 companies, which appear to be on first-name basis with Big Blue as they buy thousands of PCs in a single order, make the headlines, these companies represent only the tip of the business pyramid. As Steve Jobs reportedly said, “How many Fortune 1000 companies are there?” IBM doesn’t have a monopoly in the business market yet, but it does have a strong software base, which gives it the edge.

Apple sent the Macintosh into IBM’s traditional territory armed with some impressive ammunition. The Mac’s unique user interface lends a new appeal to application software. Its latest programs are often more flexible and easier to learn than IBM’s standards. With this solidifying software base and the promise of even more outstanding software, such as Jazz from Lotus, the Mac could start to enchant the business market away from Big Blue.

Most of the Mac’s hardware advantages are obvious. Unlike the PC, it has a small footprint and is truly portable. It doesn’t require special furniture or additional space to adapt to an office environment. With its announcement of the Macintosh Office, Apple is putting all the pieces together—business software, the $12K Mac, a laser printer, and a network capability—to give the Mac the corporate clout it needs to be taken seriously as a business machine.

Apple’s advantages could be short-lived, however, as IBM maintains its long-standing reputation and upgrades its PCs. While Apple split its family tree with the Mac, IBM has kept its PC family together and compatible. IBM also has the advantage of an immense array of software, hardware accessories, networks, and links between mainframe and personal computers. Most IBM accessories have been around for a while; their developers have already paid the price of pioneering. What people give up in creativity and originality when they opt for IBM, they make up for in stability.

Since the Macintosh is hampered by both its inchoate introduction and the IBM PC’s three-year head start, Apple has several battles to wage in the corporate market for both symbolic and strictly business reasons. While vying for the executive hand, some of Apple’s marketing tactics seem less than honorable. In the long run, harassment is not the way to win friends and influence people.

Apple may want to foster anti-IBM feelings through decisive advertising, but it’s a risky move. PC users are legion, particularly in the corporate world. They are already committed to IBM and are very satisfied with the PC. The ads showing frustrated users smashing IBM PCs because of repeated syntax errors were tasteless and surprisingly vindictive. The Macintosh has enough style; Apple shouldn’t have to stoop to petty name-calling. Even so, Apple doesn’t have enough security to protect itself from retaliation. Many people probably have similar frustrations with the Macin-
tosh's slow disk drives. IBM could counter Apple's attack very easily.

The merits of derisive advertising are questionable. If Apple continues to irritate IBM with its ads, IBM might eventually sink another few million dollars into their research and development budget to initiate the Mac's replacement. Since IBM's R&D budget is greater than Apple's gross revenues, the challengers in Silicon Valley are playing with fire.

Apple has everything it needs to share success in the business market with IBM without resorting to tacky advertising. The keys lie in the development of better Macintoshes and more application software. The Mac is an amazing computer; with a few changes it could be excellent.

For instance, the Mac's hard disk configuration moves data through a serial, instead of parallel, port, which slows down data transfer considerably. Since speed is a primary advantage of a hard disk, the Mac doesn't rate well in this regard. The recent jump to 512K from 128K was important but took too long. Annual upgrades in memory are not going to be sufficient in this industry. The Mac also needs to be able to run several applications concurrently. Finally, the machine needs its first great program to give it the notoriety that VisiCalc gave the Apple II and 1-2-3 gave the IBM PC. Developing these attributes would give the Mac far more charm than a derogatory advertising campaign.

In many ways Apple is simply recasting the Lisa with the Mac, giving a good idea and a good machine a second chance. And if the company can continue to romance the market, the Mac will survive. Although the Macintosh is not fated for the Fortune 1000, it will be popular among smaller businesses, professionals, and students. All in all, that's not a bad following.
Oh my gosh, look what's new for your Macintosh!

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Run for the Money™ by Tom Snyder. Learn to pursue profits in the real world as you escape from an alien planet. Based on economic models prepared by an MIT economist, teenagers learn and experiment with this fast-paced game that encourages sound business thinking. With graphics that look great on the Mac, lots of action, and a compelling scenario, Run for the Money is a game to be enjoyed again and again by youngsters or the whole family.

Make Millions™ by Tom Snyder. The adult business simulation game that tests entrepreneurial skills and strategies through "boom and bust." Make Millions gives aspiring capitalists all of today's management tools: stock quotations, market research, spreadsheets, database and consulting services. And, to create variety, you can "mouse your Mac" into different environments while you wheel and deal. Play Make Millions. See if you have what it takes to be a tycoon and make millions.

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   B. ENTERTAINMENT: Applications that entertain. This category will include video games and simulations.
   C. EDUCATION: Applications that teach. This category will include educational software aimed at all ages.
   D. UTILITIES: Applications that make it easier to develop or maintain systems.

2) Your program must be written in Microsoft BASIC for the Macintosh. You may use any version of Microsoft BASIC you wish.

3) All programs submitted must be the original work of the author(s), and must be placed in the public domain. Neither the author nor Microsoft will claim copyright or any other rights.

4) Programs may not have been previously published anywhere. *Macworld* magazine will publish the winning programs. Authors may submit programs to other publications after the conclusion of the contest.

5) All entries must be submitted on disk. Entries must include documentation (when necessary) and must indicate which contest category you are entering (education, recreation, productivity or utility).

6) Your entry must include the following materials:
   1) Disk containing the program you wish to enter,
   2) Your name, address, and phone number,
   3) The documentation for the program (if needed),
   4) An indication of which category you wish to enter. Please include this both on the outside of your envelope and inside with your name and address.

Send these materials to: MICROSOFT BASIC PROGRAMMING CONTEST, P.O. Box 82243, St. Paul, MN 55182. Entries must be postmarked no later than June 30, 1985 and received no later than July 7, 1985.

7) Entries will be judged by an independent group of judges selected by *Macworld* and Microsoft. Entries will be judged on the following criteria:
   70 percent for creativity, i.e. definition originality, implementation originality and use of Mac features.
   30 percent for implementation, i.e. programming elegance and bug free.
   Limit one prize per person or household per category. All prizes will be awarded.

8) There will be a First, Second and Third prize awarded in each category, along with a Grand Prize for the best overall program submitted. The prizes for each category are:
   First—512K RAM upgrade and 4 Microsoft packages.
   Second—Your choice of one of the following: external disk drive or a printer or a modem and 4 Microsoft packages.
   Third—Mac carrying case and 4 Microsoft packages.
   The Grand Prize is—Corvus 1MB hard disk drive.

9) A list of the major prize winners is available by sending a stamped, self-addressed envelope to:
   MICROSOFT BASIC PROGRAMMING CONTEST WINNERS LIST, P.O. Box 82217, St. Paul, MN 55182
   Requests must be received by July 7, 1985. Do not send entries to this address.

10) All entries become the property of Microsoft and none will be returned. Winners will be notified by mail on or about August 30, 1985. There will be no substitution of prizes. Any taxes on prizes shall be the sole responsibility of the winners. Microsoft reserves the right to secure a certificate of eligibility from winning entrants.

11) Miscellaneous: No special form needed to enter. Enter as often as you wish, but each entry must be mailed separately. Disks will not be returned. Decision of the judges is final. Contest open to all residents of the USA except employees of Microsoft and *Macworld*, their affiliated companies and agencies and Carlson Marketing Group. Contest void wherever prohibited or restricted by law.
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Macs Are for Kids Too

Why should Macintosh computing be one of life's deferred pleasures?

The other day I was sitting in a computer store amusing myself with some of the long-awaited Mac software when a woman walked in with her daughter and announced she was interested in buying a first computer for her family. For the next few moments the salesclerk sized up the family (and the family pocketbook) and asked a few critical questions in order to lead the family to one or another of the computer carrels in the store. Was this to be an IBM or an Apple II family? Or would the family be more likely to settle on an Atari or a Commodore?

The clerk began with some obvious questions. "Do you have any particular computer in mind? Do your children have computers at school?" The answers to both questions were negative, but the mother added with some conviction that she would like to look at the Macintosh because she had heard it was the newest thing.

"Well, it does have new technology," replied the clerk, "but it's really a business computer. If you want a computer for kids, then the Mac is out. I think you might be interested in the Apple IIe or perhaps the IIc." The mother looked a little disappointed but dutifully followed the clerk over to the Apple IIe, where a colorful game was running ad infinitum. "This computer," the salesman announced proudly, "will meet all your family needs. It runs lots of educational software as well as games, and you can program it, too. Besides, it has color and costs much less than the Macintosh."

"The Mac is newer," he conceded, "but Apple has committed itself to maintaining the II series as the computer of choice for schools. After all, there are already thousands of programs for the Apple II."

Pity, I thought to myself as I opened MacPaint to take a look at a new clip art disk. I had yet to meet a child who didn't fall in love with the Macintosh, and this family was not going to be given a chance. I considered inviting the child over to play with MacPaint while the mother looked at the IIe but decided I wanted to preserve my welcome in the store. Eventually mother and daughter left, promising to come back on Saturday with Dad for the final decision. I wondered whether they would have gotten to see the Mac if Dad had been along on this trip. After all, the clerk might have thought that the father would have an appropriate business use for it. No, I decided, in that case they would have been steered to the IBM PC.

I didn't feel I could really blame the clerk for his advice that the Macintosh is primarily a business computer; it's been promoted that way all along. You don't find the likes of Charlie Chaplin cavorting in Macintosh ads. Ironically the Mac is being recommended for business because it's easy to use but not for school or home, where a computer's ease of use would be appreciated as much as in business if not more so. Isn't the whole idea behind the mouse and the pull-down menus to make the Mac more accessible to beginners than a computer with lists of commit-to-memory commands? Why indeed should adults and college students get to celebrate the virtues of the "fun" computer and leave kids with the "kid stuff"?

It seems as if Apple is carefully ignoring the potential of the Macintosh for education, and more the pity. Some adults may not mind that a machine as exciting and easy to use as the Macintosh is not being made available to kids. After all, there are supposed to be deferred pleasures in life, such as staying up late or not having to do homework. As a teacher, however, I'm disturbed that such a marvelous tool is being kept out of the classroom.

A few computer experts argue that good reasons exist for keeping Macs out of schools. They contend that the Mac is too expensive compared to the competition, that the computer has a capability that goes beyond what children need, and that kids fail to appreciate it in the absence of color and fancy games.

Some store owners and Apple marketing personnel argue that so far they have been unable to meet the adult demand for the Macintosh and are waiting for the interest in it to "trickle down" from the heavily subsidized college market. A third group insists that the Mac is too easy and that children who play with the Mac fail to appreciate how a computer works because so much of the computing process is sealed from view. Are these the same people who still argue for learning to drive a stick shift or beating egg whites by hand?

There is certainly some truth to all of these arguments, though I think they miss the point. A black-and-white screen may be a drawback for particular applications, but it is largely offset by the high resolution of Macintosh graphics. The waiting list for Macs, a reality last spring, is no longer a serious problem as the automated plant churns out more and more machines by the hour.
The argument that the Mac is too easy is more subtle. I was told by a friend who developed programs for an earlier generation of computers that the Macintosh really isn't a computer in the traditional sense because you can't get inside it, switch the interface boards around, or otherwise interact with the hardware. As he reminisced about the "golden days of the 1970s" when a personal computer could only be assembled from a kit, I was reminded of the admonitions I heard in my childhood against using a ski tow instead of climbing the hill to get the exercise.

For naught I tried to explain how to many people (myself included) getting inside a computer seems even less attractive than overhauling a car engine and that children would better appreciate taking a computer (or a car) apart after they have had the fun of being in the driver's seat.

As an educator I want to see the best possible equipment in schools. I want to see that kids in every way while they learn, not so they can be lazy but so they can learn more and feel greater success as they go along. I believe that the Mac has tremendous potential in the teaching and learning process as a way to build confidence and enhance creativity.

It would be absurd for schools to dump perfectly good Apple II equipment in an attempt to keep up with the ever-evolving state of the art. As long as the Apple II and its programs serve educational purposes, they should be valued and maintained in the schools. But the fact that a school has already invested in an Apple II orchard is no reason to ignore the possibility of planting some Macintoshes as well.

While I don't usually subscribe to the conspiratorial view of history, I believe that Apple has been purposefully recalcitrant about promoting the educational value of the Mac for young students. The company's marketing strategy may stem from the fear that the Mac might get a reputation as a kid's computer because it is so embarrassingly easy to use. Of greater concern to Apple must be the dilemma of competing against itself in a market that it has dominated for the last five years. The Apple II series is by far the dominant computer in schools; any suggestion that the Apple II is not forever might water down its market by scaring school districts into questioning computer purchases or delaying decisions.

But with or without Apple's blessing, I am convinced that the marvelous qualities of the Mac—the mouse, the menus, the large type sizes, the magnificent graphics capabilities—make it a natural for young students. In time, either Macintoshes or the inevitable Mac compatibles are going to find their rightful place in schools.

Neale McGoldrick is the author of Applications for MacPaint, forthcoming from Addison-Wesley.
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The Universal Printer Stand, for the Apple* Imagewriter*, also fits most other dot matrix printers. It raises your printer 1½” from the desk at the front and 4½” at the back, an angle that allows you to monitor your printer's performance more easily. By raising your printer a few inches from the desk, the Universal Printer Stand solves the problem of where to store your paper. Several hundred sheets are accommodated neatly underneath.

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Greek Roots
I read "The Macintosh Family Tree" [Macworld, November 1984] with great interest. It appears to me that Ted Nace did not go back far enough in tracing the ancestry of the Mac's user interface. The Mac's genealogy does not begin with PARC, ARPA, or even the idea of a "memex." Icons, overlapping windows, and the desktop metaphor as ways of intuitively organizing information are not just 20 years old but in some respects more than 20 centuries old. We've been wrestling with the best way to deal with small computers, both natural (the brain) and now artificial (the personal computer), since we began to think.

To take one example, memory was in the past considered an art to be learned much as one learns computer literacy today. Cicero reported that Simonides "inferred that persons desiring to train (memory) must select places and formal images of the things they wish to remember and store those images in the places, so that the order of the places will preserve the order of the things, and the images of the things will denote the things themselves, and we shall employ the places and images respectively as a wax tablet and the letters written on it."

Simonides' technique for a "user interface" between memory and intelligence was used through classical antiquity and the Middle Ages. It died out only when the printed book reduced the need for mnemonic athleticism. How ironic that the Mac's advanced form of memory manipulation, which has been rightfully hailed as opening the doors of computing to the average person, is really nothing more than an updated version of an ancient rhetorical device.

Leland Gallup
Panama City, Panama

Reward to Those Who Didn't Wait
How far we've come in a few short months. The Macintosh is an unqualified success. You can even buy software.

Who made the Mac a success? There is the brilliant team in Cupertino. I trust Apple has rewarded it. Then there are the advertising and marketing people who, of course, are always taken care of.

But there's another, very important group that Apple has ignored: those of us who bought the first Macs. We took a big chance paying full price for this funny-looking machine with no software available. We took it home and showed it to our friends. I can claim personal responsibility for selling eight Macs.

Don't get me wrong. I'm glad I bought the Mac when I did. But I had to wince when I convinced my employer to buy a Mac for the office six months after I bought mine for $1000 more. Now comes the long-awaited Fat Mac. In a few months I'll be selling for as much as we paid for the first Macs.

Had I waited, I would have been well rewarded. Had everyone waited, however, the Mac would have been a big flop.

Here's my idea: In recognition of our contribution to the Mac's success, Apple Computer should offer a free or generously discounted 512K upgrade to those who bought a Macintosh before, say, March 20, 1984. Apple took a big risk with the Mac and won. We took a big risk, too, but as things stand, we would have been smarter to wait.

How about it, Apple?
Kurt Wanfried
Newville, Pennsylvania

What Price Upgrade?
In "The Macintosh Deluxe" [Macworld, November 1984], Danny Goodman states categorically that there is no price difference between the upgraded and the 512K Mac that comes from the factory. Not so. A dealer upgrade involves replacing the original 128K logic board with a 512K model. The dealer receives a $300 core rebate for each 128K logic board returned to Apple. Why is this not reflected in the $1000 swap at the consumer level? Technicians to change boards and run a diagnostic is certainly not worth $300. Actual dealer cost for the 512K board from Apple is probably in the area of $500. Is the real "Two-Model Strategy" to rip off current Macintosh owners?
G. Norton
Walnut, California

Randy Battat, Macintosh product manager at Apple Computer, tells us that the amount given to dealers for each 128K board they return is not a rebate but rather the dealer's profit margin on the 512K board it purchased for the upgrade. The amount is withheld, in effect, to encourage the return of the used board. Apple wants the 128K boards back to use as service spares.—Ed.
Letters

Mac Attack
I read David Bunnell's column ["The Macintosh Is Here to Stay," Macworld, December 1984] and feel that you have swept a number of important issues under the rug concerning the Macintosh. Let's cut the fat and get down to the beef.

Apple Computer has always stated that it developed the Macintosh as a business machine. One wonders how Apple ever expected the Mac to be a business computer, given some of the design limitations. A business computer must have a hard disk capability, period. Big Blue found this out the hard way and had to rewrite its DOS to allow the efficient use of a hard disk. As the Mac is, any hard disk has to move data through a serial port. In order to maximize data transfer rates, a parallel port is required. No matter how fast a serial port is, a parallel one is faster. Present Macintosh hardware and software do not support hard disks efficiently. The sad fact is that Apple has designed the Mac with planned obsolescence.

After reading the reviews of the Tecmar, Davong, and Corvus hard disks, I have decided not to buy a hard disk. I would prefer a 256K Mac with a hard disk that is user-friendly to the 512K Fat Mac that isn't. I shouldn't need to boot my hard disk with a floppy; the system should boot directly from the hard disk.
Apple has failed to give Macintosh owners any sort of documentation on the machine. Where does the ROM lie in the memory map? What routines are in it? Where does the Mac store its system variables? What is in the System folder? How do you program the beast? I don't want to hear any rebuttal about how it's not a hacker's machine. If that is really the case, the Macintosh should accept only cartridge software, à la Atari. The point is, after paying $2750 for the computer, why should I have to pay $150 for a photocopy of its memory map or pay $500 to become a "certified developer"? The machine is mine, not Apple's. I want to be able to control it.

I don't like having to pay $200 to get a language for the machine, yet Macworld has yet to drag Apple publicly over the coals on this point. I can program my $49 Timex Sinclair 1000 as is, a feat that my Macintosh cannot match. If Apple can give us MacWrite and MacPaint, why can't it give us BASIC?

The Macintosh is slow. When you print a MacWrite document, the Macintosh saves the document to disk first. Why can't it simply start dumping the print data to the printer from the memory? If you use the draft mode, the printer flies, but the output looks like junk, not a draft.

Please don't think that I am anti-Macintosh. I bought one in June 1984. I love my Mac and have no regrets about buying it, but I also recognize its limitations. Apple needs to get off its high horse and listen to its customers, or it will not survive the next 15 years.

Anthony J. Oresteen
Fort Knox, Kentucky

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Why pay more for a Mac carrying case than you have to? Get all the features and utility of cases costing much more. Our Carrying Case is priced at just $59 and includes a one year warranty.

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Questions

- Where does the ROM lie in the memory map?
- What routines are in it?
- Where does the Mac store its system variables?
- What is in the System folder?
- How do you program the beast?

- If Apple can give us MacWrite and MacPaint, why can't it give us BASIC?
- The Macintosh is slow. When you print a MacWrite document, why can't it simply start dumping the print data to the printer from the memory?
- Please don't think that I am anti-Macintosh. I love my Mac and have no regrets about buying it, but I also recognize its limitations.

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Letters

Second Thoughts on Second Drives
I've been reading your magazine since its first issue, and until recently I've been very pleased. The article about Apple's external disk drive ("Double-Disk Strategies", Macworld, November 1984) was very annoying.

Daniel Farber states, "If you're tired of juggling disks, adding an external disk drive is a practical, economical way to manage your information."

I take issue with this remark on several counts. First, there is nothing economical about a $500 disk drive that stores only 400K of information. At work we use IBM PCs extensively, and we have no difficulty buying a disk drive that holds nearly as much information for about $200.

Second, the disks are as overpriced as the drives. They do not hold much more than 5½-inch floppy disks yet cost almost twice as much.

Third, Mac owners are paying for new technology. This would not be objectionable if premium prices bought premium performance. Do Macintosh disk drives deliver such performance?

Mr. Farber reports that between 50 and 60 percent of Mac owners are buying the external disk drive. He takes those figures as an indication that consumers regard the disk drive as worth its cost. But those figures might as well imply that the internal disk drive is not sufficient to run Mac software.

Aren't consumers, then, coerced into buying an Apple external disk drive? (There are no third-party vendors.)

Apple leaves us with three choices: suffer through eight disk swaps when we start up applications lacking the operating system, buy an Apple external disk drive, or throw away the Mac altogether.

Robert P. Goldman
New Haven, Connecticut

Ready for Takeoff
Is anyone working on a version of Microsoft’s Flight Simulator for the Macintosh? It seems that the Mac’s screen would produce a great simulator, though I can see how the lack of color would discourage software companies.

Daryl P. Friedman
Santa Cruz, California

At press time Marty Taucher, public relations manager at Microsoft, said that there were no plans to introduce a Macintosh version of Flight Simulator, Microsoft's best-selling game, in the near future - Ed.

