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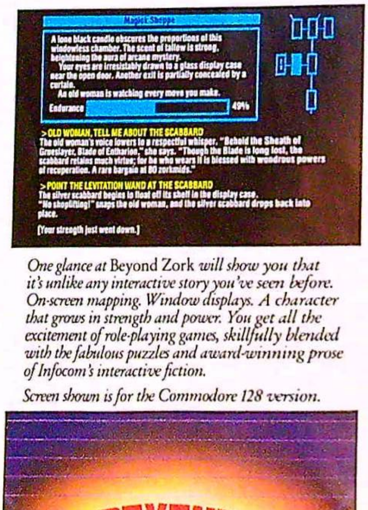

```
Magick Shoppe
A lone black candle obscures the proportions of this
windowless chamber. The scent of tallow is strong,
heightening the aura of arcane mystery.
   Your eyes are irresistably drawn to a glass display case
near the open door. Another exit is partially concealed by a
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>OLD WOMAN, TELL ME ABOUT THE SCABBARD
The old woman's voice lowers to a respectful whisper. "Behold the Sheath of
Grueslayer, Blade of Entharion," she says. "Though the Blade is long lost, the
scabbard retains much virtue; for he who wears it is blessed with wondrous powers
of recuperation. A rare bargain at 80 zorkmids."

>POINT THE LEVITATION WAND AT THE SCABBARD
The silver scabbard begins to float off its shelf in the display case.
"No shoplifting!" snaps the old woman, and the silver scabbard drops back into
place.

[Your strength just went down.]
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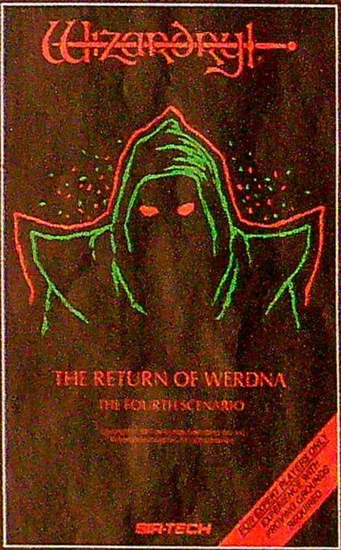

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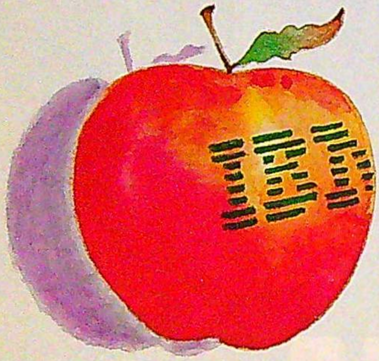

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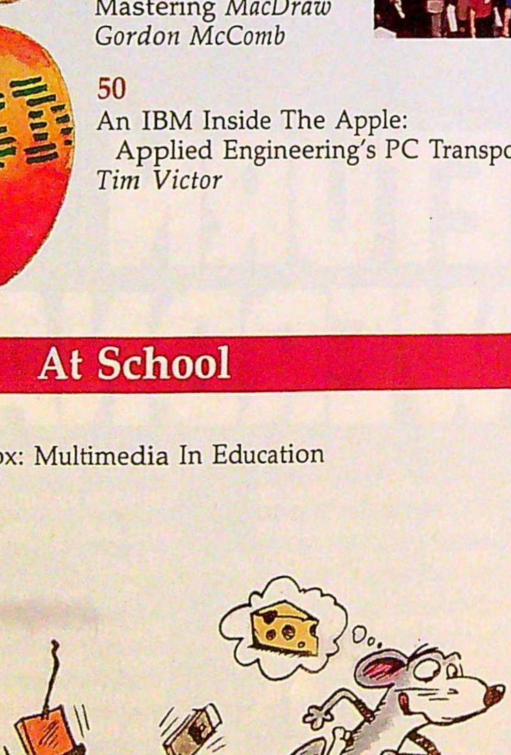

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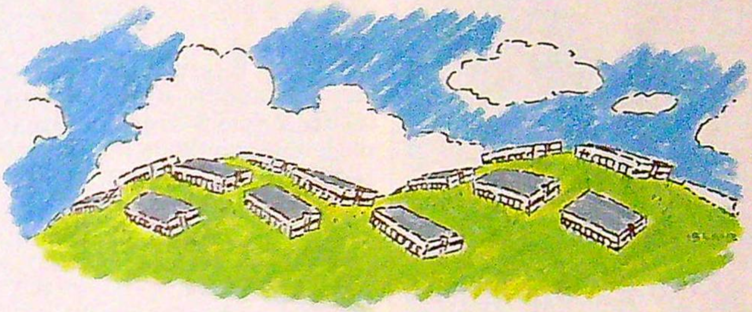

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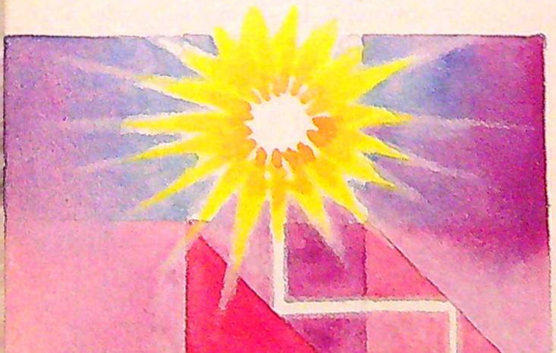

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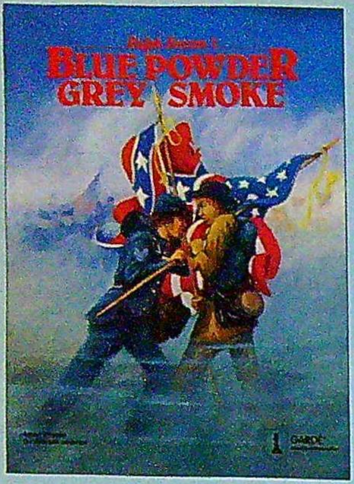

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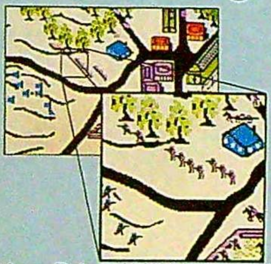

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Editor's Notes

The Apple II turned ten this year. During that time, an estimated 4 million Apple II computers have made their way onto desks at home, school, and work. In this business, where ten years is the equivalent of a geological eon, Apple's birthday celebration is certainly justified.

The stratum lies thick with computer fossils, Apples among them: Osborne-1, TI-99/4A, PCjr, Coleco Adam, Apple III, Commodore VIC. Just a few of the machines whose remains can be found in the past *five* years. The Apple II has been around double that. No other microcomputer line can match that for durability.

In recent years, though, *Apple* and *II* weren't words automatically connected. When the Macintosh appeared in 1984, the Apple II line took a back seat. Apple watchers saw the Macintosh take the company's time, talent, and dollars away from the Apple II.

Some observers think that's still happening. Product announcements, always an indication of how strongly Apple is supporting its two lines, lean heavily on the Macintosh. Two new Macintosh computers—the SE and the II—were announced in 1987. The Mac's *HyperCard* and *MultiFinder* were the most important Apple software announcements of the year. In contrast, Apple's sole significant contribution to the Apple II line was the IIGS Finder.

That's why AppleFest was such a bright signal to so many followers of the Apple II. It was the first Apple II-specific show in years, the first where Apple itself made a major effort at spotlighting the II. It will go a long way toward calming fears that the company is obsessed with the Mac, and that the Apple II computer's days are numbered.

It wasn't just the more than 23,000 people who attended the show, nor their partisan enthusiasm for the Apple II. Nor was it the wealth of software and hardware. The importance of AppleFest was demonstrated best by Apple's presence on the show floor and by the appearance of Apple Computer's biggest names.

Apple's booth was the show's largest. Taking an example from other computer manufacturers at other computer shows, Apple sheltered several third-party software and hardware efforts under its umbrella. In an area set aside for special education, for example, there were demonstrations of the Unicorn keyboard and Adaptive Firmware Card.

In other locations, Apple set up Apple IIe's, IIc's, IIGS's, and Macintosh Plus's for people to

All the Apple II programs in this issue are available on our companion Apple Applications Disk. This 5¼-inch disk, formatted for both DOS 3.3 and ProDOS, runs on any Apple II+, IIe, or IIc. You can order this disk ($12.95 plus $2.00 shipping and handling) only through COMPUTE! Publications, either by using the card bound in this issue or by calling toll-free 1-800-346-6767 (in New York, 1-212-887-8525).

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Coming Attractions

Coming in the April issue of COMPUTE!'s Apple Applications:

Inside *HyperCard*. An in-depth look at *HyperCard*, the new information retrieval (and more) application from Apple. What it is, what it can do, and how you can customize or create your own stacks.

Stars. This outstanding simulation puts a planetarium in your home or classroom. See the night sky represented from any place on earth.

New Vistas: Gaming On The IIGS. What makes a good game on the newest Apple II? This survey of all the available IIGS games gives you a hint.

Locker. Secure your disks from prying eyes with up to four levels of protective passwords.

The Taxman Cometh. Get ready for April 15—and put your Apple or Macintosh to work on your taxes—after you see what tax preparation software's available.

Basketball Sam & Ed. A fantastic machine language game where you and your opponent not only *play* basketball, but *are* the basketballs.

pound on and play with. A mock classroom showed Apple's Classroom of Tomorrow concept and a gallery upstairs took visitors through a history of Apple Computer.

But it was the Apple people and what they had to say which was the best indicator of how the company feels towards its first machine. John Sculley, in a speech before Apple developers, almost gleefully noted that the Apple IIGS had an installed base of 200,000 by mid-September. He congratulated the developers for supporting the new (and the old) Apple II, then challenged them to find new ways to use the old technology. Duplicate such applications as desktop publishing or *HyperCard*, Sculley said, and you will be successful. Push the machine to its limits, then beyond. ''This isn't a great finale to a wonderful story,'' said Sculley. ''This is really just the beginning for the Apple II.''

Del Yocam, former head of the Apple II division when there was such a schism at Apple and now its Chief Operating Officer, admitted that one of his responsibilities is to make sure that there's a balance between the Apple II and Macintosh. More interesting, however, was his comment about Chairman John Sculley: ''John would be the first to say that he's come around, and he made some mistakes in not supporting the Apple II as strongly as he should.''

Admitting errors is the first step in correcting them. AppleFest was the first move in correcting the neglect showed the II.

That's not to say that Apple II users are completely satisfied. Apple still seems Macintosh-heavy. Brand loyalty is strong in computer owners, and Apple II users are no exception. Many even hesitate to embrace the Apple IIGS and its point-and-click software because it's too much like a Mac. But that's where the Apple II is heading. It now seems less likely that the IIGS is simply a stopgap measure before all Apples become Macs. The future of the II line must lie in its newest incarnation.

The IIGS *is* an Apple II, not just a slower, scaled-down color Macintosh. AppleFest, with all its hype and hoopla, made that point plain. Plainer still was Apple's attitude about the II and its place in the company and personal computing. As Sculley said, ''The Apple IIGS is, I hope, a very clear statement that we're going to continue to grow the Apple II technology.''

A clear statement, and one that had to be made.

Gregg Keizer

Gregg Keizer
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Apple News & Notes

Finally, The Finder

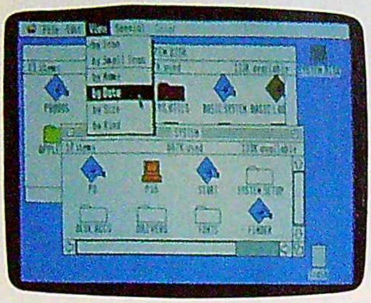
The implication has always been that the Apple IIGS is a junior, but more colorful, Macintosh—maybe not as fast or as powerful, but still with the strong influence of the Macintosh graphics interface.

Much of the most sought-after IIGS software looks like it could run on the Mac and no one would know the difference, *if* you turned off the color. *Deluxe Paint II, Writer's Choice Elite, Notes*N*Files,* and others use the pull-down menus, the dialog boxes, and the icons that the Macintosh typifies.

One of the revolutionary aspects of the Macintosh when it debuted, however, was its Finder, the desktoplike application that both launched programs and carried out file-maintenance tasks. The Finder was everyone's first introduction to the Mac's interface, for it was here that users learned how much easier it was to point and click to copy a file than it was to type in a long and hard-to-remember command.

The IIGS didn't include a Finder when it first shipped. Instead, there was the Program Launcher, which filled only part of the Finder's function. Now, with the recent release of the *Apple IIGS System Disk* version 3.1, the Finder finds its way to the IIGS.

To obtain *System Disk* 3.1, simply visit your local Apple dealer with a blank disk in hand. You'll be able to copy their disk onto your blank. If you want the updated manual which includes Finder information, however, you'll have to pay for it. Although Apple has frequently made its Macintosh system updates available on information services (CompuServe, GEnie, Delphi, The Source), unfortunately they haven't done the same for the IIGS Finder.



The IIGS's new Finder graphically shows the contents of any disk. More importantly, the Finder makes it possible to conduct all file maintenance chores with the mouse and on the desktop.

Folders, Files, And The Trash

If you're at all familiar with the Macintosh Finder, you won't have any trouble with this IIGS version. However, if you're a dedicated Apple II user, and haven't touched a Mac before, here's how the Finder works.

The Finder is a significant step in taking Apple II system software into the next generation, one of Macintosh-like power.

Each type of file—runnable application, binary, Applesoft, text—appears in a different iconic form. You can double-click (place the mouse pointer on and click twice in quick succession) on applications to run them, making it a simple matter to launch a program. ProDOS folders appear as just that—folders. You put files within folders by clicking on them (to select) and then dragging them to the folder. Removing files from folders is just as easy: Open the folder by double-clicking on it and then drag the file(s) out.

File maintenance—the kinds of things you would normally do with the *System Utilities*—can be handled from within the Finder as well. Such tasks as copying, deleting, renaming, and locking/unlocking are carried out using the mouse. Deleting a file, for instance, is done by dragging the file to the Trash, an icon appropriately shaped like a trash can. To copy a file, just drag it onto another disk. Disk maintenance chores—initializing, erasing, or copying a disk—can also be handled from the Finder.

And when you quit from a IIGS program written to Apple's specifications, instead of returning to the Program Launcher, you find yourself back at the Finder. All in all, it's much like the Macintosh.

Pink Folders And Orange Applications

The one menu choice in the IIGS Finder not found on the Macintosh's menu is, of course, *Color.*

Select a folder, file, or application by clicking on it. Pull down the Color menu and choose one of the 16 shades. The designated folder or file turns that color (and remains that color until you change it again).

With the Color menu, you can separate files from applications not only physically, but with color. Turn your applications orange, for instance, so that they'll stand out. Mark all your text files as pink and then put them into pink document folders. It not only provides an eye-catching arrangement on the screen, but has a purpose, too.

Slow Down

Detractors of the Finder will point out that it takes time to load when you first turn on the IIGS and that it's slow in displaying files when you open a disk or folder. True—when compared to a Macintosh.

But the Apple IIGS isn't a Macintosh; it's an Apple II. Once you remember that, the Finder is all the more amazing.

Using the Finder with just one 3½-inch disk drive is a wrist-wrenching lesson in disk swapping. On a two-drive system, with the System disk (which includes the Finder) in one drive and your application disk in the other, things work well.

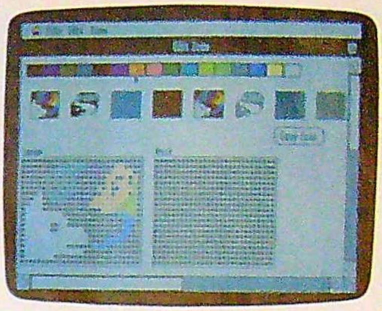
The best application of the Finder, however, would seem to be a hard disk. Some early Finder users with hard disks, though, reported frequent crashes. Conversations on one of the commercial telecommunications services were lively, to say the least, when the Finder and such crashes were brought up. Although many of the reported crashes were intermittent, messages from several users seemed to indicate that there was a Finder/SCSI compatability problem, especially when files were copied from one disk and/or folder to another.

One has to keep in mind that the Finder is only in version 1.0. Problems appeared with the Macintosh's Finder at various times as well, but were worked out by Apple or the supporting third-party manufacturer or publisher.

Customized Icons

Although not available at the time of this writing, the *Apple IIGS Icon Editor* promises to let you easily alter existing icons and create new ones for the Finder. The *Icon Editor* was written by Dan Oliver, one of the coauthors of the Finder. Version 0.2 (not a release version, obviously) was given to developers at an AppleFest dinner.

Icon Editor uses the now-familiar point-and-click IIGS interface. Modifying existing icons is simplest, but creating new icons isn't beyond anyone's abilities. The sketchy documentation included with the prerelease version of *Icon Editor* walks you through the procedure, from entering the icon's parameters to editing it in the Fat Pixel display screen.

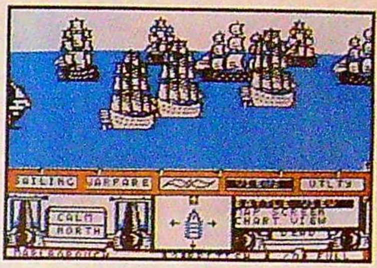


Apple's Icon Editor (still in prerelease form) lets you alter icons and create new ones in a FatBits-style fashion. Here, a new icon—Woof!—is built.

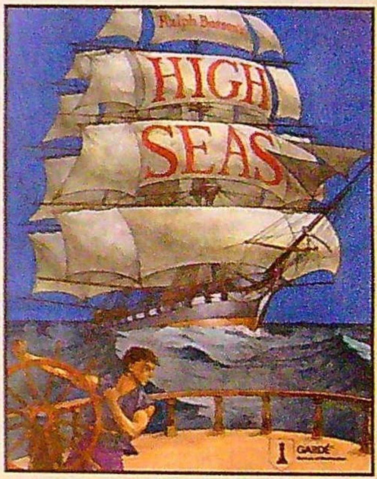
You can select colors from a color bar at the top of this window and then draw with the mouse. Icon masks (what appears when you click once on an icon in the Finder) can be created with a single command, or you can custom design them to your own specifications.

Quick Notes

- Motorola has announced volume production schedules for its newest microprocessor, the 32-bit 68030. Apple, along with other 68000-series supporters like Sun and Unisys, were part of the press conference in October. It's expected that the next generation of Macintosh computers will use the 68030.
- Microsoft has introduced a word processing alternative to low-end programs like *MacWrite* and *WriteNow*. The Redmond, Washington-based company's *Microsoft Write*, priced at $175, is a scaled-down version of its *Word*.
- Apple IIGS BASIC is in beta version, and if some of its proponents within Apple have their way, it may be bundled with the computer at some future date. A release version of IIGS BASIC, which fully supports the IIGS Toolbox, is expected sometime in early 1988.



From the crow's nest, your topman bellows, "Enemy ship ahoy!" You immediately order battle sails, your guns loaded and prepared to fire. You change your course in anticipation of your enemy's next move. Now, the wind is in your favor, and so is lady luck. Before the enemy captain can bring the ship about, you level a broadside amidship; crushing her main mast, taking sails and rigging down with it. She's dead in the water, gunports blocked by the fallen mast and sails. Your next broadside explodes into her hull, ravaging her decks; then another until finally, she strikes her colors. The prize is yours.



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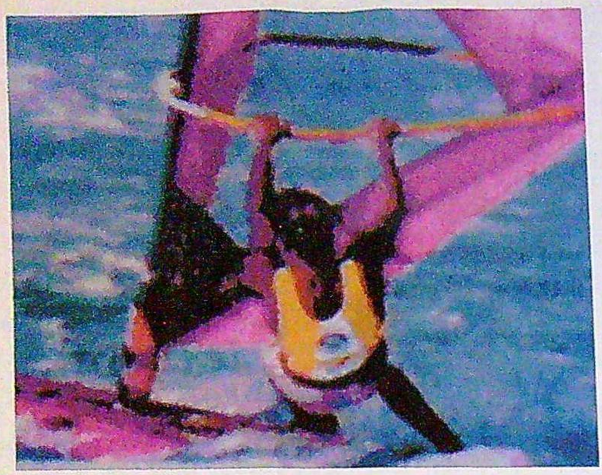
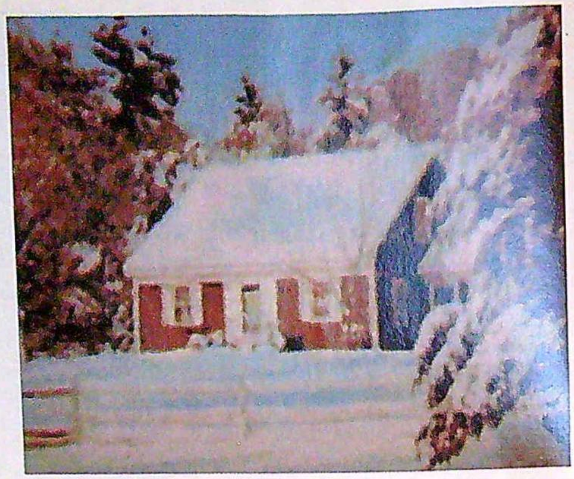


Although not of photographic quality, images acquired with the ComputerEyes IIGS video digitizer are impressive.



One of the practical applications of a video digitizer is in a field like real estate, where the computer could be used to show properties to prospective buyers.

Portraits From Pixels

The Apple IIGS digitizing market is heating up, thanks to a new entry from Digital Vision and a planned product from Applied Engineering.

Until recently, the only video digitizer for the IIGS was the AST-VisionPlus card from AST. Retailing for $399, the AST-VisionPlus is a sophisticated board that—with a camcorder, video camera, or VCR—captures NTSC composite video signals (color or black-and-white) and puts them in a form that the IIGS understands and can use.

ComputerEyes for the Apple IIGS, from Digital Visions, does much the same thing. Plug the $249 board into any slot, use a standard video source (again, anything from a camcorder or VCR to video camera or videodisk player), and capture color or black-and-white images in either the 320 × 200 or 640 × 200 graphics mode. Scans in the 320 × 200 mode takes 6 seconds; 12 seconds for the higher resolution mode of 640 × 200.

The ComputerEyes software allows changes to the image—such things as brightness, contrast, and color content—after you've acquired an image. If you don't like what you see, a few alterations can make all the difference.

Once to your liking, you can save the images as files compatible with a range of popular IIGS paint programs, such as *PaintWorks Plus, Deluxe Paint II,* and *816/Paint* for either touchup or major modification.

Applied Engineering—one of the preeminent add-on board manufacturers for the Apple II line—meanwhile, is working on a video digitizer of its own. AE's unnamed (and, as of press time, without-a-price) digitizer will be available in the first quarter of '88. Reportedly, AE's digitizer will work not only with the IIGS (in its super-hi-res modes) but also with the other models in the Apple II line.

Mac On The Big Screen

Everyone knows the Macintosh has a small screen. Its nine-inch built-in monitor has been criticized by many, and ultimately rejected by thousands who have attached larger monochrome screens to their computers.

One place where small screens work worst is in group presentations. The Macintosh, with its graphic abilities, can be a perfect training, teaching, or demonstration device. But crowding around the machine, heads peeking over shoulders, isn't very effective.

Enter Warren J. English, professor in public relations at the University of Pittsburgh at Bradford. He uses a Macintosh to lead group discussions on effective writing, putting text on the Mac's screen and then showing students how word substitution or rearrangement of phrases can improve the work. Trouble was, not all the students could see the screen. Even worse, his budget wouldn't allow for the modification to the Mac ($250) for hooking up to a $4,000 projector.

Instead, English aims an inexpensive video camera at the screen and then feeds the video signal through a VCR into a large monitor everyone can see. The Macintosh's screen scan rate of 50 megahertz eliminates the rolling black scan lines people are used to seeing when television cameras are aimed at computer monitors.

And it makes English's job easier. "I needn't carry a lesson plan with me into the classroom; it's all in the *Microsoft Word* document."

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Game Designer Greens

Professional game designers make, on the average, between $33,300 and $38,900, according to Chris Crawford's "The Journal of Computer Game Design."

Crawford arrived at this figure after he asked his readers to list the percentage of time in 1986 they devoted to game-design activities and their incomes from those activities.

Of the 14 designers who responded, 9 worked full-time on game design. The top income of that group was $83,000, while the low was $23,000. The remaining designers, however, spent between 1 and 75 percent of the year working on games, and made a lot less money—incomes topped out at $16,800.

Crawford, designer of several best-selling games, including *Eastern Front* and *Balance of Power*, and creator of the soon-to-be-released *Trust and Betrayal* (Mindscape), concluded that only full-time designers make decent money. And though the average was 25 percent less than that for a software engineer, it's possible to make a good living as a game designer, Crawford claims.

The average income of a professional computer-game designer is over $38,000.

All this is just part of Crawford's bimonthly newsletter. With articles on such topics as visual impact, second-generation adventure games, and pictographs in computer games, the newsletter speaks primarily to professional game designers, although amateurs or those wanting to break into the market will also find things of interest. There are no game reviews here. Instead, says Crawford in the first issue, "the purpose of the 'Journal' is to foster the development of the art of computer game design." That means articles on how to handle the business end of game design or practical information on the craft of game design. In its first three issues, the newsletter's writers ranged from Kellyn Beeck (designer of the Amiga version of *Defender of the Crown*) to Don Daglow (Director of Home and Entertainment Software for Brøderbund) to Crawford himself.

A six-issue subscription to the Journal runs $30, and can be ordered from Crawford by writing him at 5251 Sierra Rd., San Jose, CA 95132.

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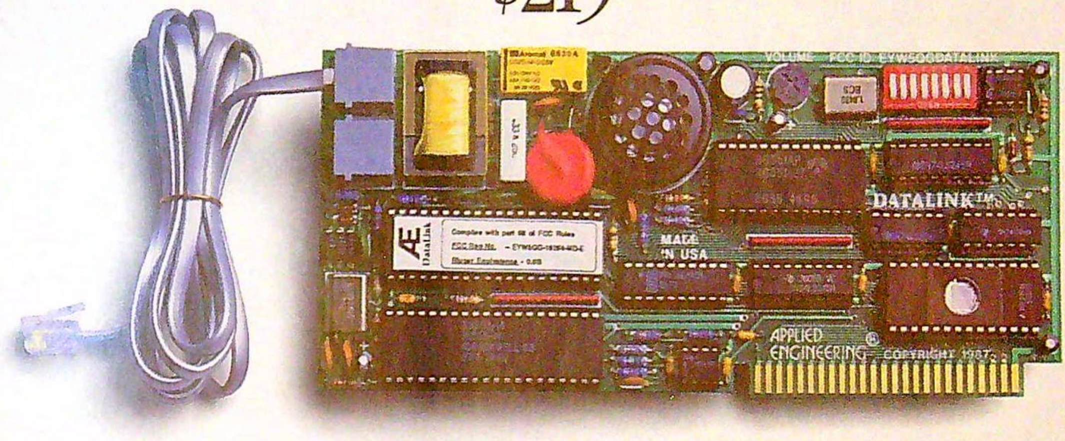

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AppleFest
Celebrating The II

Keith Ferrell, Features Editor

It was a big show for Apple II users—the biggest in years—and a landmark of sorts. Lots of people, lots of new products, and lots of excitement combined to successfully kick off the reborn AppleFest. We were on the floor for three days, looking at the new software and hardware, and asking lots of questions. Here's what we found.

After a two-year absence, AppleFest returned to resounding success, attracting over 23,000 Apple II enthusiasts to San Francisco's Civic Auditorium for three days of exuberance, education, and entertainment.

Attendees crowded through exhibition hallways lined with booths displaying major commercial programs from large publishers, "home-made" software from start-ups and entrepreneurs, books and instructional materials, periodicals, hardware enhancements, and user and support groups. There were even a few Macintoshes lurking among the exhibits.

But this was an Apple II party. The newest member of the family, the IIGS, was also its brightest star, spotlighted by virtually every developer present either with products, beta versions, or big promises.

"New capabilities" was certainly the theme sounded by many of the IIGS developers. From sophisticated animation programs to music synthesizers to RAM expansion, the word from GS developers was that a new age of computing was already well underway.

New In School

Despite growing claims made by MS-DOS manufacturers, Apple remains the dominant computer supplier to the American educational establishment. As far as AppleFest attendees were concerned, there's no reason for that situation to change.

Developers and teachers alike expressed delight at the possibilities the IIGS offers. Because some schools are taking advantage of IIGS upgrades for existing Apple II's, or are boosting the RAM in their present machines, there's an opportunity for developers to market more memory-intensive, and hence more sophisticated, educational packages.

Increased memory showed in dramatically expanded math, science, English, foreign language, and other basic curriculum programs, as well as in specialized programs, games, and computer activities addressing more focused topic areas.

New Ways To Write

WordPerfect for the IIGS attracted perhaps more attention than any other word processor on display at AppleFest, bringing to the

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show the company's commitment to offer the number one word processor in *all* computer markets. In the Apple market, *WordPerfect* faces some stiff competition, as AppleFest revealed.

Roger Wagner's *MouseWrite* caught attendees' attention with its Macintosh-like interface, spell-checker, communications, and printing protocols.

MultiScribe GS 3.0, from Styleware, is a full-featured word processor that includes the Merriam-Webster/Proximity spell checker and thesaurus, as well as drawing and color-editing features.

Random House Electronic Media was showing its *// Write* word processor. Pulldown menus are one of this program's features, along with multiple windows for working on more than one document at a time.

Pergamon Software showed its *Manuscript Manager*, a customized word processor that incorporates the style manuals of the American Psychological Association, as well as that of the Council of Biology Editors.

Several companies were talking about or showing prerelease versions of their desktop publishing ventures for the Apple II line. (For more detailed information about desktop publishing software at AppleFest, see the sidebar "The Presses Roll.")

Beagle Bros debuted their *TimeOut* series, seven new *AppleWorks* enhancements that work inside the popular integrated program.

Baudville's *Award Maker Plus* appealed to those who like to honor achievement; the program lets users design awards, certificates, and similar graphic materials.

Brøderbund displayed *Print Shop* IIGS, a program that takes advantage of the machine's super-hi-res capabilities. [Editor: We review *Print Shop* in this issue.]

Pinpoint's *Graphic Edge* is a chart and graph generator that's compatible with *AppleWorks* spreadsheets. The program can be linked to the spreadsheet, allowing for changes in the graph when numbers are changed on the spreadsheet.

Postcards from Activision, a collection of clip art and one-liners, lets users compose their own funny, funky postcards, memo-

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Manzanita ***BusinessWorks***	
System Manager *(Required)*	65.
GL/AR/AP/ or Inventory Control	239.
Payroll Module	239.
MECA	
Managing Your Money 2.0 *(IIe, IIc, IIGS)*	99.
Megahaus MegaWorks or ThinkWorks	38.
Monogram Dollars and Sense *(II+, IIe or IIc)*	75.
Nolo Press Will Writer *(Version 2.0)*	32.
Peachtree Back To Basics Accounting System: *GL/AR/AP*	135.
Pinpoint Publishing	
Pinpoint IIGS Starter Kit	89
Pinpoint	49
PinPoint Spelling Checker	45
PinPoint Document Checker	45
PinPoint Speller/Document Checker Combo	61
PinPoint Toolkit	39
Infomerge	49
Key Player	31
RunRun	31
Command.Com	39
Graphics Edge	56
Pinpoint IIe Upgrade Kit	19
PinPoint Ram Enhancement	19
PinPoint Modem Enhancement	19
ProFILER 3.0	74
Random House	
*//*Write *(IIe, IIc, IIGS)*	54
*//*File	54
Roger Wagner Publishing	
Mouse Write *(IIe, IIc, IIGS)*	89
Scholastic Talking Text Writer *(IIGS)*	149
Sensible Software	
Sensible Grammar ProDos *(3.5" & 5.25")*	59
Sensible Speller-Dos or ProDos w/3.5 & 5.25"	69
Sensible Writer *(3.5" & 5.25")*	59
Sierra On-Line Smart Money	54
Homeword Plus *(128K) w/Speller*	45
Simon & Schuster	
Real Estate Investment Management	69
Webster's Spelling Checker *(ProDos)*	39
Sir-Tech Software, Inc.	
The Clan Practical Accountant	55

Phenomenal Prices...

Software Publishing	
All Programs for IIe with 128K or IIc	
PFS: Workmates *(File/Report/Plan/Write)*	129.
PFS: Graph	66.
PFS: File/Report Bundle	66.
PFS: Write w/Speller	66.
Softwood GS File	62.
StyleWare, Inc.	
Multiscribe 3.0 w/Speller *(128K IIe or IIc)*	52.
Multiscribe GS *(Apple IIGS)*	65.
Picture Manager or Desk Accessories	27.
Multiscribe Spell Checker	27.
Multiscribe Fontpaks 1-8 *(each)*	15.
VIP Software	
VIP Professional *(Apple IIc or Enhanced IIe)*	159.
VIP Professional *(IIGS Version)*	179.
Word Perfect Corporation	
WordPerfect V1.1 w/Speller *(IIe & IIc)*	89.
WordPerfect *(Apple IIGS)*	89.

Educational Software

Activision Term Paper Writer	34.
Barron's Computer SAT Revised Version	28.
Baudville Guitar Wizard	19.
Ted Bear Discovers...Rainy Day Games	19.
Broderbund	
Science Tool Kit Master Module	45.
Science Tool Kit Module I or II	26.
Type!	30.
Variable Feasts	35.
Where in the World is Carmen Sandiego?	26.
Where in the USA is Carmen Sandiego?	29.
Davidson & Associates	
Alge-Blaster, Classmate or Math Blaster Plus	29.
Grammar Gremlins or Read 'N' Roll	29.
Homeworker	54.
Speed Reader II	40.
Spell-It or Word Attack!	29.
Math & Me	25.
Designware Grammar Examiner	25.
Remember/SAT Bundle or W.O.R.K. At Home	31.
Spellicopter or Math Maze	25.
States & Traits or Mission Algebra	25.
The Body Transparent	31.
First Byte/Electronic Arts	
Mathtalk, Kidtalk, First Shapes, Speller Bee, or Smoothtalker *(IIGS) (each)*	36.
Mathtalk Fractions or First Letters & Words *(IIGS)*	36.
Great Wave Kidstime II *(IIGS)*	24.
Harcourt, Brace, Jovanovich Computer SAT	27.
Hesware Project Space Station	24.
Learning Company Reader Rabbit *(IIGS)*	32.
Think Quick *(IIGS)* or Writer Rabbit	32.
Bumble Plot, Reader Rabbit or Magic Spells	26.
Gertrude's Puzzles or Secrets	30.
Word Spinner	23.
Math Rabbit	26.
Moptown Hotel, Parade, or Number Stumper	26.
Robot Odyssey I or Rocky's Boots	32.
Mindscape Crossword Magic, Drug Alert, or Brainstorms	34.
Perfect Score SAT	48.
Principal's Assistant	42.
Multibotic Robotic Workshop	119.
Peachtree/Eduware Algebra 1, 2, 3, or 4	25.
Algebra 5 & 6	31.
Decimals or Fractions	25.
Compu-Read *(V 3.0)*	18.
Introduction to Counting	25.
PSAT or SAT Word Attack Skills	19.
Writing Skills 1, 2, 3, 4 or 5	25.
PinPoint Micro Cookbook *(IIe or IIc)*	29.
Bon Appetit	37.
Randam House Charlie Brown's ABC's	21.
Charlie Brown Typing is a Ball	21.
Garfield Double Dares	21.
Garfield Eat Your Words	21.
Snoopy Writer	21.
Simon & Schuster	
Lovejoy's Preparation for SAT	41.
Speed Reading Tutor IV *(IIe or IIGS Ver.)*	34.
Typing Tutor IV *(IIe, IIc, or IIGS)*	34.
Spinnaker Kindercomp Gold	29.
Homework Helpers Writing or Math *(IIGS)*	32.
Typing Made Easy	32.
Facemaker: Golden Edition	27.
Kidwriter	27.
Kindercomp, Kids on Keys or Alphabet Zoo	21.
Terrapin Enhanced Terrapin Logo V3.0	69.
Weekly Reader	
Stickybear Series: Sticky Bear ABC, Car Builder, Codes & Cyphers, Basic, Drawing, Math I, Math II, Math Word Problems, Music, Music Library, Numbers, Opposites, Parts of Speech, Pic. Builder, Picture Printer Library I, Printer, Reading, Reading Comprehension, Shapes, Spellgrabber, Typing, Townbuilder, Word Problems or Writer *(each)*	25.

Modems

Anchor Automation	
Signalman Express 1200	185.
Signalman Lightning 2400	299.
Applied Engineering	
DataLink Modem *(300/1200 Baud Internal Modem II+, IIe, IIGS)*	179.
Hayes Hayes Micromodem IIe *(Internal)*	159.
Hayes Smartmodem 1200A *(Internal)*	275.
Hayes 300 Baud Smartmodem IIc w/Smartcom I	189.
Hayes 300 Baud Smartmodem	159.
Hayes 1200 Baud Smartmodem	299.
Hayes 2400 Baud Smartmodem	449.
Prometheus Pro Modem 1200 *(External)*	239.
ProModem 1200G *(Non Expandable)*	169.
Pro Modem 2400 *(External)*	309.
Pro Modem 2400G *(Non Expandable)*	229.
Pro Modem 1200A *(Single Card)*	189.
Pro Modem 300c	89.
Communications Buffer *(2K Exp. to 512K)*	105.
Alphanumeric Display	72.
U.S. Robotics U.S. Robotics Sportster 1200	119.
U.S. Robotics Courier 1200	199.
U.S. Robotics Courier 2400	349.
U.S. Robotics Courier 2400E	409.
U.S. Robotics Courier HST 9600	689.

Accelerators/Ramcards/Z-80/80 Column Cards

Advanced Logic Systems	
Add-Ram 80/64	54.
Apple Computer	
Apple IIe Extended 80 Col. Card	89.
Apple IIe Enhancement Kit	49.
Applied Engineering	
RamWorks III *(64K to 3 MB)*	Call
RamWorks Expander 512K or 2M Ver.	Call
2 Meg Plus RamWorks Expander *(1 or 2M)*	Call
RamFactor *(256K to 1MB)*	Call
Z-RAM Ultra 1 *(256K or 512K)*	Call
Z-RAM Ultra 2 or 3 *(256K to 1Meg)*	Call
GS-RAM *(256K to 1.5Meg)*	Call
GS-Ram Plus *(1MB to 6MB)*	Call
Phasor *(II+, IIe, and IIGS)*	139.
TransWarp Accelerator *(II+ and IIe)*	219.
ViewMaster 80 *(II+)*	119.
Z-80 Plus *(II+, IIe, IIGS)*	119.
AST Research	
Ramstack Plus IIGS *(256K Exp. to 1MB)*	105.
MDIdeas, Inc. OctoRam 256k *(8Mb RamCard w/256k Installed)*	129.
OctoRam 1 Meg *(8Mb RamCard w/1 MB Installed)*	279.
OctoRam 2 Meg *(8Mb RamCard w/2 MB Installed)*	479.
OctoRam SIMM Module Upgrade *(256k SIMMs)*	69.
OctoRam ESP 128K *(Extended Static Ram w/256k)*	149.
OctoRam ESP 512K *(Extended Static Ram w/512k)*	299.
OctoRam ESP Upgrade 64k *(64k Static Ram)*	35.
Micro Sci Micro Sci 80/64e	55.
Orange Micro Rampak 4GS *(512k Exp. to 4MB w/Utilities)*	149.

Printer Interface Cards

Apple Apple Super Serial Card	119.
Applied Engineering	
Serial Pro *(II+, IIe, IIGS)*	135.
Apricorn Apricord IIc	59.
Super Serial Card	79.
Orange Micro	
Pro Grappler *(Apple IIe or IIGS)*	79.
Serial Grappler Plus	61.
Grappler C/Mac/GS	65.
Hot Link	54.
Thirdware	
Finger Print GSi *(Includes Desktop Accessories - IIGS)*	69.
Finger Print Plus *(Specify Cables: Parallel, Serial or ImageWriter II-II+ & IIe)*	89.
Fingerprint IIc *(Specify Internal or External Version)*	79.
Finger Print G+ *(With Parallel Cable II+, IIe, IIGS)*	55.

Clock/Calendar Peripherals

Applied Engineering TimeMaster H.O.	79.
IIc System Clock	55.
SMT No Slot Clock *(II+ & IIe)*	42.
Thunderware Thunderclock Plus	119.

Accessories

Kensington System Saver *(Platinum or Beige)*	65.
Kensington System Saver IIGS	69.
Conserver *(IIGS Switched Surge Suppressor w/Fan)*	119.
Juice Box *(IIGS Switched Surge Suppressor w/Fan)*	69.
Curtis Diamond	29.
Curtis Emerald	36.
Curtis Ruby	54.
Curtis Sapphire	47.
A+ Mouse *(IIc)*	69.
A+ ADB Mouse *(IIGS)*	89.
Apple Mouse IIe	125.
Apple Mouse IIc	89.
Thunderscan Apple *(IIGS, IIe, and IIc)*	179.
AST-VisionPlus Digitizer *(IIGS)*	219.
SuperSonic *(Stereo Card for IIGS)*	52.
SuperSonic Digitizer *(IIGS)*	52.
Hayes Mach II Joystick *(Beige or Platinum)*	29.
Hayes Mach III Joystick *(Beige or Platinum)*	37.
Hayes Flight Stick	52.
Kraft Universal 3 Button Joystick *(II+ IIe, IIc)*	34.
Koala Pad Plus w/Graphics Exhibitor	84.
Echo IIB Speech Synthesizer *(II+, IIe, IIGS)*	109.
The Cricket IIc	129.
ImageWriter Ribbon-Black	4.50
ImageWriter Ribbon-Color	5.
ImageWriter II - 4 Color Ribbon	12.
ImageWriter Rainbow Pk. (6 Colors)	27.

Blank Media

5¼" Blank Diskettes	
BASF 5.25" SS/DD *(box of 10)*	8.
Verbatim 5.25" SS/DD *(box of 10)*	10.
Sony 5.25" SS/DD *(box of 10)*	9.
Maxell 5.25" SS/DD *(box of 10)*	10.
3M 5.25" SS/DD *(box of 10)*	11.
3½" Blank Diskettes	
BASF 3.5" DS/DD *(box of 5)*	9.
Bulk *(Sony)* 3½" DS/DD *(box of 10)*	16.
Centech 3½" DS/DD Color Disks *(box of 10)*	19.
Sony 3.5" DS/DD *(box of 10)*	19.
Fuji 3.5" DS/DD *(box of 10)*	20.
Maxell 3.5" DS/DD *(box of 10)*	20.
Verbatim DS/DD *(box of 10)*	20.
3M 3.5" DS/DD *(box of 10)*	21.
C. Itoh 3.5" DS/DD Color Disks *(box of 10)*	25.

Printers

Brother M-1109AP *ImageWriter Comp.*		269.
M-1409 *(180cps Dot Matrix NLQ) 10"*		349.
M-1509 *(180cps Dot Matrix NLQ) 15"*		389.
HR-20 *(20cps)* Daisywheel		359.
HR-40 *(35cps)* Daisywheel		599.
TwinWriter 5		799.
Epson LX-86/LX-800		Call
FX-86e	Call For	Call
FX-286e	Most	Call
LQ-800/1000	Recent	Call
EX-800/1000	Low! Low!	Call
LQ-2500	Prices	Call
Okidata Okimate 20 Color Printer		139.
Microline 182P *(120cps Dot Matrix 10")*		249.
Microline 192*Plus (200cps Dot Matrix 10")*		339.
Microline 193*Plus (200cps Dot Matrix 15")*		489.
Microline 292P *(240cps Dot Matrix 10")*		539.
Microline 293P *(240cps Dot Matrix 15")*		639.
Panasonic		
KXP-1080AP *(100 cps) ImageWriter Compatible*		249.
KXP-10801/M2 *(144 cps)* NLQ Mode		199.
KXP-10911/M2 *(192 cps)* NLQ Mode		209.
KXP-10921 *(240 cps)* NLQ Mode		329.
KXP-1592 *(180 cps)* NLQ Mode		429.
KXP-1595 *(240 cps)* NLQ Mode		469.
KXP-3131 *(17 cps)* Daisywheel		279.
KXP-3151 *(22 cps)* Daisywheel		439.
Star Micronics		
NX-10 *(120cps Dot Matrix/NLQ 10")*		189.
NX-15 *(120cps Dot Matrix/NLQ 15")*		339.
NP-10 *(100cps Dot Matrix/NLQ 10")*		189.

Disk Drives & Hard Disk SubSystems

American Micro Research *(Micro Sci)*	
A5 D Half Height 5¼" Drive *(IIGS)*	149.
A2 Full Height *(II+ & IIe)*	149.
A5 Slimline *(II+ & IIe)*	139.
A5 Slimline IIc	139.
Micro Sci C2 Controller	52.
Central Point Software	
Mix and Match 5¼" & 3½" Drives:	
Universal Disk Controller	79.
Central Point 800KB Drive	185.
Universal Disk Controller/800KB Drive Bundle	259.
First Class Peripherals	
Sider 20MB Hard Drive	549.
Sider 40MB Hard Drive	839.
B-Sider 60MB Tape Backup	839.
Blank Tape 5 Pack	65.
Revision D *(Chip/Software for CP/M)*	52.
Hi-Tech Peripherais	
Full Height 5¼" Drive for Apple IIe *(Beige)*	139.
Half Height 5¼" Drive for Apple IIe or IIc *(Beige)*	139.
Half Height 5¼" Drive for Apple IIe or IIc *(Platinum)*	149.
Half Height 5¼" Drive Platinum for IIGS	169.
Apple IIc Drive Adaptor	15.
Mitac AD-3C Slimline IIc	129.
Pico Products	
Apple Half-Height II+, IIe, IIc	139.
ProAPP ProAPP 20 MB Hard Disk System *(II+, IIe, & IIc)*	799.
Video Technology Computers, Inc.	
Laser FD 100c *(Apple IIc)*	139.
Laser FD 100 *(Apple II Series)*	139.

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Is The Apple II Forever?

Just how committed is Apple Computer to the Apple II line? Is the IIGS a bridge machine that will eventually close out the Apple II family and move users toward the Macintosh world? Or, does the IIGS represent Apple's renewed commitment to the machine and the market that have been so good to the company?

To answer those questions, Apple Chairman John Sculley and Chief Operating Officer Del Yocam worked overtime at AppleFest to emphasize their firm commitment to the Apple II line, and the Apple IIGS in particular.

In separate interviews with COMPUTE!'s Apple Applications and in remarks to developers and show attendees, both Sculley and Yocam pulled no punches in their statements about the future of the Apple II.

"You should expect to see a lot of evangelizing from us, you should see a lot of marketing effort . . . and more new products in the Apple II family coming from us because it's a very, very big business," Sculley told software developers.

Sculley's enthusiasm for the Apple IIGS market was seconded by Yocam, the eight-year Apple Computer veteran who oversaw the Apple II line during a time when Sculley and Apple co-founder Steve Jobs had seemingly shifted the company's heart, soul, and financial resources to the Mac. As Yocam proselytised for the Apple II and as Apple's financial fortunes waned, Sculley realized that the Apple II family was a bread-and-butter component of the company that had been overlooked.

In the two business quarters covering the months of April through September—traditionally a heavy buying period for schools—Apple sold more Apple II computers than during any two periods in the company's history, said Yocam. (Both Yocam and Sculley were quick to point out that IIGS sales had passed the 200,000 mark this past fall.) The net result, according to Apple's analysis, is that the Apple II family still has an impressive 65 percent of the computers used in the K–12 educational sector.

For Yocam, talk of the ultimate demise of the Apple II line simply doesn't add up. "We're positioning the Macintosh for business and the Apple II for education. There are 45 million desktops in American schools, and we have less—even with our competitors—than 2 million of those desktops with computers on them. There's so far to go."

With Sculley and Yocam both talking about Apple II add-ons such as CD-ROM, laser discs, and Macintosh-style programs and user interfaces, it's clear that Apple will be pushing the II family in the direction of its higher-end Macs. But, with strong sales, software support, and plenty of cash and savvy for marketing muscle, the Apple IIGS appears likely to extend the II legacy for quite awhile.

"The most important message to get out is that this isn't a great finale," said Sculley. "This is really just the beginning for the Apple II. And the Apple IIGS gives it that bridge into the future. . . . This is a product not just for the 1980s, but for the 1990s as well."

—Selby Bateman

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randa, and cartoons.

Electronic Arts was on hand with its *Deluxe Paint II*, as well as announcing *DeluxeWrite* and *DeluxePrint*, programs promised for 1988 that will serve the desktop publishing market.

AppleFest Accessories And IIGS Databases

On Three, Inc. announced *The Desktop Manager*, an accessory package for the IIGS that includes a notepad, appointment calendar, printer manager, and more.

StyleWare presented *DeskWorks* for the same computer. This accessory package offers users a scientific calendar, alarm clock, appointment book, and phone file.

Several exhibitors addressed the business and database market. Datapak's *Notes*N*Files* for the IIGS delivers database, mail merge, sorting, and correspondence generation via a mouse-driven iconic interface.