Font Utility Overdue
The versatility of the Mac in font adaptation is well established. It is disappointing, however, that the promised utility to design one's own fonts for use with the Font Mover (as opposed to the unfriendly reprogrammability feature of the Imagewriter) has not been made available. As evidenced by the proliferation of font software, there seems to be some sort of conspiracy between Apple and these software outfits to withhold this capability from the rest of us. This forces us to buy expensive font packages that include fonts we may not need or to negotiate for costly custom fonts. What is the prospect of Apple releasing a friendly font generation utility for the Mac in the near future?

We read your magazine from cover to cover and find most of the information quite useful.

Nissan Graham-Mayk
Eatontown, New Jersey

According to Randy Battat, Macintosh product manager at Apple Computer, a font utility that allows you to design your own fonts is already
available from Apple as part of a Macintosh software supplement. The supplement consists of various programs and accompanying manuals and is not restricted to certified software developers. To receive the supplement, send $100 (plus sales tax in California) to Apple Computer, Macintosh Software Supplement, 467 Saratoga Ave. #621, San Jose, CA 95129. Mr. Battat also says that another font utility, easier to use than the one included in the supplement, is under development and scheduled for release late this year.—Ed.

Master-Slave Relationship
I found Daniel Farber's "Double-Disk Strategies" [Macworld, November 1984] informative and well written. I have had my external drive for about a month now, and I am extremely happy with my purchase. I have changed my entire operating method to maximize the efficiency in working with two drives. Mr. Farber has given me additional insights into other methods I intend to try.

One statement in his article is misleading. He indicates that when using copies of copy-protected applications, you have to insert the master disk only once during a work session unless you turn off the computer. I recently explored a demonstration copy of Filevision and found a dramatic difference between its copy-protection scheme and Multiplan's.

When I use a copy of Multiplan, I insert the master once when starting up the application. I then have free to switch back and forth between that application and the copies of MacWrite and MacPaint that I have included on the same disk. I never have to insert the master again unless I turn off the computer.

On the other hand, when I quit Filevision, I had to insert the master each time I tried to restart it, even if I had not turned off the computer. In fact, I wasn't even offered the choice of canceling. This turned out to be a critical deficiency, coupled with the fact that Filevision has no Save As option. Each time I created a new document, I was required to save it to the same disk.

Since Filevision consumes 159K of disk space, I had to quit and move the new document to a data disk to allow room for new documents. Of course, I had to insert the master each and every time I went through this tiresome process.

With the exception of those difficulties, Filevision was easier to use than I ever dreamed. I look forward to purchasing a copy once those significant bugs are worked out.

Mitch Cooper
Topeka, Kansas

Correction
In "Mac on the Audit Trail" (Macworld, February 1985), Brad Boaz and Debra Frank of Peat Marwick's Tampa, Florida, office were incorrectly identified as supervising manager and managing auditor, respectively. Actually, Mr. Boaz is a supervising senior, and Ms. Frank is a senior accountant. Our apologies for any confusion that may have resulted.

Letters should be mailed to Letters, Macworld, 555 De Haro St., San Francisco, CA 94107, or sent electronically to CompuServe 74055,412 or The Source STE908.
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None of this is meant to imply that the legendary love affair between mouse and man is over. Rather, we've created yet another exciting way to enhance the Macintosh's remarkable performance. And dramatically improve yours.

Apple's Macintosh, "the computer for the rest of us," is probably the most advanced and easiest to use computer on earth. But until now, Mac couldn't be taken seriously for word processing. Enter Microsoft Word for the Macintosh. Mac's professional word processing program.

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Calling All Programmers

Microsoft has announced a programming contest as a way to kick off the release of its new BASIC for the Macintosh. Grand prize will be a 10-megabyte hard disk from Corvus Systems. Winners in each of the four software categories (productivity, entertainment, education, and utilities) will receive a 512K upgrade, and the four second-place winners will get their choice of an external drive, a printer, or a modem.

Microsoft wants to use the contest as a way to show off the capabilities of its Macintosh BASIC to programmers. All submissions will go into the public domain, and many of the programs that the contest brings in will be sent to user groups and published on bulletin boards or in Macworld. Of course, Microsoft is also hoping that the contest programs will lay the foundations for a library that will help the company’s BASIC for the Mac circumvent the Catch-22 that faces all new languages: developers are reluctant to write applications in a language that no one uses, but no one uses the language because no applications are written in it.

Because the submissions will go into the public domain, it’s unlikely that professional programmers will compete. However, Rob Dickerson, Macintosh product manager for languages, says he expects the chance for publicity and prizes to attract a wide variety of serious Macintosh programmers—“everyone from 14-year-old kids to some very good hackers.” Dickerson notes that “a lot more people are creative than are programming wizards, and we’re trying to get creative people to enter this contest.”
In line with this goal, the judges, who will include Macworld editors as well as Microsoft representatives, will emphasize originality (70 percent) over implementation (30 percent). They will consider more how creatively the programmer has used the Mac’s special capabilities than how bug-free or efficient the code is. Look for Microsoft’s announcement in this issue.—Joe Matazzoni

Sleight of Hand

Until now art directors preparing multimedia presentations for their companies had no way to determine at an early production stage whether the presentations would achieve artistic and corporate goals. Dudley Ackerman, consultant to Automation, an animation production company located in San Francisco, and its founder Andy Fahrenwald have invented an interesting solution. They have designed electronics and software for the Macintosh that will give art directors a clear idea of what their final product will look like. Automation’s simulation system includes a camera that digitizes images onto a Mac disk. An art director uses a three-axis joystick to manipulate the digitized images and simulate camera movements. Once the information is stored on disk, the performance can be repeated and edited easily. When the art director has finished the multimedia show simulation, the disk is sent to Automation along with the original artwork and sound track. The information on disk is relayed via microprocessors to cameras that replicate the sequence of camera movements over the artwork.

Ackerman believes that a portable robotic animation system will significantly alter current film and video production methods. Fahrenwald says, “What we’re doing is breaking the mold. We’re filmmakers and electronics people. When we’re done, scripting, producing, and editing an audiovisual production in any medium will be done in one sitting.”

For the Mac owner who wants to create a slide show that does not require high production quality, Slide Show Magician, released by Magnum Software, is available. Special effects options can be used on any text or graphics that you can display on the Mac screen. The visual effects include barn door, checkerboard, window shade, venetian blind, iris, and arrowhead wipes. Text can be superimposed and displayed as a block or word by word. The designer can set the timing of each frame, interrupt a frame, or jump to another frame.

The introduction of both these products and services further strengthens the Mac’s position as a tool in the production of computer-generated audiovisual presentations.
Hot List

Macintosh products have hit the charts. Softsel Computer Products, a software distributor in Inglewood, California, compiles a Hot List from its sales to approximately 9000 retail outlets located in the United States and abroad. Over a sample period of three weeks, the company tracks the sales and reorder rates on the software it distributes. Softsel categorizes each program under headings such as business, recreation, and education. The program's position on the chart relative to other programs is determined from its total sales for all personal computers on which it runs. Programs that are slipping from the charts, such as Murder by the Dozen, often bounce back onto the Hot List when Mac versions are released. Bob Leff, president of Softsel, states that at first Mac software was so scarce that almost any Mac product could be expected to sell well, but the phenomenal sales figures will not continue through 1985. He does expect that software such as Peachtree's General Ledger package and Lotus's Jazz for the Mac will bring more business customers into retail stores.

With the release of the 512K Mac, it is likely that more software developers will design integrated programs. Many products that run on other personal computers and were converted for the Mac in 1984 will be modified to take better advantage of the Mac's user interface and hardware such as the laser printer. We should see more specialized programs, such as music and sound-generating programs, and vertical applications for professionals. Applications that integrate the Mac's sound, graphics, and networking capabilities may require Softsel to invent new categories for the Hot List.

A Contest of a Different Color

While the Microsoft contest favors people with creativity and practical computer skills, another contest, sponsored by MacConnection, a Macintosh product mail-order house, is being aimed at what is probably a much larger constituency within the Mac community: people who are creative but who lack practical computer skills.

The MacConnection contest was spawned by an experience that usually inspires only frustration—a telephone company screw-up. MacConnection placed an ad for themselves listing a phone number that wasn't hooked up by the time the ad ran. According to partner David Hall, the complaints that came in weren't what the company expected. "We started getting letters asking, 'Hey, where are you guys?' The letters didn't sound mad; they were interesting. They were written on the Macintosh, had graphics, and showed a lot of wit." The company's managers decided that Mac owners are a different breed of computerist—odder than the owners of other computers, according to advertising coordinator Kate McVey—and the managers dreamed up this contest to test that theory.

The contest announcement begins with the headline "We'd like to think you're a little strange" and goes on to offer $500 worth of hardware and software for strange-but-true Mac stories. These tales of Mac magic or misadventure will be used in a series of "Real People"-style ads that MacConnection is planning. The stories can be on any subject—"Has your Mac ever saved your life? Did you canoe solo down the Amazon with only a

Libraries and Computer Literacy

What better place for adults to overcome a resistance to computers than a library? After all, not everyone has a 13-year-old computer expert available to teach them all about personal computers. Now that computer literacy is as important as the three Rs, many adults can go to their local library and get acquainted with computers in a familiar setting.

Library programs for familiarizing adults with computers are coordinated in California by the Adult Computer Literacy Program, funded by the California State Library. A variety of personal computers is already in use throughout the state. One library where the Macintosh will be used is the Pinole Branch Library of the Contra Costa County Library. Only adults will be able to reserve the computer and the several...
available programs, some of which were donated by Macintosh software developers. The library will also be collecting public domain software. One of the branch librarians, Steve Cisler, will be on hand to help people get started.

Nationwide, the Microcomputer User's Database, a project of the Public Library Association of the American Library Association, has 300 members. The project is intended to help people form or join personal computer user groups. Its main effort is to identify the areas of expertise of each member so that members can exchange skills. The group has nationwide meetings and communicates updates to its database. No membership fee is required, but send a stamped, self-addressed envelope when asking for information and an application. Write to Carol Liu, Queens Borough Public Library, 89-11 Merrick Blvd., Jamaica, NY 11432.

Students at Drexel University in Philadelphia can reach the library by modem. They receive training from the university librarian and have access to public databases. In a Livermore, California, library the Macintosh is being used by the public for information and referral services. Perhaps in the future all personal computer owners will use library information and referral services from home. They will go to the library only for books and, of course, computer training.

An interesting sidelight to Macintoshes and adult computer literacy was reported by David Swain, a computer consultant and trainer in Alameda, California. He is frequently called on to train workers who have no computer experience. These people use IBM PCs and other types of personal computers at work, and when they have problems, they are trained by David on a Macintosh. He reports that Macintoshes are less threatening, easier to use, and more fun to play with than other computers. The Mac helps people feel comfortable with computers in general. After learning applications on the Macintosh, people can then move on to try other machines. The question is, will they want to?--Heidi Mitchell

**Softcasting**

Radio Free Software? Well, not quite. For $70 you should now be able to buy a device called a shuttle communicator (it was in beta test at press time) that attaches to an FM or AM radio receiver and lets you download software to the Macintosh and other personal computers. The communicator was designed by Micro peripheral Corporation to accommodate a radio show the company is producing. Tentatively titled "Download," the weekly, half-hour show will broadcast public domain computer programs along with computer news and information.

Micro peripheral will be the first company to take advantage of a recent FCC ruling allowing the use of normal AM and FM airwaves for computer communications. Previously, banks and other institutions that used radio for computer communications transmitted over FM subcarrier channels that can't be picked up by ordinary radios. Other software distribution schemes in the works, such as that of Electronic Publishing Systems of Sunnyvale, California, will also use subcarrier channels. These software distribution systems are similar to public television in that they will be supported by subscribers, who in this case will be charged a fee. "Download," on the other hand, will be paid for by the show's sponsors.

The shuttle communicator works like a modem, translating analog radio signals into the digital form required by the computer. Because it receives information at a rapid 4800 bps (bits per second), radio stations can transmit a program in a burst lasting only seconds. According to Don Stoner, Micro peripheral's vice president of engineering, the error rate on FM channels is comparable to phone line communications at 300 bps; AM error rates have been less satisfactory. Of course, since communication is in one direction only, there's no opportunity to retransmit garbled data. However, each program uses a checksum system (in which the computer compares the number of bytes a program is supposed to have with the number actually received), so you can at least get some idea of whether the program was received intact before you run it.

According to Stoner, the show's producers intend to include the Macintosh audience. Micro peripheral has already experimented with downloading Mac graphics, and in a move resembling videotex applications, the company is looking at the possibility of using the Mac's high-resolution screen to display such things as weather maps that Mac owners could study while listening to the weather report. For more information, contact the Micro peripheral Corporation at 265 152nd Ave. NE, Redmond, WA 98052, 206/881-7544. --Joe Matazzoni
With Odesta Helix, you can model worlds of ideas, things, and relationships, and watch them live and interact upon your desktop. Odesta Helix is a new program—not an old program made to work on a new machine. It takes a new approach—letting you define and control the shape and form of information according to your own needs and style. Odesta Helix gives you a rich and powerful set of visual tools that let you begin working immediately, without having to learn a programming language or battle with the restrictions of "spreadsheet" type thinking.

Odesta Helix uses icons (visual symbols) to represent ideas, relationships and functions as objects that you can easily manipulate. Create them by clicking on the icon-wells on the left, and dragging them to your desktop. Each opens to reveal deeper and deeper operations and values that may be invoked and shaped with the click of a mouse button.
Visual building blocks let you set up even the most complicated statement or calculation and use it whenever you want to. Drag tiles out from the list at the left. Drop icons into the tile holes, or type in numbers or text. Connect the tiles by pulling arrows around. This whole calculation is represented by a single abacus icon that may be used on any form, and you may make up as many as you feel like.

Here is a form-view being used in conjunction with an interactive search form (query icon titled "Castles < 1860"). One aspect of the radically innovative design of Odesta Helix is that you can enter, query, edit, and print information all from one window – without having to shift from one mode or application to another. Another reflection of this dynamic design is that if you make a change in one window, you see the result pop-up in any open related window.
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MegaMerge

MegaMerge is the mail merge program of MacWrite! With MegaMerge, you can use MacWrite to create form letters, print mailing labels and more. You can even overcome MacWrite's limited document size by "chaining" several documents together and printing them as one long document!

MegaFiler

If you do any filing at all in your home or office, you NEED MegaFiler! It's the file management system for the Macintosh that lets you file and retrieve information with ease. You can store names, addresses or other information using MegaFiler's library of ready-made files for:
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- Customer Orders and Invoices
- Home Management
- Business Inventory
- Customer Files
- And much more!

You can also design your own files using MegaFinder's fun-to-use design file! You can also print lists, tables, mailing labels and MegaMerge mailing lists. You can even incorporate them into MacWrite and other Macintosh applications!

Here's what else MegaFiler can do:
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- Find forms based on any criteria you choose. For example, Find all the people who live in California whose names begin with "S" and own a Macintosh and print them in zip code order.
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- Order Forms
- Purchase Orders
- Expense Reports
- And much more!

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MegaDesk is something almost all of us can use. With MegaDesk, you get three desktop accessories...in other words, a program that you can run at the same time as other programs.

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Decking Out the Mac’s Desktop

Gordon McComb

No desktop, whether it’s made from the wood of an oak tree or the glow of an electron beam traveling through a cathode tube at the speed of light, is complete without accessories—handy gadgets that make work easier and more productive. On the Macintosh desktop, accessories include electronic versions of many items ordinarily found on a traditional desk, such as a calculator, notepaper, and a calendar.

With a Macintosh atop your desk you can clean up the clutter created by calendars, clocks, calculators, and even cockroaches. Like their real-world counterparts, the Mac’s desktop accessories take up space (usually from 3K to 5K) and can disappear beneath your current work.
Like any good desk tool, the Mac's accessories are always ready for work. Choose an accessory from the Apple menu, and it appears on the screen. What's more, you can have more than one desk accessory on screen at once, and they can be called up from within any Mac application program. As with other aspects of the Macintosh, such as fonts, you have some control over desk accessories. You can delete accessories you no longer need, giving you more storage space on your disks. Dozens of new desk accessories are available that you can add to your disks (see "Desk Accessory Sampler" for descriptions of new desk accessories and "Desk Accessory Catalog" for a list of products and manufacturers).

Inside Desk Accessories

The Macintosh's graphics capabilities and high-resolution screen are well suited to desk accessories. A desk accessory is basically a miniapplication that performs a simple function and can be run concurrently with an application such as MacWrite, Multiplan, or the Finder.

When you pull down the Apple menu and choose the Alarm Clock, for example, the clock appears on screen in its own window, which you can move around the screen like any other Mac window (see Figure 1). Closing the accessory right after you finish using it is good practice because every accessory on screen takes up valuable memory.

However, keeping an accessory on screen is often useful while you work with an application. You might want to use the Note Pad with Multiplan or the calculator with MacWrite, for example, while you enter a list of totals provided in a report (see Figure 2). Keep in mind that Mac desk accessories can be lost behind other windows, in the same way that real calculators, notepads, and scrapbooks can get lost under mounds of paper on a desk. The active window, the one you're currently working with, always becomes the topmost window. When you want accessories to remain in view while you work with an application, resize and relocate the windows on screen as necessary (see Figure 3).
With some applications, such as MacPaint, you must close the accessory before you can go back to work on your document. Other applications let you keep no more than one or two accessories open at one time.

The number of desk accessories you can have open at once depends on the amount of memory available. You know that you're trying to open too many accessories when you get the "not enough memory" alert box. You have to close one of the accessories displayed on screen before you can open another.

An Accessory's Habitat

All desk accessories are stored on disk, tucked within the Macintosh System file, which is usually found in the System Folder. Most of the desk accessories that appear in the Apple menu are from 3K to 5K in size. Some accessories are as large as 18K, however, which is less than 1/2 the size of a regular Macintosh application such as MacPaint. The compactness of desk accessories is dictated by the need to leave as much space as possible in memory and on disk for application programs and documents. For 128K Macs Apple programmers recommend that individual desk accessories take up 8K or less. Larger accessories may not work with some applications on a 128K Mac. For a 512K Mac the recommended maximum size is 32K.

In many ways the Macintosh works with desk accessories as it does with fonts. The Mac doesn't retrieve an accessory from disk until it's needed, which explains the short delay between the time you select an accessory and when it appears on screen. Like fonts, accessories can be removed from the System file or new ones added to suit your needs.

Juggling Desk Accessories

To the Macintosh, desk accessories are like manila folders, full of information and instructions. To call up a desk accessory, the Mac opens the folder, reads what's inside, and follows the instructions. Since each desk accessory is in its own folder, it can be easily removed from the System file as a discrete entity the way an entire folder can be removed from a filing cabinet.

Why would you want to delete the Mac's desk accessories? To free disk space. The seven desk accessories that come on most Mac disks—the Scrapbook, the Alarm Clock, the Note Pad, the Calculator, the Key Caps, the Control Panel, and the Puzzle—take up 17K on disk. When space is in short supply on your work disks, pruning desk accessories is a good way to start creating more space.

You need to use a special program to delete a desk accessory. A few available programs make deleting accessories a simple chore. The Resource Editor, a utility developed by Apple for program developers, is the easiest program to use for that purpose. Desk accessories, fonts, icons, dialogs, and other programs that make up the Macintosh environment are called System resources. The Resource Editor is designed to let you modify those resources even if you haven't any programming experience. Another benefit of the Re-

![Figure 1](image1)

The Apple menu contains desk accessories, which can be used from the desktop or within an application. Accessories provided on most Mac disks are shown in this figure.

![Figure 2](image2)

The Mac's desk accessories take advantage of the Mac's graphics capabilities and high-resolution display. You use them as you would their real-world counterparts.
Within the DRVR window are all the desk accessories contained in the System file. To delete an accessory, select it and choose the Clear command from the File menu (see Figure 5). Repeat the procedure for each accessory you want to remove.

The Resource Editor also allows you to rename desk accessories. First select the appropriate accessory name in the DRVR window. Then choose the Get Info command from the File menu to bring the information window on screen. Select the text within the Name box (it becomes highlighted) and enter the new name. Once you finish, choose the Save command from the File menu, close each window in turn, and choose the Quit command.

The Desk Accessory Mover

Another handy program for removing accessories is the Desk Accessory Mover from CE Software. This program is sold under the MacHon system, which allows you to try the program and send $15 to CE Software if you like it. In addition to deleting accessories, the Desk Accessory Mover lets you transfer accessories from one System file to another and add desk access-

(continued from page 50)

Figure 4

The Resource Editor allows you to delete or rename desk accessories. This Resource Editor selection window displays the names of the resources in the System file.

Figure 5

The DRVR resource includes all the desk accessories. To remove a desk accessory, you select the accessory and choose the Clear command.
Desk Accessory Sampler

The business of designing desk accessories has become a small cottage industry. Several types of desk accessories are available, including calendars, calculators, clocks, phone directories and dialers, terminal programs, music programs, and games. Most of the new desk accessories are more elaborate than the original set provided by Apple. They often combine several functions in one accessory. An integrated desk accessory might combine an appointment calendar with an alarm clock, a telephone dialer, and a calculator. See "Desk Accessory Catalog" for a list of products and manufacturers.

Executive Decision Maker
You can idle hours away with this unique game. Press the Think button, and the game gives you an answer. Some people insist that this desk accessory helps them make better decisions.

MacCalendar
MacCalendar from Videx lets you keep appointment notes for each day of the year. MacCalendar has its own alarm clock, which you can set to go off at a time months in the future.
Saw Hyperdrive at Comdex. Runs very quiet, backup software seems out, has parking zone for head, park. I looked at several Macs with Hyperdrive, they didn't seem to be giving off hang up than my stock 512k Mac even after all day long. I can't wait for MB in the same box.