DB Master, Version Five, from Stone Edge Technologies, can create records holding up to 200 separate fields, generate up to 255 report formats per file, sort records in a variety of ways, and convert *AppleWorks* database files into *DB Master* files.

Brown-Waugh Publishing's *SoftWood* GS *File* uses a Macintosh-style interface with pull-down menus and scroll bars to view several records at once, import both *AppleWorks* and ASCII files, calculate fields, and sort and search files by several methods.

List Plus, from Activision, is a database that includes a Quicklist function for printing an entire file, customization of fields for output, successive sorting by fields, and spreadsheet capabilities.

FastPak Data is DHA Systems & Software's database manager for use as a stand-alone program or with its *FastPak Mail* mailing software. *FastPak Data* allows more than 65,000 records per file, with up to 99 fields of information per record.

Fast Apples And The MS-DOS Invasion

Image digitizing caught many eyes at AppleFest, quite a few of them at the Digital Vision booth. The company's *ComputerEyes* is a hardware/software package that enables users to digitize high-quality video images such as those captured on videotape or photographic film.

Checkmate Technology had two boards addressing the IIGS's RAM. *MemorySaver* is a hardware/software combination that can support up to eight megabytes of RAM, as well as supporting two RAM cards at once. *MultiRAM GS* is Checkmate's RAM expansion card, letting users add up to two megabytes to their GS.

Other add-on board manufacturers ranged from the giant Applied Engineering with its multitude of cards to the start-up Parallax with its single TopRAM memory card for the IIGS.

Zip Technologies introduced a replacement microprocessor for the Apple IIe and IIc (and promised something similar for the IIGS) that increases the speed of the computer up to four times its normal speed.

The busiest hardware demonstrations, though, had to be for Applied Engineering's PC Transporter card, a board which

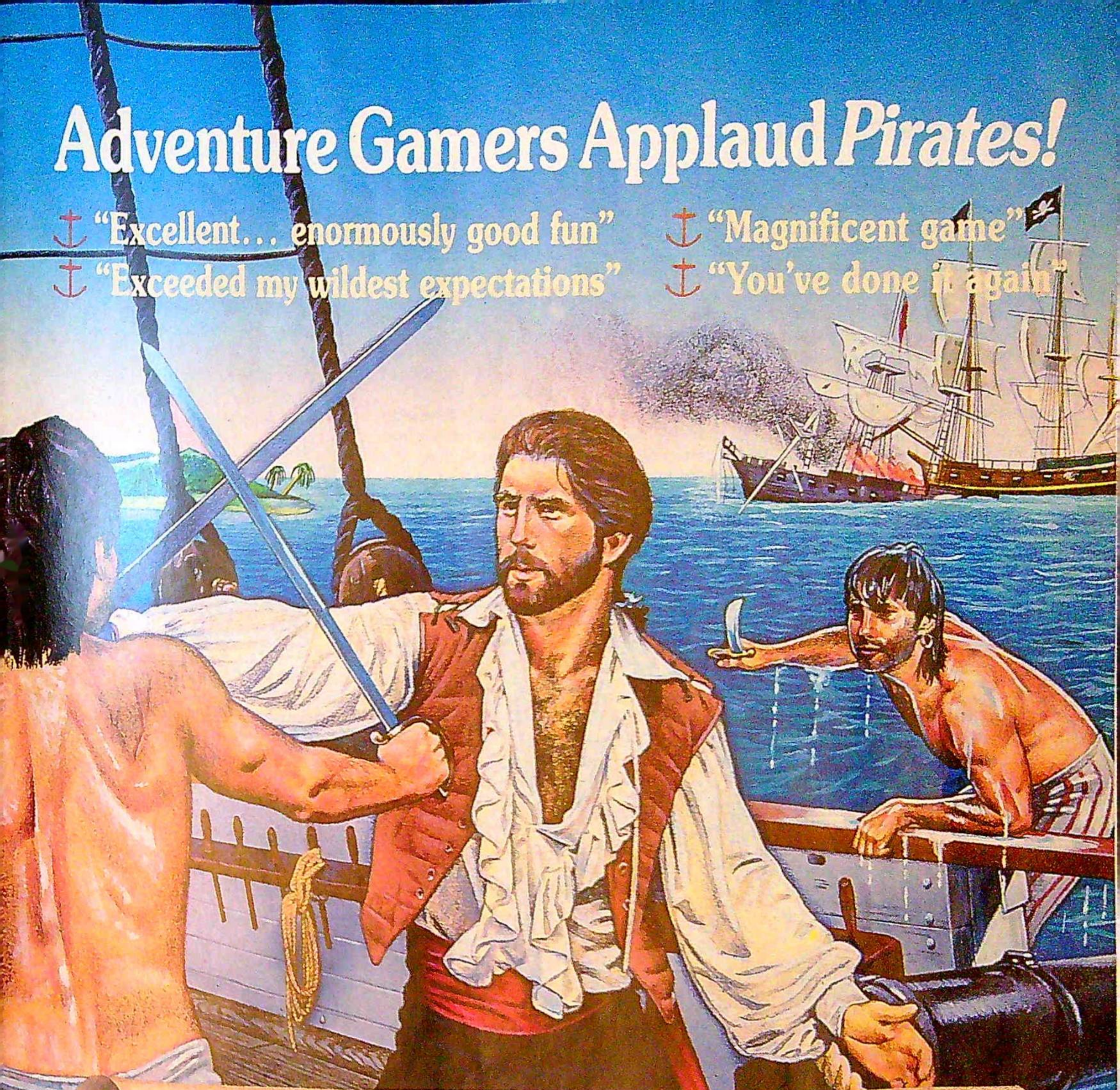
Adventure Gamers Applaud *Pirates!*

⚓ "Excellent… enormously good fun"

⚓ "Exceeded my wildest expectations"

⚓ "Magnificent game"

⚓ "You've done it again"



"PIRATES! *is excellent . . . a great swashbuckling game,* **enormously good fun** *. . . it should keep you playing for months."*
(Popular Computing Weekly, U.K.)

"*. . . your game has* **exceeded my wildest expectations** *. . . I have run up more game time on the computer in 3 days than in the entire month previous."*
(C.J.M., Buffalo, N.Y.)

"This is one of the most **magnificent games** *I have ever had the pleasure of playing! It has exactly the balance of realism, playability and silliness that I most adore."* (J.P.S., San Diego, CA)

"**PIRATES!** *is a big hit in the Dallas area. This game is one of your best efforts. The graphics on all screens are excellent!* **You have done it again,** *Microprose."*
(Larry Medlin, DallasGamers, in Game News)

PIRATES! It's another winner from Sid Meier, author and designer of the award-winning F-15 STRIKE EAGLE and SILENT SERVICE. His creative genius has combined the best of simulation, role-playing and strategy games in this high seas adventure.

You're a 17th century privateer captain in the thick of the action on the Spanish Main. **PIRATES!** challenges your reflexes in simulated sailing, sea and land battles and swordfights. It tests your cunning in bargaining with merchants and negotiating with government officials. From the romance and intrigue of more than 50 foreign ports to the thrill and excitement of buried treasure, **PIRATES!** takes you on an exhilarating quest for power and prestige.

PIRATES! is available at your local "Valued MicroProse Retailer" (VMR). Call for locations nearest you. Get it today for Commodore 64/128, IBM-PC/compatibles and the Apple IIc and 128K IIe. Call or write for MC/VISA orders if product not found locally.

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The Presses Roll

One of the best indicators of the Apple II's durability is a soon-to-explode application—desktop publishing. Although rudimentary desktop publishing software for the Apple II has been around for several years—*The Newsroom* and *Print Shop* are two examples—sophisticated software that lets you create professional-quality newsletters, brochures, and reports hasn't been available.

Four companies demonstrated or announced Apple II desktop publishing programs at AppleFest. None of the programs were available for sale at the show, though several were actually up and running (in prerelease versions). Assuming that all four make it to market, here's what you'll find to help you become a personal publisher with your Apple II.

Springboard Publisher, easily the most visible at AppleFest, is also the most anticipated of the four packages. Delayed several times, still not released by mid November (Springboard will only say that they anticipate a release in 1987), *Springboard Publisher* ($139.95) comes from the same company that made *The Newsroom* famous. The program puts together page layout, word processing, and graphics creation in an integrated package. Advanced features include multiple columns, text that flows automatically around graphics, importation of text and graphic files from a variety of sources, page preview, and more.

Springboard Publisher requires only 128K of RAM, so it runs on IIe, IIc, and IIGS computers. A mouse is optional; both 5¼- and 3½-inch disks are to be available. As is, *Springboard Publisher* prints to dot-matrix printers, but an additional package called *Springboard Publisher Laser Driver* ($39.95) allows output to a PostScript-compatible laser printer, like Apple's LaserWriter.

Publish It!, from Timeworks, might shape up to become the main competition for Springboard's product. Its feature list, though not as long as *Springboard Publisher*'s, is impressive. Running at AppleFest, but not available as this went to press (mid-November was the latest estimated release), the program includes the standards—built-in word processor, graphics toolbox, built-in fonts, and a Macintosh-like interface. Macros (called *quick keys*), optional laser printing, and snap-to page guides for precise placement of page elements are just some of the package's extras.

Publish It! ($99.95) works on Apple IIe, IIc, and IIGS machines, requires 128K and a joystick or mouse, and supports the major dot-matrix printers.

Personal Newletter, another entry in the desktop publishing race, is a program that promises the basic features and more. From Softsync, *Personal Newsletter* ($59.95) was released in late October, and works with 128K on the IIe, IIc, and IIGS. Six different fonts, a variety of type styles, a clip-art disk, and the ability to import *Newsroom, Print Shop,* and *Dazzle Draw* artwork are some of the program's highlights. The program is positioned as a simple and easy-to-use software package that still operates fast.

Melody is from Millikin Publishing, a company traditionally strong in the educational software market. *Melody* ($195) is the only Apple IIGS-specific program of the four at AppleFest. At press time, the program was still in development, with a possible release in late '87 or early '88. *Melody*'s enhancements include an integrated spelling checker (80,000 words) and thesaurus, the ability to use graphics created by any IIGS paint or draw program which complies with Apple graphics standards, a clip-art disk with more than 500 illustrations, and built-in LaserWriter support. *Melody* requires an Apple IIGS with at least 768K of RAM.

—Gregg Keizer

emulates an IBM PC inside an Apple computer (see the separate article in this issue, "An IBM Inside the Apple").

Pinpoint Publishing offered an operating system shell, *Command.Com,* that consists of over 100 MS-DOS commands, configured to accomplish their work in the ProDOS environment.

Disk Util GS, from FWB Software, lets users back up copy-protected software for archival purposes.

Roger Wagner's *SoftSwitch* was one of the show's top drawing cards. This program switcher for the IIGS gives users the capability of holding more than one program in memory and switching among programs at the touch of a key. [Editor: We review *SoftSwitch* in this issue.]

Fun At The Show

Sports, arcade action, high fantasy, combat simulations, and a sequel to the most successful interactive text adventure ever published stood out among the entertainment software on display at AppleFest.

Accolade showed its IIGS sports-oriented games, including *Mean 18* and *Hardball.*

Activision drew one of the largest crowds at AppleFest for a chance to go against J. B. Carroll of the Golden State Warriors in *GBA Basketball Championship, Two on Two.* Non-players could boogie to the beat of *The Music Studio.*

Piloting a World War II F6F Hellcat was the big draw at Brøderbund where *Wings of Fury* challenged players to take off from a carrier, face the enemy, and return for a successful landing.

Electronic Arts' booth rocked to the strains of *Music Construction Set* and *Instant Music,* a program that lets even the seriously tune-deaf come up with musical hits.

Appropriately for San Francisco, *California Games* was on display at the Epyx booth. Players got the chance to try surfing, skateboarding, BMX bicycle riding, and other totally awesome California-style outdoor activities.

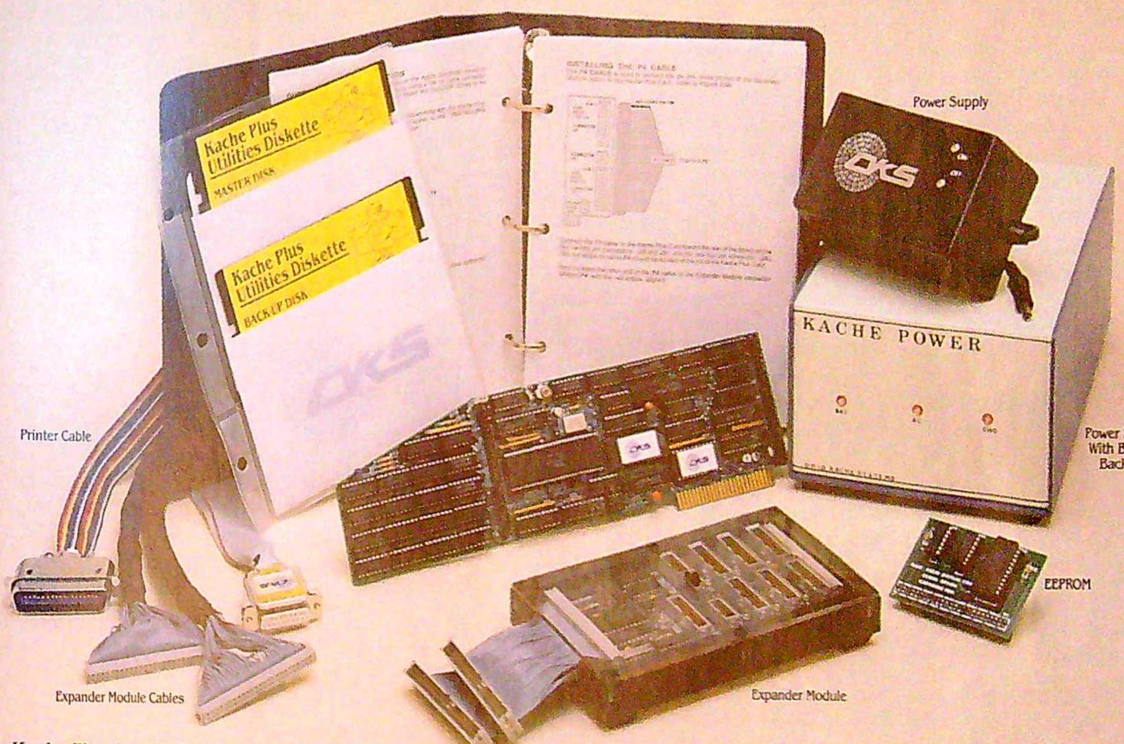
Firebird pressed its growing Apple presence with a display showing its fantasy role-playing adventures, such as *The Pawn* and *Guild of Thieves,* as well as arcade simulations like *Starglider.*

Infocom's portion of the Activision exhibit was the scene of some excitement as the long-awaited *Beyond Zork* was unveiled. Developer Brian Moriarty was on hand to show off his creations and answer questions about the new text adventure.

At Mindscape, Chris Crawford, designer of *Balance of Power,* was eager to discuss his

The World's Fastest Floppy Disk Controller Card

For The Apple II, II+ and *IIe*



The Kache Plus Card is the World's fastest 5¼" floppy disk controller card you can buy for the Apple II, II+ and *IIe*! It replaces your standard Apple controller board, giving you the power to operate up to 6 floppy drives and the speed to access data from those floppies several times faster than a hard disk drive![*]

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Viewpoint

AppleFest Wins Hearts and Minds. What a headline.

The show was a certified success. Attendance was far more than expected. Sales for those selling were good. Lots of new hardware and software products were shown for the first time. And thousands of copies of Apple-specific magazines were handed out and carted home.

But judging AppleFest by numbers alone is deceiving. The value of a consumer show like AppleFest—as opposed to the trade shows like the Consumer Electronics Show that the computer press frequently attends—isn't just in the numbers of people that walk through the doors or stop by your booth.

It's the feeling, the underlying current one comes away with, that is so important. And the feeling I got from AppleFest was *vitality*.

Apple II users are excited about their computers. They want the best and the fastest in both hardware and software. That translated to an intense interest in the Apple IIGS at AppleFest, both by people who already owned one and by those who wanted to trade up from an Apple II+, IIe, or IIc.

The vitality of the Apple II market should not be underestimated. Even in when many thought the line was coming to a close, Apple II owners never called it quits. They kept their enthusiasm alive until the next generation—the IIGS—made an appearance.

Owners weren't alone in their dedication to the Apple II, of course. Hundreds of developers stuck with the machine. Now, with sales of the IIGS passing the 200,000 mark, that dedication can be rewarded.

Hardware manufacturers and software publishers are continuing to push the Apple II into its second decade. Witness some of the more amazing things debuting at AppleFest:

Applied Technologies' PC Transporter Card, which lets you run IBM PC software from your Apple II, even lets you run PC software in your Apple 3½-inch disk drive.

Beagle Brothers' *Timeout* series, seven *AppleWorks* enhancements that add things like a spell checker, spreadsheet, disk file maintenance, macros, graphing, fonts, and desktop tools.

Desktop publishing software for the Apple II, from a number of publishers, that is close to the capabilities of the vaunted Macintosh.

The Zip Chip, from startup Zip Technologies, is a microprocessor replacement for the IIe and IIc which increases the speed of the computer up to four times.

There was more, of course. Lots more. New games, new productivity packages, new hardware. The Apple II market is, after ten years, far from quiet.

Before the show closed, it was announced that two AppleFests will be held in 1988. The orginal site in San Francisco has been retained (though it's moving to a much bigger hall in the same building), but an additional event is scheduled for late May in Boston.

We'll be there, of course, with more magazines to hand out, more answers to readers' (and nonreaders') interesting questions, and if it's possible, more enthusiasm for the Apple II.

We can't wait.

—Gregg Keizer

latest game. *Trust and Betrayal: The Legacy of Siboot* is based upon problems of communication among members of different species.

APBA Major League Players Baseball from Random House Media is a multidisk series that puts users in the position of major league managers and owners.

An animated robot named Thexder prompted oohs and ahhs at the Sierra On-Line display. *Thexder* is an arcade game imported from Japan, where it has sold more than half a million copies.

Apple Was There

In spite of the fact that the show was put together by an outside organizer, with most of the space devoted to third-party developers, Apple Computer itself made a constant impression at the festival.

Its booth space was the largest of the show and harbored a number of third-party works Apple was showcasing. The company sponsored seminars and made available hands-on training rooms in which educators and children could put into practice some of the packages—and educational computing theory—in a relaxed atmosphere.

The second floor of the Civic Center was given over to the Apple Museum, a multipaneled panorama in which photographs, reproductions of documents, and a detailed chronology annotated the high points of Apple's first decade. A strategically placed monitor provided passersby with the chance to watch some of Apple's old commercials.

Wozniak, Kay, And The Next AppleFest

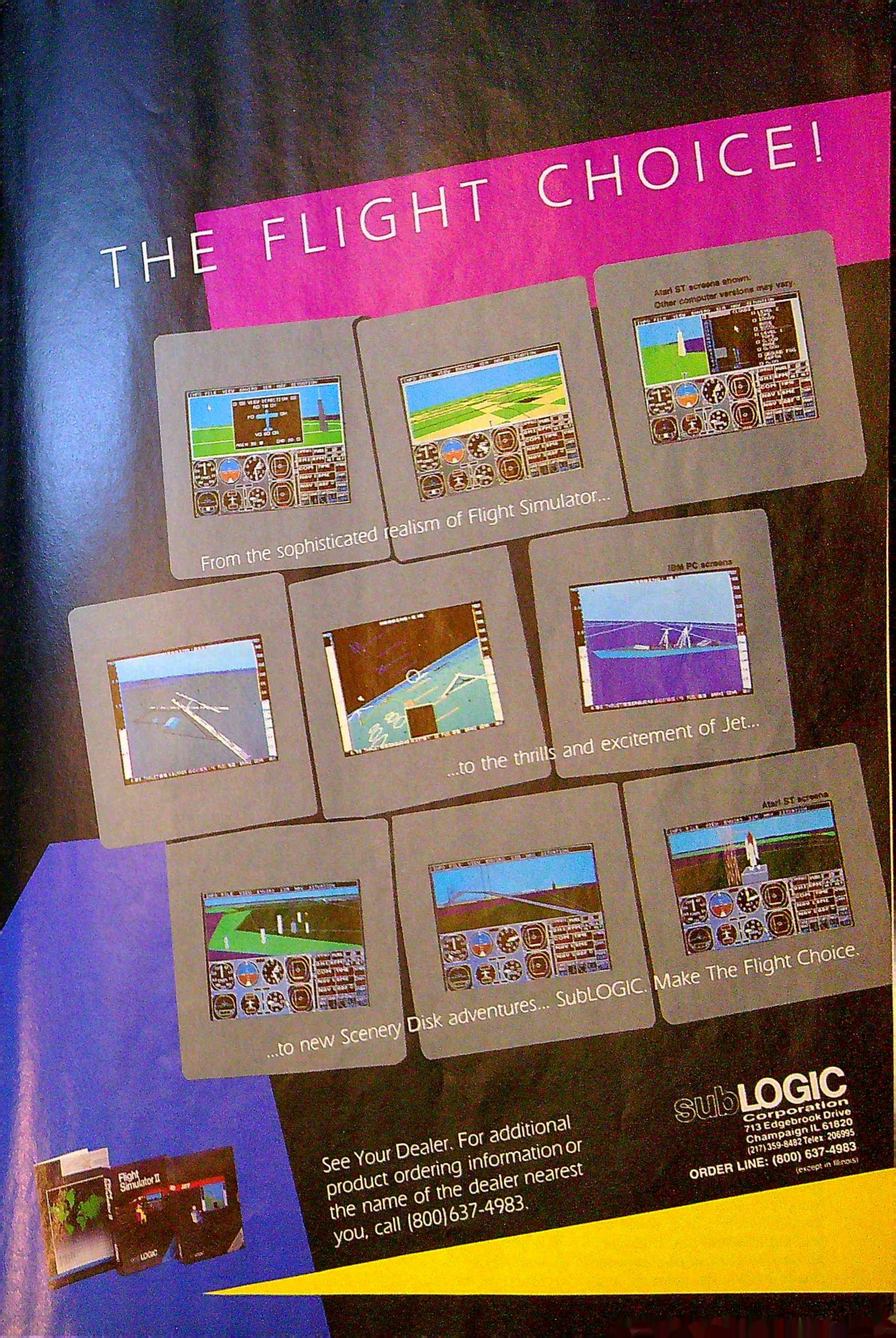
AppleFest was concerned with computers and software, but the human element also played a large part. Many of those attending the show enjoyed the opportunity to see Apple "legends" as much as they did the opportunity to catch a glimpse of state-of-the-art software and hardware.

Steve Wozniak, one of the company's two founders, entertained a packed auditorium with stories of Apple's early days.

Apple Fellow Alan Kay brought the future home in a multimedia presentation concerned with iconic interfaces, the future of computers in education, and the educational possibilities of high-level simulations.

Martin Engel, director of Apple's Classroom of Tomorrow project, injected a note of darkness into the proceedings, speculating profoundly on the risks we run of creating a society in two tiers: those who have access to computers and those who do not.

The people who mattered most, of course, were those in attendance, the ones who have helped make Apple a success. Their enthusiasm and numbers insure not only a bright future for the GS, but also for future AppleFests.



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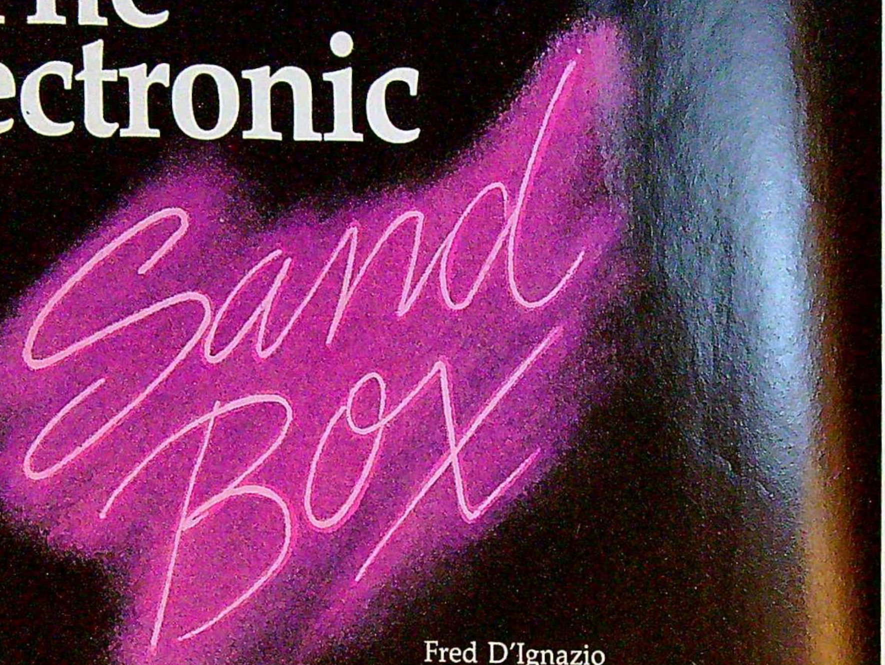
The Electronic Sand Box



Fred D'Ignazio

Noted computer author and columnist Fred D'Ignazio originated the idea of the multimedia sandbox, *where high tech—Apple computers, video cameras, desktop publishing, and more—meets the the freewheeling imaginations of teachers and school children. Here, he reports how one school set up an electronic sandbox.*

Imagine a classroom where children help create the teaching materials, where high-tech hardware goes hand in hand with creativity, and where the final product emerges as a videotape or a newspaper, or as electronic music.

That's the kind of classroom typical of the *multimedia sandbox* approach to teaching. Take an imaginary sandbox—a metaphor for play, storytelling, world building, exploration, and discovery—add a liberal dose of computers, music keyboards, printers, and software; mix in excited school children and blend with equally enthusiastic teachers. The result? A unique way to use computers (and other electronic devices) to make learning fun, new, and memorable.

The Multimedia Sandbox

"The moment we arrived [at our first electronic sandbox workshop] we just dove right in," said Sandra Pilley, third grade teacher at Hewitt Elementary School in Birmingham, Alabama. "We videotaped each other, printed signs, worked on a new program for word processing, called *Magic Slate,* and began to learn *Fantavision.* We learned how to film, edit, and put music to a movie. The potential of using this new technology to feed a child's imagination and watch it grow was more than enough to make us all explore and learn more."

The Indian Boogie-Woogie

When the Hewitt Elementary teachers returned to their classrooms in the fall of 1986, they carried the concept of the multimedia sandbox with them. Third grade teacher Chiquita Marbury demonstrated video cameras to her students by taking them to the school playground and having one of them film her sitting in a sandbox, tossing sand up in the air, while telling her viewers that sandboxes are fun places to learn, "so come on in!"

Sandra Pilley and fellow third grade teacher Susan Busenlehner found a grocery cart in the school cafeteria and created a video of Pilley pushing the cart through the halls saying, "Boy! I have pushed my way through a lot of stuff. It's been wild! But now I'm ready to bring multimedia to you!"

The three sandbox graduates recruited four more teachers. Known as the Multimedia Seven or, simply, the *media maniacs,* they got up and danced during a team-teaching unit on American Indians. A third grader captured their "Indian Boogie-Woogie" on video. "Here we were dancing in front of all these children and imitating them." said Pilley "With multimedia, even your inhibitions are eradicated and the real you *must*

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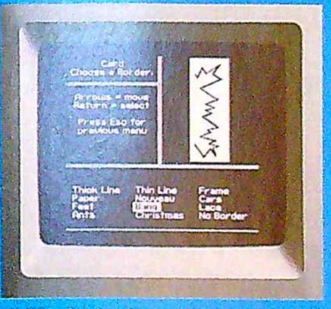
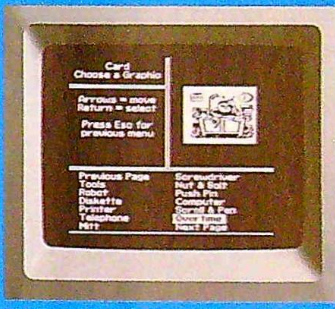
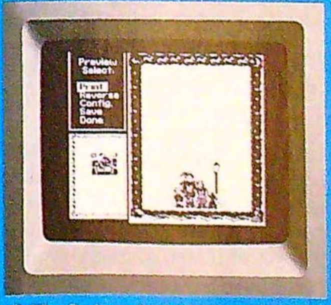

Card
Choose a Border.
Arrows = move
Return = select
Press Esc for
previous menu
Thick Line
Paper
Fest
Ants
Thin Line
Nouveau
Bang
Christmas
Frame
Cars
Lace
No Border

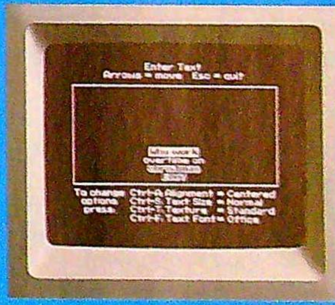
10:00— *Pick from 11 beautiful borders.*


Card
Choose a Graphic
Arrows = move
Return = select
Press Esc for
previous menu
Previous Page
Tools
Robot
Diskette
Printer
Telephone
Mitt
Screwdriver
Nut & Bolt
Push Pin
Computer
Scroll & Pen
Over time
Next Page

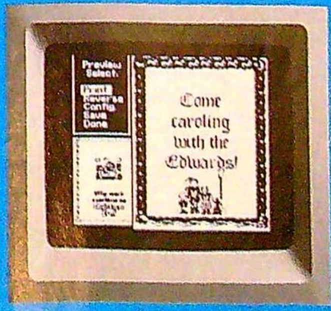
10:01— *Select from more than a hundred high-quality graphics— hundreds more when you add the Art Galleries.*


Preview
Select.
Print
Reverse
Config.
Save
Done

10:02— *Preview and make changes anytime without starting over. What a time saver!*


Enter Text
Arrows = move Esc = quit
To change options press:
Ctrl-A Alignment = Centered
Ctrl-S Text Size = Normal
Ctrl-T Texture = Standard
Ctrl-F Text Font = Office

10:03— *Craft your message from 9 expressive typefaces in upper and lower case.*


Preview
Select.
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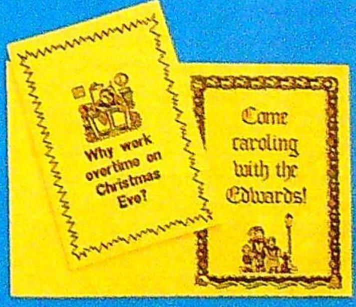
Config.
Save
Done
Come
caroling
with the
Edwards!

10:04— *And preview again.*


Why work
overtime on
Christmas
Eve?
Come
caroling
with the
Edwards!

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come out. Just ask those 200 kids."

Not satisfied with just taking the sandbox to school, the teachers also took it home where they held all-night multimedia parties to prepare for upcoming multimedia lessons on sentence prefixes, math word problems, creative writing, and China. The teachers' homes overflowed with computers, printers, modems, electronic keyboards, video tape recorders (VCRs), and monitors. Cables snaked everywhere. The teachers taped operating instructions to the walls. They were constantly on the phone—asking a local teenager for advice on a computer graphics program, calling the school music teacher for the musical notes in "Ten Little Indians," and even contacting the local radio station so they would play a song the teachers could record on cassette for one of their lessons.

Eighty-Seven Kids

The response from Hewitt Elementary's students reached beyond the teachers' expectations. When the media maniac teachers announced that Hewitt would be hosting a media club for third and fourth graders (the school includes K–4 grades), they expected only five or ten children. The bleachers in the school auditorium were lined with 87 enthusiastic students. After the teachers recovered, they divided the media club into four sections: the Desktop Publishing team, the Sound team, the Video team, and the Computer Art team.

The media kids became a school-wide resource. It was a common sight to see them rushing around Hewitt like a high-tech rescue squad. When a squad member visited a new room, a teacher got to see firsthand what the media maniac teachers were up to. Before long, teachers throughout the school were asking Pilley and the other teachers if they could join the group.

From Sandbox To Studio

As metaphor, the *sandbox* appealed powerfully to the teachers' imaginations. But to kindle their own students' imaginations, the teachers created a new metaphor, the *studio*. Student producers in a classroom "studio" took over much of the responsibility for their own learning. Now the children listened carefully when the executive producer (the teacher) taught them new subjects. They organized the new material and planned how they would communicate it to other students, to their parents, and back to the teacher.

To communicate what they had learned, the students had many options—they could choose from a wide variety of equipment and production formats. For example, a "Science Radio" program might use a boom box, a keyboard synthesizer, and a microphone. Or they could print up a student newspaper, as Hewitt students did, called "The Greek Gazette," filled with stories drawn from Greek mythology, each end-

Ten Ideas For Multimedia Lessons

Like building blocks, you can build your multimedia center piece by piece. And you can use the center for a variety of activities, including:

- Desktop publishing
- Video
- Radio-style programs
- Creating an electronic blackboard
- Writing to computer pen pals

The multimedia center transforms your classroom into a studio. Your multimedia productions can be on any subject in the curriculum. Here are ten multimedia ideas you may be able to adapt to your own lessons.

1. Organize a variety show (on audio or video, and publicize with flyers) featuring math word problems, science facts, American history trivia, and so on.
2. Create a student-run ad agency to market curriculum topics like fractions, the American Revolution, and the oceans.
3. Produce a news program that turns commonplace curriculum into hot news stories. Publish a weekly newspaper with short, zingy stories on curriculum topics. Let students use their own bylines and recruit columnists to feature your classrooms' very own Irma Bombecks and "Dear Abbys."
4. Help your students create how-to videos, radio shows, and booklets that explain difficult subjects—prefixes, science experiments, formulas for circles, diagramming sentences, and the like.
5. Organize a game show program with contestants anwering tough curriculum questions, solving problems and puzzles, and explaining how things work.
6. Keep a video yearbook and an audio scrapbook (on cassette) highlighting your class's major activities and events.
7. Set up a media club for students who would like to help other students use video cameras, computers, boom boxes, and keyboards in their lessons.
8. Help your students create student-produced notebooks with spiral binders or ring binders. The notebooks can contain kids' notes for their productions, scripts, storyboards, creative ideas, and how-to tips and reminders.
9. Practice lip synching to popular songs to accompany student videos on math problems, social-studies lessons, book reports, and so on.
10. Build a library of sound effects which students collect outside the classroom from electronic keyboards, television, radio, and the real world. Let the students organize and file the sounds, and then use them to accompany reports on the oceans, forest ecology, the building of the railroads, and parts of speech.

ing with a student's own byline. They could make a "do-it-yourself" video that walked other students through a math word problem, a science experiment, or a list of state capitals. One student created a computer animation of a black hole.

An Apple IIe computer served as the hub of the multimedia center, which Hewitt teachers set up on three small carts. The two-foot-high wheeled carts were pushed around the school, from classroom to classroom, even by kindergartners. Students used the computer in desktop publishing activities, to make computer art to illustrate their homemade books, to create title and credit screens in their videos, and to create computer music to accompany their video and audio productions.

The Imagination Network

In addition, teachers at Hewitt plugged the Apple into an Apple Personal Modem and connected their multimedia classroom to other multimedia classrooms scattered across Jefferson County, Alabama. Dr. Ron Jones, Director of Staff Development for the county, set up a bulletin board so teachers could share their successes and troubleshoot their problems, and keep up with new training workshops, multimedia events, and news about discount prices for videotapes, disks, printer ribbons, and other staples of the sandbox.

Hewitt teachers also joined the Imagination Network, a computer link between Alabama multimedia schools and 13 multimedia schools in the Saanich School District in British Columbia, Canada. This offered an opportunity for students in both countries to exchange computer pen pal letters online, submit stories for classroom newspapers, and report on local culture, geography, and events for lessons taught on the opposite side of the continent. Also, according to Hewitt special education teacher Lynn Murphy, it was exciting to be so closely in touch with other teachers.

"Teachers feel so isolated," she said. "They work alone in their classrooms and rarely get the chance to work with other teachers. Now we've got a 'classroom without walls.' Anytime I want I can sit down at the computer and be in touch with dozens of other teachers. I can learn about what they're doing, and they're welcome to borrow my ideas and try them out in their classrooms.

A multimedia classroom becomes a miniature studio where student producers create skits based on their lessons. Note the equipment—camcorder, electronic musical keyboard, and Apple IIGS computer.

Hello, Mr. H!

Teachers and their student producers organized skits built around daily lessons—pronouns, multiplication and division, prefixes, fall foliage, Pilgrims and Indians, community helpers, and so on. Then they videotaped the skits, or turned them into radio programs or newspapers. Sometimes they used only one or two pieces of equipment. Other times they used the entire multimedia center.

Allowing students to become producers of their own lessons gave them great power, but also a great sense of responsibility. For example, Nancy Rentschler, Hewitt's speech pathologist, organized a video lesson around letter sounds. "Making the movie was fun but hectic," said Rentschler. "We had two days to put it all together. We used kindergarten children to act out one of their letter people and also used them to film the movie. Our star, Mr. H, was very good, but our cameraman and director really took his job seriously. He would tell the others to do things over and over again. I thought I was the director but this child took over."

Watching Imaginations Grow

According to Sandra Pilley, the multimedia center let her concentrate on a vital skill she saw her students losing—the ability to imagine. "I watched my class's imagination grow from just repeating something they had seen on television into something new and genuine that they created themselves. We wrote and produced video book reports using synthesizers, keyboards, stick puppets, and *Dazzle Draw* for the puppets' background. We published our own books from stories that we wrote on our own. My class would *not* handwrite their stories. Instead they slowly and diligently typed each word with 20-column *Magic Slate*. They came up with the idea of using the greeting card option in the *Print Shop* to produce book jacket designs to cut and paste on the front of the cover and on the title page. Some even used *Dazzle Draw* to illustrate their books."

A professor from Oakland University in Rochester, Michigan, came to Alabama and conducted a study on the educational results of the multimedia approach. The report listed two benefits reported by all multimedia teachers: a significant improvement in their students' oral and written communication skills; and noticeable improvement in students' self-image.

"Our oral communication skills grew immeasurably," said Pilley. "We viewed ourselves doing skits for the whole school, giving lessons to other classes on various subjects that we had researched. And for fun, we wrote and designed a fictitious product and filmed a TV commercial for it. The same children that were so very insecure at the beginning of the year became the biggest hams under the sun."

Hewitt teacher Susan Busenlehner agreed, "I'm always on the lookout for methods that let children find and express their special talents—composing music, using their voices, creating original artwork, dramatizing, expressing their feelings, writing, directing, care of equipment for mechanically inclined students—

SCIENCE
NEWS
ON THE AIR

Students can use multimedia—in this instance a camcorder—to turn a dry science report into an exciting TV news story.

The Multimedia Center

Start small and keep it simple, or else you'll fall into what the Hewitt teachers referred to as a "multimedia black hole."

All you need to get started is one of the following:

- Cassette player
- Boom box or record player
- Apple personal computer
- Small electronic keyboard
- Video camera and VCR
- Small wheeled cart

Build your multimedia center with one piece of equipment at a time. Mix and match the equipment freely. Press buttons, experiment, and play. You and your students are pioneers exploring a new world.

Don't try to use everything at once. Instead, try one thing at a time. Later, as you become more experienced using the hardware and software, it's safe to be more ambitious. At that point, you might be interested in the following products. *(Note that the prices listed below are approximations.)*

Apple IIe, IIc, or IIGS Computer; Imagewriter II Printer; Apple Personal Modem Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 94015	**$1500**
Casio SK-1 Electronic Keyboard Casio, 15 Gardner Rd., Fairfield, NJ 07007	**$70**
Computereyes/2 Digitizer (Transfers video images to computer screen) Digital Vision, 66 Eastern Ave., Dedham, MA 02026	**$130**
"Critical Thinking With Multi-Media" videos Children's Circle Videos, Weston, CT 06883	**$50**
Environmental Music (Background to multimedia lessons) Windham Hill, P.O. Box 9388, Stanford, CA 94305	**$12**
FingerPrint Plus Card (Makes electronic "slides" from computer screen images) Thirdware Computer Products, 4747 NW 72nd Ave., Miami, FL 33166	**$100**
GR-C7U Video Camcorder (Small, lightweight camcorder—perfect for small camerapeople) JVC Company of America, 41 Slater Dr., Elmwood Park, NJ 07407	**$900**
Little Cart on Wheels (Luxor LE-26) The Highsmith Company, One Mile East—Hwy 106, Ft. Atkinson, WI 53538	**$50**
Magic Slate (Word processor—20-column version for small children and creating videos) Sunburst Communications, Inc., 39 Washington Ave., Pleasantville, NY 10570	**$100**
Microphone	**$15**
Phono cables with RCA jacks and adapters	**$8**
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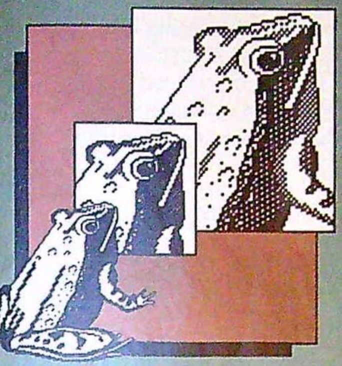
The Newsroom	Including clip art, **$150**
Certificate Maker Springboard Software, 7808 Creekridge Cir., Minneapolis, MN 55435	Approximately **$50**
Principal's Assistant (Program for making signs and certificates) Mindscape, 3444 Dundee Rd., Northbrook, IL 60062	**$60**
The Print Shop	With supporting packages, **$175**
Fantavision	Approximately **$50**
Dazzle Draw Brøderbund Software, 17 Paul Dr., San Rafael, CA 94903-2101	Approximately **$60**
Taking Advantage of Media (Book by Laurene Krasny Brown) Methuen Books, 29 W. 35th St., New York, NY 10001	**$15**
***Videomaker* magazine** (Great magazine for beginners) *Videomaker*, Depot Square, Peterborough, NH 03458	**$15/year**



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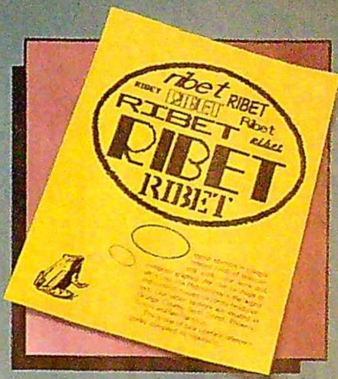
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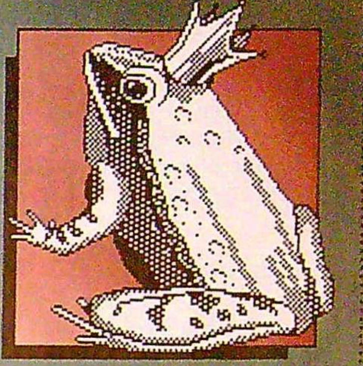

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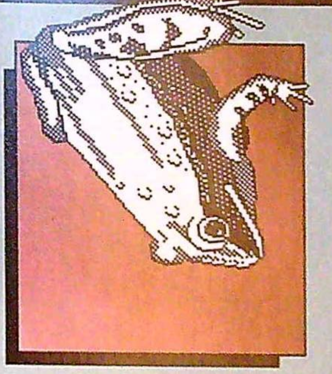

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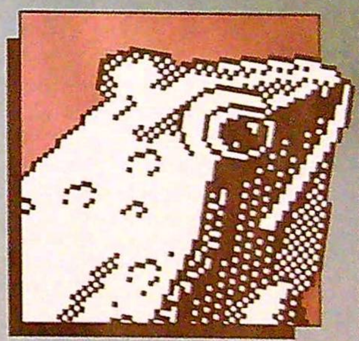

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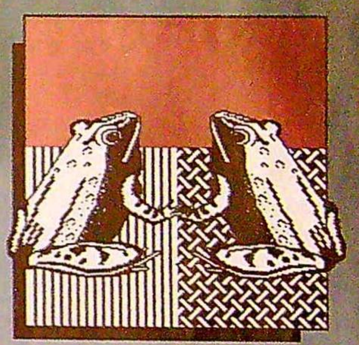

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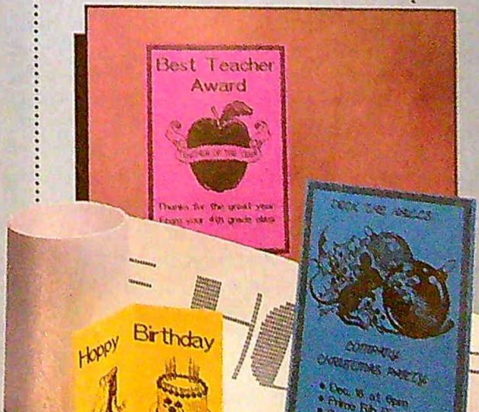
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it's all there in the multimedia center. Success is so important to children. It encourages other successes and I didn't see a single child or teacher who didn't feel a certain pride of success in some aspect of multimedia."

Six Giggling Moms

The teachers' and students' enthusiasm for the multimedia classroom overflowed into other classes, and even found its way into students' homes. Parents who showed up at open houses and parent-teacher conferences remarked that they had never seen their children so eager to leave for school each morning. "Whatever it is you're doing," said one parent, "keep it up."

Parental involvement also took more substantial forms. When teachers appealed to the PTA for new equipment and supplies, carloads of material arrived from home. Parents loaned and donated old video cameras, cassette players, VCRs, electronic keyboards, TV sets, printers, modems, and computer paper.

Parents also began showing up in the classroom as multimedia helpers. Said one Hewitt teacher, "We even had a dad make us a 'clacker' that I painted black and white. We used it to announce to the camera crew that a 'take' was ready. You could hear them clack the boards together and say, 'Science News on the air, take two!'"

Teachers who used to scramble to get one or two parents to help were suddenly overwhelmed by parent volunteers. Sandra Pilley's experience was typical. "I asked my head room-mother if she would call and see if there would be any of this year's moms that could come to school and do various things. She said that on Thursday there would be a mom to come and work on the computer. On Thursday, I heard a real buzz coming from the back of the teacher's station. When I looked back there, there were six giggling moms, all trying to use *Print Shop.*"

Three Keys To Success

The teachers at Hewitt Elementary learned that there were three keys to success with multimedia.

- **Keep it simple.** The teachers learned not to strive for perfection in their productions. They weren't professional TV producers, so they didn't try to act like them. The whole purpose of multimedia was for a teacher to have fun and to help the children learn. The emphasis was on *process,* not *product.*
- **Do it your way.** Each teacher found that she had to find her own doorway into multimedia. If a teacher had already used a cassette player, then that became the starting point for her first multimedia activity. Or if she was interested in video or computer word processing, then she started there. Teachers learned they couldn't do everything at once. They tried one thing at a time and built on their successes.
- **Be a *maniac.*** The teachers learned early that if they didn't concentrate on their own enjoyment and satisfaction, then they lost the sandbox spirit. In multimedia, teachers had to come first. It was important for teachers to relax and have fun playing with the equipment, or it wasn't worth the hassles and extra work.

Multimedia On A Shoestring

Recently, a group of college professors visited Hewitt Elementary and the other twelve Alabama multimedia schools as part of a Congressional study on the use of technology in education. The professors had visited some of the top projects in the country, but they concluded: "The multimedia effort in Jefferson County had the lowest per capita expenditure in the case study...it operated on a shoestring. And yet in terms of excitement—and in our judgment, impact—it was among the top two or three projects reviewed for this study.

"It is impossible to convey on paper the excitement generated among the public, the administrators of the schools involved, the teachers, and the students...all agreed, and our observations would strongly support their assessment, that the project was a success beyond their wildest dreams, that it had produced significant learning outcomes among the students and teachers, and that it truly led to an integrated use of technologies throughout the curriculum."

A Final Word

The teachers at this one elementary school in Alabama turned to multimedia for five reasons:

- As a means to enliven the teaching of dry or difficult subjects, like parts of speech, letter writing, and math word problems
- As a way to reach special, hard-to-teach children
- As an enrichment activity for students to do on their own
- As an enrichment activity for the entire class
- As an incentive to get students to complete their regular assignments.

Teachers who reported using multimedia as an incentive talked about amazing results. According to one teacher, "Getting the kids through some units used to be like pulling teeth. But this year, all I had to say was, 'As soon as you're done, we'll do multimedia.' Units that used to take two or three weeks were completed in a matter of days. I've never seen anything like it."

At the end of the year, the Hewitt teachers agreed that multimedia had been a challenge, but that it contained many rewards for a teacher who was looking for something new for both herself and her students. "I would strongly recommend that any teacher who is looking for a way to plug her children into tomorrow's high-tech world *today,* pursue multimedia," said Sandra Pilley, "The assets far outweigh the negative aspects. I have always believed that good teachers were people that stretched themselves. What better way than to stretch all the way into tomorrow and have a real effect on tomorrow's people."

Fred D'Ignazio is an Associate Editor for COMPUTE! magazine, the author of numerous books, including COMPUTE!'s Computing Together *(COMPUTE! Publications), and a popular speaker on educational computing issues.* aa

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Laser Chess™

Michael Wu
Original game design by Mike Duppong

COMPUTE!'s Apple Applications is proud to present Laser Chess™, *a two-player strategy game with some fascinating new twists on traditional chess. The original version was written for the Atari ST, and won First Prize in the $10,000 programming contest sponsored by COMPUTE!'s Atari ST Disk & Magazine last year. This all-new Apple version of* Laser Chess *is a machine language, double-hi-res game that works in both DOS 3.3 and ProDOS. 80-column card (or equivalent) required.*

Laser Chess, as the name implies, is a chess-like strategy game for two players. The goal is to manipulate a laser-firing cannon and various reflective objects to eliminate your opponent's king. But as in traditional chess, there are an infinite number of ways to do this.

Laser Typing

Since *Laser Chess* is written in machine language, it's listed in our MLX format, ready to type in with "Apple MLX," the program entry utility found elsewhere in this issue.

Load and run Apple MLX, then answer the starting and ending address prompts with

```
STARTING ADDRESS   6000
ENDING ADDRESS     6D6F
```

When Apple MLX displays its options menu, select E to enter the program, then type the address where you'd like to start typing. (If you're just starting on entering *Laser Chess,* type 6000, the first address in the listing.) Type in the data and save this file on the disk with the name *LASERCHESS.*

Since *Laser Chess* uses double hi-res graphics, it will only run on an Apple IIe equipped with an 80-column card, a IIc, or a IIGS.

To run the game, type

```
BRUN LASERCHESS
```

and press Return. If you're playing *Laser Chess* on an Apple IIGS, make sure the System Speed option in the Control Panel has been set to *Normal.*

In seconds, the playing board appears. You're ready to play.

A Geometric Army

There are eight basic types of pieces in *Laser Chess.* Each piece has its own unique capabilities, its own strengths and weaknesses. Exploiting these characteristics is something that comes with experience. The more you play, the better you'll get at *Laser Chess.*

Figure 1 shows each piece and its name. Notice that some sides of some pieces are highlighted (or appear thickened on a monochrome display). This indicates a reflective surface. When a laser beam strikes a reflective surface, it bounces off without harming the piece. But if a

Figure 1

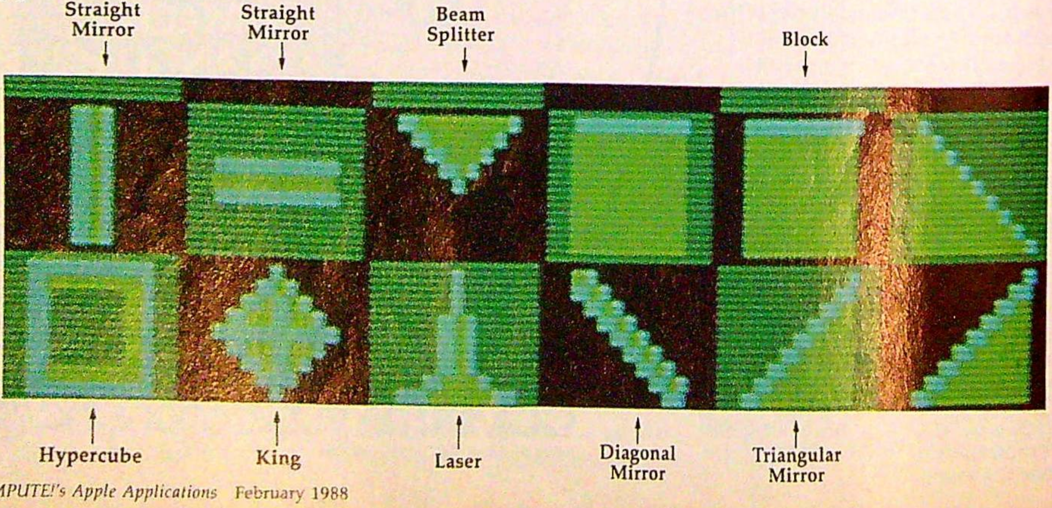
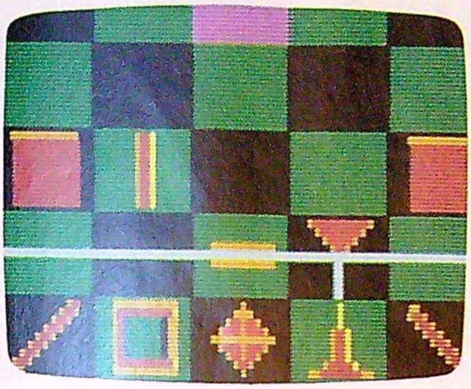
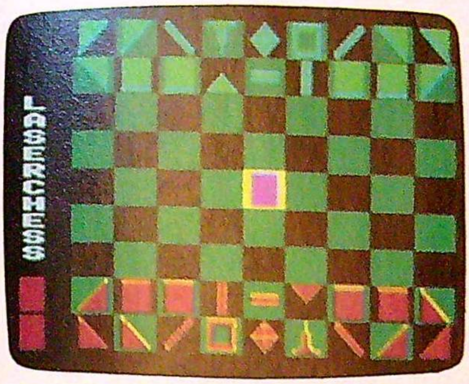


Figure 2



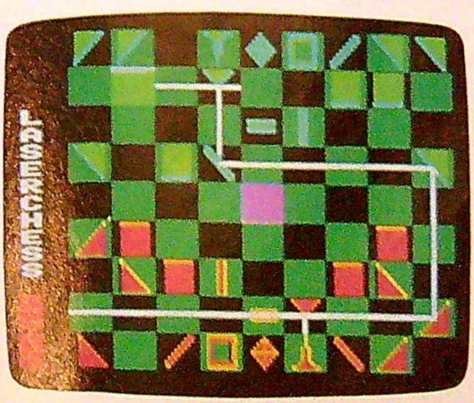
As seen in this magnified view, a beam splitter's vertex reflects a laser shot in two perpendicular directions.

Figure 3



A full-screen view of Laser Chess, *with its 9 × 9 board grid and complete complement of pieces.*

Figure 4



The combination of reflective and transparent surfaces of the various pieces can result in complex bounce patterns. Here, the red laser takes advantage of the green beam splitter to destroy two blocks.

piece is hit by a laser on a nonreflective surface, the piece is destroyed.

A piece can also be removed from the board if it's captured by an opposing piece. This is similar to traditional chess—to capture a piece, you simply move one of your own pieces onto its square.

In addition to their ability to move from square to square, pieces with reflective surfaces can also be rotated in place in 90-degree increments. This lets you orient the piece to protect it against opposing laser shots, or to set up bounce shots with your own laser piece.

The *king* is the most important piece in *Laser Chess*. When the king is eliminated, the other player wins the game. Since it has no reflective surfaces, it can be destroyed by a laser from any angle. It can also be captured by an opposing piece. The king is not totally defenseless, however. It can capture any opposing piece by moving onto its square, something that can be done only once per turn.

The second most important piece is the *laser*. This piece is your primary offensive weapon; it's the only piece that can fire a laser shot. To take aim, it can be rotated in place at 90-degree angles. Like the king, it's completely vulnerable to enemy laser strikes since it has no reflective surfaces. The laser cannot capture an enemy (or friendly piece). If you lose your laser, the game isn't over, but only the most skillful (or incredibly lucky) player can overcome its loss.

Tricky Pieces

The *hypercube* is an interesting piece. It can't harm an opposing piece directly, but may very well do so indirectly. When the hypercube is moved onto another piece (even your own), that piece disappears from its original position and reappears on a randomly selected empty square. This can be done only once per turn. Thus, the hypercube is a two-edged sword. It may relocate a piece to a vulnerable position, or make it possible for the piece to capture an important opposing piece on the next move. The hypercube has no reflective surfaces and cannot be rotated. It's invulnerable to laser shots, however, because it's made of transparent glass—a laser beam passes right through it. Remember that.

The *beam splitter* is another tricky piece. When a laser beam strikes a splitter's vertex (the point opposite its base), the beam splits in two. The two new beams travel in opposite directions, perpendicular to the original beam's path. (See Figure 2.) When a laser shot hits one of the beam splitter's reflective surfaces, it bounces off at a 90-degree angle *without* splitting. If the beam splitter's base is hit by a laser shot, the splitter is destroyed. The beam splitter can be rotated, but it cannot capture other pieces.

Blocks are fairly simple pieces. Much like a king, a block can capture *any* opposing piece by moving onto that piece's square. Except for the king, then, only blocks may capture other pieces (you can capture your own piece if you want, something that may be necessary in certain situations). Unlike a king, a block has one reflective side and can be rotated. Therefore, blocks can be used either offensively or defensively. A laser beam that hits the reflective surface of a block is deflected 180 degrees—bouncing the beam back to where it came from.

A *diagonal mirror* cannot be destroyed by a laser, because both of its surfaces are reflective. Diagonal mirrors can be removed from the board only when captured by a block or a king. When a laser beam strikes a diagonal mirror, the beam is deflected 90 degrees. Diagonal mirrors can be flipped to their opposite diagonal, but cannot be rotated to face horizontally or vertically.

The *horizontal mirrors* and *vertical mirrors* (known collectively as *straight mirrors*) are also invulnerable to lasers, due to their reflective surfaces. When a laser hits a straight mirror on its flat surface, the beam is deflected 180 degrees. But if the laser hits a straight mirror edgewise, the beam passes straight through it. Straight mirrors can be rotated to become either horizontal or vertical mirrors, but not diagonal mirrors.

The *triangular mirrors* deflect laser beams just as diagonal mirrors do, but they are vulnerable to hits on their two nonreflective sides. A triangular mirror can be rotated in 90-degree increments.

No mirror may capture another piece in *Laser Chess.*

Making Moves

The red player (whose pieces are at the bottom of the screen) always has the first move. There's no particular advantage or disadvantage to moving first.

A turn consists of two moves. The number of moves remaining in a turn is indicated by the number of boxes at the lower left of the screen. (See Figure 3.)

Before you move or rotate a piece, you must select it. This is done by moving the cursor—the hollow yellow box that starts out in the middle of the game board—to the desired piece. *Laser Chess* uses an inverted-T key arrangment, using the I, J, K, and L keys—I to move up, J for left, K for down, and L for right.

Press the spacebar to select the piece beneath the cursor, and the cursor turns gray. If

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you accidentally select the wrong piece, you can deselect it by pressing the spacebar again. This doesn't cost you a move.

After selecting a piece, your next decision is whether to move or rotate it. Moving a piece is as simple as pressing the appropriate key(s). Moving a distance of one square takes one move; moving two squares takes two moves (although you can move a piece two squares in one step). Since you have only two moves per turn, the maximum distance a piece can be moved in one turn is two squares. The computer doesn't let you make more than two moves in one turn.

Pieces can be moved forward, backward, left, or right, but not diagonally. You can effectively move a piece diagonally by using two moves—forward and right, for instance.

You cannot move a piece through other pieces. The only exceptions are captures with block and kings, and moves of the hypercube, as described earlier.

If you change your mind about a move (*before* you deselect it), just return the piece to its original position and facing. As you do, watch the colored boxes at the left—they'll reappear as you retrace your moves.

Rotating A Piece

To rotate a piece, select it and press the O key (that's *not* the zero key) to rotate it 90 degrees clockwise. Press the U key to rotate the piece 90 degrees counterclockwise. The computer ignores these keys when the king or hypercube is selected. You may continue rotating the piece to any desired position before deselecting it. Rotating a piece to face any direction takes only one move, and the move is subtracted after the piece is deselected. If you deselect the piece in its original position (you've rotated the piece all the way around to its original facing), no move is subtracted.

Special Features

At the center of the 9 × 9 board is a special square called a *hypersquare*. It absorbs laser beams and acts like a stationary hypercube. That is, if you try to move a piece onto it, the piece disappears from its original position and reappears randomly on an empty square. This may be done only once per turn, however.

Two other keys are active in *Laser Chess*. Press the Q key to quit the game—you're not asked to confirm the Quit command, so use the Q key with caution. If you're playing *Laser Chess* on a DOS 3.3 formatted disk, pressing Q drops you into the Apple's monitor. To return to the familiar] prompt, press the Control and Reset keys at the same time. To restart the game, type **BRUN LASERCHESS**.

To restart the game, press the R key. This begins a new game without finishing the current one. (For instance, a player may be so hopelessly behind that he or she wants to resign.)

Firing The Laser

The Return key is your laser trigger. When it's your turn, you can press Return to fire your laser. The laser need not be selected to fire. If your laser has been captured or destroyed, pressing the Return key has no effect.

The laser beam flashes on the screen when you press the Return key, and remains there for a few moments. (See Figure 4.) Look quickly, especially if you want to see the exact path of a complex bounce shot.

Firing your laser takes only one move, but can be done only once per turn. Therefore, you may want to use your first move in a turn to aim the laser, rotate a reflecting piece to set up a bounce shot, or move another piece into position. Of course, you won't necessarily be firing the laser on every turn. Much of the strategy in *Laser Chess* involves moving and rotating your pieces to set up complex shots.

It's critically important to realize that *any* laser hit on a piece's nonreflective or nontransparent surface will destroy that piece. You can just as easily destroy your own pieces as well as your opponent's. You can even zap your own laser, particularly if you fire directly into the 180-degree reflective surface of a straight mirror or block, or if you fail to anticipate the effects of a beam splitter.

Be forewarned.

Win, Lose, Or Draw

Eliminate your opponent's king and you win at *Laser Chess*. As soon as one player's king is destroyed or captured, the appropriate message (RED WINS or GREEN WINS) appears. In the case of a tie (rare but possible), the message IT IS A TIE replaces the *Laser Chess* title at the left of the game board.

Pressing "N" at the PLAY AGAIN? prompt exits the game; press any other key to play again.

Advice On Play

Get your mirrors out early. Use them to gain the fullest potential of your laser. Try to position mirror networks on both sides of the beam splitter so you can inflict as much damage as possible.

Take advantage of the blocks. Since they "control" an area around them with their threat of capture, no other pieces can safely move within their range. Make your opponent work to displace them. Remember to rotate the reflective side of a block to the most probable direction of laser fire. If you can prevent a laser from destroying the block, your opponent will most likely have to gang up on it with two or more blocks.

Use mirrors to protect your king. If you surround your king with straight and diagonal mirrors, there's no way it can be hit by a laser. Therefore, your opponent will have to break through your defense with blocks. (This is a pretty dirty trick, because if your opponent loses all of his or her blocks, your king is almost invulnerable.) Defending your king with blocks is also a good strategy.

The hypercube should be used sparingly, since you have no idea where a relocated piece will reappear. Most players use the hypercube as a last resort—if another piece is going to be destroyed anyway, it doesn't hurt to take a chance and relocate it with the hypercube. Also, if your opponent decides to encircle his or her king with mirrors, you can march right in with your hypercube, followed by a block. This tactic may displace your opponent's defense, forcing the king from its mirrored fortress. Escorting the hypercube with an adjacent block prevents the opponent from attacking the hypercube with the king. Your opponent's only options will be to flee or be displaced.

Laser Chess™

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
6000: 20 A9 65 20 6A 68 20 C7 E6
6008: 68 A9 00 85 D6 85 D7 85 C1
6010: A2 85 9C 20 1F 68 20 C1 B5
6018: 66 A9 04 85 FA 85 FB 4C 81
6020: 35 60 20 47 60 A5 D6 D0 24
6028: F9 A5 93 C9 02 D0 F3 A5 3F
6030: D7 49 80 85 D7 A9 00 A0 9D
6038: 09 99 92 00 88 D0 FA 85 39
6040: CE 20 C1 67 4C 22 60 A9 74
6048: 0E A4 D6 F0 02 A9 05 85 69
6050: 08 20 94 67 A5 D6 85 F9 B3
6058: 20 E6 66 20 35 FD 85 1B 79
6060: 20 FB 67 20 A0 66 B9 A2 D3
6068: 40 85 F9 20 E6 66 A2 00 02
6070: BD FC 6A F0 12 C5 1B F0 7A
6078: 03 E8 D0 F4 8A 0A AA BD ED
6080: 08 6B 48 BD 07 6B 48 60 DB
6088: A5 D6 D0 03 68 68 60 20 E1
6090: BA 61 B0 FA 20 F3 61 B0 11
6098: F5 68 68 4C D2 60 A5 FB 9F
60A0: F0 07 C6 FB 20 88 60 E6 FE
60A8: FB 60 A5 FA F0 07 C6 FA 10
60B0: 20 88 60 E6 FA 60 A5 FB BE
60B8: C9 08 F0 07 E6 FB 20 88 DE
60C0: 60 C6 FB 60 A5 FA C9 08 9D
60C8: F0 07 E6 FA 20 88 60 C6 FA
60D0: FA 60 E6 95 A4 95 A5 FA 1F
60D8: 99 A9 00 A5 FB 99 AC 00 CA
60E0: 20 7D 62 60 20 FB 67 A5 C8
60E8: D6 D0 03 4C 8A 61 B9 A2 5E
60F0: 40 F0 2D B9 F3 40 C9 09 8C
60F8: D0 11 A5 D6 99 A2 40 A9 0A
6100: 15 85 D6 20 3B 62 E6 9A 57
6108: 4C 20 61 A5 D6 29 7F C9 A3
6110: 15 D0 08 20 3B 62 E6 97 5D
6118: 4C 20 61 20 BA 61 B0 C3 B7
6120: 20 A0 66 B9 A2 40 85 1B BF
6128: A5 D6 99 A2 40 85 F9 20 FC
6130: E6 66 A5 D6 29 7F C9 05 02
6138: B0 06 24 95 F0 02 E6 99 A9
6140: C9 16 D0 02 E6 CE A9 00 6D
6148: 85 D6 A5 1B 29 7F C9 16 DA
6150: D0 35 A5 9C C9 FF D0 05 3C
6158: A9 03 4C 6A 61 A5 1B 29 E1
6160: 80 10 05 A9 01 4C 6A 61 12
6168: A9 02 20 1F 68 A2 7F 20 63
6170: 70 FC CA D0 FA A9 04 20 B7
6178: 1F 68 20 35 FD C9 CE F0 E1
6180: 03 4C A2 65 4C A7 65 4C 9A
6188: 7D 62 B9 F3 40 C9 09 F0 45
6190: 28 B9 A2 40 29 80 C5 D7 DC
6198: D0 1F B9 A2 40 85 D6 85 38
61A0: 8E A5 FA 85 A9 A5 FB 85 2D
61A8: AC A5 93 85 94 A9 00 85 C6
61B0: 95 85 96 99 A2 40 20 A0 03
61B8: 66 60 20 FB 67 B9 F3 40 D4
61C0: C9 09 D0 06 A5 9A D0 27 85
61C8: F0 27 B9 A2 40 F0 22 A5 DE
61D0: D6 29 7F C9 05 B0 06 24 F0
61D8: 99 D0 14 F0 14 C9 15 D0 F0
61E0: 06 24 97 D0 0A F0 0A C9 A1
61E8: 16 D0 04 A5 CE F0 02 38 3C
61F0: 60 18 60 A4 95 F0 37 88 A7
61F8: A5 FA D9 A9 00 D0 0D A5 26
6200: FB D9 AC 00 D0 06 C6 95 90
6208: C6 95 18 60 A5 FA 48 A5 ED
6210: FB 48 C8 B9 A9 00 85 FA EC
6218: B9 AC 00 85 FB 20 FB 67 FC
6220: 68 85 FB 68 85 FA B9 A2 AE
6228: 40 F0 03 4C EF 61 A5 94 53
6230: 18 65 96 65 95 C9 02 F0 4C
6238: B6 18 60 B9 A2 40 85 F9 21
6240: A5 FA 48 A5 FB 48 20 97 D2
6248: 65 85 FA 85 92 20 97 65 82
6250: 85 FB 85 CF 20 FB 67 B9 FD
6258: A2 40 D0 EA B9 F3 40 C9 2F
6260: 09 F0 E3 20 E6 66 98 AA 11
6268: 68 85 FB 68 85 FA 20 FB 1D
6270: 67 B9 A2 40 9D A2 40 A9 51
6278: 00 99 A2 40 60 18 A5 94 3F
6280: 65 95 65 96 85 93 4C C1 48
6288: 67 A5 D6 F0 0F A5 94 18 A4
6290: 65 95 65 96 C9 02 D0 05 80
6298: A5 96 D0 01 60 C6 D6 A2 6E
62A0: 00 A5 D6 10 02 A2 01 29 70
62A8: 7F 85 D6 4A 4A C9 04 90 20
62B0: 0E D0 07 A5 D6 49 02 4C 18
62B8: D9 62 A5 D6 4C D9 62 0A BD
62C0: 0A 85 1C A5 D6 38 E5 1C 49
62C8: 18 A4 1B C0 CF F0 27 38 FA
62D0: E9 01 B0 02 A9 03 18 65 EF
62D8: 1C E0 00 F0 02 09 80 18 40
62E0: 69 01 85 D6 C5 8E F0 07 0A
62E8: A9 01 85 96 4C F3 62 A9 7D
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62F0: 00 85 96 4C 7D 62 18 69 BD
62F8: 01 C9 04 D0 D9 A9 00 4C FF
6300: D6 62 A5 D6 F0 03 20 E4 A5
6308: 60 A5 98 D0 77 A5 FA 85 56
6310: 92 A5 FB 85 CF A9 00 85 0C
6318: 9D 18 A5 94 65 95 65 96 94
6320: C9 02 B0 58 A2 00 A9 00 50
6328: 85 FA 86 FB 20 FB 67 B9 7A
6330: A2 40 29 7F 38 E9 01 4A 2B
6338: 4A C9 03 D0 2F B9 A2 40 E9
6340: 29 80 C5 D7 D0 26 B9 A2 27
6348: 40 38 E9 01 29 03 85 9E 89
6350: A5 FA 85 A5 85 8A A5 FB 51
6358: 85 A8 85 8B A9 00 85 8C 5A
6360: 85 9D A5 D6 F0 03 20 7C C3
6368: 63 4C 0A 64 E6 FA A5 FA E4
6370: C9 09 D0 B8 E8 E0 09 D0 B1
6378: AD 4C 7C 63 A5 92 85 FA 6C
6380: A5 CF 85 FB 60 A5 FB F0 01
6388: 1C C6 FB 60 A5 FA C9 08 49
6390: F0 13 E6 FA 60 A5 FB C9 7C
6398: 08 F0 0A E6 FB 60 A5 FA F6
63A0: F0 03 C6 FA 60 A6 9D F0 F2
63A8: 15 A6 9D B5 A5 85 A5 B5 F6
63B0: A8 85 A8 B5 9E 85 9E C6 AC
63B8: 9D 68 68 4C 0A 64 A4 A2 08
63C0: F0 1C B9 00 40 85 FA B9 06
63C8: 51 40 85 FB 20 FB 67 20 98
63D0: A0 66 B9 A2 40 85 F9 20 0F
63D8: E6 66 C6 A2 D0 E0 68 68 F2
63E0: A5 8C F0 13 A5 8A 85 FA 4A
63E8: A5 8B 85 FB 20 0C 68 20 F7
63F0: FB 67 A9 00 99 A2 40 E6 83
63F8: 93 20 C1 67 E6 98 A5 9C C1
6400: F0 05 85 1B 4C 52 61 4C 9F
6408: 7C 63 A5 A5 85 FA A5 A8 03
6410: 85 FB A5 9E 0A AA BD 25 D4
6418: 69 8D 23 64 BD 26 69 8D 8A
6420: 24 64 20 00 20 20 FB 67 F8
6428: A5 08 C9 09 D0 05 48 48 03
6430: 4C A5 63 A9 0F 85 08 B9 E7
6438: A2 40 29 7F 0A 0A 18 65 8D
6440: 9E AA BD 46 69 0A AA BD A5
6448: 34 69 8D 57 64 BD 35 69 9A
6450: 8D 58 64 20 BE 65 20 00 50
6458: 20 E6 A2 A4 A2 A5 FA 85 B0
6460: A5 99 00 40 A5 FB 85 A8 37
6468: 99 51 40 C0 50 D0 9B 48 AB
6470: 48 4C A5 63 B9 A2 40 29 5D
6478: 7F C9 16 D0 0E A5 9C F0 74
6480: 05 A9 FF 4C 89 64 B9 A2 EE
6488: 40 85 9C A9 00 99 A2 40 EC
6490: 20 0C 68 4C A5 63 A9 FF 4C
6498: 85 8C 4C A5 63 A5 9E F0 0B
64A0: 0A C9 02 F0 06 20 3E 65 C2
64A8: 4C 76 65 20 27 65 4C 5C A7
64B0: 65 20 A5 64 E6 9D A4 9D C3
64B8: A5 FA 99 A5 00 A5 FB 99 C8
64C0: A8 00 A9 01 99 9E 00 4C B6
64C8: D5 64 20 0F 65 20 3E 65 18
64D0: A9 01 85 9E 60 20 0F 65 50
64D8: 20 76 65 A9 03 85 9E 60 62
64E0: 20 1B 65 20 5C 65 A9 00 FA
64E8: 85 9E 60 20 1B 65 20 27 FF
64F0: 65 A9 02 85 9E 60 20 AB D1
64F8: 64 E6 9D A4 9D A5 FA 99 BE
6500: A5 00 A5 FB 99 A8 00 A9 2B
6508: 00 99 9E 00 4C EB 64 A5 8D
6510: 9E C9 02 F0 03 4C 27 65 E8
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6518: 4C 5C 65 A5 9E C9 01 F0 36
6520: 03 4C 3E 65 4C 76 65 A5 4A
6528: FC 18 69 06 85 06 A5 FE 93
6530: 69 09 A8 84 07 20 D6 65 1B
6538: C8 C4 FF D0 F6 60 A5 FC 27
6540: 18 69 06 A8 A5 FE 69 09 C1
6548: 85 07 84 06 20 D6 65 E6 96
6550: 07 20 D6 65 C6 07 C8 C4 80
6558: FD D0 EF 60 A5 FC 18 69 15
6560: 06 85 06 A5 FE 69 0B 85 E3
6568: FF A4 FE 84 07 20 D6 65 50
6570: C8 C4 FF D0 F6 60 A5 FE 61
6578: 18 69 09 85 07 A5 FC 69 55
6580: 07 85 FD A4 FC 84 06 20 60
6588: D6 65 E6 07 20 D6 65 C6 53
6590: 07 C8 C4 FD D0 EF 60 20 B0
6598: AE EF A5 9F 18 69 09 90 6E
65A0: FC 60 68 68 4C 06 60 68 39
65A8: 68 8D 5F C0 8D 0C C0 8D AE
65B0: 51 C0 8D 56 C0 8D 00 C0 68
65B8: 8D 54 C0 4C 58 FC A6 FA 3B
65C0: 18 BD 69 6A 85 FC 69 0D DA
65C8: 85 FD A6 FB BD 72 6A 85 7C
65D0: FE 69 14 85 FF 60 86 1E FC
65D8: 84 1F A4 07 A6 06 18 B9 E9
65E0: 04 42 85 EC B9 44 41 7D 9C
65E8: C4 42 85 EB BC 50 43 A9 6D
65F0: 66 48 B9 2D 69 48 A0 00 B8
65F8: A5 08 8D 55 C0 60 65 09 FA
6600: 91 EB A6 1E A4 1F 60 85 2F
6608: 09 B1 EB 29 70 4C FE 65 ED
6610: 29 07 0A 0A 0A 0A 85 09 A1
6618: B1 EB 29 0F 65 09 91 EB 2D
6620: 8D 54 C0 A5 08 29 08 4A 7A
6628: 4A 4A 85 09 B1 EB 29 7E FB
6630: 4C FE 65 8D 54 C0 0A 85 A7
6638: 09 B1 EB 29 61 4C FE 65 A5
6640: 8D 54 C0 29 03 4A 6A 6A 14
6648: 6A 85 09 B1 EB 29 1F 65 8F
6650: 09 91 EB 8D 55 C0 A5 08 5D
6658: 29 0C 4A 4A 85 09 C8 B1 3E
6660: EB 29 7C 4C FE 65 0A 0A 6D
6668: 85 09 B1 EB 29 43 4C FE 1D
6670: 65 29 01 4A 6A 6A 85 09 10
6678: B1 EB 29 3F 65 09 91 EB 90
6680: 8D 54 C0 A5 08 29 0E 4A E6
6688: 85 09 B1 EB 29 78 4C FE 12
6690: 65 8D 54 C0 0A 0A 0A 85 1C
6698: 09 B1 EB 29 07 4C FE 65 33
66A0: 86 1C 84 1D 20 BE 65 A4 85
66A8: FE A6 FC 84 07 86 06 20 05
66B0: D6 65 E8 E4 FD D0 F6 C8 97
66B8: C4 FF D0 ED A6 1C A4 1D EC
66C0: 60 A0 00 A2 00 86 FA 84 A4
66C8: FB 20 FB 67 20 A0 66 B9 9B
66D0: A2 40 85 F9 20 E6 66 A6 5F
66D8: FA A4 FB E8 E0 09 D0 E5 0D
66E0: C8 C0 09 D0 DE 60 84 1D 0F
66E8: A5 F9 D0 01 60 B9 F3 40 43
66F0: C9 09 F0 F8 A9 08 85 19 24
66F8: A9 0C 85 1A A5 F9 10 08 2D
6700: A9 06 85 19 A9 07 85 1A F5
6708: 20 BE 65 C6 FD A6 FE E8 21
6710: 86 07 C6 FF A9 00 85 ED 03
6718: 85 EE A5 F9 29 7F A8 88 DA
6720: F0 10 18 A5 ED 69 1B 85 99
6728: ED A5 EE 69 00 85 EE 88 48
6730: D0 EE 18 A5 ED 69 1B 8D 59
6738: 6D 67 A5 EE 69 6B 8D 6E BD
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6740: 67 A0 00 A5 FC 85 06 20 6F
6748: 60 67 88 88 88 A5 FC 85 15
6750: 06 20 60 67 A5 07 C5 FF 81
6758: F0 03 4C 43 67 A4 1D 60 86
6760: 20 6C 67 20 6C 67 20 6C F6
6768: 67 E6 07 60 B9 00 20 85 1F
6770: 1C A2 00 A5 1C 3D 5E 6A 4D
6778: F0 11 DD 5E 6A F0 05 A5 6C
6780: 19 4C 86 67 A5 1A 85 08 DE
6788: 20 D6 65 E6 06 E8 E0 04 D1
6790: D0 E1 C8 60 84 1D 20 BE F6
6798: 65 C6 FF A5 FC 85 06 A2 D2
67A0: 00 A4 FE 84 07 20 D6 65 8C
67A8: 18 98 7D 51 6A A8 C4 FF ED
67B0: D0 F1 84 07 20 D6 65 E6 73
67B8: 06 E8 E0 0D D0 E3 A4 1D 2E
67C0: 60 A9 08 85 08 A5 D7 F0 FA
67C8: 04 A9 06 85 08 A0 B9 A5 F8
67D0: 93 C9 02 D0 04 A9 00 85 75
67D8: 08 A2 01 86 06 84 07 20 4D
67E0: D6 65 E8 E0 09 D0 F4 88 9D
67E8: C0 A6 D0 0A A5 93 F0 04 DD
67F0: A9 00 85 08 88 88 C0 91 3F
67F8: D0 DF 60 A5 FB 0A 0A 0A B4
6800: 18 65 FB 65 FA A8 B9 F3 ED
6808: 40 85 08 60 A0 0F 84 08 B3
6810: 20 A0 66 AD 30 C0 88 D0 27
6818: F5 20 FB 67 4C A0 66 0A 9D
6820: 0A 85 1B 65 1B 65 1B AA 60
6828: BD 15 6A 85 1B E8 A9 30 C2
6830: 85 07 A9 07 85 9B BC 15 54
6838: 6A B9 9E 69 85 8D A9 02 CE
6840: 85 06 06 8D A9 00 90 02 5F
6848: A5 1B 85 08 20 D6 65 E6 F1
6850: 06 A5 06 C9 0A D0 EB E6 3D
6858: 07 C8 C6 9B D0 DB E8 E6 20
6860: 07 E6 07 A5 07 C9 93 D0 01
6868: C9 60 8D 5E C0 8D 0D C0 E4
6870: 8D 50 C0 8D 57 C0 AD 52 78
6878: C0 A0 00 84 9B A6 9B BD 86
6880: 7B 6A A2 08 99 44 41 C8 A7
6888: CA D0 F9 E6 9B A5 9B C9 15
6890: 18 D0 EA A0 00 84 9B A5 F7
6898: 9B AA BD 93 6A A2 08 18 D8
68A0: 99 04 42 69 04 C8 CA D0 C7
68A8: F7 E6 9B A5 9B C9 18 D0 02
68B0: E6 A9 00 A0 00 99 F3 40 F7
68B8: 49 02 C8 C0 51 D0 F6 A9 39
68C0: 09 A0 28 99 F3 40 60 8D CB
68C8: 01 C0 8D 55 C0 20 03 69 47
68D0: 8D 54 C0 20 03 69 A9 00 A8
68D8: A8 A2 00 18 7D 62 6A 99 0C
68E0: C4 42 C8 E8 E0 07 D0 F3 05
68E8: 69 00 C9 28 D0 EB A0 00 A1
68F0: A2 07 A9 00 18 99 50 43 15
68F8: 69 01 C8 CA D0 F7 C0 8C F8
6900: D0 EE 60 A9 20 85 EE A0 33
6908: 00 98 85 ED 91 ED C8 D0 37
6910: FB E6 EE A6 EE E0 40 D0 2F
6918: F3 B9 AB 6A 99 A2 40 C8 10
6920: C0 51 D0 F5 60 85 63 8C 8D
6928: 63 95 63 9E 63 06 0F 32 EB
6930: 3F 65 70 90 74 64 96 64 D9
6938: 9D 64 B1 64 CA 64 D5 64 67
6940: E0 64 EB 64 F6 64 02 02 AF
6948: 02 02 00 00 01 00 00 00 A4
6950: 00 01 01 00 00 00 00 01 84
6958: 00 00 00 00 04 06 04 00 6B
6960: 00 07 05 07 00 00 00 06 0C
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6968: 05 00 00 06 03 06 04 00 56
6970: 04 08 03 07 00 07 05 08 46
6978: 05 00 00 00 00 00 00 00 CD
6980: 00 00 00 00 00 00 00 00 53
6988: 00 00 01 02 01 02 05 07 BC
6990: 04 06 02 01 02 01 04 06 59
6998: 05 07 02 02 02 02 00 00 28
69A0: 00 00 00 00 00 18 3C 66 B2
69A8: 66 7E 66 66 3C 66 60 60 1E
69B0: 60 66 3C 7C 66 66 66 66 9C
69B8: 66 7C 7E 60 60 7C 60 60 C9
69C0: 7E 3C 66 60 60 6E 66 3C 7A
69C8: 66 66 66 7E 66 66 66 7E 35
69D0: 18 18 18 18 18 7E 60 60 16
69D8: 60 60 60 60 7E 66 66 76 D6
69E0: 7E 6E 66 66 7C 66 66 7C 88
69E8: 60 60 60 7C 66 66 7C 78 16
69F0: 6C 66 3C 66 60 3C 06 66 E7
69F8: 3C 7E 18 18 18 18 18 18 77
6A00: C3 C3 C3 DB FF E7 C3 66 6B
6A08: 66 66 3C 18 18 18 3C 66 B2
6A10: 0C 18 18 00 18 0F 38 07 68
6A18: 54 1C 4D 0E 2A 1C 54 54 67
6A20: 00 08 00 4D 1C 15 00 62 63
6A28: 31 3F 54 00 00 06 23 4D 9B
6A30: 1C 1C 3F 00 62 31 3F 54 AC
6A38: 00 0B 31 5B 00 31 54 00 19
6A40: 07 00 5B 31 1C 0E 46 38 F4
6A48: 07 69 00 07 23 07 31 3F 42
6A50: 70 01 01 13 13 13 13 13 0D
6A58: 13 13 13 13 01 01 C0 30 CC
6A60: 0C 03 00 00 00 00 01 00 FD
6A68: 00 11 1E 2B 38 45 52 5F D2
6A70: 6C 79 06 1A 2E 42 56 6A CD
6A78: 7E 92 A6 00 80 00 80 00 0B
6A80: 80 00 80 28 A8 28 A8 28 87
6A88: A8 28 A8 50 D0 50 D0 50 8F
6A90: D0 50 D0 20 20 21 21 22 E7
6A98: 22 23 23 20 20 21 21 22 97
6AA0: 22 23 23 20 20 21 21 22 9F
6AA8: 22 23 23 86 86 92 8F 96 58
6AB0: 95 94 87 87 87 83 83 89 B9
6AB8: 91 93 83 83 86 00 00 00 18
6AC0: 00 00 00 00 00 00 00 00 95
6AC8: 00 00 00 00 00 00 00 00 9D
6AD0: 00 00 00 15 00 00 00 00 F6
6AD8: 00 00 00 00 00 00 00 00 AD
6AE0: 00 00 00 00 00 00 00 00 B5
6AE8: 00 00 08 01 01 13 11 0B 50
6AF0: 01 01 05 05 05 14 15 16 30
6AF8: 0D 12 08 08 C9 CA CB CC 38
6B00: CF D5 D1 D2 A0 8D 00 9D 74
6B08: 60 A9 60 B5 60 C3 60 88 3C
6B10: 62 88 62 A6 65 A1 65 E3 51
6B18: 60 01 63 0F FF FC 05 55 10
6B20: 54 05 55 54 05 55 54 05 7D
6B28: 55 54 05 55 54 05 55 54 6A
6B30: 05 55 54 05 55 54 05 55 15
6B38: 5C 05 55 5C 05 55 5C 05 2A
6B40: 55 5C 05 55 5C 05 55 5C CC
6B48: 05 55 5C 05 55 5C 05 55 4E
6B50: 5C 05 55 54 05 55 54 05 B1
6B58: 55 54 05 55 54 05 55 54 9A
6B60: 05 55 54 05 55 54 05 55 45
6B68: 54 0F FF FC 0D 55 54 0D 70
6B70: 55 54 0D 55 54 0D 55 54 D3
6B78: 0D 55 54 0D 55 54 0D 55 F1
6B80: 54 0D 55 54 0D 55 54 0C 27
6B88: 00 00 07 00 00 05 C0 00 D5
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6B90: 05 70 00 05 5C 00 05 57 9A
6B98: 00 05 55 C0 05 55 70 05 CA
6BA0: 55 5C 05 55 5C 05 55 70 41
6BA8: 05 55 C0 05 57 00 05 5C E0
6BB0: 00 05 70 00 05 C0 00 07 09
6BB8: 00 00 0C 00 00 0D 55 54 44
6BC0: 03 55 54 00 D5 54 00 35 2E
6BC8: 54 00 0D 54 00 03 54 00 65
6BD0: 00 D4 00 00 34 00 00 0C 8A
6BD8: 00 00 0C 00 00 34 00 00 02
6BE0: D4 00 03 54 00 0D 54 00 A4
6BE8: 35 54 00 D5 54 03 55 54 7A
6BF0: 0D 55 54 00 00 00 00 00 2E
6BF8: 00 00 00 00 00 00 00 00 CF
6C00: 0C 00 00 37 00 00 D5 C0 BE
6C08: 03 55 70 0D 55 5C 0C 00 CA
6C10: 00 07 00 00 05 C0 00 05 DA
6C18: 70 00 05 5C 00 05 70 00 84
6C20: 05 C0 00 07 00 00 0C 00 34
6C28: 00 0D 55 5C 03 55 70 00 03
6C30: D5 C0 00 37 00 00 0C 00 AF
6C38: 00 00 00 00 00 00 00 00 11
6C40: 00 00 00 00 00 00 0C 00 31
6C48: 00 34 00 00 D4 00 03 54 2F
6C50: 00 0D 54 00 03 54 00 00 60
6C58: D4 00 00 34 00 00 0C 00 F6
6C60: 0C 00 00 0C 00 00 0C 00 18
6C68: 00 37 00 00 37 00 00 37 FF
6C70: 00 00 37 00 00 D5 C0 0F 18
6C78: 55 7C 0C 00 00 0C 00 00 CC
6C80: 07 00 00 05 FF 00 05 55 8C
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6C88: FC 05 FF 00 07 00 00 0C 65
6C90: 00 00 0C 00 00 0F 55 7C 4E
6C98: 00 D5 C0 00 37 00 00 37 EF
6CA0: 00 00 37 00 00 37 00 00 3D
6CA8: 0C 00 00 0C 00 00 0C 00 60
6CB0: 00 00 0C 00 00 0C 00 00 3B
6CB8: 34 00 3F D4 0F D5 54 00 59
6CC0: 3F D4 00 00 34 00 00 0C 1C
6CC8: 00 00 0C 00 00 00 00 00 23
6CD0: 00 00 00 00 0F FF FC 05 21
6CD8: 55 54 0F FF FC 00 00 00 3B
6CE0: 00 00 00 00 00 00 07 00 C7
6CE8: 00 0D C0 00 03 70 00 00 F6
6CF0: DC 00 00 37 00 00 0D C0 86
6CF8: 00 03 70 00 00 DC 00 00 14
6D00: 34 00 37 00 00 37 00 00 B8
6D08: 37 00 00 37 00 00 37 00 60
6D10: 00 37 00 00 37 00 00 37 A9
6D18: 00 00 37 00 00 00 34 00 42
6D20: 00 DC 00 03 70 00 0D C0 C0
6D28: 00 37 00 00 DC 00 03 70 2E
6D30: 00 0D C0 00 07 00 00 0F AD
6D38: FF FC 0D 55 5C 0D 00 1C 7C
6D40: 0D 00 1C 0D 00 1C 0D 00 80
6D48: 1C 0D 00 1C 0D 55 5C 0F BB
6D50: FF FC 00 0C 00 00 3F 00 A9
6D58: 00 DD C0 03 5D 70 0F FF BD
6D60: FC 03 5D 70 00 DD C0 00 26
6D68: 37 00 00 0C 00 FF 00 00 9F
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MouseWrite v1.5.7

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Mastering *MacDraw*

Gordon McComb

MacDraw is the oldest—and still the most popular—drawing program for the Macintosh. Veteran MacDraw user Gordon McComb shows how to master the program's intricacies and how to complete almost any project with this versatile software.

A word processing program lets you write words and print them out. An electronic spreadsheet program lets you enter a series of numbers and find the result of some computation. A database management program lets you store facts and figures for retrieval at some later date.

These programs—the word processor, the electronic spreadsheet, and the database manager—allow you to do a single, defined task. They are designed with a specific function in mind: to write, to calculate, to file away for some future date. But not all computer programs are so single-minded.

Claris' (Apple Computer's new software-only spin-off company) *MacDraw* is multifunctional—it behaves like many powerful graphics programs combined into one. Using special tools and commands, you can create

☐ Engineering drawing designs
☐ Isometric drawings
☐ Exploded-view drawings
☐ Architectural drawings (including renderings, elevations, and floor plans)
☐ Product sketches and patent drawings
☐ Electronic circuit-board layouts and schematics
☐ Forms (for business or personal use, in any size or shape)
☐ Single- or multiple-column typeset pages (for newsletters, reports, books—you name it)
☐ Graphs and charts of all types
☐ Stationery—including logos, letterheads, business cards, envelopes, and personalized note pads
☐ Signs and labels
☐ Paper toys and greeting cards

At first glance, it may appear that *MacDraw* is an integrated program, with many individual software modules rolled into one. It isn't. By definition, *MacDraw* is an *electronic drafting set*—a mechanical drawing program for a computer.

By itself, *MacDraw* is capable of little more than drawing lines, circles, and squares on the Macintosh screen. Your creativity and skill transform these objects into pictures and images—whether they be a drawing for a new high-rise, the schematic for the latest electronic marvel, or a page for the current issue of your in-house company magazine.

The creative part of designing graphics with *MacDraw* is up to you. You have to provide the brain power. The skill part you can develop with *Mastering MacDraw,* the book from which the following was excerpted. With this book, you'll learn what *MacDraw* is, how to use it, and the function of its various tools and commands. The book includes over four dozen completed models that show you how to apply *MacDraw*'s features to your particular requirements. The models, one of which covers signs and labels, cover a myriad of practical *MacDraw* applications.

Mastering MacDraw also presents advanced information of interest to all *MacDraw* users—beginning and experienced alike. There are chapters on sharing text and graphic data with *MacDraw* and other Macintosh programs, how to create a *MacDraw*-based *graphics workstation,* how to effectively print with *MacDraw* using a variety of output devices, and how to customize parts of *MacDraw* to suit your needs and tastes.

Signs And Labels

Are you in a hurry and need a sign for your office reception? Has the boss asked you to make labels for all the expensive equipment your department has been purchasing lately? Do you need to come up with a set of address labels for a short-run mailing?

If these tasks sound like ones you're required to do from time to time, *MacDraw* can help. You can use *MacDraw* to make signs and labels of all shapes and sizes—from a scant one-inch square to a behemoth four by eight feet. And when printed with an ImageWriter II, the signs and labels you make can be in living color.

The projects outlined below are

☐ Placards
☐ Posters
☐ Mailing labels
☐ Price tags
☐ Banners
☐ Color output

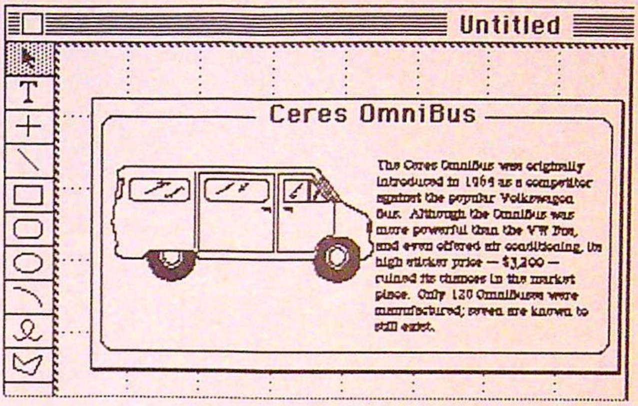
Placards

By definition, a placard is a printed or written announcement for display in a public place. Most placards are small—8½ × 11 inches or under—and are printed on some type of long-life medium, such as brass, plastic, or glass.

You can produce long-lasting placards by designing them in *MacDraw,* printing them with an ImageWriter or LaserWriter, and covering them with plastic. A clear acrylic glazing can be placed over the original, or the paper can be coated with thin laminating plastic.

The design of the placard depends entirely on the subject matter and the size of the placard. Figure 1 shows one example for a

Figure 1: Placard Example

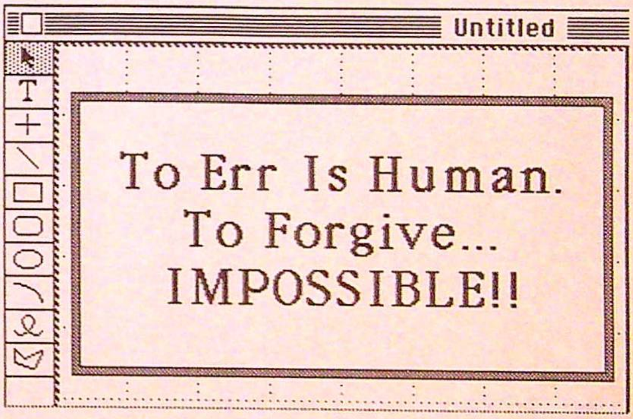


Ceres OmniBus

The Ceres OmniBus was originally introduced in 1964 as a competitor against the popular Volkswagon Bus. Although the OmniBus was more powerful than the VW Bus, and even offered air conditioning, its high sticker price — $3,200 — ruined its chances in the market place. Only 120 OmniBuses were manufactured; seven are known to still exist.

An example of a text-and-graphics placard.

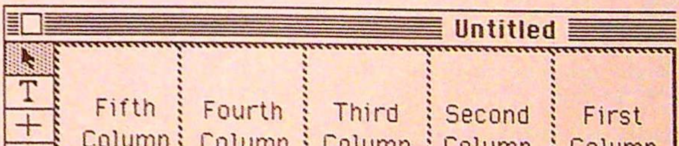
Figure 2: Sample Desktop Poster



To Err Is Human.
To Forgive...
IMPOSSIBLE!!

A desktop sign (original size is 7¾ × 4½ inches).

Figure 3: Order Of Paper For Billboard



To make a billboard, overlap the columns of paper, starting from the right.

placard used in an automobile museum. The graphic is a bitmap created in *MacPaint* and then transferred to *MacDraw*. The original size of the placard was five by eight inches (length by width).

Create your own placards by following these general instructions:

- Switch to Reduce to Fit view and make a box the size and shape of the final placard. If the placard is wider than it is tall, choose the File-Page Setup dialog box and click the Landscape (or Wide) option.
- Write and draw within the confines of the outline box. The text in most placards is flush left, single-spaced. Choose a readable font in a 12- or 14-point size. Font sizes under 10 points may be difficult to read when viewed at a distance greater than one or two feet.
- When you're finished writing, center the text blocks within the box by selecting everything and choosing the Arrange-Align Objects command. Click the L/R Centers option and press OK. The outline box can be deleted prior to printing.

Posters

MacDraw can make posters as large as four by eight feet, though most of the posters you make will likely be smaller. Large posters are created by printing the document in several 8½ × 11-inch sheets and then taping or pasting them together.

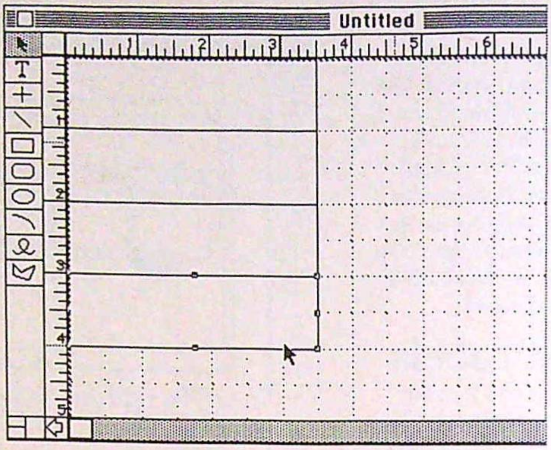
To make small posters (under 8 × 10 inches):

- Create the poster by drawing and writing, as usual. Prior to printing, switch to Reduce to Fit view and position the text and graphics for best appearance. A sample desktop poster is shown in Figure 2. You can substitute the text for any of your favorite sayings.

To make large posters (over 8 × 10 inches):

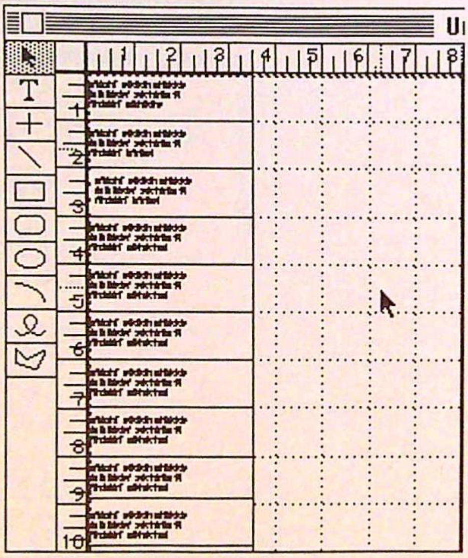
- Define the size of the poster in the Layout-Drawing Size dialog box. Click OK and create the poster by drawing and writing. If the heavy page-break marks bother you, you can switch them

Figure 4: Page With Boxes



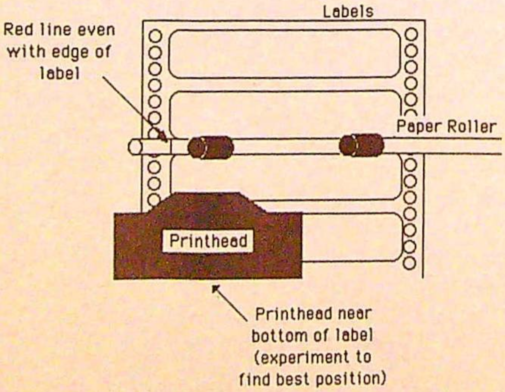
Start the mailing label format by duplicating a column of 1 × 3½-inch boxes.

Figure 5: Labels Ready To Be Printed



A sample page of mailing labels.

Figure 6: Alignment In ImageWriter For One-Up Labels


Labels
Red line even with edge of label
Paper Roller
Printhead
Printhead near bottom of label (experiment to find best position)

Correct alignment in the ImageWriter for printing one-up labels.

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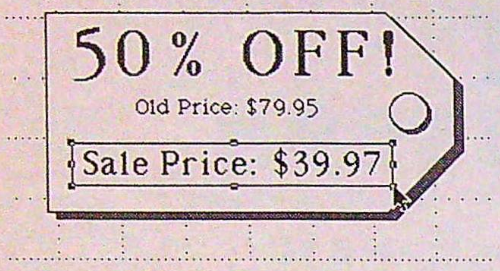
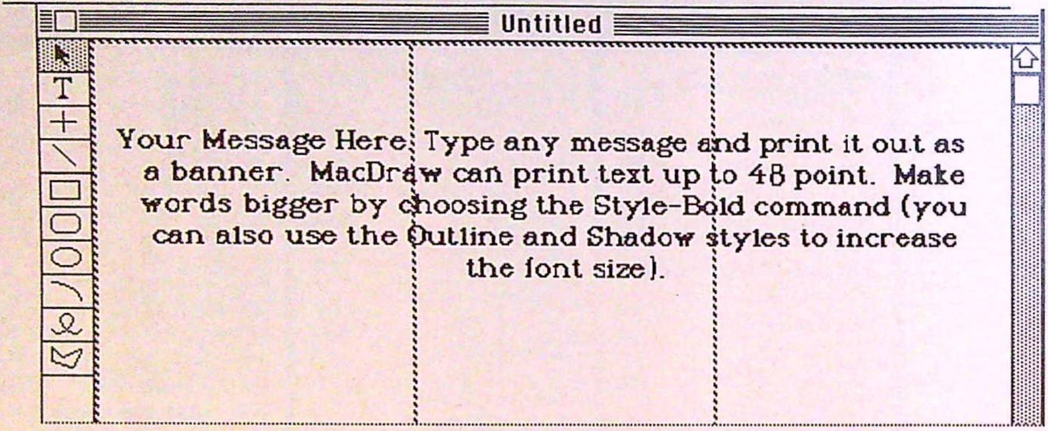
Figure 7: Sample Price Tag, With Frame



A sample price tag.

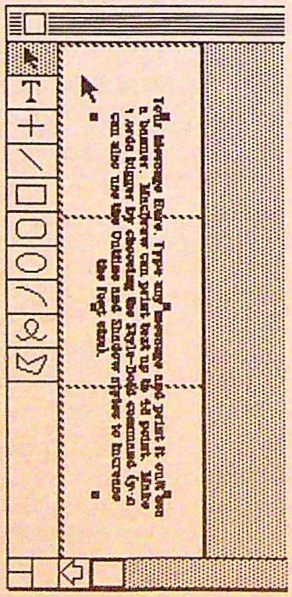
Figure 8: Reduced-Size Banner



Your Message Here. Type any message and print it out as a banner. MacDraw can print text up to 48 point. Make words bigger by choosing the Style-Bold command (you can also use the Outline and Shadow styles to increase the font size).

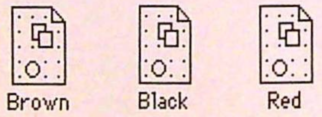
A banner made with 48-point New York text.

Figure 9: Sample Message



The banner text rotated and positioned in the far left column of pages.

Figure 10: Three Documents For Color



Duplicate the original document to make the color submaster documents.

off with the Layout-Hide Page Breaks command.

≡ Prior to printing, switch to Reduce to Fit view and position the text and graphic elements for best appearance. Choose the File-Page Setup dialog box and click the No Gaps Between Pages option.

≡ Print as usual. Tape the pieces together in the proper order, as shown in Figure 3, so the pages overlap one another but don't block the picture. You may need to trim excess paper off some of the sheets.

You can also mount the pages on artboard for a sturdier poster.

Mailing Labels

MacDraw can be used for printing a small quantity of mailing labels, perhaps the return address labels for sales brochures or the mailing list for a small club newsletter. You'll want to use a mailing-list program or word processor if you must print many mailing labels or if the labels must be routinely edited and updated.

The instructions below are for using one-up label stock. You can easily modify the layout of the mailing-label document to accommodate other sizes and styles of labels.

Initial Settings: Show Ruler, Grid On, Show Size

≡ Make a box 3½ × 1 inches and place it in the upper left corner of the *MacDraw* drawing window. Duplicate the box and put the duplicate immediately below the original. Repeat the process eight more times, for a total of ten boxes (see Figure 4).

≡ Each box represents a standard 3½ × 15/16 mailing label. Select all the boxes and group them together. Save this document and call it *Mailing Labels*, or some other descriptive name.

≡ Test the label layout by making a sample print of the grid. Line up the printed grid with a sheet of mailing-label stock. The boxes should be the same size as the labels.

≡ Click the T (Text) tool, choose a small font (such as Geneva 9 point), and click inside the box in the upper left corner. Type the text for the first mailing label.

≡ Repeat the process for the remaining labels. If all of the labels are the same, write the text for one and duplicate it for the

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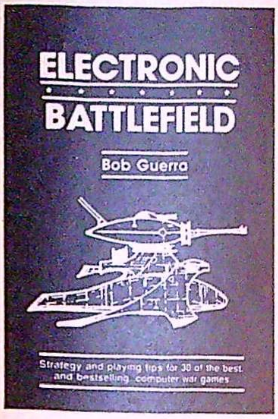

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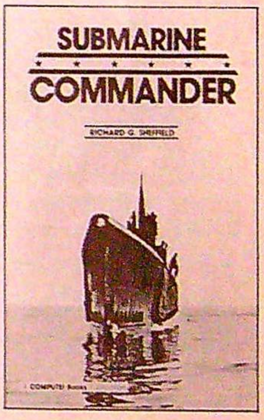

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remaining labels.

≡ After the text for all the labels has been written, check to make sure that no characters overlap the lines. Select the set of grouped boxes and delete it, leaving only the text. Figure 5 shows a page of mailing labels ready to be printed.

≡ Insert a sheet of label stock into the printer. Be sure the labels are aligned as shown in Figure 6.

≡ Print the labels, making sure that the label stock feeds through the printer smoothly.

Price Tags

You can use a sheet of gummed label stock to make price tags of any size or shape. The stock comes in 8½ × 11-inch sheets and is available in many colors, including eye-catching fluorescent green and orange. For a dramatic effect, use a colored ribbon in the ImageWriter II. (Blue ink on yellow paper will catch everyone's attention.)

Once the tags have been printed, cut them to the desired size.

Initial Settings: Show Ruler, Grid Off

≡ Draw a box for the price tag. You can use any line width or pattern. For starters, try the four-pixel line width and one of the heavy-striped patterns. The box serves as the frame for the price tag.

≡ Fill in the price tag with text. Use different fonts and sizes to accentuate your message. If an item is selling for 50 percent off, for example, you might write the tag as shown in Figure 7.

When finished with the tag, group its elements and slide it to the upper left corner of the drawing window.

≡ If you have several of the same item, duplicate the tag and make as many copies as you need. Leave ⅛–¼ inch between each tag. If you have other items, make the tags for them as well.

≡ Make a sample print on plain paper using the Best print setting. Examine the printed copy and make any last minute changes or corrections.

≡ Load the printer with the label stock. Most stocks are heavy, so you may need to adjust the head-to-platen adjustment on the ImageWriter. (*Mastering MacDraw*'s Chapter 18, "Printing and Reproduction Tips," shows how to do this.)

Print the labels, making sure that the stock flows through the printer at an even, steady rate. Don't allow the sheet to skew to one side or the labels will be ruined.

Banners

MacDraw prints large documents in columns, as depicted in Figure 8. If you set the No Gaps Between Pages option in the Page Setup dialog box, you can use this feature to make banners.

The biggest limitation to banner making in *MacDraw* is that no text can be larger than 48 points, or about three-quarters of an inch. You can increase the size of text by formatting it as bold, outline, or shadow (or all three). You can also include graphics of any size in your banners.

This project requires you to use an ImageWriter I or II with continuous fan-fold paper.

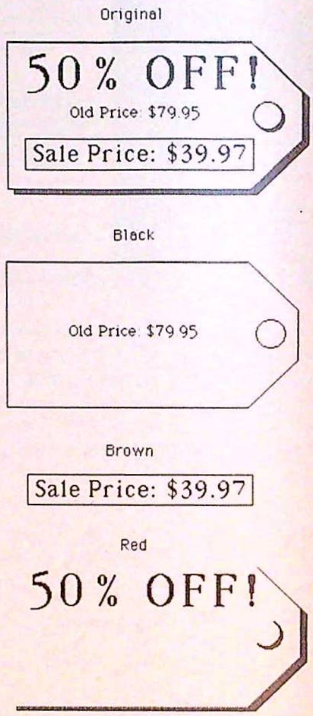
Initial Settings: Grid Off, No Gaps Between Pages (in the File-Page Setup box), **Drawing Size:** 96 × 48 inches

≡ Click the T (Text) tool and choose a font, size, and style to use. Set an insertion point for the text and start typing.

≡ As you get to the right edge of the screen, the text you are currently writing drops out of sight. Scroll over to see the current text with the horizontal scroll bar. If the insertion point is accidentally lost, click after the last character in the block and continue typing.

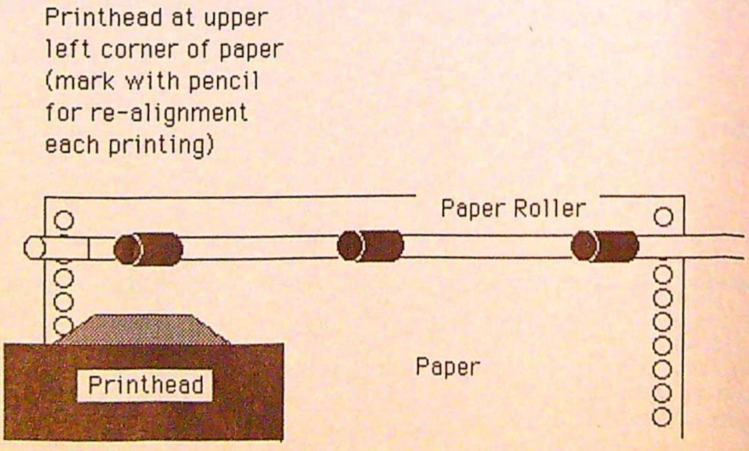
≡ Most *MacDraw* banners will have several lines of text. After

Figure 11: Price Tag With Removed Portions



One way to print a multiple-color price tag (ribbons are available in just about any color).