***

MockTerminal

CE Software's MockTerminal lets you communicate with almost any computer if you have a modem attached to the Mac's communications port. MockTerminal acts as a semismart terminal emulator and provides downloading capability so you can permanently record data you receive.

System Bugs

The most bizarre accessory to date is the work of Clark Sloan at Apple. When you click the Bugs option, evil-looking cockroaches crawl up the screen. You can't get rid of the roaches once they've infested a Mac without turning the machine off. You can get the Bugs accessory with the Video QuickPak game or from CompuServe.

Financial Calculator

EnterSet's Deskset accessory includes a financial calculator, which resembles Hewlett-Packard's 12c hand-held calculator. The calculator has its own memory, performs financial functions, and allows you to chain up to 100 program steps.

Calendar

The Calendar desk accessory, designed by Mike Schuster, is available on CompuServe. It lets you store up to 13 lines of notes for any day of the month of any year. The Calendar takes up about 18K, so it doesn't always work well on a 128K Mac.
accessories to a System file. Always be sure to leave at least one accessory in the System file; otherwise, the System file gets corrupted. When a System file is corrupted, the Macintosh screen goes black and displays an unhappy Mac icon, or the Mac crashes as it starts up.

Like the Resource Editor, the Desk Accessory Mover lets you change the name of an accessory. Actually, being able to rename an accessory has limited usefulness unless you install two accessories with the same name. When the Mac encounters two accessories with the same name, it replaces the first accessory with the second one.

The Desk Accessory Mover and the Font Mover work similarly. Say you want to put an accessory such as MockTerminal, a terminal emulator desk accessory from CE Software, on your MacWrite disk. MockTerminal enables you to communicate with other computers without quitting the application you are using. The program also lets you capture the data from a telecomputing session and save it in a MacWrite or Microsoft Word document.

To install MockTerminal, place the Desk Accessory Mover and the MockTerminal file on a MacWrite disk. Double-click the MockTerminal document icon to start the Desk Accessory Mover. MockTerminal is preloaded into the Holding Area and is then ready to install. Select it, click the Install in System Section button, and the program handles the rest (see Figure 6). While you're at it, you can delete some accessories from the System file. Select the ones you don't want, and click the Delete button.

One useful feature of the Desk Accessory Mover is that it lets you save accessories that you take out of the System file. You can remove the saved accessories and place them on another disk for storage. Later you can reload accessories into the System file of any disk. Because of the way the program works, you can store any number of accessories as individual files or all in one file (see Figure 7).

Some Macintosh desk accessories come with their own installation utility program and don't require the Desk Accessory Mover. One such accessory is MacCalendar from Videx. To place MacCalendar on any disk, just start the Install program and follow the instructions. A few other accessories do away with installation programs and automatically load themselves into the System file.

Desk Accessory Management Tips

With such a variety of desk accessories available and limited disk space, you may have to create disks with desk accessories suited for particular applications. For example, you might want to put a financial calculator on the disks you use to track stocks or real estate holdings but not on your MacPaint disks. Think about how you use a particular disk's applications, such as word processing, data management, or graphics, and then decide which accessories fit best.

**Figure 6**

CE Software's Desk Accessory Mover does for desk accessories what Font Mover does for fonts: you can add, delete, and rename accessories quickly and easily.

**Figure 7**

The Desk Accessory Mover lets you store the accessories you take out of the System file. Any number can be tucked away in an accessories file.
Desk Accessory Catalog

Desk accessory products and their publishers are listed here. Check your dealer, user group, or information service such as CompuServe for up-to-date information.

- **CE Software**
  801 73rd St.
  Des Moines, IA 50312
  515/224-1995
  Desk Accessory Mover, RPN Calculator, Executive Decision Maker, FRP (Fantasy Role-Playing), Die Roller, Clock $15 for license fee, $20 for license fee and disk; MockTerminal, MockWrite, MockPrinter, and Desk Accessory Installer $25 for license fee, $30 for license fee and disk. Send a blank disk and a stamped, self-addressed envelope to CE Software.

- **Club Mac**
  735 Walnut
  Boulder, CO 80302
  303/449-5533
  Public domain library; call for disk distribution fees.

- **CompuServe Information Service**
  5000 Arlington Center Blvd.
  Columbus, OH 43220
  800/848-8199
  Calendar, Bugs, and Desk Accessory Mover (with CE Software accessories) can be downloaded from the MAUG database.

- **Creighton Development, Inc.**
  16 Hughes #C-100
  Irvine, CA 92714
  714/472-0488
  HomePak with Financial Calculator, Improved Alarm Clock, New Puzzle, Desk Accessories Editor $39 ($49 after March 1); MacOffice with Financial Calculator, Scientific Calculator, Calendar, Desk Accessories Editor $39 ($49 after March 1).

- **EnterSet**
  410 Townsend #408B
  San Francisco, CA 94107
  415/543-7644
  DeskSet $99.95.

- **Haba Systems, Inc.**
  15154 Stagg St.
  Van Nuys, CA 91405
  818/989-5822
  Window Dialer $49.95, Window Calendar $49.95, Quick Finder free with purchase of HabaDisk Drive.

- **Harvard Associates, Inc.**
  260 Beacon St.
  Somerville, MA 02143
  617/492-0660
  DeskToppers, including calendar, phone book, music maker, and sketchpad $49.95.

- **Macadam**
  4700 S.E. Macadam Ave.
  Portland, OR 97201
  800/547-4000 ext. 203
  WindoWare Phone Book $49, WindoWare Calendar $49.

- **Megabauss Corp.**
  5703 Oberlin Dr.
  San Diego, CA 92121
  800/358-8882, 800/451-1230
  in California
  MegaDesk (appointment book); call for price.

- **Videx, Inc.**
  1105 N.E. Circle Blvd.
  Corvallis, OR 97330
  503/758-0521
  MacCalendar $89, FunPak (includes Bugs, Magnifying Glass, RPN Calculator, Hex Calculator for programmers) $39.

- **Warner Software, Inc.**
  666 Fifth Ave.
  New York, NY 10103
  212/484-3070
  The Desk Organizer $149.
Nothing is particularly complex about juggling Macintosh desk accessories, but some tricks and suggestions might be helpful. Close all accessories before deleting them or adding new ones, or you could damage the System file. The possibility always exists when you delete or add accessories that the System file will become corrupted, rendering it useless. For this reason, make a backup of the System file before you add or subtract accessories, in case the computer loses power or you run into a software bug.

If you want to make the same desk accessory changes to several disks, you can alter one System file and copy the file to other disks. Copying the System file to another disk deletes the System file that exists on the destination disk. Make certain then that the replacement System file also contains the fonts used by the Mac; you'll lose any special fonts stored on your disks unless the replacement file contains those fonts.

If you delete either the Scrapbook or the Note Pad, remember to get rid of the Scrapbook and Note Pad files, which are usually located in the System Folder. Without their accompanying desk accessories, the files are useless and waste valuable disk space. If you reinstall either the Scrapbook or the Note Pad, the Mac automatically recreates the Scrapbook and Note Pad files the next time you use the accessory.

Since the Mac uses only the desk accessories residing on the startup disk, you can't easily toggle from one set of desk accessories to another. You can switch to a different set of accessories by turning the Mac off and then on again using a disk with another set of accessories in its System file. This technique, however, erases any information you may have temporarily stored in the Clipboard.

If you want to preserve the contents of the Clipboard, you can switch to a different set of desk accessories by ejecting the startup disk, inserting another disk in the drive, and starting an application to make the second disk the startup disk. You may need to juggle disks as the Mac transfers control from one System file to the other. With an external disk drive this procedure is easy. Insert the disk containing the alternate set of desk accessories in the second drive and open an application residing on that disk.

To switch to a disk that holds a different set of desk accessories without turning off the Mac or opening an application, you can use a shortcut. Insert the disk with the set of accessories you want and locate the Finder icon, which is usually in the System Folder. Hold down the Option and Esc keys and double-click the Finder icon. Once the word Finder appears at the top of the screen, let go of the Option and Esc keys. Keeping the keys depressed too long deletes any folders on the disk, which isn't disastrous but can still be annoying, since you have to remake them.

The Tower of Desk Accessories

If you wanted to have a lot of gadgets on your electronic desktop, you could create a disk that has only desk accessories on it. The Mac lets you load up to 18 accessories into the System file; the Apple menu can't display any more (see Figure 8). Most likely, you'll run out of disk space before you can cram 18 accessories into the System file.

If you choose to enhance your computing with Macintosh desk accessories, you'll probably come to rely on them. Whatever way you use the accessories, you'll undoubtedly find that filling your Mac desktop with calculators, calendars, note paper, or games gives you quick access to programs and removes the clutter from your real desk top.

Figure 8
You can fit up to 18 desk accessories into one System file. That limit is based on the number of slots for names in the Apple menu.

<table>
<thead>
<tr>
<th>About the Finder...</th>
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<tbody>
<tr>
<td>MockTerminal</td>
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<tr>
<td>FRP Die Roller</td>
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<tr>
<td>Hex Calculator</td>
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<tr>
<td>Calendar</td>
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<tr>
<td>System Bugs</td>
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<td>Magnifying Glass</td>
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<td>RPN Calc</td>
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<td>Clock</td>
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<td>Puzzle</td>
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<td>DeskSet</td>
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<td>Mac Calendar</td>
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<td>Music Maker</td>
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<tr>
<td>Executive Decision Maker</td>
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<td>Scrapbook</td>
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<td>Note Pad</td>
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<tr>
<td>Calculator</td>
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<tr>
<td>Control Panel</td>
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Macworld's tutor answers questions about using the Mac

A Game Language

Q. I am interested in developing professional-quality games for the Macintosh, both graphics-oriented combat games and text adventure games. Which programming language should I use?

Rana Pennington
Alexandria, Virginia

A. No language is ideal for programming computer games, but some considerations should influence your choice. First, the language must give you access to the Macintosh Toolbox, which lets you create pull-down menus and dialog boxes, as well as use the Mac's QuickDraw graphics routines. Some languages, such as Creative Solutions' MacFORTH, add graphics features beyond those provided in QuickDraw, such as rotation and scaling, that are valuable in graphics-oriented games.

If you intend to sell your finished masterpieces, you'll have to decide whether to require your customers to purchase the language in which the game is written or whether to make the game a stand-alone application, which requires no additional software to operate. The second approach will probably mean more sales, since prospective buyers will not have to buy a separate product just to use yours. This approach means that the language you choose must be able to produce stand-alone applications. Finally, remember that the producer of the language may charge you for the privilege of selling an application developed with it. The actual financial arrangements can vary from a royalty on every copy you sell to a flat licensing fee.

Stylish Heads

Q. When I set up a MacWrite header or footer, page numbers, dates, and times appear in whatever format the first text in the header or footer window appears. This makes it impossible, for example, to have a report title in bold and page numbers in plain text. Is it possible to change the style in which page number, date, and time text appear?

Maryellen Kelly
Pittsburgh, Pennsylvania

A. When you create a header or a footer containing page number, date, or time icons, MacWrite formats the page number, date, and time text in the same style as the first character that appears in the
Headers with Style (Before)

MacWrite formats page number, date, and time text in headers and footers in the same style as the first character in the header or footer window, which often leads to unexpected results. Here, the page number is bold and underlined even though the word Page is in plain text.

Headers with Style (After)

To work around MacWrite's formatting quirk, make the first character in the header or footer window a blank space, then change the style of the blank space.

Batch Files Wanted

Q. When I use the Macintosh applications, I like to have the Note Pad, Alarm Clock, and Calculator desk accessories open. I find it time-consuming and annoying, however, to have to open each desk accessory myself every time I start an application. The operating systems on computers like the IBM Personal Computer let you put repetitive command sequences in batch files. You can then execute an entire set of commands by simply typing the batch file's name. Is there any way to create similar files on the Mac?

Margaret Baker
Tiverton, Rhode Island

A. Unfortunately, there is no way to produce batch files with the current Macintosh Finder. Furthermore, batch file capabilities would be difficult to implement on the Mac, because the stored commands could not be typed but would be combinations of mouse movements and button clicks.

Printing Problems

Q. I've encountered a problem with MacWrite when I try to print large documents. If free space on the disk is insufficient to hold the printed copy, MacWrite displays either "Insufficient Disk Space, Delete Some Documents" or "Printer Error, Please Save and Try Again." If I follow MacWrite's message and try to save, it displays the first message again. The only way to get out of the loop seems to be to quit MacWrite and lose your document (or at least any changes made since the last successful save). Is there a way out of this loop? How can I tell how much disk space I need before I attempt to print a large document?

Bangs L. Tapscott
Salt Lake City, Utah

A. When you print a document with MacWrite, the program creates a picture file containing commands that tell QuickDraw, the Macintosh's built-in graphics procedures, how to re-create the document on paper (see "The ImageWriter and Beyond," Macworld, September/October 1984). The messages described above appear if there isn't...
enough space on an application
disk to store the picture file.
(You may also read the message,
"The disk is full. Please try
again.") The following steps
will help you get out of the
loop without losing your
document:

• Get rid of the error mes-
  sage by clicking the OK button.
• Choose Save As from the
  File menu.
• If you have an external disk
  drive, insert a disk in the drive.
  Make sure the disk's name ap-
  pears above the Eject button. If
  the name of the disk in the in-
  ternal drive appears, click the
  Drive button to switch to the
  external drive. Next, type a
  document name if your docu-
  ment is still untitled, then click
  Save.
• If you don't have an exter-
  nal drive, click the Eject button.
  Insert a different disk (one with
  some free space on it), type a
  document name if your docu-
  ment is still untitled, then click
  Save. You'll be asked to swap
  disks several times during the
  save process.
• To print your document,
  use a MacWrite disk that has
  enough free space on it to hold
  the picture file, using the
  guidelines below to estimate
  the space required.

MacWrite version 2.20 and
earlier versions require approxi-
imately 6K of free disk space
per page for pages that contain
only text. (Earlier versions have
version numbers smaller than
2.20; choose the About Mac-
Write command from the Apple
menu to see which version you
have.) A page containing simple
pictures requires about 8K of
free space, while a page con-
taining an extremely complex,
full-page picture can require
up to a whopping 32K of free
space.

To estimate how much disk
space you need, multiply the
number of pages in your docu-
ment by the approximate
amount of space required for
each page. A ten-page docu-
ment containing no pictures re-
quires approximately 60K of
free space to print (ten pages
times 6K per page).

For MacWrite versions be-
Yond 2.20, your job is some-
what easier because picture
files are created and printed
one page at a time; that is, a pic-
ture file for page 1 is created
and printed, then a picture file
for page 2 is created and
printed, and so on until your
entire document has been
printed. Ed Ruder, one of Mac-
Write's programmers, recom-
mands leaving about 40 to 50K
free on your MacWrite disk.
That way you'll have no trouble
printing even documents con-
taining complex pictures.

If you use an early version of
MacWrite on a 512K Mac, you
may encounter the full-disk
problem often, since the docu-
ments you create can be much
larger than on a 128K Mac. To
avoid the problem, print large
documents in pieces by choos-
ing Print from the File menu,
then typing beginning and
ending page numbers in the
Page Range boxes. A better so-
lution is to obtain the most re-
cent version of MacWrite from
your dealer.

Send your questions to Get
Info, Macworld, 555 De Haro
St., San Francisco, CA 94107.

Lon Poole is a Contributing
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### UTILITIES SOFTWARE

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<td>Novation, Smart Plus w/software</td>
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<td>Prometheus, ProModem 1200 w/phone</td>
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<td>Innovative, Flip-n-File, 40</td>
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<td>RX100-100 cps, 130 col, pin &amp; frict</td>
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<td>FX600-160 cps, 160 col</td>
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<td>Serial Interface Board</td>
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<td>1014-13 cs, para &amp; serial</td>
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Have you ever taken on a project—like building a redwood deck or painting the kitchen—only to discover, once you got underway, that the job became a chore rather than the pleasant pastime you had anticipated? A project that looks promising on paper, once realized, often fails to live up to your expectations.

A similar situation arises when you own a 512K Macintosh and add a RAM disk, which is specialized software designed to fulfill Mac owners’ dreams of zipping in and out of programs. A RAM disk helps you avoid waiting for a mechanical disk drive to turn as the computer stores and retrieves information. But when you use one awhile, as I did during a test of the *Mac Memory Disk* by Assimilation, you may find it doesn’t live up to your expectations.

Before I proceed, I want to make clear that my reservations are with RAM disks for the Macintosh in general and not with the Assimilation product, which is well designed. The problem is that the Macintosh System Folder takes up so much room that it seriously limits the usefulness of a RAM disk.
An Electronic Disk

For those who have not heard of RAM disks, a little background is in order. A RAM disk is a program that fools the computer into operating as if an extra disk drive were attached (see Figure 1). The extra disk, however, consists of part of the computer's random access memory that a RAM disk program formats to appear to the computer as an actual floppy disk. When the computer stores or retrieves information, instead of changing magnetic information on a floppy disk, a RAM disk reorganizes information in the computer's memory. Since a RAM disk uses electronic circuitry to store information, it is sometimes called an electronic disk.

A RAM disk speeds up work because information can be transferred many times faster electronically than mechanically, which is how any disk drive—hard or floppy—operates. No matter how much memory you set aside for a RAM disk, most programs running on the Macintosh require at least 128K of RAM. When you open an application from a RAM disk, the program still loads into available RAM, just as if it were opened from a floppy disk. A running program, therefore, is actually twice in memory—once on the RAM disk and once in active memory (see Figure 2).

Using a RAM disk requires more caution than using a floppy disk. Unlike the Mac's 3½-inch floppy disk, a RAM disk isn't a form of permanent information storage. The instant you turn off the machine, everything in a RAM disk is lost.

If you use a RAM disk to store documents you're working on, you have to copy those documents to a floppy disk or a hard disk before you turn off the computer. Storing documents in progress on a RAM disk is risky because an unanticipated power outage could result in the loss of hours of work.

Speed Trials

A RAM disk should be used as a temporary repository for programs you regularly use. When a program is stored on a RAM disk, the computer can retrieve portions of it from the RAM disk much faster than from a floppy disk, improving productivity.

To examine the performance of the Mac Memory Disk, I timed how long it took to open and quit the disk-based version of MacWrite announced with the 512K Macintosh from the RAM disk with a startup floppy disk in the Mac's internal drive. I set up the Mac Memory Disk in three ways: with MacWrite only, with MacWrite and the System Folder, and finally with MacWrite and the System Folder but without the startup floppy disk.

When I stored only MacWrite on the RAM disk, the application took 11 seconds to open and 15 seconds to quit. On a floppy disk MacWrite took 25 seconds to open and 16 seconds to quit. The 14-second improvement in opening the application is significant, but because quitting the application took about as long with the RAM disk as it did with a floppy disk, speed is not improved enough to seriously increase productivity.

When the System Folder was added to the RAM disk, performance improved significantly. MacWrite took only 8 seconds to open and 8 seconds to quit. When the floppy disk that started up the RAM disk was ejected, MacWrite took only 5 seconds to open and 4 seconds to close. The last configuration, however, is
not useful because you should always work from documents stored on floppy disk to avoid the danger of losing them if your power supply is interrupted.

Out of Room

For optimum RAM disk performance, the System Folder should be on the RAM disk with the applications. A 316K RAM disk—three-quarters the size of a 400K floppy disk—is simply too small to accommodate the System Folder and desired applications. Once you add up a 46K Finder file, a 17K Imagewriter file, and a modest-sized 130K System file, you don’t have room on a 316K RAM disk for even two relatively small applications like MacWrite and MacPaint, which together occupy 129K (see Figure 3). A System Folder and Microsoft Chart on a RAM disk don’t leave room for a Clipboard file, with which to cut and paste charts between documents, unless you strip additional fonts from the System file with the Font Mover.

With a RAM disk in a Mac, you expect a certain quick rhythm in your work that can be accomplished only when the System Folder is on the RAM disk. If you try to save room on a RAM disk by leaving the System Folder files on a floppy disk, you’ll sometimes have to wait for the computer to store and retrieve information from the floppy disk, defeating the purpose of a RAM disk.

Unfortunately, the Mac’s dependence on the Finder and System files in the System Folder doesn’t leave enough room on a RAM disk to make it a powerful tool. The Mac insists on maintaining at least one copy of the Finder and System files on a disk immediately accessible by the computer, whether it is a floppy disk, a hard disk, or a RAM disk. The Mac needs those files because they contain critical instructions to maintain the desktop and files. In contrast, a computer such as the IBM Personal Computer doesn’t need to store information for maintaining files once it’s turned on because the necessary instructions of the PC disk operating system (DOS) are in the same portions of memory as those reserved for running programs.

An alternative to storing applications on a RAM disk is to keep them on a single floppy disk without a System Folder, which is then stored in the RAM disk. Each application uses the System Folder from the RAM disk. While this scheme reduces swapping application disks, it presents a major problem because the RAM disk has to be the startup disk. When you set up the RAM disk, the Mac Memory Disk (which has its own System Folder) remains the startup disk on the desktop.

The only way to make the RAM disk the startup disk is to start an application that is on the disk. This operation removes the Mac Memory Disk from the startup disk position and allows you to eject it. You can then insert the floppy disk storing only applications and open an application from it. But this procedure is too elaborate for a tool that should make work smooth and easy. Instead, the procedure adds steps to your work.