Figure 12: Alignment In ImageWriter


Printhead at upper left corner of paper (mark with pencil for re-alignment each printing)
Paper Roller
Paper
Printhead

Careful alignment in the ImageWriter is a must for successful MacDraw *color printing.*

the message has been typed, switch to Reduced to Fit view and find the approximate center of the block. Click there with the mouse and press Return. This forces a new line. Center the lines by choosing the Style-Centered command, as shown in Figure 9.

You can use the same technique to divide the message into three or four lines. Check for typos before proceeding (you may have to temporarily switch to Normal view to read the message).

≡ Select the text block and choose the Arrange-Rotate Right command. Position the message evenly in the first column of pages. If the message spans more than four pages, it's too long to print as one continuous banner. You'll have to break it up into several columns.

≡ Choose the Layout-Document Size command and click in the upper right corner of the matrix. Only those pages that have text on them will remain. The others will be deselected and won't print.

≡ Print the banner. For optimum appearance, choose the Best print option.

Color Output

Add impact by making your signs and labels in color. The ImageWriter I and II accept colored ribbons, allowing you to print in a rainbow of hues. The entire printout can be one color or a variety of colors. Printing in more than one color with *MacDraw* involves some careful planning and manual intervention, but it can be done.

Single color. Making a single-color printout is easy: just use a colored ribbon. Replace the black ribbon in the ImageWriter with one of a different color.

Multiple color. Multiple-color printouts require you to change the ribbon two or more times as the document prints. *MacDraw* has no means of establishing colors with objects, so you can't use a four-colored ribbon with the ImageWriter II for color output. For both models of the ImageWriter, use a single color ribbon.

≡ Create the document and save it. Make several copies of the original—one for each color you will use. For example, if your printout will have black, green, and blue in it, make three copies, as shown in Figure 10.

≡ Open each document (up to four can be open in *MacDraw* at the same time) and *remove* those elements that you don't want printed in that particular color (see Figure 11).

≡ Be careful that you do not accidentally move any of the objects that will be printed in each particular document. For basic colored printouts, no object appears twice in the documents.

For advanced printouts, you may *mix* hues by overprinting them with the different colored ribbons. You get purple, for instance, by first printing an object blue and then overprinting it in red.

≡ Make trial printouts of each document. Sandwich the printouts together and examine them by shining a light through the pages. Look for objects that have been inadvertently moved.

≡ Load the ImageWriter with a sheet of paper, making sure that it's aligned as shown in Figure 12. Load the first colored ribbon. Turn the ImageWriter off and on to reset it.

≡ Print the document in the first color and then reload the paper back into the ImageWriter. Be sure the sheet is properly aligned as shown in the figure above. Change the ribbon, turn the ImageWriter off and on (an important step), and print the next color. Repeat the process for all the colors.

Gordon McComb, well-known computer author, lives in California where he writes regularly about computers and high technology. His book Mastering MacDraw *(COMPUTE! Books) was released in November.*

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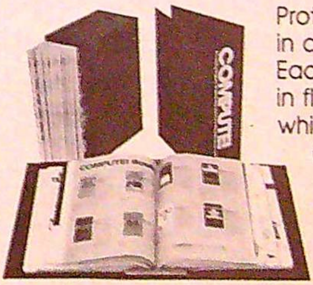

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The Upgrade Path

Tom Netsel, Assistant Features Editor

Afraid the dazzling graphics and sound capabilities of the Apple IIGS will make your IIe obsolete? Don't worry. Apple offers an upgrade conversion kit that'll add new polish to your IIe. Question is—are IIe owners making the upgrade?

What do you do with your Apple II computer when a new model is introduced? Do you become a victim of advancing technology, forced to dump your computer on a scrap heap? Not necessarily.

In the past, Apple didn't abandon owners of its earlier machines. When the Apple II+ and the IIe came out, Apple was there with a conversion kit to turn the older models into more powerful computers. Thousands of owners took advantage of the upgrade and were delighted with the results. With the IIGS collecting rave reviews, Apple IIe owners should be jumping for the upgrades. But are they? And if not, why not?

The Price Is Right

For around $500, an Apple dealer replaces the IIe's motherboard, basepan, and in some instances the case, leaving only the original power supply and keyboard. The resulting conversion effectively turns your IIe into a IIGS.

The upgrade gives you 256K of RAM that can be boosted to eight megabytes through a built-in connector, and 128K of ROM that can be expanded to one megabyte. The IIGS, which stands for *graphics* and *sound,* also has several custom chips which effectively duplicate an Apple IIe and a IIc. In addition to supporting existing IIe programs and graphics, the IIGS offers an extra hi-res palette packed with 256 hues, which have 16 brightness levels each. As a result, you have a choice of 4096 colors, in addition to improved resolution.

More memory, great graphics and superior sound, plus compatibility with existing IIe programs make the IIGS the most exciting addition yet to the Apple II family.

A 32-oscillator sound chip from Ensoniq generates up to 15 voices. The chip, capable of reproducing sample sounds, offers excellent speech synthesis. It is controlled by a dedicted 64K of RAM that lets music play in the background while other programs are running.

More memory, great graphics, and superior sound, plus compatibility with existing software, make the IIGS the most exciting addition yet to the Apple II family. Conversions for older IIe's would seem to be a natural, but Apple dealers say the upgrades have lagged behind sales of new IIGS units.

Sluggish Conversion Sales

In checking with Apple dealers around the country, most expressed similar views as to why the owners of the more than 2 million IIe's are not upgrading.

"The price of the upgade board is not bad," said Jim Brown, manager of Carolina Biological Supply, a large Apple dealer, "but to take advantage of the GS' capabilities, you will need an RGB monitor and a 3½-inch drive. All GS software is coming out on 3½-inch disks."

Most software developers are designing IIGS programs that require 512K (or more) of RAM, so you'll have to buy additional memory, Brown said. Almost all of the new IIGS software uses the IIGS mouse, another item a IIe owner would have to buy.

"By the time you've added all the extra hardware, you've come close to the price of a IIGS," Brown said.

Kathy Preston, manager of The Byte Shop of Milwaukee, echoed Brown's reasons for the slow upgrade sales. "People are buying new GS's instead," she said. "There's a good market for used

Conversions for older IIe's would seem to be a natural, but Apple dealers say the upgrades have lagged behind sales of new IIGS units.

IIe's, so they just sell those and get the GS."

Among first-time computer buyers, the IIGS has virtually replaced the IIe in the Milwaukee market, Preston said. "I think the people who want the IIc still buy the IIc," she said, "but the GS has become the best-selling Apple II. Even though the GS was in short supply last Christmas (1986), it still outsold the IIc and the IIe."

An Apple dealer in New York said he was selling three new IIGS's for every upgrade kit. "I'm still selling a ton of of IIe's, but I'm selling whole labs full of IIGS's to schools." Schools own a large number of Apple IIe's, and they would seem to be a prime candidate for the conversions, but the dealer said he was not certain if schools were aware of the upgrade kits.

Money And Other Issues

The people who buy computers for school systems are aware of the upgrades, but they have various reasons for buying IIe's or new IIGS's. Pat Barrow, computer education curriculum specialist in Guilford County, North Carolina, said the county is equipping each elementary school with Apple IIe's. Area educators plan to go with the IIGS ultimately, but for the present there are two reasons for staying with the Apple IIe: money and compatibility.

"Even with the low price of the upgrades, if we started converting to the GS, it would cut down on the total number of computers in the schools," Barrow said.

The compatibility problem wasn't with the IIGS—it runs virtually all IIe programs—but with the teachers. "They're [teachers] afraid of them [IIGS]," Barrow said. "They say having two systems in a lab is confusing."

Since the Apple IIGS is relatively new, some educators want to see what it can do before they make any major purchase decisions.

Since the Apple IIGS is relatively new, some educators want to see what it can do before they make any major purchase decisions. Gwen Varsamis, computer education consultant in Greensboro, North Carolina, equipped a lab in one elementary school with 24 new IIGS's to evaluate new software.

"We're not upgrading until we see what educational software is made available that will take advantage of the GS sound and graphics capabilities," she said.

Not Serious About Upgrades

The San Diego (California) Unified School District has more than

A Thousand Apples For The Teachers

Many parents rely on the public school system to teach their children how to use computers. Before that can happen, though, teachers have to know how to use the machines.

The Lake Washington School District, near Seattle, Washington, has a large number of microcomputers in the classrooms, but until recently many were gathering dust. Teachers were encouraged to use them and to incorporate them into the curriculum, but many lacked the confidence to use computers, despite the efforts of Bob Lehman, the district's director of planning, evaluation, and technology.

The administration established training programs to familiarize teachers with different machines and applications, but only a small percentage of the faculty would attend. "We probably trained the same 100 people 200 times," Lehman said. "I'm exaggerating when I say that, but it was a small number of staff members who were into using computers."

Before the schools could teach the students how to use computers, the administration had to teach the teachers. As Lehman said, most people attending the training classes were those already interested in computers. Too many teachers seemed to be ignoring computers, hoping they would go away.

To counter this apathy, Lehman came up with a plan the teachers found too good to turn down. "We offered nine days of training in exchange for an Apple IIGS," Lehman said. "We have just over 1,000 teachers in our district, and on the first go-around we had 983 sign up." Another 45 signed up for a later course, giving up part of their Christmas vacation to attend.

The Apple IIGS's belong to the teachers. They can take them home, put them in their classroom, or do anything else they want with them. Lehman said it was their payment for attending the nine-day training session that kicked off the district's five-year technology plan. Now that the teachers each own a computer and have been trained in its use, the computers in the classroom are starting to see some use.

"We stressed *AppleWorks* to give them some practical experience with spreadsheets, database management, and word processing. That gave them a tool they could use," Lehman said. "My initial assessment is that it is working very well. The teachers are very excited about it. It was like Christmas."

6,000 Apple IIe's in its classrooms. Even though the Apple IIGS is a high-end machine, the district recently installed 34 IIGS's in one elementary school, 12 in another, and has plans to buy more.

"A number of schools have seen the IIGS's," said Richard Fabian, computer resource teacher for secondary education, "and when they've seen them, they want to purchase them."

Even with such a large base of installed IIe's, Fabian said the school system has not seriously considered the upgrade kits. "I don't know if Apple has changed, but until recently they were not offering a mouse with the conversion boards," he said. The need for a mouse, a 3½-inch disk drive, and new color monitor were major drawbacks to the conversions, Fabian said.

Up the Pacific coast near Seattle, the Lake Washington School District took a look at the Apple IIGS and liked what it saw. It also decided the IIGS would be an ideal machine to get teachers interested in computers. (See the sidebar "A Thousand Apples for the Teachers".)

The classrooms still have quite a few Apple IIe's, but they're getting old, said Bob Lehman, director of planning, evaluation, and technology. The school system is in the process of putting together a bond issue to raise money to buy replacements. Lehman said he expects to buy more IIe's and IIGS's, but he was not certain about upgrading the older IIe's.

> **"I'm not too sure about the upgrades. . . . They're still relatively expensive, but I suppose we'll go ahead and convert some since we converted some of our old II+'s."**

Indianapolis Schools Pick The Apple IIGS

Remember when you were in the market for your first computer? A friend might have recommended one brand, while a relative might have recommended another. Salesmen pushed their latest models, which left you more confused than ever. The Indianapolis school system was recently in a similar situation.

It planned to install computer labs in 26 elementary schools, but it couldn't decide which computer to buy. A team of educators was appointed to develop a proposal outlining specifications for the new machine. After evaluating a number of makes and models, the team recommended the Apple IIGS. On that recommendation, the school system bought 600 Apple IIGS's.

"We wanted a computer with at least 512K, good high-resolution screen quality, and good sound," said Ann Hart, computer training planner for the school system. The team also wanted a computer that was designed around new technology and was not likely to be discontinued after a year or two. As funding becomes available, the school system plans to upgrade its older labs, and it wants a computer system that will be available in the future.

"We checked out a lot of computers," Hart said, "and the IIGS met all of our specifications."

Another important consideration in chosing the IIGS was the tremendous amount of educational software already available for the Apple II system. Educators are excited about new programs that take advantage of the IIGS' outstanding sound and graphics capabilities, but they also like the fact that old favorites can still be used.

"We use *LogoWriter* in many of the schools but its graphics are not too good yet," Hart said. "But I understand it will be upgraded for the GS."

Next year, Indianapolis plans to install Apple IIGS computers in 25 additional elementary schools. The following year, 16 more schools, which currently have IBM and IIe labs, are scheduled to be upgraded to IIGS's.

"I'm not too sure about the upgrades. I don't know if we'll go that route, or not," he said. "They're still relatively expensive, but I suppose we'll go ahead and convert some since we converted some of our old II+'s."

The Race Is On

Although the IIe has long been the workhorse of the Apple family, the IIGS may be ready to give it a run for it money. And when that money belongs to big customers such as school boards, the IIGS presents an exciting sight and sound package that's starting to loosen a few billfolds. But the upgrade kit seems to be a dark horse that's falling short of coming in a winner.

Apple's idea of offering a conversion kit is to be commended; it's a sound idea that has worked well in the past. The conversions added a plus to the Apple II and enhanced the II+, and—best of all—it was cheaper than buying a new machine. But perhaps the IIGS is too big a leap for the IIe to make. While a IIe can be upgraded for about half what a new Apple IIGS costs, IIe owners appear to be balking when it comes to buying the RGB monitor, the mouse, the additional memory, and the new disk drive—all that's needed to tap the IIGS' full potential.

No matter what users choose, as long as they stay with Apple computers, the company wins. Even though fewer upgrade kits have been sold than anyone, including Apple, anticipated, it's still money in the bank for Apple as thousands of IIe owners hang *For Sale* signs on their old machines and buy brand new IIGS.

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Applied Engineering's PC Transporter

An IBM Inside The Apple

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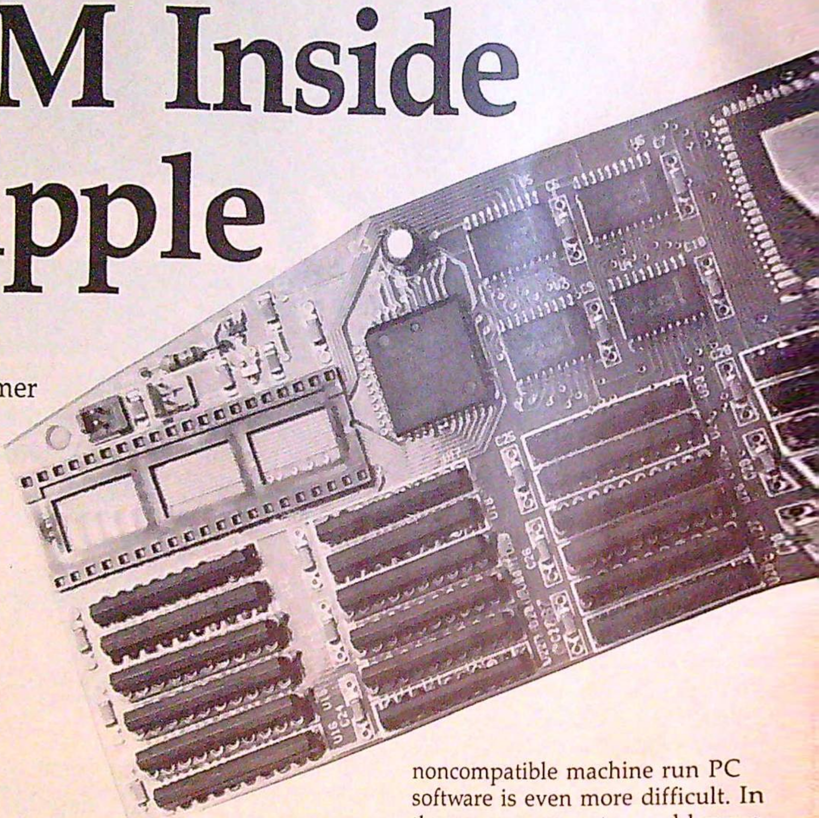


The PC Transporter card from Applied Engineering effectively puts an IBM PC computer inside your Apple II+, IIe, or IIGS, giving you access to the huge software selection of the PC and its clones. Here's a first hands-on look at this impressive card.

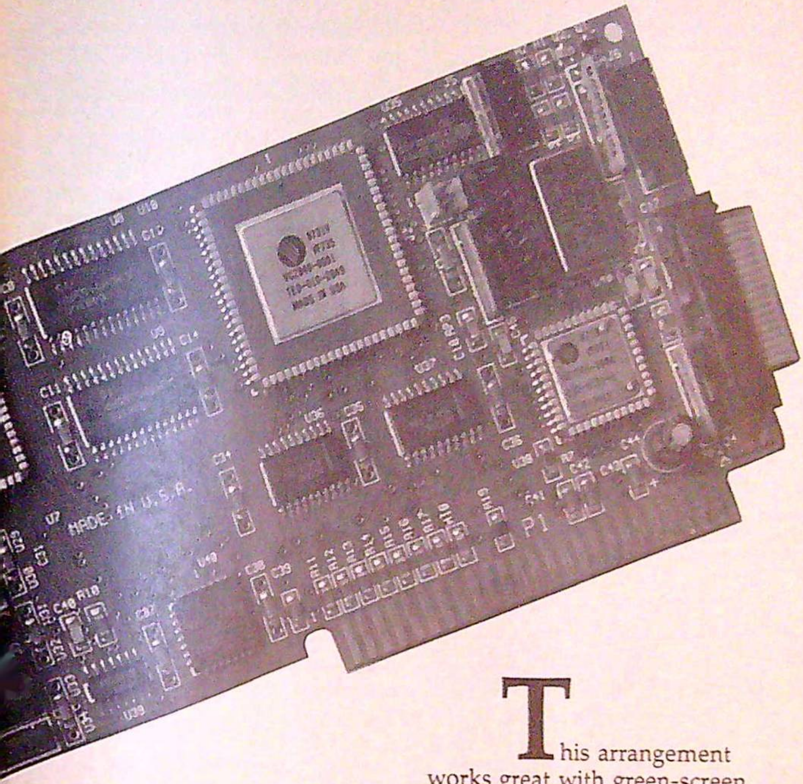
Even though dozens of small computers are called *personal computers* or use the abbreviation *PC*, for most people PC means just one thing—the IBM Personal Computer. The IBM PC has been the de facto standard in desktop business computers for more than five years. With its almost limitless supply of software and expansion hardware, it has become as common as the Rolodex in the American office.

Its success is so great that, until Apple beefed up its Macintosh with memory and more sophisticated applications, most businesses would not even consider buying a computer that didn't run IBM PC-style software.

Recognizing an established standard and seeing such relentless demand, dozens of manufacturers have grabbed portions of this market. They sell machines that work the same as (or sometimes even better than) IBM's own PC computers. There are certain characteristics that define an IBM PC-compatible, or *clone*, computer: a microprocessor of the Intel 8088 family; a certain type of connector for attaching expansion cards; a standard video generator, the CGA (Color/Graphics Adapter) card or, more recently, the upward-compatible EGA (Enhanced Graphics Adapter); and the PC-DOS operating system or its near-double, MS-DOS.

Designing and building a clone from scratch is a challenging task, but making an existing noncompatible machine run PC software is even more difficult. In theory, any computer could run a program which would make it emulate any other computer perfectly. In reality, software-only emulations are almost always far too slow. Adding more hardware helps though, especially if that hardware includes a microprocessor that understands the native machine language of the PC, the Intel 8088 instruction set.

The Applied Engineering PC Transporter, an add-on board which plugs into an expansion slot in an Apple IIGS, IIe, or II+, makes it possible for these computers to run PC software. It doesn't turn the Apple into a true clone—the Transporter has no PC-style slots to accept expansion hardware. But by shrinking most of the circuitry of a clone to fit in a single Apple II slot, Applied Engineering has achieved very satisfactory software compatibility.



The PC Transporter uses Apple II hardware for most of its input and output.

Smart Video

Rather than using IBM-style peripherals, AE designed the PC Transporter to use either Apple II hardware or special devices for most of its input and output. With the card installed, you can use your Apple's serial and parallel interfaces, mouse, and hard disk drive. A clever system of hardware and software make these devices appear to be their IBM equivalents. Some Apple II components are harder to transform. Depending on the computer and its intended use, you might need an extra monitor, keyboard, or disk drive.

For IIe and II+ computers, the simplest arrangement for video display is to show the output of both modes (Apple and IBM) on one composite monitor. (Since one of the display screens is always blank, you won't miss anything.) When a cable, included in the Transporter's installation kit, feeds its output into the Apple's circuit board, both Apple and PC-mode output goes through the normal video jack. The PC-mode display only shows up as shades of gray, however, not as colors.

This arrangement works great with green-screen monochrome monitors, but for color systems it's a little disappointing. The PC Transporter can only display color output on an RGB monitor, of which two types exist. The PC-type RGB monitor has digital inputs, while the IIGS-type accepts analog signals. Although the Apple RGB monitor makes a noticeably better picture, it's also more expensive. Digital RGB monitors, which are easily found and moderately priced, can be attached to the Transporter with an optional cable, producing quite acceptable color displays.

But the Transporter has no provision for showing Apple output on a PC-style monitor—it still needs a composite monitor to show Apple II-mode video. If desktop space doesn't permit two different display units, a monitor that features both digital RGB and composite video inputs is a good alternative. It won't automatically select the active input, but changing modes is just a matter of flipping one switch on the unit's front panel. This arrangement also requires the digital RGB cable.

If the PC Transporter is going in a IIGS, where the analog RGB monitor is essential for super-hires graphics, or in a IIe or II+ that's already equipied with an adapter and an analog RGB display, the choice of monitors is obvious. In either operating mode, this is the display that will produce the best image. It's attached to the optional ColorSwitch adapter (included in the IIGS installation kit), which attaches in turn to both the Apple's RGB output jack and the RGB video connector on the Transporter card. This adapter card converts the Transporter's digital RGB output to analog RGB and selects the active signal for display on the monitor.

Not Enough Keys

PC Transporter might also require a new keyboard, depending on the type of computer system it goes in and the software it runs. In a IIGS, the standard keyboard works quite well for PC mode. It's only shortcoming is the lack of function keys. The Transporter's software neatly remedies this: Holding down the Option key, then pressing a number key, has the same effect as pressing a function key on a PC keyboard.

At the other end of the spectrum, the II+'s built-in keyboard simply doesn't have enough available keys to work with the card. A separate IBM-compatible keyboard must be connected. Applied Engineering supplies the adapter cable to attach it, and a keyboard as well, though keyboards are also widely available from clone-parts vendors and electronic supply houses.

Halfway between, the IIe's keyboard works in PC mode, but not as well as the IIGS's. It can be used, but only with some sacrifices, since it lacks a numeric keypad. Although the latest IIe's do have a separate keypad, these keys are electrically indistinguishable from the top row of the keyboard, so they're actually no better for Transporter applications. The decision as to whether to add a PC-type keyboard to a IIe (and this applies to IIe-to-IIGS conversions, as well) depends on how the system will be used. Of course, it's easy enough to try the built-in keyboard first. Depending on the software that the system will run, the limitations of the existing keyboard might not be a problem.

Use An Apple Drive

Reading and writing to standard IBM-format disks is an important part of PC compatibility, but Apple disk drives and disk controllers are totally incompatible with IBM disks. Accordingly, the PC Transporter has its own disk port. The drives which attach to this connector are like the drives in a clone, except they have a different cabling system, one that lets two drives connect to the single port on the card. It's a *daisychained* arrangement—one cable attaches a drive to the disk connector on the Transporter card while another cable runs between the second drive and an additional connector on the first. Properly cabled PC-compatible 5¼-inch drives for the Transporter are available from Applied Engineering.

The Transporter's disk port uses the same connector as Apple's disk controllers. The cable from any Apple disk drive will physically attach to the Transporter, but only the Apple Disk 3.5 drive—the standard 3½-inch drive for the IIGS—can actually be connected there. The Unidisk 3.5, used with IIc's and IIe's, may appear similar to the Disk 3.5 (it's white rather than gray), but it won't work with the disk controller on the Transporter card. When one or two Disk 3.5's are attached to the Transporter, they can read and write to 3½-inch PC disks using the same format as IBM's PS/2 machines and MS-DOS laptops, but they can't read ProDOS-format disks while attached there. Most Transporter users will need two sets of drives—one for Apple disk and another for PC disks—to avoid eternal disconnecting and reconnecting of cables.

Although IBM-style hard disk drives will not work with the PC Transporter, an Apple II hard drive, formatted under ProDOS, can also be used in PC-DOS. The Transporter can use a large ProDOS file as though it were a separate hard disk volume. This file can even be on a ProDOS-format floppy disk, though this makes the system vulnerable to loss of data, since PC-DOS never expects a hard disk volume to be removed.

No Problems

The ultimate test of a PC-compatible system is its ability to run PC software. If it runs the programs, it passes. While the perfect clone would be a photographic and an electronic copy of an IBM machine, IBM would certainly take legal action against any clone maker who tried this shortcut. Because differences must exist by law, no machine is absolutely PC-compatible. The body of PC software is large enough that almost any discrepancy will keep some program, however obscure, from running correctly. Reputable manufacturers won't claim 100-percent compatibility for their clones. But they *will* make sure that their equipment runs all the most popular PC software (*Lotus 1-2-3, dBase III, Flight Simulator*, and so on) without a hitch.

While using the PC Transporter card, we found no problems with software incompatibility. It ran every PC program on hand and was impressively fast. Its NEC V30 microprocessor runs at 7.14 MHz, faster than the 4.77 MHz of the original IBM machines, slightly slower than the generic 8-MHz XT clones. However, its performance is better than the clock speed might suggest. Because of its design, the NEC processor chip can execute certain machine language instructions in fewer ticks of the system clock than the standard Intel part, increasing the overall performance of the computer.

According to the System Information program in the *Norton Utilities*—a very popular PC utility package—the PC Transformer runs 3.4 times as fast as an IBM PC XT. While this particular benchmark is very sensitive to the particular speed advantages of the NEC V30 chip and is thus somewhat optimistic, other benchmarks clocked the Transformer at more than twice the speed of an XT, at least as fast as IBM's newer PS/2 Model 30.

Bridging The Gap

But the PC Transporter can also be used as a bridge between the Apple and MS-DOS worlds. It includes an MS-DOS utility program called *Transfer* which can work with ProDOS-formatted disks from MS-DOS, copying files back and forth between the two operating systems. This capability is quite valuable in any environment where PC-DOS and Apple II computers coexist, and it's hard to find in any other system.

PC Transformer runs three times as fast as an IBM PC XT.

The Transporter features a control panel, called by holding down the Shift key, then pressing the Caps Lock key twice. This program is part of the Transporter system file, so it's always loaded and available. The panel is used to control the system configuration, which would usually be done with tiny DIP switches in most clone systems. One of its most important functions is the selection of disk drives, assigning a drive identifier letter to each drive on line. The Transporter software can handle up to five PC-DOS volumes at once, identified with letters from *A* through *E*.

The control panel is also used to load device driver files from disk and to set operating param-

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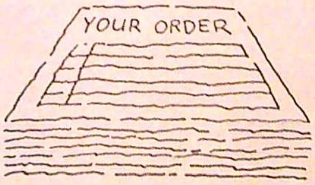

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eters for the devices they control. Each driver tells the computer how to operate a particular I/O device—such as a Super Serial card—and make it look like a PC-DOS device, like the printer port called LPT1. Additionally, the control panel contains a keyboard help screen, showing the Apple IIe or IIGS keystrokes which replace IBM keys that aren't available. By the way, the Transporter doesn't interfere with the IIGS Control Panel. It remains available, though it's rarely needed when the Transporter is active.

And as Applied Engineering is quick to point out, the PC Transporter is useful in normal Apple II operation, too. A fully equipped board has 768K of RAM, all of which is available as *AppleWorks*-compatible expansion RAM. For other applications, this RAM can be used as a ramdisk. However, it isn't a substitute for a IIGS-specific memory card, which installs in the GS's special memory slot (see "Mountains of Memory" in this issue). The Transporter's RAM is still available as a RAM disk in the IIGS, but the 65816 processor can't access it directly like true GS RAM.

Hooking It Up

The PC Transporter is harder to install than most Apple cards. Although the package is well thought-out and Applied Engineering has done much to make it convenient, the installation is still complex. There are several different connectors to attach and many different configurations to choose from, depending on the the kind of computer in which you're installing the board and the equipment being used with it. There are also several operations which, if done wrong, could damage the machine.

New Apple owners and those less technically inclined might be better off to leave the job to a technician, or to enlist a trusted computer veteran for assistance. Even if you're an experienced user who has spent time with the cover off your machine, you'll want to set aside lots of time for the project. Be sure to read the manual carefully before starting.

To give something of the flavor of the installation, here are some highlights. (Don't mistake this for a step-by-step tutorial. This description is extremely superficial and is no substitute for the installation guide that comes with PC Transporter.) AE's recommended procedure begins with the removal of all the cables attached to the rear of the Apple and all the peripheral cards already installed inside. Anyone uneasy about disconnecting and reconnecting this equipment should seriously consider having someone else do the job.

Up to three new connectors will have to be installed on the back panel of the Apple, in locations that don't conflict with the connectors for existing cards. It's a good idea to work this detail out before starting the installation, when the system is still intact.

Transporter is useful in normal Apple II operation, too—the fully equipped board's 768K of RAM is available as *AppleWorks*-compatible expansion RAM.

In some configurations, there are additional cables which connect the Transporter card to the Apple's system board. A couple of these can be tricky. For instance, the cable which carries composite video to the Apple board attaches to a four-pin connector. But on the II+, the connector on the board allows the cable to be attached in two different ways, one of which will cause electronic damage. The connector on the IIe board is keyed to prevent this from happening, but the cable can still be forced on the wrong way. Unless the connector bodies on the board and the cable line up perfectly when this cable is attached, they're not hooked up correctly.

The same sort of problem exists with the keyboard cable on IIe's, including IIGS upgrades. If this cable is attached backward, the computer will run an attractive, though unwanted, diagnostic program when the power is turned on.

Computer On A Card

Although the PC Transporter is built and marketed by Applied Engineering, it was designed by The Engineering Department, a contract design group in Campbell, California. Staffed by some of the top engineers and managers to have worked for Apple, this group began work on the Transporter in 1985. The result combines custom-designed integrated circuits with innovative software to tie the PC-compatible system to the Apple II computer.

The card is built around a set of three integrated circuits (IC) designed specifically for it. One of these, the disk controller chip, can read and write disks in standard PC format. But, unlike the standard PC controller, it's designed to control Apple Disk 3.5 drives as well as PC-type units, and to be operated by the Apple's 6502-family processor, not the 8088 microprocessor of a PC.

Another custom chip on the Transporter card implements CGA graphics. Like the disk controller, it's operated by the Apple's processor rather than the PC-mode CPU. Since the display RAM for CGA graphics is located in memory address space in the PC environment, it gets accessed by the V30. But all the control registers of the standard PC video controller are emulated by the Transporter's 6502-family software, manipulating the real control registers of the custom chip.

The third IC is a GLU (General Logic Unit) chip that hooks various parts of the PC Transporter to each other, to the Apple, and to the peripherals that attach to the system. By putting a board's worth of miscellaneous circuitry in one custom chip, AE reduced both the cost and the size of the system.

Clever Software, Too

But the software of this system is just as important, and at least as clever, as the hardware. The software is divided into two parts, the *BIOS*, normally the lowest level of software in a clone, and the *portware*, a class of software unique to the PC Transporter.

The BIOS of a PC-type machine is a collection of 8088 machine language (ML) programs, usually built into the computer as data in a ROM chip on the system board. This set of programs performs basic operations to mediate between the operating system and the hardware of the machine; it's one of the most important components of a PC clone, affecting both its compatibility and its speed.

In the case of the PC Transporter, the BIOS is kept in a disk file rather than in a ROM chip. Written exclusively for Transporter, it's optimized to improve its performance in the hybrid Apple/PC environment where the Transporter lives. AEPC.SYSTEM—the ProDOS program that boots MS-DOS—loads the BIOS into RAM on the Transporter card when it starts. Reading this disk file does slow the boot process a bit, but it has two big advantages: The BIOS is easy to update if bugs or incompatibilities are found in the future, and the PC Transporter card is more economical, since the additional expense and complexity of ROM circuitry is avoided.

Portware is a set of Apple II ML (6502 code) programs which the PC Transporter uses to emulate the PC's hardware, including serial and parallel ports, a mouse port, and a disk controller. Anytime the Transporter's V30 (PC-type) microprocessor tries to access an I/O device, special circuits on the board freeze it in its tracks. The microprocessor in the Apple starts up and executes a driver program, performing an equivalent action with the machine's actual hardware, like a Super Serial card, an Apple mouse, or the special disk controller on the Transporter card. Then it restarts the V30, giving the appearance that standard PC hardware did the job.

PC For You?

The PC Transporter is a cleverly executed device that greatly extends the performance of the Apple II family of computers. But, compared to a true PC clone computer, it has some disadvantages. Since it lacks IBM-compatible peripheral slots, its expansion is limited to (though sometimes as simple as) acquiring a new device driver file for Apple II hardware. And since PC peripheral makers outnumber Apple ones, there's a wider variety of PC hardware available, usually at a lower price. This difference is especially apparent in the hard disk market. The PC world also offers more in other areas, like networking equipment and alternate display adapters such as EGA and Hercules video cards.

If you use Apple II software most of the time and only need to run standard MS-DOS applications, PC Transporter could be an effective solution.

The Transporter's performance is quite good when compared to XT clones and the IBM PS/2 Model 30, but many PC users now demand faster AT-class machines, which can handily outrun the Transporter. These machines are more expensive—even the simplest system will exceed $1,000—but many PC applications, including popular desktop publishing programs, are very poor performers on a lesser machine. To top it all off, the much-anticipated OS/2 multitasking operating system will run *only* on AT-class machines.

If several people share the use of a machine, getting a separate clone could allow two people to work at once. For instance, if a school wanted to use Apple II software for some subjects and PC software for others, adding PC Transporter cards to existing Apple II's instead of getting clones would certainly save space, and probably some money. But having separate PC compatibles might allow twice as many students to work at once.

For people who use Apple II software most of the time and only need to run fairly standard MS-DOS applications, the PC Transporter could be a very effective solution. An Apple II with Transporter installed takes up very little extra space—maybe a bit for a disk drive, or an extra keyboard or monitor—and this could be an important factor in a crowded school computer lab or at home.

The price of the PC Transporter is roughly comparable to that of a standard PC clone system. A card with the full 768K of RAM costs $609, plus $39 for the installation kit, or $49 for IIGS's. But most Transporter buyers will also need a 5¼-inch PC compatible disk drive, at $269 for a single-drive unit and $399 for double drives. But unlike most clones, this system can take advantage of some of the peripherals already equipping Apple II systems at no extra cost, such as the monitor, printer, and modem.

If you're looking to leave Apples behind and to convert over to the PC world, you're probably better off with a clone, particularly a fast AT-class machine. But if you're happy with your Apple computer and only see yourself using MS-DOS part of the time, the PC Transporter might be the way to go. For bringing work home from the office, exchanging data and documents with PC-based co-workers, or running a specialized PC program that has no equivalent in the Apple world, PC Transporter could be the answer for you.

AppleWorks For Everyone

Christopher Van Buren

In the second of a two-part series, Christopher Van Buren, AppleWorks *expert, takes you beyond ready-made templates and shows you how to build your own database to manage your finances.*

In the last issue of COMPUTE!'s Apple Applications, "*AppleWorks* for Everyone" showed you just some of the templates available for *AppleWorks*. Using one of the hundreds of existing templates—those created by commercial software publishers and those placed in the public domain—is an excellent way to avoid extra work when building an application in *AppleWorks'* spreadsheet or database. At the very least, you can use the existing template as a starting point, then build your own additions onto it.

Another place to look for templates or template ideas for *AppleWorks* is from publications like Apple Applications—more specifically, from articles like this one.

Database Construction Set

Let's build an *Appleworks* database template to help manage your expenses. (If you aren't familiar with the *AppleWorks* database or its features, this article will serve as a good introduction.)

The template and database will organize your records so that paying expenses becomes more automatic and systematic. Not only that, but once you've entered your financial information, you'll be able to do things like view all expenses for any given time period, view the total amounts you've paid on certain expense items, or even calculate the total of remaining debt to any given expense item. This database template isn't meant to be a check register or general ledger, but is simply an organization tool.

Knowing *where* your money is going, and *why* it's going, is more than half the battle in balancing personal finances.

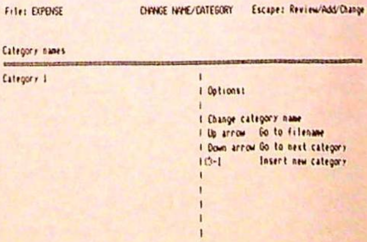
Create Custom Categories

Begin a new *AppleWorks* database by first selecting option 1 on the Main Menu, then option 4. Choose the *From scratch* option to start a brand-new database. When asked, enter the name **EXPENSES** for this database. The screen should look like Figure 1.

You're ready to enter the *categories* (also called *fields*) for the database. This is an important step, since the categories determine the information which you can place into and get out of the database.

Press Open Apple–Y to delete the phrase *Category 1*, then enter the category names shown in Figure 2. Just type the names and press Return after each.

Figure 1: Starting a New Database

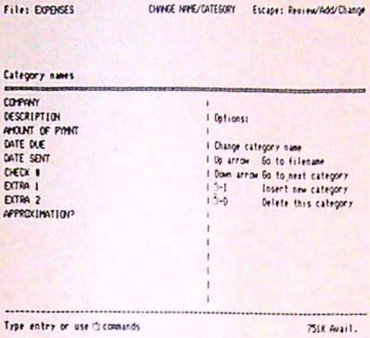