Quick-Change Artist

Having used the 512K Macintosh for some time, I’ve discovered that a RAM disk, capable of holding only one program and a System Folder, doesn’t speed up programs much. Programs written to run on a 128K Mac almost always perform better on the 512K Mac anyway, because more of the program is stored in memory, giving the same speedy access to functions that a RAM disk is meant to offer.

For example, when you load MacWrite into a 512K Mac, the same portion of the program is initially placed in memory as on a 128K Mac. Some parts of the program, such as those used when you change fonts, insert rulers, and open headers, are kept on the disk

(continues on page 79)
Setting up a RAM disk with the *Mac Memory Disk* is simple. Copy the RAM disk program to any floppy disk storing applications or documents you want to use with the RAM disk. When you open the *Mac Memory Disk*, an initialization dialog box appears with four choices (see "Initialization Dialog Box"). Two choices are active and are used to create a RAM disk. The two dimmed choices are used to dissolve RAM disks after their creation.

If you want to create a RAM disk for only a single work session, select the Create Temporary Disk choice and click OK. The program presents you with another dialog box in which you adjust an elevator control to indicate the amount of memory to devote to the RAM disk (see "Size Control Dialog Box"). You can set up a RAM disk with as few as 35K and as many as 316K. The 316K maximum is considerably less than the 384K that you might imagine should be available. Gary Croucher, one of the program's authors, explains that you can't calculate the amount of memory available for a RAM disk by subtracting the 128K set aside for programs from the 512K total memory; extra room is reserved for application programs that need more than 128K.

After you determine the size of the RAM disk, the program returns you to the desktop, where a disk icon labeled RAM Disk appears below the *Mac Memory Disk* icon. The appearance of the icon indicates that the Mac considers a portion of its own memory as another disk drive. Add files or programs you want to work with by dragging them to the...
RAM disk just as you would copy files between floppy disk drives.

You should not store work on the RAM disk because you could lose it in a power outage. If you do store work in progress on the RAM disk, be sure to save it on a floppy disk before you turn the machine off.

To take advantage of the RAM disk’s speed, you must establish the RAM disk as the startup disk by opening an application that is on the RAM disk.

Another choice from the RAM disk’s initialization dialog box lets you set up the program so that it automatically creates a temporary RAM disk whenever you insert the floppy disk. When you select this choice, the dialog box for sizing the RAM disk appears. When you click OK, another box appears that lets you choose the files you want the program to load automatically into the RAM disk at startup (see “File Selection Dialog Box”). The files must be on the floppy disk before the program can load them. You must also make sure that the RAM disk has enough space for all the files.

When you want to remove a RAM disk, you reopen the RAM disk program and choose one of the two removal options from the initialization dialog box. You can restart the Mac without choosing either option if you have created a RAM disk only for the current work session or if you haven’t stored information on it that you want to keep.

Before you can remove the RAM disk, however, the program prompts you with an alert box that asks you to erase all programs and documents on the disk. But be sure you copy updated documents to a floppy disk (see “File Removal Alert Box”). The alert box offers you some protection against inadvertently deleting important files.

---

**File Selection Dialog Box**

*If you choose to set up the Mac Memory Disk so that it creates a RAM disk automatically at startup, the File Selection dialog box appears. This dialog box lets you choose the files you want automatically loaded onto the RAM disk when you turn on the Mac.*

---

**File Removal Alert Box**

*The alert box prevents you from losing updated documents before you copy them to the floppy disk. You can’t use the initialization dialog box to remove a RAM disk without first erasing the files stored on it. However, you’ll receive no warning if you restart the Mac or turn it off without attempting to remove the RAM disk through the initialization dialog box.*
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How to find a Needleman in a haystack.
Review

until you choose those functions from the pull-down menus. Those parts of a program are considered displacable because they are not fundamental to the program's operation. On a 128K Mac, in which memory is at a premium, a displacable part of the program held in RAM is replaced by another section of the program if the new section needs the space. On a 128K Mac, however, plenty of room exists in RAM for all sections of a program. Therefore, when you summon a program section from the disk, the 512K Mac retrieves it only once. Thereafter, that section is on standby in memory.

I ran a second set of tests to evaluate how much a RAM disk improved the speed of storing and retrieving displacable portions of a program. I compared the time it took a floppy disk and the Mac Memory Disk to perform various operations with the disk-based version of MacWrite on a 10K document. Storing only MacWrite on the RAM disk or including the System Folder with MacWrite made little if any difference to the speed of using portions of the program, such as nonsystem fonts like Athens and Geneva, that are held on disk until you use them. No matter how I configured the RAM disk, it took about 5 seconds to change the font of a short paragraph from Geneva to Athens, which had not been loaded from the System file into memory. Changing the font back to Geneva took only 2 seconds, demonstrating how the program runs more quickly when you reuse a portion of the program that has already been retrieved from storage once before.

Unimproved Productivity

My final judgment on the RAM disk for the 512K Mac is that there isn't much reason for it unless you're thrilled at the sight of a single program on the RAM disk loading and quitting in several seconds. Most 128K Mac software works at RAM disk speeds in a 512K Mac anyway. The Mac Memory Disk doesn't significantly improve work productivity even if it can sometimes increase the speed of opening and quitting programs. Storing the System Folder necessary for a dramatic speed improvement on the RAM disk leaves insufficient room for several application programs. This eliminates one of the major benefits of a RAM disk on the Macintosh, the ability to switch quickly between applications.

The Mac Memory Disk should be a smash on a 1-megabyte Lisa running Macworks, which lets you run Mac software on the Lisa. With a megabyte of RAM to play with, the Mac Memory Disk lets you set up a RAM disk with more than 700K of storage (see Figure 4). A RAM disk of this size leaves plenty of room for a well-stocked System Folder and five or six programs. Copying so many files to the RAM disk when you start a work session might be a bit tedious; the Mac Memory Disk program allows you to copy files only from a single floppy disk when you set up a RAM disk automatically. To minimize copying time, you could leave the Lisa on or copy the files once in the morning, knowing you'll be zooming around the desktop all day.

It's unfortunate that the usefulness of a well-designed program like the Mac Memory Disk is ultimately impaired by the Mac's limitations. On the plus side, the program is inexpensive, so it won't put you out too much if you're tired of waiting for documents to open and close or if you want to experiment with it. But don't expect it to substantially improve your productivity. □

Danny Goodman is a Contributing Editor of Macworld and the author of several personal computing books. He has appeared as a product reviewer on the Public Broadcasting System television series "The New Tech Times."

Mac Memory Disk
Assimilation, Inc.
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Our "we'd like to think you're a little strange" contest has born fruits, so to speak. In the April issue of Macguts, and exposing themselves in a variety of bizarre ways.

For this simple act of self-disclosure those gallant Macaddicts will earn your unending fascination, and $500 worth of add-ons and software from MacConnection.

If you haven't sent us your story yet, get to it! We're still on the lookout worldwide, your fellow Mac owners will have never heard the phrase "list price". They believe, in their unfathomable goodness, that your daddy, mommy, and you kids should be able to buy Mac products for very very low prices. And that you should get them very very quickly.

And to reach this splendid kingdom all you have to do is pick up the phone and punch or dial the secret code: 1-800/Mac & Lisa. Now be quiet while I study this month's product/price list.

SOFTWARE

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATI</td>
<td>MacCoach Training</td>
<td>$49.50</td>
</tr>
<tr>
<td></td>
<td>Interactive teaching program for using the Mac, two disks/handbook.</td>
<td></td>
</tr>
<tr>
<td>Ann Arbor Softworks</td>
<td>Animation Toolkit 1</td>
<td>$39.00</td>
</tr>
<tr>
<td></td>
<td>Create, edit, and animate pictures right on your Mac.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Animation Toolkit 1 - advanced version.</td>
<td>$54.00</td>
</tr>
<tr>
<td></td>
<td>All the features above plus sound.</td>
<td></td>
</tr>
<tr>
<td>Apropos</td>
<td>You must have Multiplan to use.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial Planning</td>
<td>$65.00</td>
</tr>
<tr>
<td></td>
<td>Home budget, tax, auto, life insurance and college planner.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Investment Planning</td>
<td>$65.00</td>
</tr>
<tr>
<td></td>
<td>Stocks, real estate, loans, IRA vs. CD's.</td>
<td></td>
</tr>
<tr>
<td>Axlon</td>
<td>Art Portfolio</td>
<td>$44.00</td>
</tr>
<tr>
<td></td>
<td>120 drawings await your creative desires.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Card Shoppe</td>
<td>$44.00</td>
</tr>
<tr>
<td></td>
<td>Make professional quality greeting cards.</td>
<td></td>
</tr>
<tr>
<td>Creative Solutions</td>
<td>MacForth - Level 1</td>
<td>$99.00</td>
</tr>
<tr>
<td></td>
<td>Learn to program your Mac in &quot;Forth&quot;, define your own menus &amp; windows.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MacForth - Level 2</td>
<td>$139.00</td>
</tr>
<tr>
<td></td>
<td>Now you can get serious; Level 2 includes an assembler, floating point, and advanced graphics.</td>
<td></td>
</tr>
<tr>
<td>Desktop Software</td>
<td>1st Base</td>
<td>$109.00</td>
</tr>
<tr>
<td></td>
<td>File management and report writing program for use with MacWrite &amp; MacPaint.</td>
<td></td>
</tr>
<tr>
<td>Dow Jones</td>
<td>Straight Talk</td>
<td>$54.00</td>
</tr>
<tr>
<td></td>
<td>Communications package for accessing on-line databases and other Macs and micros.</td>
<td></td>
</tr>
<tr>
<td>Expertelligence</td>
<td>Expertlogo</td>
<td>$99.00</td>
</tr>
<tr>
<td></td>
<td>A new compiled logo for your Mac.</td>
<td></td>
</tr>
<tr>
<td>1st Byte</td>
<td>Smooth Talker</td>
<td>$119.00</td>
</tr>
<tr>
<td></td>
<td>Voice synthesis software for the Mac.</td>
<td></td>
</tr>
<tr>
<td>Forethought</td>
<td>Factfinder</td>
<td>$99.00</td>
</tr>
<tr>
<td></td>
<td>Keep track of people, places, and things.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Free-form entry.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typing Intrigue</td>
<td>$33.00</td>
</tr>
<tr>
<td></td>
<td>Typing instruction that features solving a mystery case.</td>
<td></td>
</tr>
<tr>
<td>General Computer</td>
<td>Ground Zero</td>
<td>$26.00</td>
</tr>
<tr>
<td></td>
<td>Save your nation from enemy attack.</td>
<td></td>
</tr>
<tr>
<td>Harvard Associates</td>
<td>MacManager</td>
<td>$35.00</td>
</tr>
<tr>
<td></td>
<td>Improve your strategic business skills with this simulation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Desktoppers</td>
<td>$35.00</td>
</tr>
<tr>
<td></td>
<td>Four new desk accessories.</td>
<td></td>
</tr>
<tr>
<td>Hayden Software</td>
<td>DaVinci Buildings</td>
<td>$34.00</td>
</tr>
<tr>
<td></td>
<td>DaVinci Interiors</td>
<td>$34.00</td>
</tr>
<tr>
<td></td>
<td>DaVinci Landscapes</td>
<td>$34.00</td>
</tr>
<tr>
<td></td>
<td>DaVinci Building Blocks</td>
<td>$46.00</td>
</tr>
<tr>
<td>Hayden Bases</td>
<td></td>
<td>$75.00</td>
</tr>
<tr>
<td></td>
<td>Fully relational database.</td>
<td></td>
</tr>
<tr>
<td>Hayden Spellers</td>
<td></td>
<td>$47.00</td>
</tr>
<tr>
<td></td>
<td>Spelling checker for MacWrite and Microsoft Word.</td>
<td></td>
</tr>
<tr>
<td>Masterpieces</td>
<td></td>
<td>$24.00</td>
</tr>
<tr>
<td></td>
<td>Turn your favorite drawings into a jigsaw puzzle.</td>
<td></td>
</tr>
<tr>
<td>Musicworks</td>
<td></td>
<td>$46.00</td>
</tr>
<tr>
<td></td>
<td>Compose and listen to your own songs on the Mac.</td>
<td></td>
</tr>
<tr>
<td>Word Challenge</td>
<td></td>
<td>$24.00</td>
</tr>
<tr>
<td></td>
<td>How many words can you find?</td>
<td></td>
</tr>
<tr>
<td>Hippopotamus Software</td>
<td>Hippo-C - Level 1</td>
<td>$117.00</td>
</tr>
<tr>
<td></td>
<td>Eat, compile, link, and execute C programs on a 128k Mac.</td>
<td></td>
</tr>
<tr>
<td>Human Edge Software</td>
<td>The Sales Edge</td>
<td>$160.00</td>
</tr>
<tr>
<td></td>
<td>Helps prepare strategies for all aspects of sales negotiations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Communications Edge</td>
<td>$113.00</td>
</tr>
<tr>
<td></td>
<td>Identifies communication strengths and weaknesses.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Management Edge</td>
<td>$123.00</td>
</tr>
<tr>
<td></td>
<td>Identify and evaluate management skills and discover methods for improvement.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Negotiation Edge</td>
<td>$179.00</td>
</tr>
<tr>
<td></td>
<td>Develop &quot;How To&quot; plan by analyzing critical factors.</td>
<td></td>
</tr>
<tr>
<td>Mind Prober</td>
<td></td>
<td>$31.00</td>
</tr>
<tr>
<td></td>
<td>Software that reveals people's hidden thoughts.</td>
<td></td>
</tr>
<tr>
<td>Layered</td>
<td>Front Desk</td>
<td>$85.00</td>
</tr>
<tr>
<td></td>
<td>For organizing and scheduling your most important activities.</td>
<td></td>
</tr>
<tr>
<td>Linguist's Software</td>
<td>MacGreek</td>
<td>$89.00</td>
</tr>
<tr>
<td></td>
<td>12 + 24 point Greek font including math symbols.</td>
<td></td>
</tr>
<tr>
<td>MacHebrew</td>
<td></td>
<td>$89.00</td>
</tr>
<tr>
<td></td>
<td>12 + 24 point Hebrew font. Text reads left to right.</td>
<td></td>
</tr>
<tr>
<td>MacHebrew/Basic Kanji</td>
<td></td>
<td>$75.00</td>
</tr>
<tr>
<td></td>
<td>12 point Japanese font. Includes approximately 70 of the most common Kanji.</td>
<td></td>
</tr>
<tr>
<td>MacGreek/Hebrew/Phonetics</td>
<td></td>
<td>$149.00</td>
</tr>
<tr>
<td></td>
<td>12 + 24 point includes all extra symbols of phonetic alphabet.</td>
<td></td>
</tr>
<tr>
<td>Living Videotext</td>
<td>ThinkTank 128</td>
<td>$85.00</td>
</tr>
<tr>
<td></td>
<td>Put your ideas into ThinkTank and let your thoughts flow, the perfect idea organizer.</td>
<td></td>
</tr>
<tr>
<td>Magnum</td>
<td>McPic - Volume I</td>
<td>$35.00</td>
</tr>
<tr>
<td></td>
<td>Create maps, logos, etc. with this collection of MacPaint drawings.</td>
<td></td>
</tr>
<tr>
<td>McPic - Volume II</td>
<td>McPic - Volume II</td>
<td>$35.00</td>
</tr>
<tr>
<td></td>
<td>150 new pictures.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Slide Show Magician</td>
<td>$38.00</td>
</tr>
<tr>
<td></td>
<td>For presentations, teaching or just plain fun.</td>
<td></td>
</tr>
</tbody>
</table>
We'd like to think you're a little strange.

Why be normal?
The Mac was heralded as "the computer for the rest of us." For the artists, literati, flagpole sitters, creative accountants, circus clowns, and surfer lawyers. For any otherwise-normal-looking person with a taste for the truly fascinating, off-beat, or plain old different.

Thanks to the Mac, you've probably experienced the wild-eyed frenzy of computer addiction. Or, you may have brought an illusion of order to your chaotic life.

But have you sold out? Are you normal? Ordinary? We sincerely hope not. We think that even the most straight-laced among you have a deep dark secret crying to get out. An experience that proves you are still certifiably intriguing. If not totally off the wall.

This is your life.
(Or, Mac bites dog.)
Tell us your best Mac story. Are you powering your Mac with an ancient generator in the remote Canadian wilderness? Has your Mac ever saved your life? Did you canoe solo down the Amazon with only a Mac for company? Do you use your Mac to keep track of the plant locations on your ginseng farm?

Do you use your mouse as a hood ornament?

MacConnection

Do I win a prize?

But, of course. If we use your Mac story in one of our ads, you'll receive $500 worth of add-ons and software—your choice. Plus, your name will be up in lights, and your winning smile will be gracing the pages of this magazine.

In the meantime, we're here to offer you the lowest prices, best advice, and strongest customer support available. And to help you fulfill your wildest Mac dreams.
**Broderbund Software**

<table>
<thead>
<tr>
<th>Game</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lode Runner</td>
<td>$27</td>
</tr>
<tr>
<td>Baron</td>
<td>$37</td>
</tr>
<tr>
<td>Transylvania</td>
<td>$27</td>
</tr>
<tr>
<td>MacPuzzle</td>
<td>$27</td>
</tr>
<tr>
<td>Sargon III</td>
<td>$35</td>
</tr>
<tr>
<td>MacAttack</td>
<td>$29</td>
</tr>
<tr>
<td>FX-80 with GRAFTRAX-Plus</td>
<td>$5.00</td>
</tr>
<tr>
<td>Planet1all</td>
<td>$35.00</td>
</tr>
<tr>
<td>Mac to Epson FX/RX printer cable</td>
<td>$19.00</td>
</tr>
</tbody>
</table>

**Industrial Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac Puzzle</td>
<td>$27</td>
</tr>
</tbody>
</table>

**Infocom**

You're a magician challenging the dungeon master, a detective solving murder mysteries, a scientist deciphering hieroglyphics, or just an ordinary mortal meeting the Wizard of Frobozz. (Difficulty levels shown in parenthesis)

<table>
<thead>
<tr>
<th>Game</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zork I (standard)</td>
<td>$27</td>
</tr>
<tr>
<td>Zork II (advanced)</td>
<td>$35</td>
</tr>
<tr>
<td>Sorcerer (advanced)</td>
<td>$35</td>
</tr>
<tr>
<td>Suspender (expert)</td>
<td>$39</td>
</tr>
</tbody>
</table>

Invisibliss (hint booklets) are available for all Infocom games. Specify game. Game... 7.

**Mark of the Unicorn**

Mouse Stampede: $23
Blow up the mice and watch them turn into cheese—addictive.

**Miles Computing**

<table>
<thead>
<tr>
<th>MacAttack</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arcade quality tank simulation, 3-dimensional animation with sound.</td>
<td>$29.00</td>
</tr>
</tbody>
</table>

**Mirage**

Trivia: $29

Over 5000 questions, 5 categories, 3 difficulty levels. Find out what you know, thought you knew or never knew you didn't know. You know?

**Penguin**

Pensate: $24

You can control the obstacles, but can you make it to the top of the grid?

**Priority Software**

Forbidden Quest: $27
A truly challenging sci-fi adventure. Vivid graphic art prints.

**Scarbrough Systems**

Run for the Money: $32
Learn business skills to escape from a strange planet. Best with 2 players.

**Soft-Life Corp.**

Mac-Sots: $49
An electronic slot machine. Includes Keno.

**VIDEX**

Collection of familiar, entertaining, and challenging games.

**VIDEX**

Funpak: $23
MacCheckers/Reversi: $29
MacVegas: $35
MacGamin/Cribbage: $27

**HARDWARE**

<table>
<thead>
<tr>
<th>Component</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compucable</td>
<td>$69.00</td>
</tr>
<tr>
<td>Mac to Hayes Smartmodem cable</td>
<td>$18.00</td>
</tr>
<tr>
<td>Mac to Epson FX/RX printer cable</td>
<td>$19.00</td>
</tr>
</tbody>
</table>

**Cuesta Systems**

Datasafer AC Power Backup: $239
Keps Mac operating during line power interruptions or brownouts. 90 watts.

**Curtis SUPREME SUPPRESSORS**

Diamond Switched 6 outlets: $39
Emerald Switched 6 outlets, 6 ft cord: $49
Sapphire Switched 3 outlets, EM/FI filter: $69

**Epson**

RX-80 with GRAFTRAX-Plus: call
RX-80 F/F with GRAFTRAX-Plus: call
RX-100 with GRAFTRAX-Plus: call
RX-100 F/F with GRAFTRAX-Plus: call
RX-100 F/F with GRAFTRAX-Plus: call

**Hayes Microcomputing**

Smartmodem 300: $197
Works with MacTerminal. Smartmodem 1200: $489
Works with MacTerminal.

**Hanzon**

Universal Card: $116
Serial interface board that gives your Epson FX or RX series printer Mac compatibility.

**Intermatrix**

Macphone: $109
The complete computer phone, with clock calendar, memo pad and auto dial. Keeps detailed log of the length of all calls.

**Kensington**

Control Center: $73
Dust Cover (Covers both Mac and keyboard): $10
Imagewriter Cover (Protection for your printer): $10
Universal Printer Stand (The perfect companion for your printer): $19
Swivel (Lazy Susan style base for your Mac): $23
Disk Case (Holds 36 Mac disks): $22
Surge Suppressor (Replaces Mac's power cord and protects from surges and line noise): $39
Starter Pack (Swivel, surge suppressor & dust cover in one package. Best buy): $54
Modem (A 300 baud portable modem. Complete with cases and cables. 5 year warranty): $99

**Koala Technologies**

MacVision: $229
Digitize pictures or objects for reports, projects for use with video camera or other video source.