```
File: EXPENSE                CHANGE NAME/CATEGORY    Escape: Review/Add/Change

Category names
==============================================================================
Category 1                            |
                                      | Options:
                                      |
                                      | Change category name
                                      | Up arrow   Go to filename
                                      | Down arrow Go to next category
                                      |-I        Insert new category
                                      |
                                      |
                                      |
                                      |
                                      |
                                      |
                                      |
------------------------------------------------------------------------------
Type entry or use  commands                                      750K Avail.
```

Your new database template is ready to accept the categories *you specify.*

Figure 2: Expense Categories



```
File: EXPENSES              CHANGE NAME/CATEGORY    Escape: Review/Add/Change



Category names
==============================================================================
COMPANY                                   |
DESCRIPTION                               | Options:
AMOUNT OF PYMNT                           |
DATE DUE                                  | Change category name
DATE SENT                                 | Up arrow   Go to filename
CHECK #                                   | Down arrow Go to next category
EXTRA 1                                   | -I        Insert new category
EXTRA 2                                   | -D        Delete this category
APPROXIMATION?                            |
                                          |
                                          |
                                          |
                                          |
                                          |
                                          |
------------------------------------------------------------------------------
Type entry or use  commands                                       751K Avail.
```

Your expense database template takes shape as you specify its categories, or fields. Use Open Apple–D to delete a category, or Open Apple–I to insert one between two existing categories.

Press the Escape key when you're finished.

Before going to the next step—entering information—it's a good idea to change the way the information appears on the screen to make it more readable. Using the Open Apple–L command, arrange the fields as desired (Figure 4 shows one example). After pressing Open Apple–L, use the Open Apple key along with the four arrow keys to change the positions of the categories (make sure that the cursor is on the first character of each category before you try to move the category). If you have trouble entering Open Apple–L, press Escape and try again.

When you're through making the layout alterations, press Escape. Choose *Order in which you defined categories* at the next prompt. Now when you enter information, you'll proceed through the database's categories in the order they were first defined, *not* the order in which you just placed them. Of course, you can choose the other option, *Left to right, top to bottom,* if you want.

Use the Open Apple–Z command to see all your records at one time. This is called the *Multiple Record Layout.* You can use Open Apple–L to change the appearance of this screen as well. Figure 3 shows an example, with many of the categories removed, leaving only those categories critical to the database in view. Make your layout changes with the commands shown at the top of the screen.

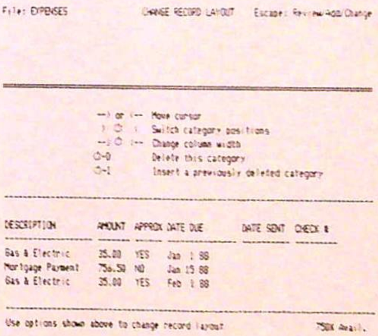
When you press Escape to finalize your changes, you'll be asked in what direction the cursor should move when you press Return. Select *Down.* This selection makes the next few steps easier. Later on, you'll change this back to *Right.*

Bills, Bills, And More Bills

You want this database template to show all your expenses throughout the year, including those that fluctuate from month to month, those that come up spontaneously, and those that are known ahead of time.

Consider your regular monthly expenses first. Enter those expenses in your database, even if the amount is only an approximation. Utility bills and grocery expenses are two prime candidates. Later, you can use the estimated amount as a kind of budget foundation.

Figure 3: Sample Layout Changes



```
File: EXPENSES              CHANGE RECORD LAYOUT    Escape: Review/Add/Change



==============================================================================

                    --> or <--  Move cursor
                     ↑    ↓     Switch category positions
                    -->  <--  Change column width
                    -D          Delete this category
                    -I          Insert a previously deleted category

------------------------------------------------------------------------------

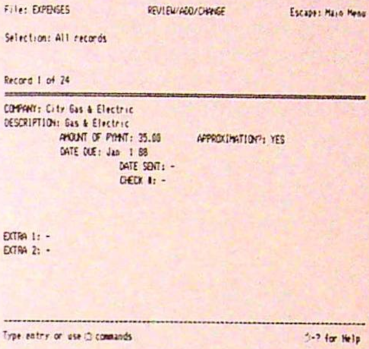
DESCRIPTION        AMOUNT  APPROX DATE DUE       DATE SENT  CHECK #
------------------ ------- ------ -------------- ---------- --------
Gas & Electric     35.00   YES    Jan  1 88
Mortgage Payment   756.50  NO     Jan 15 88
Gas & Electric     35.00   YES    Feb  1 88

------------------------------------------------------------------------------
Use options shown above to change record layout                   750K Avail.
```

Changes can be made to the Multiple Record Layout screen using Open Apple–L and the various commands listed at the top of the screen. Notice that not all categories are shown in this layout.

Instead of typing each entry individually, use this shortcut: Enter the first occurrence of each item so that it looks something like the one shown in Figure 4. Now go to the Multiple Record Layout by pressing Open Apple–Z and use the Copy command to duplicate this item 11 times. (The copy command is Open Apple–C.)

Figure 4: Individual Database Entry



```
File: EXPENSES              REVIEW/ADD/CHANGE             Escape: Main Menu

Selection: All records


Record 1 of 24
==============================================================================
COMPANY: City Gas & Electric
DESCRIPTION: Gas & Electric
          AMOUNT OF PYMNT: 35.00        APPROXIMATION?: YES
          DATE DUE: Jan  1 88
                    DATE SENT: -
                    CHECK #: -



EXTRA 1: -
EXTRA 2: -




------------------------------------------------------------------------------
Type entry or use  commands                                     -? for Help
```

The database categories have been moved into a more logical layout. Press Control–L, then follow the screen prompts to alter any database layout.

Since each of the copies has the same due date, you'll have to go back and change it. Simply move to the top and change each date in the column by typing over the month portion or by retyping the date. Continue using this technique for all regular monthly expenses. You can even alter the amounts throughout the year to reflect seasonal changes.

When entering data into this file, keep the following things in mind: If you have several transactions involving the same company or institution, make sure that the name of the company or institution is *exactly* the same throughout the database. The technique of copying entries and then altering them (as described above) helps to make sure the spelling and punctuation is consistent. If things like spelling and punctuation are *not* consistent—if you've listed your power company as both *DUKE POWER* and *DUK POWER,* you won't be able to accurately search for all bills paid to that company.

You can enter new information using the Open Apple–I command, then sort the database again with Open Apple–A. Sorting the records by the DUE DATE category is a good way to view upcoming expenses. Finally, as you enter the payment date and check number after you've made the payment, you can make adjustments to estimated amounts.

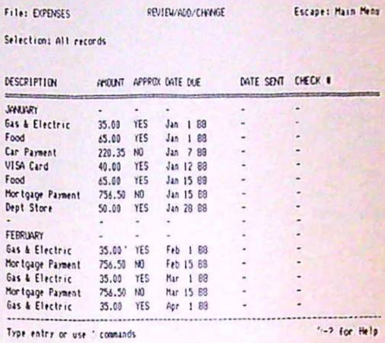
Sort On Anything

The easiest way to retrieve information from this database is by sorting it in various ways. The two most useful methods are sorting by the categories DATE DUE and COMPANY. Use the Open Apple–A command to sort the records. When sorted by DATE DUE, the screen should look something like Figure 5.

Notice the labels preceding each month's expenses. These were added by moving to the first item in each month (after the records are sorted by DATE DUE) then using the Open Apple–I command to insert a record containing only the month name in the DESCRIPTION category.

You can create a wide range of reports from this expense database: reports that list all expenses for a given period of time, ones that list all expenses for any given category, or ones that even list those expenses that haven't yet been paid. Make all such data selections by using the Open Apple–R command (Record Selection Rules). By combining the sorting features and the record selection features of *AppleWorks,* you can come up with some useful ways of viewing the information in this database—and, with some luck, never be late with a payment again.

Figure 5: Sorted Screen



```
File: EXPENSES                REVIEW/ADD/CHANGE                Escape: Main Menu

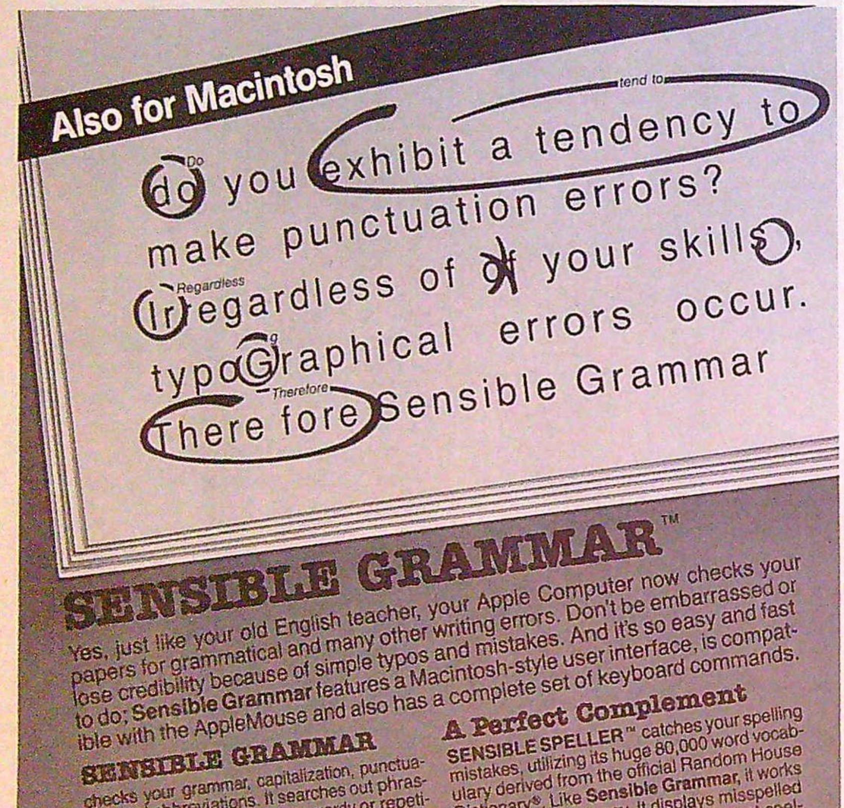
Selection: All records

DESCRIPTION        AMOUNT  APPROX DATE DUE       DATE SENT  CHECK #
===================================================================
JANUARY            -       -      -              -          -
Gas & Electric     35.00   YES    Jan  1 88      -          -
Food               65.00   YES    Jan  1 88      -          -
Car Payment        220.35  NO     Jan  7 88      -          -
VISA Card          40.00   YES    Jan 12 88      -          -
Food               65.00   YES    Jan 15 88      -          -
Mortgage Payment   756.50  NO     Jan 15 88      -          -
Dept Store         50.00   YES    Jan 28 88      -          -
-                  -       -      -              -          -
FEBRUARY           -       -      -              -          -
Gas & Electric     35.00'  YES    Feb  1 88      -          -
Mortgage Payment   756.50  NO     Feb 15 88      -          -
Gas & Electric     35.00   YES    Mar  1 88      -          -
Mortgage Payment   756.50  NO     Mar 15 88      -          -
Gas & Electric     35.00   YES    Apr  1 88      -          -
-------------------------------------------------------------------
Type entry or use ' commands                               '-? for Help
```

The records have been arranged by the category DUE DATE.

Christopher Van Buren is editor and publisher of AppleWorks Exclusive Reference *newsletter and author of several books on* AppleWorks.

aa



Also for Macintosh
Do you exhibit a tendency to make punctuation errors? Irregardless of of your skills, typoGraphical errors occur. There fore Sensible Grammar
tend to
Do
Regardless
g
Therefore
SENSIBLE GRAMMAR

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Yes, just like your old English teacher, your Apple Computer now checks your papers for grammatical and many other writing errors. Don't be embarrassed or lose credibility because of simple typos and mistakes. And it's so easy and fast to do; **Sensible Grammar** features a Macintosh-style user interface, is compatible with the AppleMouse and also has a complete set of keyboard commands.

SENSIBLE GRAMMAR checks your grammar, capitalization, punctuation and abbreviations. It searches out phrases that are inconcise, vague, wordy or repetitive, as well as faulty, informal, pompous or sexist phrases. It calls your attention to cliches and slang. It even allows you to enter your own personal trite and pet expressions and then lets you know every time you use them.

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Sensible Grammar ($99.95) which works on Apple IIGS, 128K //e and //c, and **Sensible Speller** ProDOS ($125), which works on Apple IIGS, //c, //e and II+, are available on 5" and 3.5" disks. **Sensible Speller** IV ($125) works with Apple //e, //c, II+, II and Apple-compatible computers. **Sensible Technical, Stedman's Medical** and **Black's Law** Dictionaries are available on 5" disk for $39.95 each. All programs are available separately.

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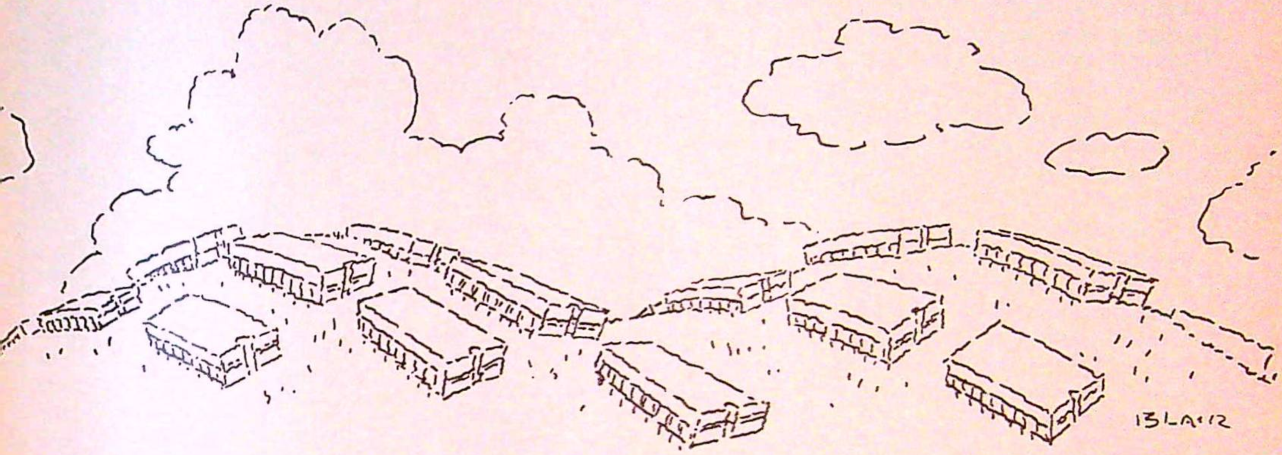

Mountains Of Memory

David Stanton

If you want to exploit the real power of your Apple IIGS, you're going to need an expansion memory card. This article looks at the seven available memory boards and shows exactly what each card offers.

True, the standard 256K inside your Apple IIGS is more than enough to run software designed for the older Apple II computers. If you plan to use only Apple IIe- or IIc-era software with your new IIGS, you may never need more than the computer's built-in memory.

But then you'd be wasting much of the Apple IIGSs' potential, power that goes far beyond the capabilities of its ancestors. From its outstanding graphics and sound to its maximum of eight megabytes of RAM and one megabyte of ROM, the Apple IIGS has much to offer.

As more and more software publishers take advantage of these advanced features, 256K will start to look skimpy. Already many programs designed especially for the Apple IIGS require 512K (see "Ten Reasons to Add Memory to Your IIGS"). Some software requires even more RAM. This trend toward increasingly sophisticated (and memory-gobbling) software will only accelerate.

Sooner or later, you'll want to see what an Apple IIGS can really do. When that time comes, you'll need more memory.

Use That Memory

The argument for upgrading gets more persuasive when you see exactly how the extra memory is used.

Much of the Apple IIGS software currently available recognizes and automatically uses the extended memory cards tested for this article. Simply insert the card into the expansion memory slot and enjoy the added benefits. *AppleWorks*, for example, immediately acknowledged all the one-megabyte cards with an unfamiliar (but welcome) message—*1149K Available* (technically, 1148K on Apple's card).

Likewise, the Control Panel recognizes each card and offers the option of configuring its memory as a *ramdisk*, a portion of memory that essentially acts like a physical disk drive—you can save files to it and load them from it. But because it's all in memory and nothing mechanical is involved, loading and saving files to a ramdisk is extremely fast. Since the 256K RAM on the motherboard cannot be used as a ramdisk, only an expanded Apple IIGS has ramdisk capability.

In addition to these two basic advantages—*AppleWorks* enhancement and a ramdisk—most expansion memory cards distinguish themselves by offering unique hardware or software. Battery-powered RAM, programmable ROM, RAM caching, and the ability to upgrade to the full eight megabytes are just a few of the possibilities.

Apple's IIGS Memory Expansion Card

Apple Computer's own memory card sets the standard by which others must be measured. Many IIGS owners buy their computers with the Apple IIGS Memory Expansion Card already installed. When looking to upgrade, cautious customers opt for Apple's own board.

To assure the widest possible marketing base, software developers write their programs to recognize and address the Apple Memory Expansion Card. When compatibility is vital, software and hardware producers rely on the standard that Apple sets.

Fortunately for third-party manufacturers, Apple encourages others to create add-ons for its equipment. While Apple and its smaller associates both benefit, users benefit even more. Apple's willingness to share its technical expertise and to provide assistance to add-on manufacturers explains why third-party IIGS memory cards are so compatible with Apple's own card.

In fact, Apple's card is one of the least versatile. The standard card contains eight 256-*kilobit* (32K) DRAM (Dynamic Random Access Memory) chips to yield 256K of on-board RAM. All chips installed at the factory are soldered into place. You can upgrade to 512K or 1024K (one megabyte) by plugging additional chips into the unfilled sockets and attaching the two jumper assemblies included.

Even when fully populated, its one megabyte falls far short of the eight megabytes the IIGS was designed to handle. While one megabyte of extra memory will probably satisfy most, you may be reluctant to give up the chance to expand even more in the future.

Others may wish Apple's boards were fully socketed to allow easy replacement of damaged chips. A few users will require sophisticated extras not available. Still, dollar for dollar, Apple's board is a dependable and safe choice. After all, there can be no question of compatibility when you buy the real thing.

Applied Engineering's GS-RAM

Applied Engineering's GS-RAM comes with a minimum of 256K RAM. For users who need more power right away, Applied Engineering offers versions with 512K, 1 megabyte, and 1.5 megabytes. An optional piggyback card which attaches to the GS-RAM board can expand memory to a full 8 megabytes, without occupying or blocking another slot.

If you want to start small, then upgrade later, you won't have any problem finding the necessary chips. Like Apple's memory card, GS-RAM employs the same 256-kilobit, 150-nanosecond DRAMs used on many Apple IIe memory cards. One well-known mail-order electronics outlet recently offered these chips for $2.75 each. Since GS-RAM automatically recognizes added memory without the need to set dip switches or jumpers, all that's necessary is to find the correct chips and insert them into the proper sockets.

Remember: It takes eight 256-kilobit DRAMs to make 256K. Still, 256K of additional RAM is a bargain at less than $25.00

What sets GS-RAM apart from the other boards, though, is its software—*AppleWorks 2 Expander* version 2.0.1. This program patches into *AppleWorks* 1.2, 1.3, or 2.0, and it adds many useful enhancements.

Imagine being able to load all *AppleWorks* files, including the printer configuration, into RAM for instant access. Imagine using extra RAM as a 64K *AppleWorks* printer buffer, saving even more time. Imagine an *AppleWorks* that can automatically split lengthy textfiles into smaller blocks and save them to several 5¼-inch disks. GS-RAM does all this, and more.

If you're a serious *AppleWorks* user, this memory board could be right for you.

RamStakPlus, By AST Research

RamStakPlus comes in three versions—256K, 512K, and 1 megabyte. It uses 256-kilobit, 150-nanosecond DRAMs similar to those on the Apple card and GS-RAM. Chips must be added in 256K increments (eight chips), and jumpers must be configured before the board recognizes the additional RAM.

This card boasts the ability to accomodate ROM devices in four specially designed sockets. The sockets can be filled with pre-programmed EPROMs (Erasable Programmable Read Only Memory chips) or with EEPROMs (Electrically Erasable Programmable Read Only Memory chips). While EPROMs require special equipment to program, EEPROMs can be programed and reprogramed quite easily.

To support RamStakPlus, AST Research offers a utilities disk which, among other things, can reformat the EEPROMs and transfer new programs to them. The package also includes a copy of ProDOS 16 version 1.0.

EPROMs and EEPROMs enhance a computer's capabilities in several ways. One of the most impressive is that memory stored on these devices remains active even when the computer's power is turned off. Such chips can be used as a ROM disk for fast loading of often-used programs like ProDOS 16 or *AppleWorks*. Used in this manner, the RamStakPlus EPROMs and EEPROMs act like a write-protected ramdisk, except that their memory is nonvolatile.

Another benefit is that the Apple IIGS can be configured to automatically boot the ROM disk when it's turned on. In practice, that means you could store ProDOS 16 on the ROM disk and set the Apple IIGS Control Panel to use it as the start-up device. Once done, each power-up or reboot runs ProDOS 16 almost instantly.

Other software can be loaded to the ROM disk, too. For quick, easy access, put BASIC.SYSTEM or *AppleWorks* in the ROM disk. And because neither DOS nor ProDOS can write to the EPROMs and EEPROMs, there's no danger of accidentally erasing their memory.

Orange Micro's RamPak 4GS

The RamPak 4GS comes in configurations ranging from 512K to 4 megabytes. Instead of the more common 256-kilobit

DRAMs, it uses 256 * 4 DRAMs. Each of these chips hold 128K of memory (as compared to 32K).

A 256K upgrade, then, requires only two chips. Since there are no dip-switches or jumpers to consider, adding memory requires nothing more than plugging additional chips into the fully-socketed board. Don't count on saving money, though, since these chips cost about $45 each. That means it would run you about $90 for 256K of RAM.

But the real uniqueness of the RamStakPlus card derives from the included RAM-caching software. The programs on the *RamPak Utilities* disk support both ProDOS 8 and ProDOS 16. Once loaded onto a startup disk, the RAM-caching utilities are easily accessible as an Apple IIGS Classic Disk Accessory.

To understand RAM caching, suppose for a minute that your computer could sense what programs and data files you use most often during any one session. Suppose, too, that the system could then use its excess RAM to keep those particular files handy. Under those circumstances, drive delay could be significantly reduced and productivity could be increased.

That's essentially what the RamPak 4GS RAM cache does in Dynamic Cache Allocation mode. But there's more. The supporting software keeps track of accesses to the cache and all physical drives, constantly maintaining the most frequently-used files in the cache. Since write functions generated by applications software still go to a physical disk drive, there's no chance of losing important information if the power goes off.

If you want to take personal control of the RAM cache, that's possible in Manual Cache Allocation mode. Either way, RAM caching is sure to improve productivity and reduce hassles and drive delays. In fact, the advantages of RAM caching haven't gone unnoticed by other manufacturers. Several plan to add the feature to their memory board software soon.

The RamPak 4GS utilities also include a Quick Memory Test, an Extended Memory Test, and an onscreen trouble-shooting guide. All are mouse-supported and selectable from pull-down menus.

OctoRam Team, From MDIdeas

OctoRam's design differs significantly from that of the other Apple IIGS memory cards. Standard chips can't be added directly to the board because there are no individual chip sockets. Instead, you must buy printed circuit modules called SIMMs (Single In-line Memory Modules) that contain eight DRAMs each and plug into the main board at an angle.

These SIMMs are available in two types. The first contains eight 32K DRAMs, for a total of 256K. The second has eight 128K DRAMs, totaling one megabyte. Since angling the cards into their slots makes room for as many as eight SIMMs on one OctoRam, the board allows RAM configurations ranging from a minimal 256K to the Apple IIGS limit of 8 megabytes.

By itself, OctoRam offers no special software, no ROM disk, nothing unusual. However, MDIdeas also sells OctoRam ESP, a piggyback card that attaches to OctoRam's expansion port. This card contains a minimum of 128K of battery-powered static RAM and can be upgraded to 512K.

Unlike dynamic RAM, static RAM is nonvolatile: When the power goes off, batteries keep this memory alive and well. The batteries, which have a projected life-expectancy of ten years, recharge whenever the computer is turned on. Since static RAM chips use minimal power to remain stable, the batteries can support memory for six months or more even when the computer is not being used.

Because the IIGS sees this memory as a bootable ROM disk, you can store *AppleWorks* or any other program (under 512K) there and boot to it in just a few seconds. Once the OctoRam ESP is programmed, removing a jumper block write-protects that memory to assure its safety. In practice, the effect is much the same as having your favorite programs built into the computer's ROM.

On the whole, the OctoRam team works quite well. A common criticism of the system is that the ESP board mounts on the left of OctoRam, completely blocking slot 7. But since slot 7 is seldom used, most users will find this a minor price to pay.

The TopRAM/TopROM Combination

If the idea of having your favorite programs stored permanently in ROM appeals to you, consider the TopRAM/TopROM combination from Parallax Inc., introduced at Applefest in September.

The one-megabyte TopRAM contains 32 32K chips soldered to its 6½-inch long board. No other configuration is available. One megabyte is this card's minimum *and* its maximum configuration. However, an expansion port provides an effective avenue for enhancements.

Currently the company offers TopROM, an unpopulated ROM card that attaches to the expansion port on the left side. Because TopROM is only seven inches long, it doesn't directly block slot 7; however, it may limit the use of that slot since it does occupy space in front.

TopROM contains 14 sockets, each of which supports a 27512 (64K) EPROM. While the card arrives with all fourteen sockets empty, you can add chips as needed. A fully-populated card holds 896K of additional ROM.

Hobbyists can put their favorite programs on these chips with an EPROM programing device and install them on the board for fast access. For the rest of us, Parallax expects to offer many popular programs already on ROM chips.

Since TopROM has its own expansion port, an additional board could piggyback on it, making a total of three cards operating from one slot. Could Parallax be planning for more RAM? That seems like a good bet.

Apple Juice—Compatability And Economy

Some Apple IIGS users will feel no need for static RAMs and ROM disks, EPROMs and

The Price Of Memory

Apple IIGS Memory Expansion Card
Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014
408-996-1010
Warranty: 90 days
Suggested retail price: $129 for standard 256K

Apple Juice
Applied Ingenuity
14922 Ramona Blvd., Unit M
Baldwin Park, CA 91706
818-960-1485
Warranty: Five years
Suggested retail price: $89.95 for 0K socketed card; $129.95 for 512K card; $169.95 for one-megabyte card

GS-RAM
Applied Engineering
P.O. Box 798
Carrollton, TX 75006
214-241-6060
Warranty: Five years
Suggested retail price: $169 for standard 256K; $299 for one-megabyte version

TopRAM
Parallax
5249 Locust Ave.
Carmichael, CA 95608
916-721-5451
Warranty: One year
Suggested retail price: $189.95 for one-megabyte board

TopROM
Parallax
5249 Locust Ave.
Carmichael, CA 95608
916-721-5451
Warranty: One year
Suggested retail price: $89.95 with no ROM on-board (Requires TopRAM)

OctoRam for the Apple IIGS
MDIdeas
1163 Triton Dr.
Foster City, CA 94404
415-573-0580
Warranty: One year
Suggested retail price: $149.95 for standard 256K; $2,899 for full 8 megabytes

OctoRam ESP
MDIdeas
1163 Triton Dr.
Foster City, CA 94404
415-573-0580
Warranty: One year
Suggested retail price: $179.95 for standard 128K; $389.95 for full 512K (Requires OctoRAM)

RamPak 4GS
Orange Micro
1400 N. Lakeview Ave.
Anaheim, CA 92807
714-779-2772
Warranty: One year
Suggested retail price: $189 for standard 512K RamStakPlus

RamStakPlus
AST Research
2121 Alton Ave.
Irvine, CA 92714
714-553-0340
Warranty: Two years
Suggested retail price: $129 for standard 256K

Ten Reasons To Add Memory To Your IIGS

These ten Apple IIGS programs are only a sampling of those that require more than the standard 256K RAM memory. Almost every IIGS-specific software package, in fact, needs at least 512K.

Software	Price	Memory Required	Description	Publisher
DeluxePaint II	$99.95	768K	An elaborate graphics program that supports 3-D perspective and a 4096-color palette.	Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415-571-7171
Diversi-CACHE	$35.00	512K	RAM-caching software. Supports ProDOS, DOS 3.3, and Pascal. Requires 3½-inch disk drive.	DSR, 34880 Bunker Hill, Farmington, MI 48018, 313-553-9460
MathTalk	$49.95	512K	A program that teaches math to elementary school children. Uses speech synthesis.	First Byte, 2845 Temple Ave., Long Beach, CA 90806, 213-595-7006
MultiScribe GS	$99.95	512K	An advanced *AppleWorks*-compatible word processing program. Supports graphics and ImagWriter II color.	StyleWare, 5250 Gulfton, Houston, TX 77081, 713-668-0743
The Music Studio	$69.95	512K	A music processor that supports printouts and stereo sound.	Activision, 2350 Bayshore, Mountain View, CA 94039, 415-960-0410
Notes*N*Files	$129.95	512K	Mouse-driven database and mail list-manager software.	DataPak Software, 14011 Ventura Blvd., Sherman Oaks, CA 91403, 818-905-6419
Print Shop IIGS	$59.95	512K	Personal printing program for design and creation of banners, signs, greeting cards and letterheads.	Brøderbund, 17 Paul Dr., San Rafael, CA 94903, 415-492-3200
RAMUP	$39.95	256K, but 512K preferred	A ramdisk utility that allows easy switching between programs on Apple II, IIc, and IIGS.	Quality Computers, 1365 Berkshire, Grosse Pointe Park, MI 48230, 313-885-4270
TopDraw	$89.95	512K	An object-based graphics program. Supports very large creations and ImageWriter II color.	StyleWare, 5250 Gulfton, Houston, TX 77081, 713-668-0743
Tower of Myraglen	$54.95	512K	An arcade adventure that offers stereo sound when used with MDIdeas Supersonic Stereo Card.	PBI Software, 1163 Triton Dr., Foster City, CA 94404, 415-349-8765

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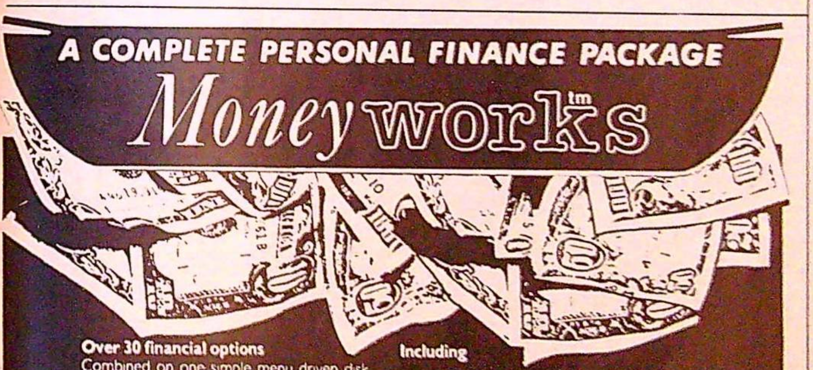

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EEPROMS. After all, those extras cost money.

For people who want a simple, compatible card at a reasonable price, Applied Ingenuity offers an alternative. Their Apple Juice comes in configurations from 0K to one megabyte. Since all configurations use 256-kilobit (32K) DRAMs similar to those on Apple IIe Extended 80 Column cards, users could recycle their old chips or purchase new ones as circumstances allow.

Like Apple's expansion memory board, this one arrives without software. A one-page document explains installation procedures and refers readers to their Apple IIGS *User's Guide* for information about setting up a ramdisk. According to a representative of the company, Apple Juice is 100-percent compatible with Apple's own board.

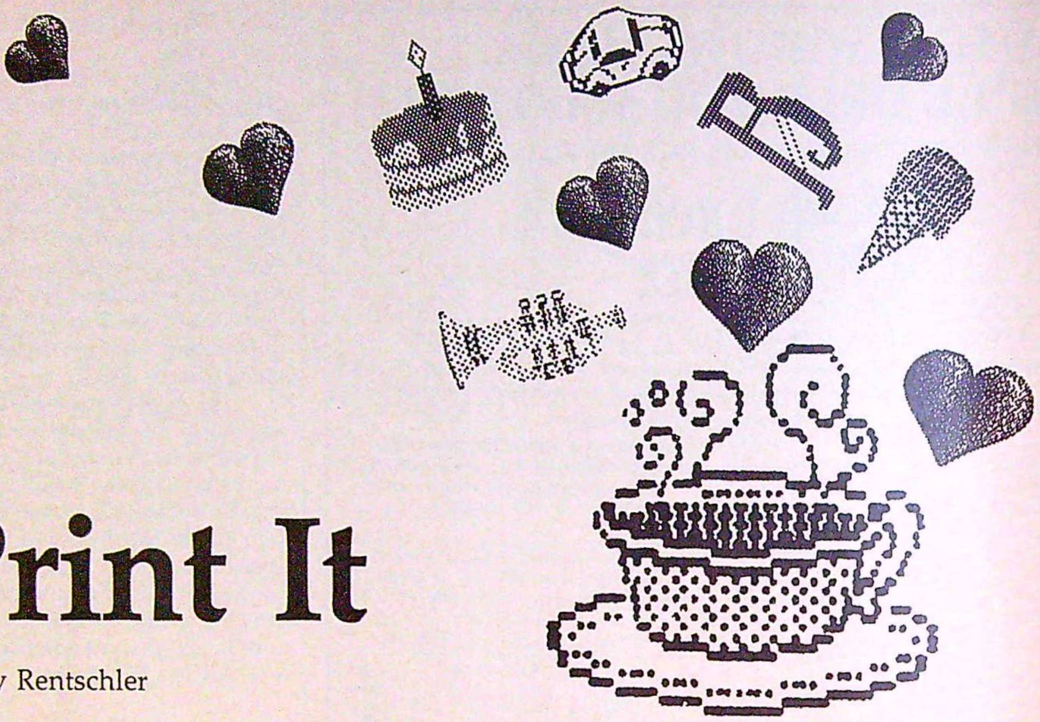
Considering The Options

Take your pick. Simplicity or versatility? Economy or expandability? Original equipment or third-party add-on? Current capability or future potential?

Apple introduced its revolutionary IIGS little more than a year ago, and already the expansion memory board market bustles with competition.

With so many things to consider, choosing the right one is certain to perplex. Apple users know well the mixed blessing of numerous choices. Fortunately, each of these boards functions well and provides a high degree of compatibility with Apple IIGS software. No matter what your choice, it doesn't seem like you can go wrong once you decide to add more—mountains more—memory to your Apple IIGS.

David Stanton is the computer coordinator for Bolivar Central School District in New York state and has written for several general and educational computing magazines. aa



Print It

Nancy Rentschler

Amazingly versatile and easy-to-use personal-publishing software can turn your Apple computer into a sign maker, a banner printer, a calendar creator, and more. A talented group of Print Shop *and* PrintMaster Plus *users show just some of the projects you can try on your own.*

Everyone looks for shortcuts, ways to trim time and effort from sometimes mundane tasks. Getting—and staying—organized is one part of our lives where shortcuts are especially appreciated.

Personal computers and their software have done wonders for helping people keep organized. Whether it's home finances, school activities, or small business ventures, duties once shunned are made easy with a computer—like an Apple IIe, IIc, or IIGS—and the right program.

Personal printing software like *The Print Shop* by Brøderbund and *PrintMaster Plus* by Unison are two such programs. Each contains options for making several types of printed materials, from banners, greeting cards, and invitations to posters, calendars, and personalized stationery. *The Print Shop* menu lets you choose your project—greeting card, sign, letterhead, or banner; *PrintMaster Plus* offers poster, calendar, stationery, drawing pad, card, and banner creation. In both packages, easy-to-follow instructions guide you through the process. *Print Shop* and *PrintMaster Plus* both include an assortment of various fonts, graphics, borders, and layouts. Even more fonts and graphics can be found in companion programs: *The Print Shop Graphics Library 1, 2,* and *3; The Print Shop Companion, Holiday Edition* and *Graphics Expander* for *Print Shop;* and *Art Gallery 1* and 2 for *PrintMaster Plus.*

As you use one of these personal printing programs, you'll find countless opportunities to simplify the most hectic lifestyle. Take a look at the projects outlined below for a small sampling of the things you can do with *Print Shop, PrintMaster Plus,* or any similar software.

It's A Date!

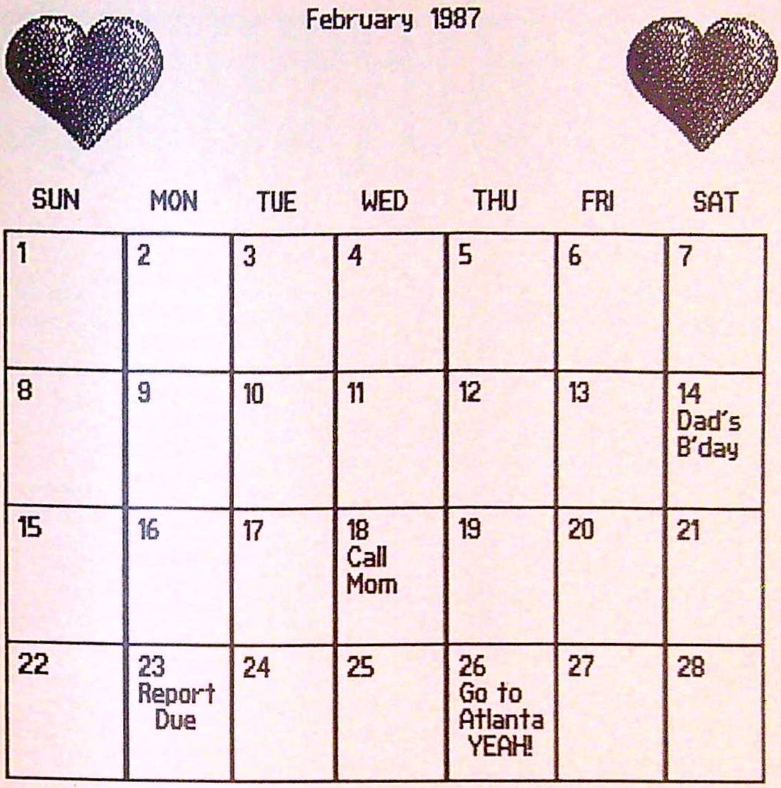
The calendar option in *PrintMaster Plus* and *The Print Shop Companion* can help establish a smooth-running schedule for your family. Here's a timely idea for keeping appointments and remembering important events for each family member.

Create a birthday book to help you remember family and special friends. Start by selecting an appropriate graphic for each month, such as a snowman for January, a heart for February, a shamrock for March, and so on (Figure 1). The Graphics Editor feature in *The Print Shop* makes it simple to create your own graphic design, further personalizing your calendar. In the Graphic Editor, you're given a drawing pad normally operated with the keyboard, although you can optionally use a joystick or Koala Pad. Create your own artwork, or modify an existing graphic. You can even save this information to a data disk and use it for other graphics applications.

PrintMaster Plus also lets you become an artist. Make new creations or change existing graphics with the Drawing Pad option.

Other ideas for your birthday book could include enhancing the memorable date with boldface type, or filling the date's square with the name of that special someone. Design a clever cover for your calendar booklet to make it an even more personalized gift for family members and friends.

Figure 1: Keep That Date



February 1987

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14 Dad's B'day
15	16	17	18 Call Mom	19	20	21
22	23 Report Due	24	25	26 Go to Atlanta YEAH!	27	28

Personalized calendars can be created quickly and painlessly with The Print Shop Companion *or* PrintMaster Plus. *Graphics can easily be chosen and placed in the calendar, and special dates can be marked as reminders.*

Want An A+ On That Report?

The ways you can use personal printing programs to enhance school work are almost limitless. When teamed with a word processing program or, in a pinch, the traditional typewriter, students can create unique formats for reports and projects of all sorts.

How about designing a cover for your report? An attractive cover works as an attention-getter for everything from a child's school assignment to your own presentation before a group or organization.

First, choose the sign or poster option. Begin with border selection. Both *The Print Shop* and *PrintMaster Plus* let you choose from available borders included on the master program disk. When you use *The Print Shop,* however, you can also select additional borders through the From Other Disk feature. The *Print Shop Holiday* and *Print Shop Companion* editions offer even more border choices, and the Graphics Editor makes it possible for you to edit existing designs or create entirely new borders.

The second step is to illustrate the cover of your report. Try to design a cover that's somehow connected to the report's subject matter. If your child is working on a report on dinosaurs, for instance, choose one of the *Print Shop*'s prehistoric graphics, and then arrange them according to size or position.

PrintMaster Plus's *Art Gallery* can be used in the same way. This program includes a wonderful brontosaurus, which you might select and place in all four corners. The title could then be positioned in the middle of the page.

Choose the text for your report cover by selecting various typestyles or fonts. They range from formal script to modern hi-tech; pick the one most appropriate to the report. Mood is often set by letter style, so use your imagination. A report on the U.S. Constitution looks great when you use the flag font on *The Print Shop*, for instance. A report on Alaskan weather patterns would catch the eye with letters that have a "frozen" look, like the frosty font on the *Holiday Edition* disk.

Individual pages within the report can be dressed up using the stationery or letterhead option. Robots on each page will delight your science teacher as she burns the midnight oil grading your report on Robotics. And Little League parents will take notice of that financial report enhanced with cleverly arranged dollar bills. The graphics can be placed in one or both corners, staggered, or tiled across the top and/or bottom of each page.

Take A Letter, Please!

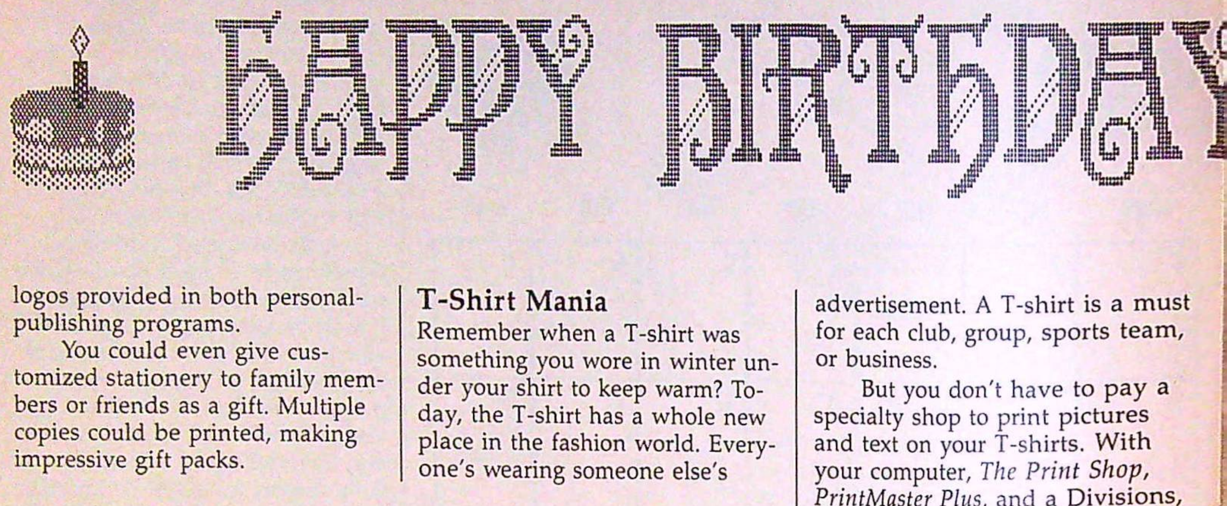
That letter to Aunt Hortense you've put off could become fun for youngsters and adults alike when you suggest that they design their own letterhead stationery. This feature is available in both *The Print Shop* and *PrintMaster Plus*.

Here's how to produce your own letterhead. First, choose a logo that identifies your individual interest—there are graphics for almost every member of the family. Mom might pick the rose, Dad could select the antique car, Sammy is into football this year, and Sally, who loves cats, has several choices. You can place these graphics at the top and/or bottom of the page. To design a letterhead for the athletic family, use one of the baseball, basketball, or skiing graphics.

With the artwork picked, you can add the text. Enter your family name and/or address on the three available lines—the result is a professional-looking product (Figure 2). Space is even provided at the bottom of the stationery for additional logos and text.

A small or home business can benefit from unique and indivdualized stationery. Think of your stationery as a way to communicate with potential customers. A pet shop could personalize its stationery with one of many animal

Figure 3: A Banner Birthday



logos provided in both personal-publishing programs.

You could even give customized stationery to family members or friends as a gift. Multiple copies could be printed, making impressive gift packs.

T-Shirt Mania

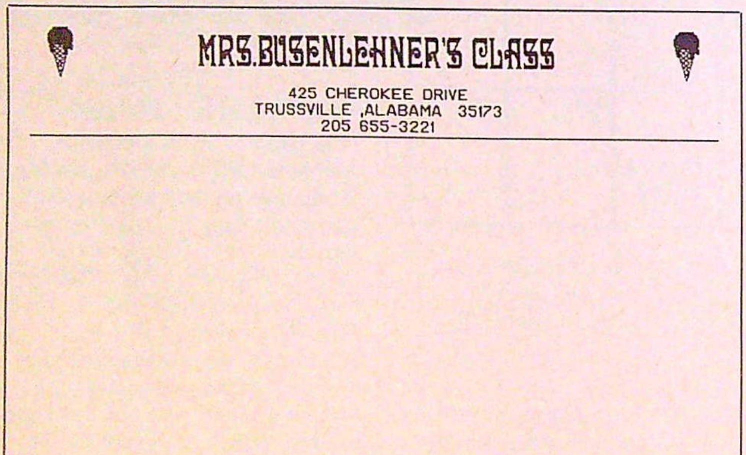
Remember when a T-shirt was something you wore in winter under your shirt to keep warm? Today, the T-shirt has a whole new place in the fashion world. Everyone's wearing someone else's advertisement. A T-shirt is a must for each club, group, sports team, or business.

But you don't have to pay a specialty shop to print pictures and text on your T-shirts. With your computer, *The Print Shop*, *PrintMaster Plus*, and a Divisions, Inc. UnderWare ribbon, you can create your own T-shirt designs. Select a T-shirt (any color) that's 50-percent polyester and 50-percent cotton. (Solid-colored T-shirts make a better finished product than patterned shirts.) Look for the UnderWare ribbon at a computer supply store (or order it directly—see the end of this article for Divisions' address). Get out your clothes iron, ironing board, and aluminum foil—you're ready for business!

Replace the ribbon in your printer with the UnderWare cartridge. Choose the graphic you want, using either *The Print Shop* or *PrintMaster Plus*, and print it through the Sign option for a large-sized graphic to transfer. Use this same option if you're adding text. Remember to print *In Reverse* when the option is offered. Computer paper works fine, but erasable-bond paper gives a better result.

After the transfer has been printed, iron it onto the T-shirt. Cover one end of the ironing board with aluminum foil to protect it from the heat, then place the front or back of the T-shirt on the ironing board. Center the graphic and/or text on the shirt. Cover the transfer with several pieces of paper, then press down with a hot, dry iron. Move the iron slowly back and forth for about 30 seconds. In moments, you'll have a T-shirt of which you can be proud. Be sure that you wash your T-shirt in cold water and dry it at a low setting.

Figure 2: Letter Perfect



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HEWITT ELEMENTARY

GRADE 3
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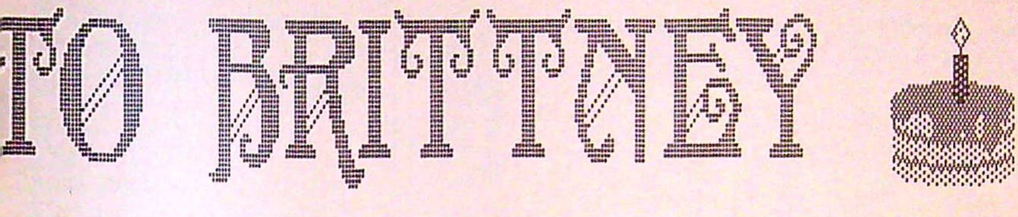
HAVE A NICE YEAR!!!!

Personalized stationery—for home, school, or a small business—can easily be created with Print Shop *and* PrintMaster Plus.



Banners like this make almost any occasion memorable. Before it was reduced to fit here, this birthday banner was almost ten feet long.

Make It A Banner Event

It's hard to find the exact party decorations for that special occasion. Banners can enhance any event, and are very easy to make. If you have *The Print Shop* or *PrintMaster Plus,* you can design the perfect saying. Banners can be text only, or you can add graphics to either end. Type in the message first, then select a logo.

A child's birthday party is more exciting with a banner across the room with his or her name on display (Figure 3). Someone coming home with a new baby would be pleased to see a *Welcome Home* greeting them. A student could make an attention-getting banner, then drape it across the front of the classroom before giving a report. The possibilities are endless. Use your imagination to make your own unique banner.

It's A Family Affair

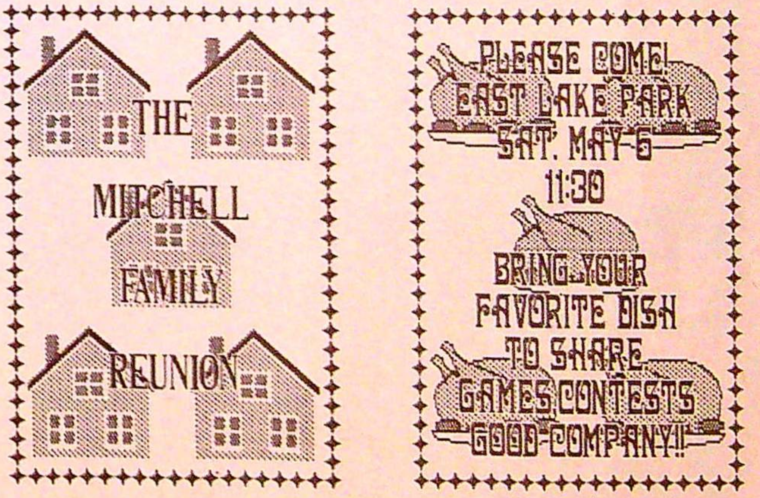
You're in charge of your annual family reunion. It's now March, and the reunion will take place sometime during the summer. Your first question probably is *Where do I start?*

Print Shop and *PrintMaster Plus* can save your sanity while pulling your family together. The first step is to get organized with the help of a scheduling calendar. Deadlines can be listed for such things as sending invitations, reserving the accomodations, and making phone calls.

Using the Graphics Editor feature of *The Print Shop,* you can design a family crest for the letterhead you'll use in all your correspondence. This is a good way to encourage participation in the events you've planned for the reunion.

Your next step is to design and print inviting invitations (Figure 4). To create this keepsake, choose the Greeting Card (*Print Shop*) or the Cards (*PrintMaster Plus*) option from the main menu. Select your favorite border and choose your graphic (you could use the family crest created for your letterhead or a different, ready-made graphic). Text isn't mandatory—an attention-getting front side of the invitation may say all that's needed. The inside of the invitation should give all the information that's necessary to get each participant to the right place at the right time.

Figure 4: Extend The Invitation



The front (left) and back (right) of this sample family reunion invitation were created with The Print Shop *using the Greeting Card option. Text is limited on the front cover, while the necessary information is listed inside.*

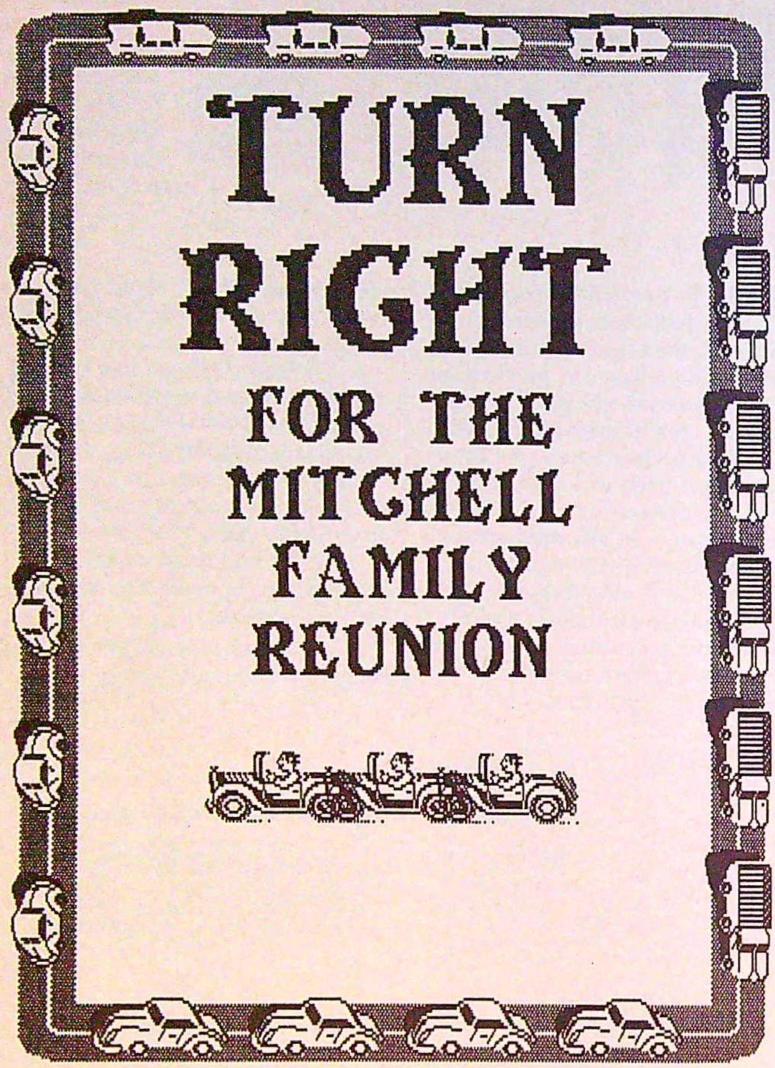
You can even defray the costs of the reunion by selling cleverly designed commemorative T-shirts. This is another opportunity to use that family crest you designed earlier. Remember to use the UnderWare ribbon and the *In Reverse* feature for transferring the image to fabric.

Another application of the UnderWare ribbon would be to create a family flag to herald the reunion.

Someone *will* get lost coming to the reunion. Everyone, especially out-of-town relatives, will appreciate directional aids. The sign or poster choice on the main menu lets you quickly and easily make signs that point the way (Figure 5). Entrances might be marked to let people know they're on the right track.

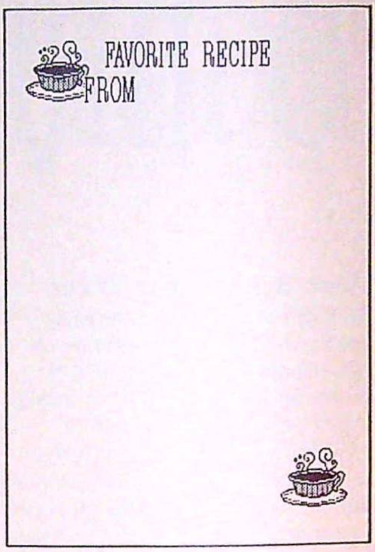
When the fun-seekers arrive, nametags can avoid some embarrassing moments and help long-parted relatives recognize each other. Nametags can be made using the Greeting Card feature on either program. Instead of making the cover and inside of the card differently, make them the same—you've just created two nametags on each sheet of paper. The tags can be cut out, pasted on

Figure 5: Turn Right Here



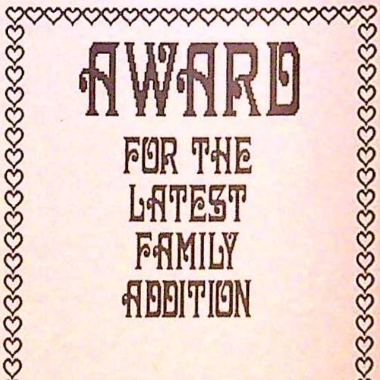
If you mount your signs on heavy cardboard, then laminate them, they'll stand up to the heaviest rain and wind.

Figure 6: Favorite Family Recipes



Using the Greeting Card option with either package, design a recipe card. If you simply duplicate the recipe card for both the outside and inside of the greeting-card format, you'll produce two cards on each sheet of paper.

Figure 7: Awards For Everyone



Awards can be printed for every activity, then handed out to contest winners.

a blank sheet of paper, and duplicated at your neighborhood copier.

Specifying which food goes on which table can be done with signs. Other uses for signs at your reunion might include designating activity areas, producing sign-up sheets, and listing a schedule of events.

Something special is often needed to entertain the preschool kids. Make a special-interest coloring book by printing enlarged graphics on the sign option, duplicating, and collating them. Don't forget to provide the crayons.