**Microcom**

MacModern: $419
Including software, upgradeable to 2400 baud.

**DISKS**

<table>
<thead>
<tr>
<th>DISK</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovative (standard)</td>
<td>$23.00</td>
</tr>
<tr>
<td>Flip &amp; File Holds 40 Mac disks</td>
<td>$17.00</td>
</tr>
<tr>
<td>Pacific Wave</td>
<td>$19.00</td>
</tr>
<tr>
<td>Flip Sort Micro Holds 40 Mac disks</td>
<td>$19.00</td>
</tr>
<tr>
<td>BASF (advanced)</td>
<td>$19.00</td>
</tr>
<tr>
<td>DISKS 3 1/2 Micro Floppy Box of 5</td>
<td>$19.00</td>
</tr>
<tr>
<td>MAXELL (expert)</td>
<td>$35.00</td>
</tr>
<tr>
<td>DISKS 3 1/2 Micro Floppy Box of 10</td>
<td>$35.00</td>
</tr>
<tr>
<td>Fuji (expert)</td>
<td>$37.00</td>
</tr>
<tr>
<td>DISKS 3 1/2 Micro Floppy Box of 10</td>
<td>$37.00</td>
</tr>
<tr>
<td>Memorex (advanced)</td>
<td>$39.00</td>
</tr>
<tr>
<td>DISKS 3 1/2 Micro Floppy Box of 10</td>
<td>$39.00</td>
</tr>
<tr>
<td>3M (standard)</td>
<td>$39.00</td>
</tr>
<tr>
<td>DISKS 3 1/2 Micro Floppy Box of 10</td>
<td>$39.00</td>
</tr>
<tr>
<td>Verbatim (junior)</td>
<td>$39.00</td>
</tr>
<tr>
<td>DISKS 3 1/2 Micro Floppy Box of 10</td>
<td>$39.00</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS**

**Elephant**

Imagewriter Ribbon: $5
For superior Imagewriter printing.

**Microsoft**

Apple-Mac Book: $14
Presentation Graphics Book: $14
MacWork/MacPlay Book: $14

---

Circle 4 on reader service card
needs a good com

Matrix Advocates
Images ........................................... $28.
Ready to use graphics and pictures.

Megahaus
Megalist ........................................... $39.
Instant access to all your data; print reports
in a variety of formats.
Megamerge ........................................ $86.
A mailmerge for MacWrite — generates form
letters and mailing labels.

Microsoft
Basic (version 2.0) ........................ $99.
The standard micro language.
Chart .................................................. $89.
Business graphics program transforms nu-
merical data into over 40 different graph
styles.
Multplan ........................................... $125.
One of the most tried, proven, and popular
electronic spreadsheets.

Miles Computing
Mac the Knife - Volume I ...................... $27.
Nearly 500 illustrations — borders, icons,
maps, etc. to be used with MacPaint.
Mac the Knife - Volume 2 ...................... $29.
Over two dozen new fonts for your Mac.

Monogram
Dollars & Sense ................................... $84.
Personal financial management program for
your Mac.

Organization Software
Omnis 2 ............................................ $145.
Information management system with glob-
al update/delete, user-defined records, mail
merge, etc. - requires external drive

Palantir
MacType ........................................... $31.
Typing instruction, supports both Qwerty
and Dvorak keyboards.

ProVUE Development
OverVUE ........................................... $185.
Database program with powerful math
capabilities. Can sort 1000 records in 2
seconds.

RealData, Inc.
Real estate and financial analysis templates.
You must have Multiplan to use.
#1 Income producing real estate ........... $75.
#2 General financial analysis ............... $75.
#3 Commercial real estate development .... $75.
#4 Residential real estate .................. $75.

Reston Publishing
Construction Estimator ......................... $49.
Calculates construction costs; you must
have Multiplan to use.

Scarborough Systems
Masterplan ...................................... $29.
Typing program with arcade action.

Software Arts
TKISolver ......................................... $149.
An equation processing program to help
you solve your most difficult problems.

Software Publishing
PFS:File ........................................... $79.
Powerful system for updating, recording,
retrieving, and printing data.
PFS:Report ......................................... $79.
Transfers PFS:File data into reports accord-
ing to your specifications.

OUR POLICY
- We accept VISA and MASTERCARD.
- No surcharge added for charge cards.
- Your card is not charged until we ship.
- If we must ship a partial order, we never
charge freight on the shipment(s) that
complete the order.
- No sales tax.
- All shipments insured; no additional charge.
- Allow 1 week for personal & company
orders
- 120 day guarantee on all products
- To order, call our business offices at 603/446-7711.

SHIPPING:
Continent US: For printers add 2% to all
orders. For all other items, add $2 per order for
UPS surface, $3 per order for UPS 2nd-Day-
Air. We particularly recommend 2nd-Day-Air if
you live west of the Mississippi or south of
Virginia. In most cases it will only cost $1 more
and will save you up to four days on delivery
time. Hawaii: For printers, actual UPS Blue
charge will be added. For all other items, add
$3 per order. Alaska and Outside Con-
tinental US: Call 603/446-7711 for informa-
tion.

GAMES
Axion
MacMatch ........................................... $34.
Match the squares and solve the hidden
puzzles underneath.

Blue Chip
Millionaire ........................................... $37.
Realistic stock market play. Start investing
with $10,000; difficulty increases with suc-
cess. T

MacConnection
MacConnection, 14 Mill Street, Markow, NH 03456 603/446-7711

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*Defective software replaced immediately. Defective hardware replaced or repaired at our discretion. Some items have warranties up to five years.
Alice soon came to the conclusion that it was a very difficult game indeed.
—Lewis Carroll, Alice in Wonderland

I saw an early version of Through the Looking Glass nearly a year ago. It's an animated game in which your playing piece, Alice, evades and captures hostile chess pieces that move in actual chess patterns. I thought Alice, as the game was informally called at the time, was clever, but my standard reaction to animated computer games held true. This is fun for a while, but then it gets old. True, the graphics were exceptional, and the fast-paced game certainly provided an entertaining way to develop eye-mouse coordination, but you can be chased by chess pieces for only so long before the thrill is gone. I was pleased, therefore, to see that a number of features have been added to the final version of the game.

When you buy Through the Looking Glass, the first thing you notice is the game's attractive packaging. The box, which resembles a cloth-bound book, has a reproduction of a fifteenth-century woodcut of a chess player on the cover. When you open the book, however, you find that it offers little in the way of reading material. The brief instructions, which also appear on the screen when you start up the game, are enough to get you started, but they make no mention of the game's special features. Perhaps Apple feels that tips from dealers, publications, and Mac owners will be sufficient to get the word around, but I find scanty documentation annoying.
Alice, who moves as the chess piece of your choice, gets you on board and in the game. With five playing modes and the ability to design your own pieces, the game has the same spirit of playful imagination as the book that inspired it.

To fill in some gaps in the game's instructions, I talked to Steve Capps, the Apple programmer who developed Through the Looking Glass. Capps wrote the program in Pascal, using only QuickDraw routines; there is no custom assembly language. He also designed and drew the game's two fonts, Alice-12 and Cartoon-12.

Let's begin at the beginning. When you insert the program disk, the familiar "Welcome to Macintosh" greeting is displayed in one of Capps' fonts. Then a disk icon named Games appears on the screen. The disk's window contains eight items: Amazing, a game in which you move through a series of mazes; Through the Looking Glass, represented by a Cheshire cat icon; Clock, an unusual digital clock display; Stuff, a folder containing the System and Finder files; Fonts, a file containing the game's two fonts, which can be transferred to other applications with the Font Mover; a document called X, which contains graphics files for Through the Looking Glass and can't be opened by the player; and two MacPaint documents, Pieces and Masks, which I'll discuss later.
Entering the Looking Glass
You double-click on the Cheshire cat to start up Through the Looking Glass. While the game is loading, the screen displays the woodcut graphic from the package (the image was captured by means of a video digitizer). After a short time the basic instructions—the same ones as on the inside cover of the package—are displayed. The game sounds very straightforward: as Alice, you capture as many chess pieces as possible while avoiding capture yourself. At the outset you give Alice the powers of one of the pieces, giving you some control over the difficulty of the game; for example, it is easier to play as a queen, which can move any number of spaces in any direction, than as a pawn (see Figure 1).

The last sentence of the instructions reads, "Hold the mouse button down over the score to get a menu." Once you start playing the game, you will no doubt feel inclined to take a look at this mystery menu, and you are in for a delightful surprise when you do. Click the pointer on the score at the top of the screen, and a grinning Cheshire cat materializes in a sparkle of pixels. (The Cheshire cat and the figure of Alice, modeled after John Tenniel's illustrations for Lewis Carroll's books, were drawn by Capps' wife, Marge Boots.) This novel menu allows you to start a new game, change the game's speed by clicking on Fast or Slow then clicking on the score again, or quit and return to the desktop.

Mutations and Erosion
But that's not all. If playing at the fastest speed with Alice moving as a pawn is not enough of a challenge for you, you have recourse to four additional modes of play:

- Mutations
- Erosion
- Mirror-Mouse
- Upside-Down

To activate the variations, you click the pointer on the Cheshire cat's left eye, right eye, nose, and mouth, respectively.

When you select Mutations, your opponents change into different chess pieces at random, making it impossible to predict their movements. Selecting Erosion causes the black "hole" that moves about the chessboard during the regular game to multiply, eating away the board and restricting Alice's movements. I found Mirror-Mouse to be the most difficult of the special modes. When you click on the cat's nose, the pointer moves left when you move the mouse right, and vice versa. The Upside-Down mode, as its name implies, inverts the board and the playing pieces.

After playing in each of the modes for 20 minutes or so, I was getting scores in the 400s or better, which I thought were pretty good. So I decided, as they say, to go for it. I selected Mutations, Erosion, Mirror-Mouse, and Upside-Down, all at the same time. I got a score of 5. That experiment shows that you can combine different modes to set a skill level that suits you.

Make Your Pieces
In addition to giving you the four playing modes just described, Through the Looking Glass lets you draw your own playing pieces. This is by far my favorite feature. Again, the instructions are somewhat terse. At the bottom of the MacPaint document called Pieces are the following four lines: "The player bitmaps can be changed. The black area MUST be preserved, so the pieces can get no wider or taller. After you edit the players, copy the file over the Masks file. Then, lasso each piece and fill with black pattern." That's the general idea, but a more detailed description of the process is in order. Here are step-by-step instructions for creating your own pieces:

1. First make a copy of the Through the Looking Glass disk. Even if your pieces are masterpieces, you'll probably want to keep an original version of the game.
• Copy the Pieces document onto a MacPaint (version 1.3) disk. You can now throw away the Pieces file and the Masks file on your Games disk. The Masks file contains black silhouettes that block out, or mask, the space taken up by the pieces so the background doesn't show through them (Capps compares the Masks file to a cookie cutter that "punches out" holes for the pieces to occupy). Since the silhouettes match the shapes of the pieces in the Pieces file, you'll need to make a new Masks file later.

• Open the Pieces file, which contains eight versions of each of the chess pieces in gradually increasing sizes. Use Show Page to move the drawing window as far to the right as possible. A ¼-inch strip of white space in the right margin provides a place to work on new pieces. As the instructions say, you should not change the size of the white rectangles in which the pieces are centered.

• Using MacPaint's tools, draw a new piece in the margin, or lasso and copy one of the existing pieces and modify it however you like (see Figure 2). I found it easiest to make a copy of the rightmost piece in order to establish the size of the new piece.

• When you have finished drawing the largest piece, surround it with the marquee, hold down the Option key, peel off a copy, and release the Option key. With the marquee still selected, hold down the ⌘ and Shift keys and move the pointer inward to shrink the drawing so it will fit in the next-smallest rectangle. Drawings this small tend to become somewhat distorted when you shrink them, so you'll have to do some cleanup work in FatBits.

• Make another copy of the large drawing and repeat the above procedure to shrink it to the next-smallest size, and so on until you have eight pieces of different sizes.

• Lasso the new pieces and place them over the old ones. Remember to save your document periodically.

• When you have modified or drawn as many pieces as you need, quit the Pieces document.

• From the desktop click on the Pieces document to select it, then choose Duplicate from the File menu. Give the copy of Pieces the name Masks, and open the Masks document. You must use the names Pieces and Masks for these documents, or a system error will occur when you start the game.

• Once you are in the Masks document, you must convert all the pieces into solid black shapes. You use what Capps calls "a simple but tedious procedure": lasso each piece and choose Fill from the Edit menu (you must have version 1.3 of MacPaint, since the earlier version doesn't have a Fill command). Include some of the black background at the top and the bottom of the piece when you lasso it (see Figure 3). When you have filled in all the pieces, save the Masks document and return to the desktop.

• Copy the Pieces and Masks documents to your Games disk.

Now you are ready to begin playing with your new pieces. Double-click on the Through the Looking Glass icon to start the game (see Figure 4). Modifying the pieces gives you a chance to add personal touches to the game. If you don't consider yourself an artist, you can use MacPaint images from some of the clip art disks available for the Mac. Or if you have access to a video digitizer, you can paste digitized pictures into the Pieces document. Giving players a chance to use their imagination makes Through the Looking Glass more than just another video game. □

Figure 3
When you have finished drawing a new set of pieces, open the Masks document and encircle each piece in turn, including some of the surrounding black background, with the lasso. You make the pieces into solid black shapes by selecting the Fill command from the Edit menu.

Figure 4
In this customized version of the game, which I renamed Through the Cooking Class, Alice is pursued by various items of food, which inexplicably move like chess pieces.
PIT YOUR PLUCK AND WIT AGAINST THE FORCES OF EVIL IN THE MYSTICAL GAME OF THE HOLY GRAIL.

IT GETS BETTER WITH TIME.

For centuries, valiant knights have pursued in vain the fabled Holy Grail.

Thank the fates, oh brave adventurer, that you come better equipped in your search than the many who went before you. They had naught but the brute force of sword and lance. You have something far, far mightier, the awesome power of your Macintosh™ and the wondrous game of The Holy Grail. With those two at your beckoning, you can journey through the medieval countryside; do battle with bold knights and foul dragons; converse with kings, thieves, and clerics; rescue a fair princess; and pursue a treasure which has eluded mankind for ages.

ACT QUICKLY. THIS GAME WILL NOT BE THE SAME AFTER YOU TURN THE PAGE.

The Holy Grail is one of Hayden's innovative new TimeQuest™ Adventure games. In these games of interactive fiction, the passage of time plays an active and crucial role. The whole nature of the game changes instantly, before your very eyes. If you aren't wise enough or swift enough to take advantage of circumstances, you may forever alter the course of your future.

So come! Through the ages, countless others have tried and failed. Now it's your turn. Take up the quest. Succeed, and you catch a glimpse of immortality.

But be wary! Myriad pitfalls lurk. You will need extreme cunning if you are to evade the treacherously clever villainy you will encounter along the way.

If you be the least bit faint of heart, try some other game instead. For dangerous adventures aplenty await you in your bold attempt to unravel the age-old secret of The Holy Grail.

The Holy Grail. Only $49.95. See your local software dealer, or contact Hayden Software, 600 Suffolk Street, Lowell, MA 01854, phone toll-free 800-343-1218.

Macintosh is a trademark of Apple Computer Corporation. TimeQuest is a registered trademark of Hayden Software Company Inc.

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AMERICA'S FIRST FAMILY OF SOFTWARE.
MUSICWORKS™
BRINGS OUT THE MUSIC IN YOU.

WRITE THAT TOP 40 HIT YOU'VE ALWAYS DREAMED OF.

With MusicWorks you can compose music directly on your Macintosh™ and hear the results instantly.

Even if you can't read a note, you can easily use MusicWorks to produce professional musical scores. You compose on a seven-and-a-half octave grid that corresponds to the keys of a piano. Use your mouse to place "notes" on the grid. As you place them, you hear them. When you've got your song the way you want it, MusicWorks can transform your grid into a musical staff, insert the proper musical notation, and print it out in a professional format which any musician can follow.

If you already know musical notation, you can compose directly on a staff. Use the mouse to place your notes, to select the meter and key signatures, and to listen to your music instantly.

Either way, grid or staff, if you make a mistake or want to change something, simply erase and edit. You can play back your whole composition or any part of it whenever you want.

ORCHESTRATE 4 PARTS SIMULTANEOUSLY.

Choose any 4 instruments from out of a selection of 10. You've got piano, chimes, flute, trumpet, organ, even a synthesizer for that contemporary electronic sound. You can hear all four instruments at once, or turn them off selectively so you can alter individual parts.

A LITTLE BACH IN EVERY BOX.

MusicWorks comes with templates which guide you through the instructional process by playing classical and popular selections.

MusicWorks is part of the Hayden HeadStart Program which allows schools to accumulate points toward free computers, peripherals, and software. Buy MusicWorks, and your school will receive 50 HeadStart Points.

MusicWorks. Only $79.95. Contact your local computer software dealer or Hayden Software, 600 Suffolk Street, Lowell, MA 01854, phone toll-free 800-343-1218.

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HAYDEN.
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IF YOU LIKE WORD GAMES, HERE'S THE ONE FOR YOU.

Word Challenge. A mind boggling computer game in which you compete head to head against LEX™ and his 90,000 word lexicon. It's a race against the clock. You and LEX each form words as quickly as you can by connecting randomly generated letters inside a playing grid.

You win points for every word you found that LEX didn't. Word Challenge keeps the score.

HOW MANY WORDS CAN YOU FIND IN THIS WORD CHALLENGE GRID?

Words are legal if their letters touch in sequence on any side or corner. "TEAM" is legal, while "TEAMS" is not, since the "S" does not touch the "M." LEX, playing at a "friendly" level, found 23 words of three letters or more. At his most competitive, LEX found 110 words (see list to the right). Can you do better?

Play Word Challenge alone or with a group. See if your family or friends together are wordy enough to bring LEX to his knees. You'll have a lot of fun and learn a new word or two in the process.

Word Challenge operates on

Apple™ II+, Ile, Iic, Macintosh™, Commodore 64™, IBM PC™, PCjr™, and popular compatibles.

Word Challenge is part of Hayden's HeadStart Program which allows schools to accumulate points toward free computers, peripherals, and software. Buy Word Challenge and your school will receive 20 HeadStart Points.

Word Challenge. Only $39.95. Contact your local computer software dealer or Hayden Software, 600 Suffolk Street, Lowell, MA 01854, phone toll-free 800-343-1218.

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HAYDEN. AMERICA'S FIRST FAMILY OF SOFTWARE.
I KNOW IT’S HERE SOMEWHERE.
The computer program that gets your facts straight.

FOR ANYONE WHO WANTS TO BE ORGANIZED BUT CAN'T SEEM TO MAKE IT HAPPEN.

"Why can't I ever find anything when I want it?" Does that sound familiar? If so, you need I Know It’s Here Somewhere. I Know It’s Here Somewhere is a simple, foolproof filing system for home, business, or school. It gives you a perfect way to catalog and store all that important information you know you have but can never seem to find when you need it most.

Users of large computer systems have been using similar programs for years. They call such programs database management systems. I Know It’s Here Somewhere takes that basic, proven concept and simplifies it for everyday use.

ANYTHING YOU CAN CATALOG OR LIST, YOU CAN STORE AWAY ON I KNOW IT’S HERE SOMEWHERE.

To create a format, simply use your mouse to position your basic headings, or fields as they’re called, where you want them. That’s all there is to it. I Know It’s Here Somewhere takes it from there. You supply the information, and the program provides the organization.

The program comes with several standard formats ready for immediate use. There are formats for filing stamps, books, slides, coins, correspondence, recipes, membership lists, names and addresses, credit card numbers, warranty information for household appliances, investments, insurance policies, financial data, capital assets, even the wine in your cellar.

But the program does much more than simply store your information away. It also lets you rearrange it or look at it in different ways.

You can do a sort. Find all the British stamps in your collection, for instance. Then you can do a second sort. Of all those British stamps, find the ones bearing a queen’s picture. Or suppose you’re doing a mailing, and you want it to go only to single people living within a certain ZIP code. No problem with I Know It’s Here Somewhere. Two sorts, and the information is ready for printout.

The program will find any piece of information for you even if you have nothing more to go on than a single, letter within its name.

If you do a lot of bibliographies, I Know It’s Here Somewhere gives you a special block at the bottom of your screen that you can use to store footnotes. You can then use the program as a word processor to correct, add, or delete your footnotes as you need.

When you see how easy it can be, isn’t it time you got organized? I Know It’s Here Somewhere. Only $59.95. Contact your local computer software dealer or Hayden Software, 600 Suffolk Street, Lowell, MA 01854, phone toll-free 800-343-1218.

I Know It’s Here Somewhere is a trademark of Hayden Software Company, Inc.

HAYDEN. AMERICA’S FIRST FAMILY OF SOFTWARE.
HAYDEN: SPELLER™
MAKES MACINTOSH™ LETTER PERFECT.

TAKE THE FICTION OUT OF YOUR DICTION.

The Hayden: Speller spelling checker software program catches and corrects spelling errors and typos.

It's easy. Using pulldown menus and dialog boxes, you check your documents against a dictionary covering 97% of the most frequently used words in the English language. It's quick. Hayden: Speller can check a 5 page document in less than 10 seconds. It's complete. You can easily create your own "personal dictionary" with up to 50,000 words per disk. You can then let Hayden: Speller check these words, too.

EASY, FAST, AND SIMPLE.

Hayden: Speller either lists questionable words or points them out in context. You choose what to do next. If the word's correct as is, let it go unchanged. If it's an obvious misspelling, change it yourself. You can do it directly within the spelling checker program. There's no need to switch back to your word processing disk. If you don't know the correct spelling, have Hayden: Speller find it for you. A click of your mouse makes the necessary correction.

WORKS WITH MACWRITE™ AND MICROSOFT WORD™

Hayden: Speller is fully compatible with MacWrite and Microsoft Word. It takes advantage of their special Macintosh features, such as windows, menus, and of course, mice.

For more information on Hayden: Speller, contact your local computer software dealer or Hayden Software, 600 Suffolk Street, Lowell, MA 01854, phone toll-free 800-343-1218.

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Microsoft Word is a registered trademark of Microsoft Corporation.

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AMERICA'S FIRST FAMILY OF SOFTWARE.
Macware News
The latest developments in Macintosh software, hardware, and accessories

Edited by Erfert Nielsen

Macware News announces new Macintosh products. Those listed here are available now or will be in the near future. We will keep you informed of developments as the number of products for the Mac increases.

Software

- **Brainworks, Inc.**
  24009 Ventura Blvd. #250
  Calabasas, CA 91302
  818/884-6911

  **ChipWits**
  An educational system in which you program robots to perform tasks in a variety of environments. ChipWits is designed to develop problem-solving skills by means of a generic, icon-based language called IBOL. Once you connect a series of programming icons, you can watch the program run and look for errors. ChipWits lets you slow down execution or single-step through your program to find flaws in the logic. The system includes several preprogrammed robots that you can use as models when writing your own programs. The IBOL language introduces programming concepts such as operators, arguments, branches, and subroutines by means of simple pictures. List price: $49.95.

- **Decision Science Software, Inc.**
  P.O. Box 7876
  Austin, TX 78713
  512/926-4527

  **Soft Palette Fonts**
  Volume 1 of the Soft Palette font series is a collection of 18 decorative fonts, including borders and a set of interior design symbols such as furniture, doors, windows, stairs, and appliances. The symbols, which are designed to be used with MacPaint, fit a standard scale of 8 MacPaint dots to 1 foot. List price: $35.

- **Digital Etc.**
  1749 14th St.
  Santa Monica, CA 90404
  213/452-5636

  **Maccountant**
  An accounting package for small businesses. Maccountant offers a variety of functions, including income statements, balance sheets, accounts payable, accounts receivable, and general ledger. All functions have flexible reporting periods that allow you to automatically segment information to fit fiscal calendar years, seasonal highlights, and so forth. Maccountant handles a full year's data on one disk. List price: $195. (Call 800/922-7500 to receive a free demo disk.)
Future Design Software
13681 Willamette Dr.
Westminster, CA 92683
714/891-9796

General Ledger
The first of five modules in Future Design's Strictly Business Accounting System. The General Ledger module provides balance sheet, profit-and-loss, and trial balance capabilities and incorporates Smoothtalker speech synthesis to draw attention to errors and to articulate commands. General Ledger also includes comparative analyses, profit-and-loss variance reports, projections for income and expense accounts, detailed journals, customized reports, and individual and consolidated balance sheets and profit-and-loss statements. Future models include Accounts Payable, Accounts Receivable, Inventory Control, and Order Entry. List price: $395.

Great Plains Software
1701 S.W. 38th St.
Fargo, ND 58103
701/281-0550

Hardisk Accounting Series
An accounting system that requires a Tecmar hard disk drive (contact the manufacturer for information on compatibility with other hard disk drives). The initial modules are General Ledger with Financial Reporting and Budgeting, Accounts Receivable, Accounts Payable, Payroll, and Inventory Management with Point of Sale Invoicing, Job Cost with Estimating, Costing, and Pre-Billing will follow later this year. The modules, which include help screens and tutorials, can be integrated or used separately. List price: $695 per module.

Hayden Software
600 Suffolk St.
Lowell, MA 01854
800/543-1218

Hayden:Speller
A spelling checker with a 22,000-word dictionary. The program also allows you to create a personalized dictionary that is limited only by available disk space. Hayden:Speller either lists questionable words or points them out in context. You can insert a correctly spelled word from the dictionary with the mouse. You need not switch between Hayden:Speller and your word processing program. Hayden:Speller is compatible with MacWrite and Microsoft Word. List price: $79.95.

MusicWorks
A program that lets you compose, edit, and play music on the Macintosh. You use the mouse to place notes on a 7½-octave grid that corresponds to the keys of a piano. When you finish composing your tune, MusicWorks transforms the grid into a musical staff. You can also compose directly on the staff. You play your composition using any of the program's ten instruments, which include piano, flute, chimes, trumpet, organ, kazoo, and synthesizer. MusicWorks lets you listen to individual parts or all four parts at once. List price: $79.95.

Henderson Associates
980 Henderson Ave.
Sunnyvale, CA 94086
408/246-8939

Real Poker
A game of five-card draw that lets you compete against five computer-simulated opponents, all of whom have distinct personalities. The game has three levels of play: in Normal mode you can follow each step of a hand; Teach mode exposes all hands, allowing a novice to observe betting strategies; High Speed mode lets experienced players play as quickly as they like. List price: $39.95.

Ideaform Inc.
P.O. Box 1540
Fairfield, IA 52556
515/472-7256

Maclabeler
A program that enables you to create labels listing the contents of a Mac disk. You insert the Maclabeler disk, eject it, then insert the disk you want to
label. You select any or all of the files on your disk for a label listing. A disk label holds 20 names. You can use the program’s directory window to view a complete list of the contents of a disk in a few seconds. MacLabeler allows you to add or delete file names before printing the label. The program can also sort file names in alphabetical order or by size, date, or type of file. List price: $49.95.

Krisia Systems, Inc.
505 N. Lake Shore Dr.
#5510
Chicago, IL 60611
312/822-0624

Neon
An object-oriented programming language that provides a Smalltalk-like environment implemented as a compact threaded language. Neon combines various sections of the Macintosh Toolbox into objects that let programmers build models of programs rather than list lengthy instructions. If you need to modify an object, you create a new class of objects, changing only the characteristics that need to be changed. Since you can reuse objects, Neon enables you to produce compact source and executable code.

If you need high speed, you can write portions of your program in assembly code. Neon is an extensible language; much of the Neon system is written in Neon, so you are free to modify the program. The Neon system can be “sealed” so that only the application, not the language.

Kensington Microware Ltd.
251 Park Ave. S
New York, NY 10010
212/475-5200

Professional Type Fonts
Two disks of fonts that can be installed in an application’s Font menu with the Font Mover. Several of the fonts are styled after well-known Mergenthaler and ITG typefaces such as Times Roman, Helvetica, and Optima. Professional Type Fonts for Text provides 16 fonts in sizes from 12- to 24-point. Professional Type Fonts for Headlines provides the same fonts in 24-point and larger sizes; this disk should be used with a 512K Mac. List price: Text $49.95, Headlines $69.95.
it's written in, is seen; you can distribute any application you write free of additional licensing constraints. The language provides a full-featured, mouse-driven editor and an interface to QuickDraw. Source definitions for all graphics objects are included with the program. The Neon kernel is written in a combination of FORTH and 68000 assembly language; a FORTH interpreter is available as a subset of the Neon system, and a 68000 assembler will be available as an add-on. List price: $150.

**McCaron-Dial Systems**

P.O. Box 45628
Dallas, TX 75245
214/247-5945

**McTrivia**

A two-player trivia game that has over 2000 multiple-choice questions. McTrivia gives each player or team 15 seconds to click on one of five answers. A game consists of two 9-minute halves. Bonus questions are provided if a player correctly answers three questions in a row. A single player can play against the clock for high-score records. List price: $40.

**Midleton Software**

146 West 255 South
Orem, UT 84058
801/224-6841

**Learn about the Solar System**

An educational package designed to teach you about the nine planets of the solar system, as well as Halley's comet. The program displays a real-time graphic simulation of the planets rotating around the sun, size comparisons of the planets, and a simulation of Halley's comet's orbit. When you click on one of the planets, a page of information about that planet is displayed. The program also includes an interactive test with three difficulty levels. List price: $24.95 plus $3 shipping and handling.

**P3, Inc.**

949 Parklane Center
Wichita, KS 67218
316/686-2000

**The Investor**

An investment portfolio management system designed to help you with financial decision making and tax preparation. The Investor handles stocks, bonds, funds, options, short sales, and margin accounts and produces reports such as Portfolio Status, Capital Gains/Losses, Interest Income, and Dividend Income. The program allows you to duplicate a portfolio in order to simulate changes in strategy without altering real records. You select transactions such as Buy or Sell from the Transact menu, and the program prompts you for the necessary information. If you have a modem, The Investor can automatically update the market values of your securities using quotes from the Dow Jones News/Retrieval service; if not, you can update prices manually. The program's Graph menu allows you to construct Portfolio Status or Profit-Loss graphs. List price: $150.
Scientific Analysis Program
A scientific and numerical analysis program written in Microsoft BASIC. The program solves linear, nonlinear, real, complex, and sets of simultaneous differential equations. **Scientific Analysis Program** performs linear regression analysis and finds the curve that best fits experimental data. The program calculates definite integrals and solves matrix equations. You can modify it to meet your needs. The program includes two disks and requires Microsoft BASIC to run. List price: $35.

Electronic PAD
An integrated, computer-aided engineering package that turns a Macintosh or a Lisa into an engineering workstation for digital circuit design. The program enables you to produce professional-quality schematics and provides complete fault and logic simulation of the design, reducing debugging time in the prototype stage. **PAD** provides nine primitive logic functions—AND, OR, NAND, NOR, XOR, XNOR, Inverter, D flip-flop, and JK flip-flop—which you select from a "palette" and place on the screen. You can connect pins using the mouse and label the functions to reflect off-the-shelf parts, creating a parts library. Designs are not restricted to the size of the Mac's screen.

Educational Programs
Four educational programs. **Reading Adventure I** is an interactive fiction program for second- and third-graders. The program lets children choose their own story lines while earning points and improving comprehension skills. In **World Geography Adventure I**, you learn to identify the countries, capital cities, largest cities, and major rivers of North and South America. In **How a Bill Becomes a Law**, you are a member of the United States Congress trying to get a bill passed, learning about the legislative system in the process. In **American History Adventure**, you meet characters from American history, whom you identify and locate in time and place. List price: **Reading Adventure I** $39.95, **World Geography Adventure I** $59.95, **How a Bill Becomes a Law** $59.95, **American History Adventure** $59.95.
Macware News

PAD's logic analysis feature allows you to test part tolerances; signal generation can be modified to test for worst case, allowing you to flag potential problem areas. Waveforms produced by probing the circuit at any location show logic errors that can be traced back to their source by probing earlier levels of the design. List price: 128K Macintosh (does not include macro library feature) $395, 512K Macintosh $595, Lisa (under MacWorks) $595, 128K to 512K software upgrade with macro library $225.

Screenplay
1095 Airport Rd.
Minden, NV 89432
800/334-5470

Caesars Guide to Gaming–Blackjack
A game that simulates blackjack as played at Caesars Palace in Las Vegas, Caesars Tahoe, and Caesars Atlantic City. You can occupy one or more seats at a casino table, set table limits, and play alone against the house or with a variety of characters who have different playing styles and strategies. The program includes instructional drills that present different game scenarios; incorrect moves are stored and later played back in a drill focusing on your areas of weakness. List price: $69.95.

SoftDesign
P.O. Box 161377
Miami, FL 33116
305/253-5521

TimeBase
A program designed to centralize your application software by combining several business applications and a time-management system. The program allows you to link information from a word processor, a database, an accounting program, or a spreadsheet into specific appointments in your schedule, eliminating the delay caused by inserting the application program, waiting for it to load, and opening the file you need. You can maintain several schedules at once. TimeBase includes appointment reminders, automatic entry of standing appointments, priority scheduling, and a simple project manager. The program's Tracking, Maintaining, and Planning feature enables you to track deadlines, call-backs, and accounts payable and receivable. The Project/Event Manager helps you with short- and long-term planning. File Cabinet is a fixed-field, limited database that has search and print capabilities. TimeBase investments. The system allows you to retrieve quotes from the Dow Jones News/Retrieval service or enter them manually. The Stock Portfolio System generates nine reports, including Current Portfolio Status of unrealized gains and losses, Profits and Loss Statement, Dividend Income Statement, and Interest Income/Expense Statement. The system incorporates 1984 tax laws and includes features such as timing notices, margin accounting, option writing, and return-on-investment calculations. The system requires a 512K Macintosh. List price: $225, extended service contract entitling buyer to all upgrades and enhancements $65 per year.

Smith Micro Software, Inc.
P.O. Box 7137
Huntington Beach, CA 92647
714/964-0412

Stock Portfolio System
A program that lets you manage a portfolio consisting of stocks, bonds, options, mutual funds, money markets, and certificates of deposit and other cash

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<th>PRODUCT</th>
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1110 BURNETT AVE, SUITES J & K
CONCORD, CA 94520
Circle 3 on reader service card
Member, Better Business Bureau
Chamber of Commerce
Listing: Don & Bradenow!
also provides an on-disk folder of standard business forms and letters that can be transferred to MacPaint for editing and customizing. List price: $149.95.

Software Masters
P.O. Box 570417
Houston, TX 77257-0417
713/266-5771

inTouch
A communications program that includes both Xmodem and CrossTalk protocol file transfers, multiple terminal emulations, and programmable function and cursor keys. The program's Communications Command language allows you to automate tasks for unattended operation. List price: $149.95.

Simon & Schuster, Inc.
Electronic Publishing Group
1230 Avenue of the Americas
New York, NY 10020
212/264-6400

Typing Tutor III
An advanced touch-typing instruction program that can be adapted to an individual's typing skills and learning needs. The program updates lessons in response to your progress throughout the course. An image of the keyboard appears on the screen along with explanatory prompts, optional help screens, and test results in the form of bar charts showing speed and accuracy improvements for each key. An arcade-style game, Letter Invaders, helps you develop typing speed and accuracy. List price: $59.95.

Superex Business Software
151 Ludlow St.
Yonkers, NY 10705
800/862-8800, 914/964-5200

MacFinance
A program that answers up to 26 financial questions, from corporate worth to the future value of an investment. A dialog window asks you to enter financial data. MacFinance's built-in formulas calculate liquidity ratios, activity ratios, market ratios, cost analysis, return on investment, depreciation, break-even analysis, value of investment, mortgages, loans, and bond yield analysis. The program has three menus: Balance Sheet, which deals primarily with a company's current financial status; Invest-
Macware News

Hardware

- **General Computer Company**
  215 First St.
  Cambridge, MA 02142
  617/492-5500

**HyperDrive**
A 10-megabyte hard disk drive that is built into the Macintosh. Memory expansion to 512K RAM is available. A Mac equipped with HyperDrive loads and starts programs three times faster than does a standard Mac, transfers programs and data up to 20 times faster (and up to 7 times faster than a Mac with an external hard disk drive), and stores 25 times more data than a 3½-inch floppy disk. Because HyperDrive’s disk interface logic board is directly connected to the Mac’s main circuit, the Mac’s serial ports remain free for modems, printers, or other devices. You can boot the system from either the hard disk or a 3½-inch disk. The software provided with HyperDrive allows the hard disk to be divided into many “virtual disks,” which resize themselves to accommodate files. List price: with 512K memory expansion $2795, without memory expansion $2195.

- **Microsoft Corporation**
  10700 Northup Way, Box 97200
  Bellevue, WA 98009
  206/828-8080

**MacEnhancer**
An expansion system that provides one parallel and two serial ports, printer driver software, and terminal emulation software. MacEnhancer adds one IBM-compatible parallel port and two IBM-compatible serial ports to the Macintosh without taking up any of the Mac’s existing ports. When installed, MacEnhancer is listed as a desk accessory in the Apple menu, allowing you to switch ports from within an application. MacEnhancer also provides software that enables you to use a variety of letter quality and dot matrix printers with the Mac, including the Epson LQ-1500, FX-80, FX-100, MX-80, and MX-100; the Toshiba P1351 and P140; the C. Itoh ProWriter; the Hewlett-Packard ThinkJet; the IBM Graphics; and the Okida Microline 92 and 93. MacEnhancer’s terminal emulation software allows you to communicate with mainframes and other personal computers. List price: $249.

- **Kensington Microware**
  251 Park Ave. S
  New York, NY 10010
  212/475-5200

**Maccessories Portable Modem**
A 7½- by 3½- by 1½-inch portable 300-bps modem that is powered by a 9-volt battery. The modem comes with a telephone cable, an interface cable to attach the modem to the Macintosh, a carrying case, and a manual. List price: $140.

- **MacIntel**
  2022 Taraval St., Suite 7437
  San Francisco, California 94116

MacIntel
... the user friendly software people...

Circle 210 on reader service card
DataTalker/MAC
An intelligent data communications processor that allows the Macintosh to emulate IBM 3271/3277, 3274/3278, 3275, and 3276/3278 interactive terminal systems. DataTalker/MAC connects to the Mac’s modem port and communicates with a mainframe by means of a modem, a modem eliminator, or a limited-distance modem. You download the 3270 emulation program from the Macintosh to the DataTalker/MAC. The package includes DataTalker/MAC, a cable, a 3270 emulation program on disk, and a manual. List price: $1095.

ColorPrint
A system that allows you to print in up to five primary colors using Apple’s Scribe printer or eight primary colors using Apple’s Imagewriter printer. You can produce additional colors by overlapping primary colors. The ColorPrint program automates the color printing process, guiding you through ribbon changes and keeping the image aligned. The program automatically scales images and allows you to print them in full-page, half-page, or quarter-page sizes. You can also change the width-to-height proportion of your drawing. List price: $49.95, ColorPrint Starter Kit (includes one red, one yellow, and one blue ribbon) $74.95.

Diskpac 3.5
A carrying case for 3 1/2-inch disks. Diskpac 3.5 holds up to six disks and folds into thirds, making it small enough to fit into a suit pocket. The case is made of nylon with a velcro closure. List price: $14.95.

MouseAround
A drawing tool that helps you trace illustrations into MacPaint documents with the mouse. MouseAround is a 12-by 12-inch plastic drawing board.

Front Desk
Now there’s a better way for contractors to keep their backdoors from getting backlogged.
Front Desk will keep schedules for all your equipment. Or your workers. Where they need to be. What they’re supposed to do. And what they cost per hour. Then it creates reports showing how many hours are spent—and how many dollars are made—on each type of work. It can help you build a better business.

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Macware News

board with a sliding mechanism that holds the mouse; you attach the mouse, place a photograph or illustration on the drawing board, and trace your artwork using the crosshairs engraved into MouseAround's clear plastic frame. The sliding mechanism keeps the mouse vertically and horizontally aligned, giving you greater control over its movement. List price: $39.95.

MouseMate
An 11½- by 13-inch rubber mat that provides a smooth surface on which to roll the mouse. The pad also helps keep the mouse clean and reduces wear. MouseMate includes an 8-foot snap-on cord and a 1-megohm resistor to dissipate static charge. List price: $29.95.

MouseMedic
A cleaning kit for the Macintosh mouse. The kit contains foam tip swabs and a cleaning solution, an antistatic cloth, a small airbrush and a blending bottle. Made of a rayon and nylon blend, the pad helps keep the mouse clean and reduces wear. MouseMedic also uses the kit to clean the mouse's moving parts. List price: $19.95.

MouseStrak Inc.
1 Weatherly #503
Mill Valley, CA 94941
415/383 2477
Moustroak
An antistatic foam rubber pad on which to roll the mouse. Made of a rayon and nylon blend, the pad helps keep the mouse clean and reduces wear on the mouse's moving parts. Moustroak measures 9½ by 7½ inches, and Moustroak II measures 11½ by 9½ inches. The pads are available in red, green, blue, gray, or brown. List price: Moustroak $9.95, Moustroak II $10.95.
Lockable Disk Tray, Ring King Visibles

MIT050 Tray
A lockable, high-impact plastic storage case that holds up to 50 3½-inch disks. The smoke-tinted case has a hinged lid, built-in handles, and indexing dividers. List price: $26.95.

MIP02 Protective Panel
A plastic and vinyl storage panel that holds two 3½-inch disks and can be inserted in either 8½- by 5½-inch or 9½- by 6-inch software binders. List price: $1.75 each.

Notes

A Megabyte of Memory
MicroGraphic Images Corporation recently announced MegaMac, an upgrade that gives the Macintosh 1024K of memory—512K of core memory and a 512K RAM disk. The upgrade board is mounted inside the Mac and is compatible with software designed to run on the 128K or 512K Mac. The software sold with the upgrade enables you to load files or application programs from the RAM disk into core memory three to six times faster than from a disk drive. The suggested retail price of the upgrade, which is available from Apple dealers, is $1595 with a trade-in of the original 128K board or $1895 without the trade-in. The suggested retail price of the software is $90. A complete MegaMac system, including a Macintosh, is available from MicroGraphic Images for $3790. For more information, contact MicroGraphic Images Corporation, 1961 Kingsbury St., Chatsworth, CA 91311, 818/368-3482.

Macware News uses information provided by manufacturers; it does not evaluate products or corroborate manufacturers' claims. Send a description of your product and a photograph or sample disk to Macware News, Macworld, 555 De Haro St., San Francisco, CA 94107, 415/861-3861.
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Database power in the palm of your hand

DB Master for the Macintosh is for anyone who can record information on printed forms and store it in filing cabinets or card files.

DB Master stands out because it meets these three major objectives:

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  - Includes a simple tutorial and on-screen help messages

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  - Place information anywhere you want
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  - Save long blocks of text—up to 3,000 characters
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Front Desk™ is a time and resource manager for Macintosh™ that understands a simple fact. Time is money.

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Layered Incorporated, 85 Merrimac Street, Boston, MA 02114. (617) 423-9841

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When the tax man cometh, he usually taketh away. You can fight back by enlisting the Macintosh and Microsoft Multiplan to help prepare your tax forms. There's no guarantee that doing your taxes with the Mac will save you money, but the Mac can make this dreaded but unavoidable task easier.

This article shows you how to create a Multiplan template that calculates most of the information required on the 1984 Form 1040. While it isn't an exact representation of the 1040 and shouldn't be mailed to the Internal Revenue Service, the template provides totals for income, adjustments, tax credits, payments, and miscellaneous taxes. After completing the template, you transfer the resulting tax figures to the official form for mailing. The template also requires you to look up your tax, according to your tax bracket and filing status, in the tables provided with Form 1040. You might further automate tax
<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
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<tbody>
<tr>
<td>39</td>
<td>Additional Taxes. Enter here and check if from Form 4972, Form 5544, or section 72 penalty tax.</td>
</tr>
<tr>
<td>40</td>
<td>Total payments. Add lines 38 and 39.</td>
</tr>
<tr>
<td>41</td>
<td>Credit for the elderly (attach Schedule E&amp;P).</td>
</tr>
<tr>
<td>42</td>
<td>Foreign tax credit (attach Form 8861).</td>
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<tr>
<td>43</td>
<td>Line 41 is under $10,000, see page 16.</td>
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<tr>
<td>44</td>
<td>Excess social security tax and RRTA tax withheld (two or more employers).</td>
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<tr>
<td>45</td>
<td>Credit for Federal tax on special fuels and oils (attach Form 4136).</td>
</tr>
<tr>
<td>46</td>
<td>Regulated Investment Company credit (attach Form 2439).</td>
</tr>
<tr>
<td>47</td>
<td>Amount paid with Form 4868.</td>
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<td>48</td>
<td>Excess social security tax and RRTA tax withheld (two or more employers).</td>
</tr>
<tr>
<td>49</td>
<td>Credit for Federal tax on special fuels and oils (attach Form 4136).</td>
</tr>
<tr>
<td>50</td>
<td>Total payments. Add lines 49 through 55.</td>
</tr>
<tr>
<td>51</td>
<td>If line 50 is larger than line 56, enter amount OVERPAID.</td>
</tr>
<tr>
<td>52</td>
<td>Amount of line 50 to be REFUNDED TO YOU.</td>
</tr>
<tr>
<td>53</td>
<td>Amount of line 50 to be applied to your 1984 estimated tax.</td>
</tr>
<tr>
<td>54</td>
<td>Excess social security tax and RRTA tax withheld (two or more employers).</td>
</tr>
<tr>
<td>55</td>
<td>Credit for Federal tax on special fuels and oils (attach Form 4136).</td>
</tr>
<tr>
<td>56</td>
<td>Total payments. Add lines 57 through 63.</td>
</tr>
<tr>
<td>57</td>
<td>If line 56 is larger than line 64, enter AMOUNT YOU OWE. Attach check or money order for full amount payable to 'Internal Revenue Service.' Write your social security number and '1983 Form 1040' on it.</td>
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<tr>
<td>58</td>
<td>Excess social security tax and RRTA tax withheld (two or more employers).</td>
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<td>59</td>
<td>Credit for Federal tax on special fuels and oils (attach Form 4136).</td>
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<tr>
<td>60</td>
<td>Excess social security tax and RRTA tax withheld (two or more employers).</td>
</tr>
<tr>
<td>61</td>
<td>Credit for Federal tax on special fuels and oils (attach Form 4136).</td>
</tr>
<tr>
<td>62</td>
<td>Excess social security tax and RRTA tax withheld (two or more employers).</td>
</tr>
<tr>
<td>63</td>
<td>Credit for Federal tax on special fuels and oils (attach Form 4136).</td>
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Under penalties of perjury, I declare that I have examined this return and accompanying schedules and statements, and to the best of my knowledge, belief, they are true, correct, and complete. Declaration of preparer (other than taxpayer) is based on all information of which preparer has any knowledge.

Preparer's signature
Preparer's firm's name (or yours, if self-employed) and address
E.I. No.
ZIP code

Spouse's signature (if filing jointly, BOTH must sign.)
Date

Paid
Preparer's Use Only

Macworld 107
calculations by entering tax schedules on the template and using Multiplan's LOOKUP function to find and display your tax liability automatically. Since entering the tables requires a good deal of effort, however, looking up your tax liability manually is probably more efficient and requires less work. Note that this article was prepared with a preliminary IRS Form 1040. Be sure to compare your 1040 form with the one presented here.

**Set Up Columns**

Design your form so that all the cells across the width of the form are visible in a single Multiplan window. As shown in Figure 1, use narrow cells for Form 1040 line numbers (column 1) and wide cells for the figures you will enter (columns 6 and 7). To change a column's width, select the column head, which displays the column number, then choose Column Width from the Format menu and specify the desired width.

**Enter Labels**

To create the first label for the 1040 form, click cell RIC4, type **IRS FORM 1040 1984**, and press Return. Don't worry about typing more characters than can be contained within a cell. When you press the Enter key after making an entry, Multiplan displays all the text you type in, spilling text into cells to the right of the selected cell if they are empty. Type the page number into RIC7 and then the Filing Status labels into rows 3 and 4 as shown in Figure 1.

To make your 1040 template easy to read, mark off sections with straight lines across the entire form. To create the first line in row 5, click cell R5C1 and enter 12 underline characters. Select the seven cells that make up the entire row (see Figure 2) and choose Fill Right from the Edit menu to copy the contents of the first cell to all the other cells in the row. While all these cells are selected, choose Align Center from the Format menu to center the lines in each cell. Next, copy the line in row 5 to rows 11, 35, 56, 68, 76, and 86.

Enter the rest of the information on the 1040 template as shown in Figure 1. Type the line numbers in column 1. Start the entire text of each line in column 2. The text spills over into columns 3 through 5. Indent section headings such as Exemptions and Income by pressing the space bar five times. Column 7 and sometimes column 6 contain formulas or are left empty so figures can be entered.

In the section on exemptions (rows 6 to 10), put each label in an individual cell. Notice in Figure 1 that text lines end with strings of periods leading to column 6 or 7, where you enter tax figures. The periods make the form easy to read. Instead of counting the
Prescribe Formulas

Now enter the appropriate formulas into the cells that will perform calculations. You enter three types of formulas, the SUM and MAX functions and IF conditional statements (see Table 1). Multiplan makes it easy for you to type in formulas that refer to multiple cells of the spreadsheet. For example, rather than typing R15C6 to refer to a cell, you click the cell, and Multiplan puts a relative cell reference into your formula (relative to the location of the cell into which you’re entering a formula or cell reference). The formulas for the two pages of the form are listed in Table 1 by cell coordinates and Form 1040 line numbers. You can type the formulas shown in the Formula column of Table 1 into the correct cells, or you can use Multiplan’s relative cell referencing feature to enter formulas by dragging and clicking. If you use relative cell referencing, your final formulas will read like those shown under the Relative Formulas column in Table 1.

The SUM function is used in several places to compute totals of two or more cells. The syntax for the SUM function is

```
SUM(staring cell:end cell)
```

In line 23 (total income), for example, a column of numbers—your income from various sources—is summed from cells R13C7 to R33C7.

The MAX function allows you to choose the largest value from several target values. The syntax for the MAX formula is

```
MAX(list of cells or values to compare)
```

On line 65 (row 87), amount overpaid, you want the formula to enter the value 0 or the difference between line 64 (row 85), total payments, and line 56 (row 75), total tax, whichever is larger. When you put R85C7-R65C7 in the formula, Multiplan chooses the larger of the two values. Negative numbers cannot be entered in this cell.

The IF function lets you define a condition and then choose which of two values to put in the cell, based on whether the condition has been met or not. The syntax for the IF formula is

```
IF(condition, value if the outcome is true, value if the outcome is false)
```

On line 46 (row 65), taxes less credits, the IF formula determines whether the value in line 45 (row 62), subtotal of credits, subtracted from the value in line 40 (row 55), total tax responsibility, is greater than zero. If the difference is greater than zero, then the formula enters the difference into line 46; if the difference is not greater than zero, then a zero is entered.

(continues on page 112)
### Figure 1
The template provides a facsimile of the 1984 Form 1040. Line numbers corresponding to the official form are entered in column 1. Descriptions begin in column 2 and automatically spill over into columns 3 to 6. Dollar figures are entered in column 7.
Tax-Time Tools

The following are application programs that help you figure your taxes. Some of them, like the template described in the article, work with Multiplan.

- **Apropos Software, Inc.**
  64 Hillview Ave.
  Los Altos, CA 94022
  415/948-7227

  **Tax Planner**
  A comprehensive tax preparer that works with the Macintosh version of Multiplan. The program links Form 1040, Schedules A through F, as well as Schedules G, W, and SE. Complete tax tables are included in hidden cells and accessed by the LOOKUP command. List price: $49.95.

- **Gamma Productions, Inc.**
  817 Tenth St. #102
  Santa Monica, CA 90403
  distributed by Software Resource
  800/851-9010, 800//511-9009 in California

  **Tax Wizard**
  An application that permits you to complete over 20 IRS forms, including 1040, Schedules A, B, C, D, E, G, W, and SE; and Forms 4562, 2106, 2199, 2441, 3903, 3468, 4137, 4255, 5695, and 6251. The program features help drawn from the IRS manual, "Instructions for Preparing Form 1040." List price: $64.95.

- **EZ Ware Corporation**
  17 Bryn Mawr Ave.
  Bala Cynwyd, PA 19004
  215/667-4064

  **Tax-Prep**
  Personal income tax preparation templates designed for use with Microsoft Multiplan. Tax-Prep incorporates all new tax laws and IRS regulations for the 1984 tax year. The program includes 22 IRS schedules and forms, which are presented on the screen as working templates; any information you enter is automatically applied to all other appropriate forms and schedules. Tax-Prep can also be tied to other Multiplan templates, such as checkbook, ledger, and expense records, to simplify year-end computations. List price: $99.95.

- **SoftWeave Company**
  400 Mobil Ave., Bldg. D, Ste. C
  Camarillo, CA 93010
  805/388-2626

  **MacInTax**
  A federal income tax program for individuals. You use the mouse to move to the appropriate sections of the displayed form, then enter information. Calculations are performed automatically. MacInTax includes the complete IRS instruction book on disk; double-clicking an item gives you access to the instructions and worksheet for that item. Information can be printed on a standard IRS form, or the program's form, including your calculations, can be printed on a blank sheet of paper. List price: approximately $75.

- **MicroLab**
  2699 Skokie Valley Rd.
  Highland Park, IL 60035
  312/433-7550

  **Tax Manager**
  A tax planner and preparer that calculates, prepares, reviews, and prints federal income tax forms. The program helps you determine which forms to file and which deductions to claim. It automatically selects the tax method that saves you the most money. When you change an entry, the program automatically adjusts related information. This feature allows you to examine different tax strategies. List price: $180.
In order to have both sides of Form 1040 fit on two sheets of paper, choose Page Setup from the File menu and reduce the top and bottom margins to 0.1 inch as shown in Figure 3. To set the page break for the completed form, click cell R4C1 and choose Set Page Break from the Options menu. A broken line appears to indicate where the page will break when the form is printed.

**Protect the Template**

Multiplan allows you to protect your document, preventing the accidental alteration of labels and formulas. A document is protected with a password, which you must enter before you can change the document.

Some cells, however, should be left unprotected so that you can enter tax figures into them. Therefore, you must specify which cells to leave unprotected before protecting the entire spreadsheet. To leave a cell or range of cells unprotected, you select the cell or range of cells and choose the Remove Cell Protection option on the Options menu. Table 2 shows the cells that should be left unprotected. After you remove the cell protection, you can protect the rest of the document by selecting Protect Document on the Options menu.

Figure 4 is a sample of a protected 1040 template. A protected document does not display cell division lines or row and column numbers. Unprotected cells, in which you enter tax information, are indicated by dotted lines. Each time you press Enter after you type a number, Multiplan prompts you by highlighting the next unprotected cell, where you enter another value. Pressing the Enter key moves the selection to the next unprotected cell.

**Use Your Template**

Your IRS Form 1040 template is now ready. Use it to figure your 1984 taxes and to plan for 1985. Try putting in different values for deductions to see their effects on your taxes. These “what if” experiments can be useful in planning tax strategies.

If you're ready for more after your success with this 1040 template, try typing in the schedules that appear at the end of the Form 1040 booklet. You can use Multiplan's LOOKUP function to incorporate the schedule information into the template. Or you might link the Multiplan template to other worksheets that calculate such totals as business income, capital gains, or rent and royalty figures. The more you work with it, the more you'll find that Multiplan can make the idea of April less taxing on the spirit, if not the checkbook.

Vahé Guzelianian is the author of Becoming a MacArtist (COMPUTE! Publications, 1985).
Figure 4
When the template is protected, the gridlines disappear. Unprotected cells appear as dotted lines. You can enter figures into unprotected cells without the risk of accidentally changing formulas or labels. After a figure is entered in an unprotected cell, the next unprotected cell is selected automatically.
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Circle 93 on reader service card
Open Window
An exchange of Macintosh discoveries

Edited by Jim Heid

Open Window offers tips to help you use your Macintosh more efficiently. Submitted by readers, industry experts, and the Macworld staff, items in this department address all facets of Mac work, from applications to programming routines to capabilities of the Mac and software not covered in the documentation.

This month’s Open Window presents a variety of tips: several methods of ejecting a disk that are faster than using the Eject command, a technique for placing text and graphics on the same line in a MacWrite header, and a way to produce shadowed text in MacPaint. For Multiplan users, we present a formula that lets you calculate the approximate difference in time between two dates. And for would-be telecommunicators, we offer a simple hardware project that lets you use Anchor Automation’s Volksmodem with the Macintosh.

Dating with Multiplan
Microsoft Multiplan has no built-in function that calculates the difference, in days or years, between two dates. The formula presented in the figure “Multiplan Date Calculation” does the job and is accurate to within one or two days, depending on how many leap years are involved in the calculation.

To use the formula, type it into the cell where you want the difference between dates to appear. Type the formula carefully, making sure not to omit any parentheses. Next place the earlier of the two dates in a cell, and name the cell DATE1 by choosing Define Name from the Select menu. Place the later of the two dates in another cell, and name that cell DATE2.

As shown in the figure, the formula returns the difference between the two dates in years. To obtain the difference in days instead of years, delete the last four characters of the formula (/365).

Edward J. Artz
Landenberg, Pennsylvania

Model 100 Compatibility Update
We have received several inquiries about the item concerning file compatibility between the TRS-80 Model 100 and the Macintosh (see “Model 100 Compatibility,” Open Window, Macworld, December 1984), in which it was suggested that MacTerminal could be used to receive files. Unfortunately, it can’t. The explanation follows.

The structure of text files on the Model 100 and on the Mac is the same; each line within the body of a paragraph terminates with a Carriage Return (CR-ASCII 13), and the last line of each paragraph terminates with a CR plus a Line Feed (LF-ASCII 10). Thus when you transfer files, you need to make an exact transfer of a text file from the Model 100 to the Mac, byte for byte, and the line and paragraph formatting of the file is preserved.

This kind of formatting task is trivial for most communications programs but not for MacTerminal. The only way MacTerminal can separately receive a file is with the Xmodem protocol, which the Model 100’s TELCOM program cannot use.
The other way to receive a file with MacTerminal is with its Record Lines Off Top option in the Command menu. But the success of the process depends on the text file being displayed accurately on the MacTerminal screen. As each line ending with only a CR is received by MacTerminal, the text display jumps back to the beginning of the line without moving down one line; therefore, each line is overwritten, the whole paragraph is displayed as a single line of text, and the file is saved in this corrupted form.

A New Line feature appears in MacTerminal's Settings Terminal menu, which the program documentation suggests will convert CRs into CR-LF combinations. This feature is exactly what we need for file transfer; however, the feature doesn't work the way the documentation describes. Instead it converts LFs into CR-LF combinations—the opposite of what we require.

MacTerminal performs some complicated communications tasks well, but not this simple one of accurate text file transfer. My suggested solution is to use one of the public-domain communications programs. MacTerm, available free on CompuServe's MicroNet Apple User's Group (MAUG) or from your local user group, is guaranteed to work admirably.—Andrew Fluegeman

**Volksmodem Goes Mac**

I recently purchased an Anchor Automation Volksmodem for $69.95 from an information service to complain, I visited my local electronics parts store and bought one five-pin DIN connector, one male DB-9 connector, a D subminiature connector hood, and a 2-foot length of four-conductor cable. After a brief bout with a soldering iron, I had the cable I needed and proceeded to join the telecommunications age. The wiring details are shown in “The Volksmodem Connection.”

Stephen Dubin
Philadelphia, Pennsylvania

**Better Shadow Text**

I like to use shadow text in MacPaint graphics, but the large font sizes have too much space between letters for my taste. A better way to get large shadow text is to start with plain text (choose the Plain Text option on the Style menu) and shadow it by selecting it with the marquee, holding down the * and Shift keys, and pressing the E key. The resulting shadow letters have less space between them (some may even touch) and look better (see the figure “The Shadow”).

Marc Reimer
Stamford, Connecticut

**Graphic Headers**

When writing business letters, I like to include my company's logo in the header of each page. It's a simple matter to design the logo with MacPaint, then cut and paste it into the Scrapbook for later pasting into MacWrite.

The dark cloud in this scheme, however, is that MacWrite cannot mix text and graphics on the same line. This limitation means creating a rather long header when I want to include the date and page number along with my logo.

I found the solution to the problem by accident. While MacWrite doesn't let you place text on the same line as a picture, it does let you place the header window's date, page number, and time icons on the same line. With this information in mind, I returned to MacPaint and used the text tool to type "Date:" and "Time:" in the upper-right corner of the drawing window.
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Circle 84 on reader service card
The above tips work, but they leave you open to possible disk troubles. When you eject a disk the "right" way—using the Eject command from the File menu—the Mac updates the disk's Desktop file, an invisible file that contains important disk information, including the names and positions of the icons on the electronic desktop. If you eject a disk any other way, the Desktop file is not updated, which can cause problems such as lost files, folders, or applications. (See "Resurrecting Disks," Get Info, Macworld, July/August 1984, for more information about the Desktop file.)—Ed.

Perhaps you've come up with a nifty routine, gained some insight into how the Mac or an application program works, or even written a short program that performs a useful function or creates an interesting diversion. Tell us about it, and we'll pass your discovery along. We'll also pay $25 to $100 for each Open Window item published. Please send your Macintosh discoveries on disk (which we will return) to Open Window, Macworld, 555 De Haro St., San Francisco, CA 94107, or electronically to CompuServe 74055,412 or The Source STE908.

Doris R. Dant
Orem, Utah

(see the figure "Graphic Headers I"). I then pasted the new graphic into the Scrapbook, quit MacPaint, started MacWrite, and pasted the graphic into the header window. Finally, I dragged the page number and date icons into position, and voilà—text and graphics on the same line (see the figure "Graphic Headers II").

Ken Mayer
West Hartford, Connecticut

Turbo Eject

Getting a Mac to release a disk can be a time-consuming process. You have to quit the application you're using, wait until the desktop appears, then use the Finder's Eject command. To get around this long process when using MacWrite, I choose the Save As command and then click the Eject button that appears under the disk's name. An alternative is to close any open documents, choose the Open command from the File menu, then click the mini-Finder's Eject button. This technique works with any application that has an Open or Save As command.

I've also found a way to eject the disk quickly and restart my Mac when using MacPaint. Choose the Quit command from the File menu and then, just before the screen clears, hold down the ⌘ key. The disk ejects, the Mac beeps, and the "where's the disk?" icon appears—just as if the Mac were turned off and on. If this trick doesn't work the first time you try it, you're not holding down the ⌘ key at the right time; the exact timing comes with practice.

Doris R. Dant
Orem, Utah

The above tips work, but they leave you open to possible disk troubles. When you eject a disk the "right" way—using the Eject command from the File menu—the Mac updates the disk's Desktop file, an invisible file that contains important disk information, including the names and positions of the icons on the electronic desktop. If you eject a disk any other way, the Desktop file is not updated, which can cause problems such as lost files, folders, or applications. (See "Resurrecting Disks," Get Info, Macworld, July/August 1984, for more information about the Desktop file.)—Ed.

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THE BERNOLLI BOX™

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The Mac Goes to the Movies

Anthony Reveaux

It was only a matter of time before Hollywood welcomed the Macintosh, that most visual of computers. Undoubtedly, the Mac's most important role won't be played in front of a camera but behind the scenes. Making movies is a complex undertaking; art, technology, and complicated logistics come together according to split-second timetables. Computerization has come slowly to Tinseltown, but film and television studios now use Macs in the production of feature films, documentaries, and commercials. Macs facilitate tasks ranging from writing scripts and designing sets to balancing budgets and keeping track of cast and crew.

The Macintosh has successfully been integrated into the production process used by large studios to make multimillion-dollar films. The Entertainment Effects Group (EEG) of Los Angeles, the special effects company responsible for the spooks and surprises in Ghostbusters, started using computers with the Apple IIe. When EEG saw what the Macintosh could do, the studio bought more than 30 of the machines for its work on 2010, the sequel to Stanley Kubrick's landmark science-fiction film 2001. All 15 EEG departments, including camera, purchasing, optical, and models, use Macs in highly specialized areas of film production.

The camera crew of 2010 used a Mac to perform the many record-keeping requirements of cinematography. On most film productions, the crew shoots scenes according to an often complicated schedule that brings together a different combination of actors, technicians, props, and equipment for each scene. Cinematographers usually maintain an inventory of film types for different lighting conditions. Like painters, they match film and light to achieve a desired "look" throughout the movie. And editing the film would be nearly impossible without the camera reports that record each shot taken in each camera. The reports include scene, shot, and take numbers;

Stage Manager

Thaine Morris keeps Apart the models of Io and Europa, two of Jupiter's moons, that were used in the production of 2010. As stage manager at the Entertainment Effects Group in Los Angeles, Morris tracks equipment and material with the Mac. "I use it like a giant filing cabinet," he says.
film type; lens used, including focal length and aperture setting; footage, or the length of each shot in feet of film; and whether the shot should be printed (shots that are obviously unusable are not printed). In the 2010 shooting schedule, stock inventory, and camera reports, the Mac replaced less efficient manual record keeping.

A large-scale production requires the acquisition of many different materials. Purchasers have to know where to find vendors who supply everything from film and lumber to automobiles and costume fabrics. For a movie like 2010, it isn’t unusual for a purchasing department to deal with over 500 vendors. EEG’s purchasing department uses Habadex to expedite purchases because the program categorizes vendors and service providers, whose telephone numbers can then be dialed automatically. Purchasers no longer have to search through lists and Rolodex cards for the phone numbers of vendors who, for example, specialize in plastics for finely detailed models.

The EEG purchasing department also handles the hiring of production personnel, from set builders to lighting specialists. For 2010, Habadex was also used for payroll information to cross-reference the 120 union employees who worked on the production with all the local unions and their different rate schedules. EEG didn’t put a Mac on the moon while working on 2010, but it did make the Mac an invaluable globetrotting companion. The film crew took the computer along on location in London, Paris, Rome, and Cairo. The Mac and a simple phone call would have saved thousands of dollars if, for example, a last-minute script change made in Hollywood eliminated a desert scene. A phone call would have alerted the crew in time to prevent payments for the location, extras, props, and rent-a-camels. In countries like Italy and Egypt, the language barrier and less than state-of-the-art telephone service make international calls undependable. The Mac earned star status overseas as a reliable means of communication because the production company was able to use a modem and communications software to send and receive telexes through Western Union’s EasyLink system, which bypasses local telephone service.

Chief Camera Assistant
As chief camera assistant on the production of 2010, Pete Romano entered camera logs on the Macintosh to keep track of scenes, shots, and takes.
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Special Effects

The Macintosh has sped up the work of special effects departments by helping them build models and organize the superimposed images that create illusions. The model shop supervisor is responsible for creating all the models and miniatures that appear as full-size objects in the finished film.

In 2010 models of rockets, space stations, and landscapes of other worlds were built with the assistance of the Macintosh. EEG's model shop supervisor used his Mac to sketch scaled plans and to keep notes on all the needed parts and supplies. As the design for a miniature spaceship changed during the early stages of production, the supervisor could quickly modify the plans in MacPaint and distribute printouts to the model builders.

Special effects in movies are often the result of intricate combinations of images, called composites, fitted together like jigsaw puzzles in motion. A shot of a spaceship crossing the face of the moon, for example, is actually a composite of at least three shots: a shot of the spaceship model, a painting of the moon, and a star-pattern background. 2010 required 297 composites. The film's optical department, which coordinated the production of composite shots and other opticals such as dissolves and fades, used a Mac to keep up-to-date information on the numerous shots that formed the composites. The completion of opticals must meet the production schedule to avoid extra cost. The optical department must know the components of each composite, its progress in the work flow, and any changes the director may have requested. The Mac was a great improvement over manual updating methods, which involved filling out numerous paper forms and charts in triplicate.

Independent Filmmaking

Big-budget movie studios aren't the only film producers assisted by the Macintosh. The Mac's speed and cost-saving ability are even more valuable to independent filmmakers, who usually have to produce films on a shoestring budget, than to well-financed studios. The independent production company Foresight Films is using Macs in the production of Passing through Linden, a public-interest project with limited funding. The feature-length film about industrial sources of chemical pollution was written by Paul Brodeur, who

Independent Producer

Based on the West Coast, Thomas Brown of the independent production company Foresight Films works with coproducer Meg Switzgab on the East Coast through Macintoshes and modems. Foresight Films is developing an electronic storyboarding system that allows real-time simulation of film or video productions, one of several software packages being designed specifically for the industry.

Macworld 135
NOTE:
SCENIC STILL PHOTO CHANGES WEEKLY

01-03

MUSIC: EYEWITNESS NEWS THEME
ANNOUNCER: From KDKA-TV2...

03-04

PICTURE FADES, LOGO FLIES FORWARD
ANNOUNCER: ...in Pittsburgh

04-05

MUSIC PICKS UP TEMPO
KDKA LOGO FLIES FORWARD

06

WE ARE DRAWN TOWARDS THE "A" IN KDKA WHICH BECOMES A TUNNEL...FT. PITT TUNNEL?

07

THE TEXTURE OF TUNNEL WALLS FLY BY WE'RE ALREADY EMERGING
MUSICAL EFFECT: Wind Noise

08

WE ENSURE FROM TUNNEL TO SEE PITTSBURGH SKYLINE. IT DARKENS AS LIGHTS BEGIN TO COME ON

09-09

SKY DARKENS MORE AND MORE LIGHTS COME ON

09

WE CONTINUE TO ZOOM INTO CITY. DARKER AND MORE LIGHTS

10-10

CONTINUE TO ZOOM, MORE LIGHTS
LOGO FLIES INTO PICTURE

11-12

ANNOUNCER: Eyewitness News...

12/DISS

ANNOUNCER: Update

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wrote the feature film Stuntman. All the proposals, scripts, and budgets for Passing through Linden were written with MacWrite.

Another area in which the Mac has proven itself is fund-raising. Linden's producers used one Mac on the East Coast, another on the West Coast, and a third for traveling. The producers relied on up-to-the-minute information to raise funds for the film's continuing production expenses. Each Mac was equipped with a modem and Apple's MacTerminal communications program so that the producers could be in constant contact with other telephonic, MCI electronic mail, and EasyLink. Scripts and storyboards, in the form of Write and Paint documents, were transmitted electronically—and immediately.

Foresight Films also experimented with MacPaint to prepare storyboards. Storyboards are series of simple sketches resembling comic strips; they are an economical and visual way to plan a film. The sketches represent shots and scenes so that the production can be thoroughly planned before money is spent on film, equipment, locations, cast, and crew—each of which is more expensive than either pencil and paper or ImageWriter printouts. For example, a scene that shows how chemical wastes are produced during manufacturing was planned on a storyboard. The film crew therefore knew which parts of a factory and which stages in the manufacturing process it had to film and from what angles in order to come away with the shots needed for the scene.

Commercials and Television
Commercials may not last long on a television screen, but they are difficult to make because they must capture the viewer's attention and persuade him or her to make a purchasing decision in seconds. Commercials, with their short production lead times, special effects, and intense work schedules, are prime candidates for computerization. Hartwick/Przyborski Productions of New York and Pittsburgh is a commercial production company that calculates bids with Multiplan, creates budgets with Microsoft Chart, and telecommunicates production information with MacTerminal.

Hartwick/Przyborski also uses MacDraw to design sets in its three studios. Each studio's floor plan is kept as a master MacDraw document. Frequently used set components, such as furniture, backdrops, and lighting equipment, are copied from files that serve as image libraries. MacDraw's ability to manipulate shapes and superimpose images allows set designers to rearrange a set without redrawing plans.

The Mac is used not only to make commercials but also to program and manage daily broadcast television. Art Greenwald, a special projects producer for KDKA-TV in Pittsburgh, creates elaborate storyboards for commercials and sequences in dramatic productions. Most storyboards use simple line drawings to give a quick impression of a scene. Certain storyboards, especially those used in the later phases of video or film production, have to convey details to set designers and camera technicians, such as when part of a character's face should be in shadow. Greenwald points out that MacPaint permits him to provide the necessary detail with shades and textures. Final touches on the hero's moustache or the villain's getaway car give designers a clear idea of a producer's or director's expectations.

The Future
What additional help from the Macintosh can film and television producers look forward to? Specialized software is being developed for the film industry by American Intellware. Intellware product designers say that the program, called MacPATS (Film-Advertising-Television System), will have components for writing scripts, preparing storyboards, scheduling production, and planning budgets.

Set Design
Producers at Hartwick/Przyborski Productions design sets with MacDraw. The set design in the figure shows the position of cameras, lights, props, and actors for a Sears commercial. MacDraw permits the producers to rearrange elements of the set quickly during planning without creating entirely new drawings for each change.

As surely as the next box office hit will have a sequel, the Mac will have a growing role in film production. Macs have been delivered to Industrial Light & Magic (IL&M), George Lucas's special effects group responsible for the visual razzmatazz in the Star Wars trilogy and Raiders of the Lost Ark. In the months to come IL&M and other production companies will see how the Mac can be used in special effects and other aspects of film production. Don't be surprised if soon, at a theater near you, the credits include "Computing by Macintosh."
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Dirk van Nouhuys

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BUSINESS SOFTWARE

(For all 52 shipping and handling for each title ordered from below.)

APPLE

ATMAC Coach
Creative Solutions MacForTh Level I
Creative Solutions MacForTh Level II
Desktop Software 1st Base
Dillihunt PC to Mac & Back again
Dow Jones Software Streetlight
Funhouse AM Man.
Haba Hohibe
Harvard MacManager
Human Edge Communications Edge
Human Edge Management of Sales Edge
Human Edge Mind Probe
Living Video Video Drive Tank
Main Street Main Street File
Main Street Main Street Writer
MegaBase Megahorse
MegaHorse Megafitter

PRINTERS

Apple ImageWriter 10" Cantelope $496.00
Apple ImageWriter 15" Cartridge $390.00
Epson RX FX 80 10" Printer $287.00
Epson RX FX 90 10" Printer 100 CPS $220.00
OkiData ML 931 Mac $860.00
OkiData ML 151 Printer 150 CPS $260.00
Kyocerawriter Lock-Aika $287.00
On-Tray Lock-Aika

ACCESSORIES

(Freight minimum $1 per item)

Apple Macintosh Carry Case $74.00
Apple Macintosh Security Kit $27.00
Apple Numeric Keypad $74.00
Intracomm Magic Phone $199.00
Intracomm Magic Phone II $29.00
Intracomm Magic Phone III $29.00
Koss MacWizard $210.00
Kodak Diskette Drawer $20.00
Kodak Stacker C 173 $21.00
Kodak Stacker NT $22.00
Kodak Stacker NT 1000 $21.00
Kodak Stacker NT 2000 $21.00
Kodak Stacker NT 3000 $21.00
Maxell Mac Diskettes (Box of 10) $10.00
Micron Tech Mouse Eye $275.00
Mouse Systems Mice Mouse $157.00
PC Network Mouse Devices (Box of 10) $30.00
SIRW Champing Disk Box $2.70
SIRW Blue Disk Box $2.70

HARDWARE

(Add 2% to the member price for each item for shipping and handling.)

APPLE

Complete Macintosh System $3,590.00
Apple Macintosh IIc $925.00
Apple Macintosh IIe $1,198.00
Apple Macintosh IIx $1,596.00
Apple Macintosh Plus $396.00
Apple Macintosh Classic $288.00
Apple Macintosh SE $396.00

Disk Drives

Apple 408KB External Drive $351.00
Apple 2MB Hard Drive $495.00
Apple 2MB Hard Drive $396.00
Apple 396.00
Apple 4.2MB Hard Drive $795.00
Apple 5MB External Hard Drive $895.00
Apple 10MB External Hard Drive $1,095.00
Apple 20MB External Hard Drive $1,596.00
Apple 30MB External Hard Drive $2,356.00
Apple 40MB External Hard Drive $3,350.00
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It's hard to draw with a bar of soap. —A Macintosh artist

Since we can't respond individually to all the queries we receive about entering the Macworld Art Contest, we'll print the contest rules again here. You don't need an entry form; just send a paper copy of your original artwork and a description of how you created it to Macworld Gallery, 555 De Haro St., San Francisco, CA 94107. All drawings are eligible for the art contest. Drawings are viewed each month by a panel of five judges, who choose one winning drawing ($500 is awarded) and two runners-up (two $250 prizes are awarded). Prize-winning drawings become the property of Apple Computer. In November 1985 a grand-prize winner ($5000) and two runners-up ($2500 each) will be chosen from among the year's winning drawings. In addition to the prize-winning drawings, several pieces are exhibited each month in the regular Gallery section; those exhibitors are paid $25 each.

If your drawing is selected, we will ask you to send a copy of it on disk. Please include your phone number with your submission. All disks become the property of Macworld.
$500—First Prize

Self-Portrait
I wondered if I could paint with the Mac as I would with a brush on canvas. As shown by this self-portrait, the answer is yes, right down to mixing paint on the palette. I started off by designing new dot patterns with the Edit Pattern function to create additional tones for the fine differences in shadows. Then I covered my “canvas” with a light half-tone and began to paint, alternating among the three smallest brushes. I find it exciting that this image could not have been created in any other medium.

Mark Wood
Batesville, Arkansas

$250—Second Prize

Bamboo
The principal tools I used in this painting were the spray can and the eraser. I applied the darker pattern first, then spray-painted over that in white to create the characteristic streaks of bamboo. I painted the leaves with the medium-size brush and shaped them with the eraser. I drew the lighter background leaves first, then drew the darker leaves and moved them into position with the lasso. I drew the signature and the seal in FatBits.

Van Chi Lau
Jamaica Plain, Mass.
**$250—Second Prize**

**Bottles**
My usual medium is oil on canvas, but my husband and my friends kept insisting that I try drawing with the Macintosh. Since I concentrate on light and detail in my drawings and paintings, I didn't think a computer would be adequate for my particular needs. When I followed their advice, however, I was delighted with the possibilities offered by MacPaint. I think the Macintosh offers alternatives to traditional engraving or lithography techniques. This drawing was done entirely free-hand with the pencil, the paintbrush, the eraser, and FatBits.

Anamario Pinto  
Washington, D.C.

6:30 a.m., 100 Million B.C.
I began by sketching the dinosaur with a thin paintbrush. I added texture and shading with different brushes and patterns. I used FatBits to add detail to the face and the upper neck. I added the sky, the mountains, the land, and the water with the pencil, the brush, and the paint bucket. Each plant was designed individually to add an exotic touch to this prehistoric scene.

Gerald Katz  
San Francisco, California
The Laundress

While playing with MacPaint I became intrigued with its similarities to woodblock prints. Accordingly, I decided to experiment with this effect. I began by filling an entire page with black, filling individual screens with the paint bucket and moving around the full drawing area with Show Page. Using the pencil, I drew the outlines of the figure and the sink. I then filled in various areas with different textures, treating the paintbrush as a chisel and leaving black areas similar to those found in woodcuts.

Sara Robb Sullivan
La Mesa, California

The Laundress
Electronic Composition for Macintosh

The September '84 Scientific American predicted a computer that would "display a fair approximation of the pages it will print, including the placement of each item, and the typeface to be employed," and that would allow a user to "manipulate page geography directly by means of a mouse." MacPublisher transforms your Macintosh into such a computer.

Multi-Column Text and Mixed Graphics

MacPublisher turns your Macintosh into a text and graphics editing, layout, and page-make-up system that produces multi-column newsletters, fliers, catalogs, ads, etc. Overcoming certain limitations of MacWrite and other word processors, MacPublisher allows several articles and pictures to be on the desktop at the same time. Articles may be clipped and carried over to other columns and/or pages. Pages are made up using MacPublisher's Layout tools. The MiniPage shows a "What You See Is What You Get" representation of a full page layout. The Dummy Page shows articles and pictures as blocks with numbers of lines, characters, and page, column continuations. Standard size ImageWriter printouts may be directly offset or photocopied for small-volume publishing. If you are lucky enough to have access to Apple's new Laser Printer, your output quality rivals the best typesetting equipment. All the Macintosh Fonts, Styles and Sizes are available, but they may only be changed for complete lines or text. MacPublisher is not a typesetting front end for communications to a typesetter. It is a complete text and graphics layout package for organizations that are satisfied with the quality of Macintosh fonts and QuickDraw pictures for small-scale publishing.

Unique Scissors, Camera, and Ruler

The Scissors drag a miniature outline of an article to be laid out on the MiniPage. An invisible grid maintains 1, 2, or 3-column format. The grid can be turned off for Free Form layout. Once dropped in place, articles can be repositioned with the Scissors.

The Camera takes pictures of anything that has been copied into the Clipboard from MacPaint, Chart, clip art, etc. You use a miniature "through the lens" Camera to crop the margins and frame your Picture.

The Ruler is a movable, see-through desk accessory. Simply Click anywhere in its transparent window and it measures in Inches, Pixels, or in Lines of the point height of the underlying text, whether full size or 44% reduced scale of the MiniPage.

See Your Dealer or Call Boston Software

Boston Software wants to put you on its MacPublisher Mailing List. We'll tell you about our carbon ribbons to enhance the output of your ImageWriter™, clip art for professional newsletters, and MacLock™ an improved Mac security kit/table clamp.

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BOSTON, MA 02132
617/327-5775
All of the examples on this page were done in MacPublisher, including the paragraph you are now reading, which is a justified text article of variable width (more than 2/3 page but not quite a full page).

To the right is the first page of the Sample News you worked on in Chapter 3.

To the lower right is an advertisement for MacPublisher in Three-Column Formal; if you have sharp eyes, note that the illustration in the middle is actually a MiniPage of the ad itself being laid out, and the smaller illustration is a Dummy Page of the same thing.

To the lower left is an imaginary restaurant menu: most of the Articles on the page feature justified text and are of standard widths (one or two thirds of a page), but all items were dropped in Free Form in order to place them at random spots on the page.
MACWORLD now offers an exciting opportunity for entering the Macintosh market

THE MACWORLD DIRECTORY

The Directory, premiering in our May 1985 issue, provides advertisers with a highly cost-effective way to become a part of the growing Macintosh marketplace.

The Directory
- consists of easily accessible listings that are organized into product categories.
- allows advertisers to select the category in which the listing will appear or even to create new categories.

The Market
- will at least double from 1984 to 1985, based on International Data Corporation's projection of Macintosh shipments.

The Excitement
- begins with MACWORLD's well-qualified audience. Mac owners constitute 76% of our circulation (based on our 1984 reader survey).
- increases as your company grows right along with both MACWORLD and the market.

With the expected rapid growth of the Macintosh market, now is the strategic time to establish a strong market share. And the MACWORLD Directory provides the cost-efficient vehicle to do so. Reserve your listing in our Directory and come grow with us!

For further information, please contact account manager Niki Stranz at 415/621-3147 or 800/872-7808 in California, 800/872-7800 outside California.

MACWORLD
The Macintosh Magazine
555 De Haro Street
San Francisco, CA 94107
GATEWAY

CAN YOU
DISCOVER THE
SECRET OF
THE GATEWAY
TO OTHER WORLDS?

Your late uncle has left a legacy of mystery and adventure in the decrepit old building he has willed to you. The building houses a fascinating array of strange weaponry and bizarre artifacts, but these are as nothing compared with the potential treasure alluded to in a yellowing journal you find in the office of Uncle Bert's "Weapons Shop." If the journal is to be believed, he has handed you nothing less than a Gateway to other worlds, worlds of infinite treasure, adventure, and danger.

But, it isn't going to be easy. Bert didn't tell you where the Gateway is, or how to find it. But there are clues—the worlds of adventure beyond the Gateway can be yours, if you can decipher those clues. Then, all you have to do is embark on your Quest... and survive!

Also Available: The thrilling Sci-Fi adventure Forbidden Quest. Journey on two starships to three treacherous planets.

GATEWAY is currently available for Macintosh for $49.95. Forbidden Quest is available for Macintosh, Apple II series and IBM-PC and PCjr. Mac version $44.95, others $39.95.

Also Available: The thrilling Sci-Fi adventure Forbidden Quest. Journey on two starships to three treacherous planets.

From the publishers of Forbidden Quest, Priority Software presents

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Personal computing took a giant leap into the future when Apple introduced the Macintosh. We’ve created Macworld as your passport into this incredible new realm of computing. Each issue brings you everything you need to explore and get the most out of your Macintosh. From the latest product news to innovative business applications, from amazing graphics to personal productivity tools and games, each issue of Macworld is packed with interesting, practical, readable information written by skilled, perceptive writers.

Each month we’ll be creating a Macworld community; sharing ideas, problems, and creative solutions while we explore the world of Macintosh together.

So why take a chance on missing a single exciting issue? For a limited time only you can subscribe to Macworld at special Charter Subscriber rates of only

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Why thousands of Mac owners bought a $10.00 product they thought they didn’t need.

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A complete sheet music development package. Contains blank staff sheets for all keys, complete character sets and chord library. For use with MacPaint. Mouse Pad $12.95, Music Character Set $24.95. Use our 24-hour order line with your MasterCard or Visa. Personal checks welcome.

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Mouse Pad $12.95, Music Character Set $24.95

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