Memorabilia may include favorite family recipes (Figure 6). Using the Greeting Card option, design a recipe card for each family cook. This card should be included in the invitation with a request to send the recipe back as soon as possible. You shouldn't have any trouble finding a volunteer to arrange the recipes in an attractive fashion on duplicated sheets of the family letterhead. Once collected and arranged, copies can be made and compiled into booklets for each family attending the reunion.

Enliven the festivities by recognizing the oldest family member present, the youngest, even the family who traveled the greatest distance. Original awards can be made using the Sign option (Figure 7). They can be made in a certificate format on either program. Winners of games, the best recipe, stalest joke, and any other contest would surely appreciate a lasting memento.

Ideas Are Easy

These sample personal-publishing projects are only the beginnings of what you can do with software like *The Print Shop* and *PrintMaster Plus*. Ideas come easy when you have your own printing press inside your Apple computer. Stretch your (and your family's) imagination as you make all kinds of unique and interesting printed products.

Contributing to this article were Sue Benes, Susan Busenlehner, Chiquita Marbury, Pam Moore, Lynn Murphy, and Sandra Pilley. Along with the author, these teachers and therapists at Hewitt Elementary School in Birmingham, Alabama have a total of nine years of experience with personal-publishing software.

Print Magic
Epyx
600 Galveston Dr.
Redwood City, CA 94063
$59.95

PrintMaster Plus
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2150 Shattuck Ave., Ste. 902
Berkeley, CA 94704
$49.95

The Print Shop
Brøderbund Software
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San Rafael, CA 94903-2101
Apple II+, IIe, IIc: $49.95; Apple IIGS: $59.95; Macintosh: $59.95

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The Personal-Printing Explosion

Print Shop and *PrintMaster Plus* aren't the only personal-publishing programs for your Apple II computer. In fact, as this kind of software, especially *Print Shop*, became more and more successful, more software publishers decided to market programs to help users make signs, banners, certificates, cards, and the like.

Certificate Maker from Springboard Software, *Create a Calendar* from Epyx, *Principal's Assistant* from Abracadata, and *Award Maker* from Baudville are just some of the other personal-publishing programs.

Two new packages offer expanded features to anyone who wants to print.

SuperPrint! ($49.95), from Scholastic Software, is a menu-driven four-disk package for the Apple IIe, IIc, and IIGS. *SuperPrint!* has specific areas to help you design and print posters, signs, cards, banners, borders, and calendars. One of the interesting features of *SuperPrint!* is that you can print in several sizes. That makes it possible, for example, to create gigantic posters almost five feet tall.

Epyx's *Print Magic* ($59.95), which also requires 128K of memory (Apple IIe, IIc, or IIGS), is a totally different kind of program. You can do much of the same kind of personalized printing—cards, certificates, flyers, stationery, banners—as other software, but *Print Magic* feels more like an elementary desktop publishing program than anything else. *Print Magic* lets you move any element—graphics or text—anywhere on the page. The program is far more WYSIWYG (What You See Is What You Get) than other software in its category. Drawing tools and patterns let you customize any graphic. Multiple fonts and typestyles are available and can be loaded from other disks. *Print Magic* even lets you create your own fonts with a Typeface Editor.

Another recent release is Brøderbund's *Print Shop* for the Apple IIGS ($59.95). It's a completely new version, not simply a faster remake of the Apple IIe and IIc program. Fully loaded with menus and totally mouse-controlled, it includes superb color graphics, patterns, borders, and fonts. Printing color signs, banners, cards, and so on with the ImageWriter II only requires a color ribbon.

Personal and desktop publishing programs will only become more popular on the Apple II line, particularly the IIGS. In the coming months, you're sure to see even more impressive packages that put the power of a printer in your hands.

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Please take a moment to fill out and mail in this questionnaire (photocopies are fine). Although this isn't a scientific survey, it will allow us to draw some general conclusions about you, our readers.

Several of the questions may require you to check more than one answer (if you have both a 5¼-inch and a 3½-inch disk drive, for example). Also, we're interested in hearing from you even if you don't own an Apple II, Macintosh, or Apple II compatible; perhaps you're reading the magazine because you're thinking about buying an Apple or Macintosh, or maybe you use one at your office or school.

Please mail the questionnaire to Readership Survey, COMPUTE!'s Apple Applications, P.O. Box 5406, Greensboro, NC 27403. We'll publish the results in an upcoming issue.

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☐ Apple IIc
☐ Apple IIGS
☐ Apple II compatible (Franklin or Laser)
☐ Macintosh 128/512
☐ Macintosh Plus
☐ Macintosh SE
☐ I don't own or use an Apple or Macintosh

If you own an Apple II, Macintosh, or Apple II compatible, is it your first computer?
☐ Yes
☐ No

If you previously owned (or still own) a computer that is *not* an Apple II, Macintosh, or Apple compatible, what kind is it?
☐ Atari
☐ Commodore
☐ IBM PC
☐ Tandy/Radio Shack
☐ Texas Instruments
☐ Other:

If you have an Apple II computer, what kind of monitor do you own or use?
☐ Monochrome
☐ RGB color
☐ Composite color
☐ TV

Which disk drives do you own or use?
☐ 5¼-inch floppy
☐ 3½-inch floppy
☐ Hard disk
☐ Two or more disk drives

Which peripherals do you own or use with your Apple or Macintosh?
☐ Dot-matrix printer
☐ Letter-quality printer
☐ Color printer
☐ Laser printer
☐ 300-bps modem
☐ 1200-bps modem
☐ 2400-bps modem
☐ Mouse (Apple II+, IIe, IIc only)
☐ Joystick
☐ Graphics tablet
☐ Scanner
☐ Video digitizer
☐ Other:

Where do you primarily use your Apple II/Macintosh system?
☐ At work
☐ At home
☐ At school

Which types of Apple II/Macintosh software have you purchased?
☐ Word processor
☐ Spreadsheet
☐ Database management
☐ Telecommunications
☐ Programming language
☐ Games/entertainment
☐ Graphics design
☐ Educational
☐ Other:
☐ None

In which languages do you program on the Apple II or Macintosh?
☐ BASIC
☐ Pascal
☐ Assembly/machine language
☐ C
☐ Logo
☐ HyperTalk
☐ Other:
☐ I don't program

Which types of articles would you like to see in this magazine?
☐ *AppleWorks* information
☐ Apple news and rumors
☐ Telecommunications
☐ Using printers
☐ Programming explanations and tutorials
☐ Programming and applications tips and tricks
☐ Graphics
☐ Sound and music
☐ Personal and/or desktop publishing
☐ Hardware (add-on cards, scanners, new computers, and so on)
☐ How to use specific software applications
☐ New Apple/Macintosh products
☐ Buyer's guides to software
☐ Apple user group listings
☐ Other:

Which types of type-in programs would you like to see in this magazine?
☐ General-purpose home applications
☐ Business applications
☐ General utilities
☐ Utilities for programmers
☐ DOS 3.3 utilities
☐ ProDOS utilities
☐ Educational programs (K–8)
☐ Educational programs (9–12)
☐ Game/entertainment programs
☐ Graphics programs
☐ *Print Shop* utilities
☐ *AppleWorks* templates
☐ Other:

Which types of new product reviews would you like to see in this magazine?
☐ Home applications
☐ Business applications
☐ Educational software
☐ Games/entertainment
☐ Programming languages
☐ Utilities
☐ Hardware
☐ Other:

Which article in this issue do you like best?
____

Which article in this issue do you like least?
____

If you saw the first bimonthly issue, which article did you like best?
____

If you saw the first bimonthly issue, which article did you like least?
____

How many of the programs in this issue did you, or are you planning on, typing in?
____

Did you have problems typing in any program and getting it to run correctly?
☐ Yes
☐ No

Do you think additional instructions on how to type in the programs should be provided, that the instructions currently offered in the issue are insufficient?
☐ Yes
☐ No
☐ No opinion

Have you bought, or are you planning on buying, the companion disk for this issue?
☐ Yes
☐ No

If you answered *yes* to the previous question, why did you buy the disk?
____

Do you like the idea of an "*AppleWorks* For Everyone" article in each issue?
☐ Yes
☐ No
☐ No opinion

What else would you like to see in the magazine?
____

How did you happen to see this issue of COMPUTE!'s Apple Applications?
☐ I subscribe
☐ I bought the issue from a newsstand or a dealer
☐ I borrowed the issue

What is your age? ______________

Additional comments: ______________
____
____

Reader's Feedback

Do you have a question or problem about hardware or software? Or have you discovered something that could help other Apple or Macintosh users? If so, we want to hear from you. Write to **Apple Feedback, COMPUTE!'s Apple Applications,** ***P.O. Box 5406, Greensboro, NC 27403. We regret that we cannot provide personal replies to technical questions.***

Checking Up On MLX

I can't figure out how the checksum for your Apple MLX entry program works. Can you please explain?

Edward L. Bishard

In an MLX-format program listing, each line contains eight data bytes and one checksum. After the typist enters a line and presses the Return key, the MLX program calculates its own version of the checksum, using the data bytes and the line's address. It will only accept a line if its result matches the typist's checksum.

The program is designed to meet three main goals: Its checksums are two-digit hexadecimal numbers like the data bytes, it can tell when a line of data has been skipped, and it catches transposition errors—entering the right numbers in the wrong order.

To calculate a checksum, MLX sums up ten numbers: the first two digits of a line's address, the last two digits of the address, and the first eight numbers on that line. Since the address is displayed as a prompt by the program and not typed by the user, MLX can warn the typist if he or she has skipped a line of the listing.

And there's an extra twist. MLX *rotates the checksum as it adds in each number. Before adding the new number, it doubles the old total. If this number has grown larger than 255, the largest possible two-digit hexadecimal number (FF), MLX subtracts 255 from it. Readers familiar with binary arithmetic may recognize that this clears the highest bit and sets the lowest (C−255 = C−256 + 1). If you think of the checksum as an eight-digit binary number, this process moves the leftmost bit to the right side of the number and slides every other bit one digit to the left. This way, the checksum reflects the order in which the numbers were entered along with their values.*

After rotating the running total, MLX adds another value to it. This often produces a result greater than 255, which is too large to be expressed with two hex digits. If so, MLX again subtracts 255, effectivly adding the high-order carry to the lowest bit.

All the checksum calculations are done in a subroutine at lines 560 and 570 of the MLX program. It gets the address of the line in the variable B and the decimal equivalents of the data values for that line in the array V( ), and uses the variable C to return its result. The code in Apple MLX might look a little trickier than the explanation above, since it combines several steps in each of its statements. Although this makes it harder to understand, it also makes the program as quick and compact as possible.

No INIT In It

I've just started using ProDOS on my Apple IIc and would like to know how to perform an INITialization from BASIC.

Michael Allen

Although the DOS 3.3 operating system can initialize, or format, disks with the BASIC INIT command, there's no matching command under ProDOS. It's a bit less convenient having to run a separate utility program, but disk formatting is a surprisingly complicated process. In DOS 3.3, which only recognizes 5¼-inch disks, the code for disk initialization takes up a substantial amount of memory, but gets very little use compared to most other parts of the operating system.

Since ProDOS handles many more disk formats, including 3½-inch floppy disks, hard disks, and ramdisks—all of which are formatted differently—an INIT command would make the BASIC.SYSTEM program quite a bit larger. The additional features in ProDOS tend to make it big anyway, but putting the initialization code in the System Utilities *program keeps the BASIC program area at about the same size for both operating systems.*

Graphics And Sound Advice

I recently bought an Apple IIGS. I'd like to access its enhanced graphics and sound capabilities, but the manuals that came with it don't say how to do it. Where can I get this information?

Todd Miller

With its sophisticated sound and graphics hardware, the Apple IIGS presents lots of new opportunities for programmers. But the hardware requires entirely new techniques that most Apple II veterans aren't familiar with. Though the built-in Toolbox software helps tame the machine's capabilities and supports a full Macintosh-style environment, with windows, menus, and icons, it means there's even more to learn about this computer than the earlier Apple IIs.

Currently, there are five COMPUTE! books about programming the IIGS. For beginning programmers, The Elementary Apple IIGS *introduces Applesoft BASIC and goes on to show how to use some of the new power of the IIGS.*

COMPUTE!'s Guide To Sound and Graphics on the Apple IIGS *assumes more programming* *prowess and focuses on making the most of the new hardware. It includes some machine language programming examples for accessing features that are unavailable from Applesoft.*

For more adventurous programmers, COMPUTE!'s Apple IIGS Machine Language for Beginners, *by Apple II guru Roger Wagner, introduces the 65816 microprocessor and its machine language, along with the application environment of the IIGS and several of the most popular ML assembler packages.*

COMPUTE!'s Mastering the Apple IIGS Toolbox *and* Advanced Programming Techniques for the Apple IIGS Toolbox *provide detailed information on the most sophisticated aspects of the machine. Intended for professionals and advanced hobbyists, these books are oriented toward writing sophisticated application programs in Pascal, C, and ML.*

Merge Ahead

I've been looking for a merge/renumber program for ProDOS, but I haven't been able to find one. I would appreciate any help you can give me.

Robert Carney

Check with your local Apple dealer for a manual entitled BASIC Programming With ProDOS *($29.95). Besides being a fairly complete guide to the use of ProDOS from BASIC, this manual includes a disk of programming examples. On this disk is a program entitled APA, for* Applesoft Programmer's Assistant, *which can merge and renumber programs. It can also generate automatic line numbers, cross-reference variables, and do several other tasks.*

Just A Dash

Could you please explain the ProDOS "smart load" command?

Doug Fullerton

In the ProDOS Applesoft environment, you can run several different types of programs with the dash (-) command, also known as the smart load. *If you type a dash, followed by a filename, ProDOS—or, more specifically, the BASIC.SYSTEM program that's always loaded in memory when you use BASIC—will look for a disk file with that name. Its next action depends on the type of file it finds. It will load and execute a BASIC program file (listed in the catalog with a type of BAS) just as if you had typed RUN, BRUN a binary file (BIN), and EXEC a text (TXT) file.*

There's a fourth type of file, the system file (SYS), which can't be executed any other way besides the dash. These files actually shut down BASIC and overwrite the memory occupied by BASIC.SYSTEM. A couple of examples of system files are the FILER and CONVERT programs that Apple includes with IIe computers and the SpeedScript *word processor.*

The smart load command isn't an absolute genius, though. Its handling of BASIC and system files is pretty trouble-free, but you can fool it on binary and text files. ProDOS can't tell whether a BIN file is an executable machine language program or something else (like a SpeedScript *document, a hi-res picture, or a shape table). If you use the dash with the wrong kind of file, you might find yourself suddenly in the Apple's monitor, or the machine could lock up.*

The same type of problem shows up when you use the dash with the wrong text file. If it isn't really an EXEC file, every line in it will cause a syntax error. If the file is long, you'll be sitting in front of a flashing, beeping computer for a while unless you reboot—Control-Reset doesn't stop EXEC's.

The Expanding Universe

I have an Enhanced Apple IIe, and I recently purchased a memory expansion card, increasing my Apple's memory to 512K. However, when I use the *SpeedScript* word processor in ProDOS and press Control-A, I see no change in memory capacity. I'm wondering if there is a way to increase *SpeedScript*'s memory size.

Ken Norton

Unfortunately, there's no easy way to get at that extra memory. Apple II's (other than the GS) are limited by their architecture*—their hardware and electronic connections—to accessing no more than 64K of memory at once. There's a common approach to breaching this barrier, a technique called* bank switching, *and Apple puts 128K of RAM in IIc and Enhanced IIe computers this way. Other manufacturers, including the maker of your card, have taken the idea further, putting a megabyte of RAM or more on an expansion card.*

But using bank-switched RAM always takes some effort. Each program must either be designed from the start to switch between memory banks as it accesses different parts of memory, or each must be individually modified to use the additional memory, a very challenging task. SpeedScript *is especially troublesome because it needs very quick access to the memory holding its text, and it accesses this memory often.*

To make things worse, memory cards from different manufacturers use different switching methods. As a result, the card manufacturer usually provides the modifications for existing programs (especially AppleWorks*) to let them use the memory card. In the IBM PC-compatible world, where a similar limit exists at 640K, several hardware makers have agreed on a standard for accessing expansion memory beyond the limit. This standard has encouraged software authors to write programs which use the additional RAM. Unless such a standard, whether official or de facto, arises for Apple II computers, few programs will ever be able to use this expansion RAM.*

In the meantime, you can use the extra RAM as a ramdisk. *ProDOS automatically sets up a disk called /RAM to use some of the auxilliary 64K in 128K machines, and most add-on RAM makers provide ramdisk programs with their boards, letting you use the additional memory as a very fast ProDOS disk volume. For non-battery-backed RAM, this disk disappears as soon as the power is turned off, but it's extremely useful nonetheless.*

Using SpeedScript *word-processing as an example, you can split a large document into smaller blocks, such as chapters, and copy them all to the ramdisk before you start editing. Loading and saving files to the ramdisk is nearly instantaneous, so it's not much harder* *to move between chapters than it would be if the whole document was loaded at once. And* SpeedScript *is much more responsive when dealing with small files.* [Ed: In fact, this column was written using *SpeedScript 80* on a IIe with a one-megabyte ramdisk.]

If you want to try using a ramdisk with SpeedScript, *refer to "Reader's Feedback" in the December 1987 issue of* Apple Applications. *A modification listed there lets you quit the program without rebooting the machine, which clears some ramdisks, including the built-in /RAM volume, even if you don't turn the power off.*

What's On First?

I am the proud owner of a new Apple IIGS, but I'm having problems when I copy programs from 5¼-inch disks to 3½-inch disks. I can put a couple of different applications on one small disk, using the IIGS System Utilites program, but when I boot the disk I go right into the first one I copied. I need something that will let me choose the program that I want to run.

Scott Anderson

Several years ago, when DOS 3.3 was the current Apple II operating system, it was easy to figure out which program would run when a disk booted. It had to be a BASIC program which the user named when he or she formatted the disk. Most of the time the program was called HELLO.

With the introduction of ProDOS, things have gotten more confusing. Most ProDOS boot disks have two files at the top of their catalog lists—PRODOS and BASIC.SYSTEM. As long as they're there, the system starts up in BASIC just like DOS 3.3. Instead of HELLO, however, ProDOS always looks for a file called STARTUP (this name can't *be changed). STARTUP doesn't have to be a BASIC program. If it's an EXECable text file or a BRUNable binary file, BASIC.SYSTEM will still execute it correctly.*

Since ProDOS keeps the disk operating system and the BASIC disk command interpreter in separate files, respectively called PRODOS and BASIC.SYSTEM, programmers can write applications that run without the BASIC environment. These system files *replace BASIC.SYSTEM on the disk. When ProDOS boots, it scans the directory for the first SYS-type file whose name ends with the extension .SYSTEM. Normally that's BASIC .SYSTEM, but any system program will do.*

This is probably where you're having trouble. Only one application can come first in the directory, that being the first one you copied, and it's the one that ProDOS will launch. There's a pretty simple solution, though—use System Utilities *to copy BASIC.SYSTEM onto the disk. Since they won't be the first .SYSTEM name in the catalog, rename the applicaton programs with convenient names. You might find it handy to use names like SS for a spreadsheet and WP for a word processor. Then when you boot the disk, you can use the CATALOG command to look at the filenames on the disk, and* smart load *the application you need, using the* dash *(-) command. Or, if you're good at BASIC programming, you can even make a simple menu program that lists your choices and lets you select an application with a single keystroke.* [Ed: The December issue of Apple Applications included the program "ProDesk," an excellent ProDOS program launcher.]

But since you have a IIGS, this approach has one hitch: You can't run a lot of the 16-bit GS-specific applications from BASIC.SYSTEM, since most of these programs use the ProDOS16 *operating system. There's no separate ProDOS16 disk format—the difference is the operating system load file on the disk. It's called PRODOS under either operating system, but the 16-bit file is larger and will only run on IIGS computers.*

ProDOS16 has its own set of rules for starting up. First, it looks for a file in the SYSTEM subdirectory (folder) called START. If this file exists and it's a 16-bit system file, ProDOS16 runs it. The 16-bit system file type, abbreviated as Sys16 or S16, is new to ProDOS16, but BASIC.SYSTEM, being an 8-bit program, doesn't know about it. If you encounter one of these files in a BASIC CATALOG listing, you'll see $B3, the internal code for Sys16, instead of its name.

In versions 1.0 and 1.1 of the IIGS System Disk, the file called START contains the program launcher, *a super-hi-res Macintosh-style program for selecting and starting applications. In version 3.1 of this disk, the program launcher has moved to a Sys16 file called LAUNCHER. Another file called FINDER contains a color desktop program complete with menus, windows, and icons. The START file is just a short program that checks the amount of system RAM. If the machine is unexpanded, it runs the LAUNCHER; if it finds 512K of RAM or more, it starts up the finder.*

But if there's no file called START in the SYSTEM folder, ProDOS16 has a backup rule—it looks in the disk's main directory for a filename ending with .SYSTEM (a ProDOS8 application, type SYS) or .SYS16 (an S16 file). If it finds one or the other, it runs that file, setting up an emulation of ProDOS8 (the new name for the old operating system) for 8-bit applications.

If you want to make a bootable disk that contains several applications along with the finder or the program launcher, copy the 16-bit PRODOS file and the entire SYSTEM folder to a blank disk, and then add the application programs to the disk's main directory. Remember that doing this uses up a lot of the space on the disk. The operating system and the system files occupy about 250K, 50K less if you leave out the finder. The free room you're left with is still the equivalent of almost four 5¼-inch disks, but 16-bit applications, designed exclusively for microfloppies, can eat up a lot of space.

As an alternative, you could put your programs on non-booting disks without system files. If you keep a copy of the system disk around, you can use it to boot the computer, using the finder or launcher on it to select your applications and move between them.

The Floppy Romance Novel

Dan Gutman

Chestnut hair, tousled by the wind, frames the tanned oval of his face. . . . You are intensely aware of the strength of his hard sea-worn body, of the deep sea blue of his eyes. And then his mouth is on yours. . . .

Whoa! Hot stuff! Is that steam coming out of my Mac?

Most press releases go straight into the old circular file, but when Infocom announced their new *Plundered Hearts* ($40), I had to go that extra mile and read the first sentence.

Plundered Hearts (for the Apple II series and Macintosh, as well as another half-dozen computer systems) is a first: The first romance novel on disk. The first game aimed at an adult *female* audience. The first interactive fiction title in which the main character is a woman. And you—whether you're a man, woman, or animal—must play her role: a beautiful young Englishwoman in the late 1600s.

I've got to root for people who take chances, in this case, Infocom. Only 5 percent of all entertainment software is purchased by women. (Infocom claims the figure is 25 percent for their programs). Stroll into any company in Silicon Valley, and you'll see a lot more ties than skirts. The computer world is, and always has been, dominated by men.

Why would anybody be crazy enough to come out with a game aimed primarily at women? How does a woman get to be a software author in the male-dominated computer industry? I had to check this thing out, so I called Amy Briggs, the author of *Plundered Hearts.*

"When companies say they're coming out with software for women, they generally release a cookbook program," claims Briggs. "That's sort of denying the intellectual ability of women."

Briggs, who is just 25, told me her story. In 1985, she left her home in Morris, Minnesota and headed for Massachusetts, where her sister lives. At the time, she didn't have much going for her except a degree in English Lit and vague ideas about joining the Peace Corps or being a copy girl in the publishing industry. Her computer experience consisted of being a student intern at Honeywell, designing ergonomic control boards of nuclear power plants.

When companies say they're coming out with software for women, they generally release a cookbook program.

She recalls: "As I was leaving Minnesota, a friend said, 'You know, Infocom is in Cambridge. Maybe you can get a job with them.'" Briggs had played a couple of Infocom games and jokingly replied that they probably could use writers and editors for their programs.

"Four days after I arrived, there was an ad in the paper for a tester (the people who do the debugging of games) at Infocom. Within two weeks I was working there."

The next step up the ladder is what Infocom calls an "implementer," which is a software author. Amy Briggs reached implementer status in August, 1986, and exactly a year later she completed *Plundered Hearts*, her first game. In just two years, she became one of the first women to crack the upper reaches of the heavily male-dominated software industry.

Put Yourself In My Pumps . . .

Briefly, here's the plot of *Plundered Hearts:* You're on the high seas bound for the West Indies, where your father lies, ailing. Suddenly, your ship is boarded by pirates. Before you can rescue your father, you'll encounter lust-crazed swashbucklers, explosives, and crocodiles. You'll go to dances and fall passionately in love with the dashing pirate captain Nicholas Jamison (and save his life on several occasions).

Briggs wrote four possible endings to the game, depending on your last few moves. One is sad; one is sad but funny; in one everybody lives happily ever after; and in another (Amy's favorite) you end up as a pirate queen.

(Did I just give away the whole game? Believe me, you'll still enjoy it.)

Since she was 13, Briggs has read hundreds of romance novels and she screened "tons and tons and tons" of pirate movies in the process of writing *Plundered Hearts*. I asked her why she chose the pirate setting, and she said she wanted something that was "action/adventure-oriented and romantic with a capital *R.*"

I also asked her if she considered herself a computer person or a literary person. "Literary," she replied emphatically. "In fact, it's sort of a joke around here that I'm one of the nonprogrammers." While Infocom authors do both the programming and the text on their games, Briggs prides herself on the text. She says, "I don't think, 'Gee that's a neat program.' I think, 'Gee that's well-written.'" When she's got the time, she likes to curl up with anything by Jane Austen or Ian Fleming.

A Rootin' Tootin' Time

Did you know there are three kinds of romance novels? There are what's called the bodice rippers, which Briggs describes as "a rootin', tootin' time." Then there are the regency romances, which all take place in England between 1790 and 1830. ("There's a chaste kiss after the couple is engaged.") Finally, there are contemporary romances. ("Modern-day female astronaut meeting the man of her dreams.")

Plundered Hearts has the setting of a bodice ripper and the feel of a regency. There are two serious love scenes. In one, you have to fend off a seduction in the bedroom of your captor, the evil pirate Lafond. In the other, you steal kisses with the handsome Jamison in a gazebo covered with scented flowers. ("You catch a glimpse of the hard masculinity of his broad shoulders, the implied power in the scar that etches the stranger's jaw, and feel tremors course through your veins.")

"I tried to keep in mind during the love scenes that some men will be reading it, and I want them to enjoy it too," says Briggs. "It's more romantic than graphic."

(Readers who prefer the latter should check out another Infocom effort—*Leather Goddesses of Phobos*.)

All in all, it's pretty tame stuff compared to what you see on any newsstand. As often as I tried to take off my dress to get something started, I was brusquely informed, "That's not done in polite society."

The Battle Of The Sexes

Men and women, you may have noticed, are different. They have different tastes in movies, music, even adventure games. *Plundered Hearts* is intentionally softer than most Infocom programs. Briggs says the puzzles in her story are more abstract and relational, and deal more with people than with objects. She admits that the game is easier than other Infocom games. That's not to say that women aren't as smart as men, but that women have not jumped into the computer revolution with as much enthusiasm as men have. I asked Briggs why she thinks that's the case.

"I have thousands of theories, some of them very pessimistic. I think women are just as logical, and just as able to deal with computers as men. Part of the problem is that we're introduced to computers in our early teenage years. At that time girls aren't interested in sitting in a dark corner staring at a tube. They're more interested in social relationships. And because they miss those first five years when the little boys are playing with computers, they're behind when they start."

Briggs uses Infocom's *Zork* to show that even if a game is neuter, it usually appeals more to men than women. "You don't look down and see that you're wearing pants, or see that you're wearing a skirt," she says. "But the things you do are not the things women are interested in doing. I don't get off on going around picking up treasure and killing things (although there are several sword fights in the game). I'm more interested in rescuing people or going to a ball."

> **I must confess I felt a tad uncomfortable kissing Captain Jamison.**

Briggs doesn't label herself as an ardent feminist, but she rejects any ideas that all women should be in the kitchen, barefoot and pregnant. As the author of the first computer game for women, she is a pioneer, but she doesn't like to shout about it. "I don't like to think of myself in the limelight that much," she says. "I hope it starts a long happy relationship of games like this, but I won't take credit for it. If nobody buys it and nobody likes it, it will probably not be tried again."

Future Schlock

I have to admit that when Amy Briggs complained that cookbook software is an insult to the intelligence of women, I was thinking, "She puts down cookbook programs and she comes out with an all-text *romance novel?*"

Everybody knows that romance novels are shlock. You know, subway reading.

Briggs, of course, disagrees with that thoughtful evaluation of the genre. "Every type of fiction—spy, mystery, horror—has its share of shlock," she says. "There are some romance novels that I . . . throw across the room, and some are just as good as any other novel." Briggs rightfully labels Jane Austen as a romance writer, and nobody would claim that she was a hack.

"If you want me to say a flaming, radical feminist thing, romance novels have a bad reputation because it's men who do the denigrating, and men aren't interested in romance novels."

Personally, I found *Plundered Hearts* to be well written and fun to play, romance novel or not. But I must confess I felt a tad uncomfortable kissing Captain Jamison.

In other Infocom news, on the tenth anniversary of *Zork* comes *Beyond Zork* ($50). The new game, written by Brian (*Wishbringer, Trinity*) Moriarty, is a new chapter in the *Great Underground Empire*. The original game has sold nearly a million copies and is the best-selling entertainment software product ever, according to Infocom.

The new game allows players to create their own characters with six attributes: strength, endurance, compassion, luck, intelligence, and dexterity. *Beyond Zork* also features onscreen windows, bar charts and maps.

The word *Zork*, by the way, first appeared in an issue of *Mad Magazine* in 1954. *Beyond Zork* will be available in the middle of October.

Dan Gutman is the author of I Didn't Know You Could Do THAT With a Computer! *(COMPUTE! Books) and writes a syndicated newspaper column of the same name. His column on computer entertainment will be appearing in every issue of COMPUTE!'s Apple Applications.*

Tips, Tricks, & Tidbits

Each issue, **Tips, Tricks, & Tidbits** *serves up a wealth of information on progamming and application software for Apple II and Macintosh personal computers. If you have an interesting (and unique) solution to a programming problem, or a tip or tidbit on almost any popular application program, send it to Apple/Mac Tips, COMPUTE!'s Apple Applications, P.O. Box 5406, Greensboro, NC 27403. We'll pay $25–$50 for each tip we publish.*

[Editor's Note: For this second edition of **Tips, Tricks, & Tidbits,** *we again asked Vincent O'Connor, a collector of Apple II programming and application bugs, to share more of his tidbits. Here he offers eight bugs—two each in BASIC, DOS 3.3, ProDOS, and* **AppleWorks**—*and their solutions.]*

INT Isn't

Applesoft BASIC's INT (integer) function is supposed to truncate (drop off) the fractional portion of a floating-point number. For example, if A = 3.9, then INT(A) should equal 3. But INT doesn't always work properly. Type in the following program:

```
10 A = 1 / 7:B = 0
20 FOR I = 1 TO 14
30 B = B + A
40 NEXT I
50 PRINT INT (B)
```

Although this short program should print 2, it actually prints 1. Part of the problem lies in the inability of Applesoft BASIC to correctly handle decimals.

One solution is to add a very small constant just before using INT, increasing the variable just enough to make the INT function work properly. But this doesn't always work; any program using it should be tested thoroughly.

A second solution is to use the STR$ function to convert the number to a string, then use the VAL function to convert it back to a number. Using this, line 50 would be changed to

```
50 PRINT INT ( VAL ( STR$ (B)))
```

Rerunning the program with this version of line 50 yields the correct answer of 2. The advantage of this solution over using a small constant is that this works every time. The disadvantage is that it's slow. A program which frequently uses the INT function runs significantly slower with this fix than without it. In addition, you can't use this solution in a defined function.

Thus, if you need speed, try adding a small constant, such as .000001, before using INT. If accuracy is critical, use the more reliable string conversion.

ONERR Errors

In the case of Applesoft BASIC's ONERR statement, there's not just one bug, there are three.

1. Any statements *after* an ONERR GOTO statement on the same line can be LISTed, but they will *not* be executed. You can see this demonstrated in this program.

```
10 ONERR GOTO 30:A = 5
20 HOME : VTAB 12: PRINT A
30 END
```

When this program is RUN, it should print 5, but doesn't, because the statement A = 5 is never executed. When Applesoft BASIC was written, its authors wrote the ONERR routine so that it was identical to the REM routine; in other words, anything after the command was skipped. The only way to avoid this problem without actually changing BASIC is to make sure that *all* ONERR statements are the last statement on any line.

2. On an Apple II, II+, or unenhanced IIe, when the TRACE command is active, or in any program that includes a PRINT statement, the *forty-third* error intercepted causes the program to crash into the monitor unless the errors are in INPUT statements, and RESUME is used to resume program operation.

If you use GOTO to resume program operation, the program will crash into the monitor after the eighty-sixth INPUT error. This usually doesn't cause any problem unless you use ONERR GOTO when debugging your program, since it's not very likely a person using a program would sit still for 43 errors, much less 86. But if you use the ONERR feature when debugging programs, there are ways to avoid the problems.

First, don't use the TRACE command. It's not very useful, since it prints statements all over the screen, making it difficult to follow your program while it's executing. It also doesn't work correctly under DOS 3.3. Second, when using GOTO to resume program execution, type **CALL -3288** first, regardless of which Apple II computer you're using. This will correct the problems when using GOTO instead of RESUME.

3. If there are two consecutive errors using a GET without a successful GET, the computer will freeze, and you'll have to press Control-Reset to regain keyboard control. This problem can only occur if you're using GET with a numeric variable, and a nonnumeric character is entered. Run this program:

```
10 ONERR GOTO 100
20 HOME : VTAB 12: PRINT "ENTER
   A LETTER: ";: GET A
30 END
100 VTAB 23: PRINT "ERROR #: ";
    PEEK (222): RESUME
```

See how everything locks up after you've entered a letter twice? The solution to this is easy—don't use GET with a numeric variable. Always use a string variable instead.

Apple Made The Bugs

Under DOS 3.3, the APPEND command is supposed to work just like OPEN, except that it should move the position-in-file pointer beyond the last byte of the file, instead of to the beginning of the file as OPEN does.

Unfortunately, APPEND doesn't always work. Worse yet, how and when it fails varies with the three different versions of DOS 3.3 that are available.

Before the problem can be identified, you have to be able to tell the difference between the three versions of DOS 3.3. This isn't easy without some help; Apple decided the revisions were too minor to warrant changes in the version numbers. To identify the versions, type

PRINT PEEK(46725)

and press Return.

If you have the orginal version of DOS 3.3, it will print 165. The first revision will print 186, and the final version will print 182.

In the first version of DOS 3.3, APPEND fails under two conditions. One is when the file being appended to is longer than 130 sectors (32,767 bytes). It also fails if it's preceded by an END OF DATA error or an EXEC if the file being appended to ends on a sector boundary, a very rare combination.

In the second version, Apple fixed the first version's APPEND bugs, but created a new bug in the process. Here, APPEND fails on any file that ends one byte short of a full sector, or once every 256 tries.

In the final version, Apple again fixed the new bug, but again created another. In the final version, APPEND fails if the file being appended is exactly 65,535 bytes long, another rare occurrance.

About all you can do is be aware of these problems and check for the conditions before using the APPEND command on any program which runs under DOS 3.3. The final version of DOS 3.3 is least likely to create problems, so locate a copy of that version if you have one of the earlier versions.

Don't Trace It

Applesoft BASIC offers the TRACE command as a debugging aid. TRACE enables a trace flag which displays each program line number as it's executed. But because of the way DOS 3.3 handles files, TRACE doesn't work properly with any program that accesses files, especially text files. Type in the following:

```
10 D$ = CHR$ (4):T$ = "THIS IS
   A TEST"
20 PRINT D$"OPEN TEST"
30 PRINT D$"WRITE TEST"
40 FOR I = 1 TO 5: PRINT T$: NE
   XT I
50 PRINT D$"CLOSE TEST"
```

Now, type

TRACE <Return>
RUN <Return>

Notice that the program never creates the file on disk, or writes to it. Everything is printed to the screen instead (along with the line numbers as they're executed). The problem can partially be corrected by changing line 10 to

```
10 D$ = CHR$ (13) + CHR$ (4):T$
   = "THIS IS A TEST"
```

This time when the program is run, the file is created and TRACE prints the line numbers on the screen as they're being executed. At least through line 30. TRACE won't show the rest of the line numbers on the screen. Instead, the line numbers are printed to the disk! Now type

NOTRACE <Return>

to turn off the TRACE function.

Your only option under DOS 3.3 is to simply forego using TRACE. If you really want to use it, write your programs under ProDOS; TRACE works correctly under that operating system.

A Weak CHAIN

One of the advantages of using ProDOS is its ability to chain programs, a feature not available under DOS 3.3. ProDOS includes the CHAIN command, identical to the RUN command except that it doesn't clear the current variables. This means that a variable defined in a program which runs a second program using the CHAIN command can be referenced by the same name and will hold the same value in the second program. This lets you keep subprograms smaller by not requiring you to use valuable space redefining variables.

Unfortunately, the CHAIN command can "lose" the first variable defined in the program which used CHAIN. For example, in programs which access files, most programmers set the variable D$ equal to CHR$(4) before defining any other variable. If you did this, then used CHAIN to run another program, you risk losing D$'s value. Your second, chained program wouldn't be able to access disk files. The worst part of the bug is that it's not consistent—sometimes the first variable is lost, sometimes it isn't. There's no way to predict when the bug will occur.

There are two ways to avoid this bug. First, in any program using CHAIN, make the first variable defined a dummy variable (DUMMY$ = " "). Losing this variable won't create a problem.

The other solution is to avoid CHAIN altogether. Instead, save the variables to disk using the STORE command before exiting the first program, then load them into the second program using the RESTORE command. Like CHAIN, this method keeps you from having to redefine your variables in subprograms.

Lost Data On Locked Files

Another problem with ProDOS is in the way it returns an error when you attempt to write to a locked file. Take the following program, for example.

```
10 ONERR GOTO 70
20 D$ = CHR$ (4):T$ = "ABCDEFGH
   IJKLMNOPQRSTUVWXYZABCDE"
30 PRINT D$"OPEN TEST"
40 PRINT D$"WRITE TEST"
50 FOR I = 1 TO 7: PRINT T$: NE
   XT I
60 PRINT D$"CLOSE TEST": END
70 PRINT "ERROR NUMBER " PEEK (
   222)" IN LINE " PEEK (218 +
   PEEK (219) * 256)
80 GOTO 60
```

If you run this program under DOS 3.3, and then in immediate mode lock the file by typing **LOCK TEST** and run the program again, the program aborts with the message

```
ERROR NUMBER 10 IN LINE 50
```

Error number 10 is a file locked error and occurs the first time an attempt is made to write to the file. If you follow the same procedure under ProDOS, however, the program aborts with the message

```
ERROR NUMBER 10 IN LINE 60
```

The reason the error occurs in line 60 is because ProDOS has a 256-byte input buffer. Any time you send data to the disk, the data is first sent to the buffer. Only when the buffer is full is the data transfered to disk. In the example above, less than 256 bytes were sent, so ProDOS doesn't notice that the file is locked until the CLOSE command in line 60 attempts to transfer the data in the buffer to disk (DOS 3.3 also has a 256-byte buffer, but the difference in the way the buffer is handled is part of the reason DOS 3.3 is slower than ProDOS). ProDOS should detect a locked file when the WRITE command is given. As it stands, however, there's a chance of losing data in the buffer if an error occurs.

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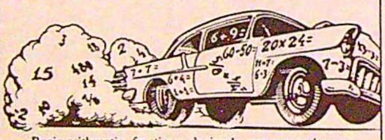

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There is a way to detect a locked file under ProDOS without risking your data. All you need to do is use these statements in your program.

```
PRINT CHR$(4)"VERIFY"F$
LK = PEEK(48823)
```

where F$ is the name of the file or pathname, and LK is the file-locked flag. If FL is 33, then the file is locked. Otherwise, it's 227.

AppleWorks 2.0, Too Bad

If a program is upgraded, and changes in the upgrade make it incompatible in some ways with older versions, or remove useful features found in older versions, then there's the potential for serious problems and upset users. Sad to say, the newest release of *AppleWorks* (version 2.0) is guilty of both incompatibility and removing useful features. Worse, the manual doesn't point out these changes. Let's look at some of these "disenhancements."

One incompatibility can be found in *AppleWorks'* spreadsheet and the use of the @IF function. Suppose you have the following formula in cell A1,

```
@IF(B1 = A2*A3,1,2)
```

and cell A2 and A3 contain 6 and 3, respectively. With versions 1.0 through 1.3, if you enter 18 into cell B1, cell A1 displays 1. Any other number puts 2 in cell A1. Not so with version 2.0. Regardless of what value is in B1, A1 always displays 2.

To correct this problem, you have to change the formula by placing the A2 * A3 in parentheses.

```
@IF(B1 = (A2*A3),1,2)
```

Problems also arise if an NA is referenced by an @IF comparison. If you enter @NA into cell B1, version 1.0 through 1.3 displays *NA* in cell A1. Version 2.0, however, displays *ERROR. All you can do to avoid this is make sure you never have an NA referenced by an @IF comparison.*

Another problem with *AppleWorks* 2.0 is that the printer configuration no longer supports Control-@, which is the null code. This means that with 2.0, it's no longer possible to change character sets on an ImageWriter from within *AppleWorks*, or make any changes to a printer or interface card that require a Control-@ anywhere in the command sequence.

Speaking of printing, if you're in the word processor and choose the *A text (ASCII) file on disk* option when printing, version 2.0 puts a carriage return at the end of each line on the screen. Older versions placed carriage returns only where *you* had put them. Among the problems this change creates is that you can't use version 2.0's word processor to enter and edit Applesoft BASIC programs of any size or complexity. If you do, and a BASIC line is longer than one word processor line, you'll lose all of the program line that extended beyond one word processor line when you EXEC it into memory.

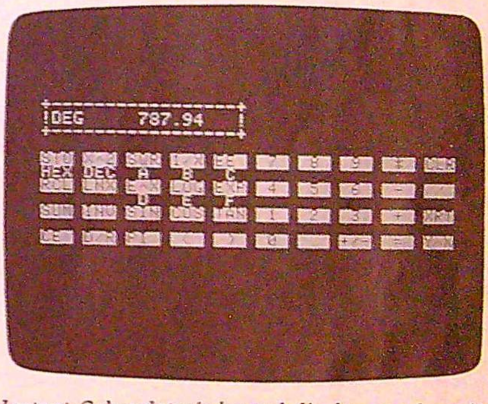
One partial solution is to use any ProDOS-based file copier, and from *AppleWorks* version 1.3, copy the *SEG.PR* file to the version 2.0 disk (do this only on a backup copy of version 2.0, not the original disk). This replaces the printer configuration file section of *AppleWorks*, but won't help you with the printing-to-disk problem.

Better yet, if you're thinking of upgrading to version 2.0, keep your old version of *AppleWorks* around as well. There are a number of other problems with 2.0, including compatibility problems with older documents that have frustrated a lot of people. You may be glad you didn't trash your older *AppleWorks*. **aa**

Instant Calculator

Jenny Schmidt

Call up a sophisticated scientific calculator with this all-machine language program. Access it in direct mode or from your own BASIC programs. "Instant Calculator" offers over 20 functions and can even convert between decimal and hexadecimal notation. For all Apple II–series personal computers using DOS 3.3 or ProDOS.



Instant Caluculator's keypad display can be called at any time by issuing a single CALL statment.

Your Apple personal computer is a wonder with numbers. After all, that's what the computer works with every instant.

So why not use it as a calculator? No, not a simple add, subtract, multiply, and divide kind of calculator—you can do that in BASIC. But a multifunction scientific calculator that uses true algebraic logic in evaluating expressions.

"Instant Calculator" provides that kind of calculator, and puts it inside your Apple II+, IIe, IIc, or IIGS, ready to pop up and use at a moment's notice. The program closely mimics the operation of a scientific calculator, and its key pad display directly corresponds to the Apple's keyboard. Choosing a function is as simple as pressing a key. You can even use it to convert to and from hexadecimal notation.

Instant Calculator can be ready any time you need it, or you can incorporate the calculator in your own BASIC programs by using a CALL statement.

Numbers Make Numbers

Instant Calculator is a machine language program that's listed in our "Apple MLX" format. The listing may look like a mass of numbers, but it's actually easy to enter. See the Apple MLX article elsewhere in this issue for more information. Make sure you have a copy of Apple MLX on disk before beginning to type in Instant Calculator.

Next, type

HIMEM: 32768

and press Return. *Important: Make sure you type in this statement before you load and run MLX* each session *you enter Instant Calculator with Apple MLX.*

Now, load and run MLX. Two prompts appear on the screen. Answer them as follows:

STARTING ADDRESS? 8B00
ENDING ADDRESS? 95E7

Press the E key at the MLX options menu to enter the program, and then type the starting address. If this is your first session at entering

Figure 1: Instant Calculator's Keys

```
+----------------------------------------+
!                                        !
+----------------------------------------+
[STO]  [ X^2 ]  [SQR]  [ 1/X ]  [ EE ]  [ 7 ]  [ 8 ]  [ 9 ]  [ * ]  [CLR]
[HEX]  [DEC]    [ A ]  [ B ]    [ C ]
[RCL]  [LNX]    [ E^X ] [LOG]   [ EXP ] [ 4 ]  [ 5 ]  [ 6 ]  [ - ]  [ / ]
                [D   ]  [ E ]   [ F ]
[SUM]  [ INV ]  [ SIN ] [COS]   [TAN]  [ 1 ]  [ 2 ]  [ 3 ]  [ + ]  [XRT]
[ CE ] [D/R]    [ PI ] [ ( ]    [ ) ]  [ 0 ]  [ . ]  [+/-]  [ = ]  [ Y^X ]
```

Instant Calculator, type **8B00**. When you're finished, save the program to disk as CALC.

Run Instant Calculator by entering

BLOAD CALC

Then execute it by entering

CALL 35584

(Note: Executing Instant Calculator with BRUN CALC creates unexpected problems—always run the program with the BLOAD/CALL combination.)

The calculator display immediately appears when Instant Calculator is executed (see Figure 1). Essentially, the display is a map of the keyboard. The buttons shown on the screen directly correspond to keys on the keyboard.

The top row of buttons on the display, **[STO]** through **[CLR]**, match the top row of keys, 1 through 0. Press the 3 key, for instance, and you're pressing Instant Calculator's [SQR] button. The second row of buttons corresponds to the Q through P keys; the third row matches the A through ; keys; and the fourth row coincides with the Z through / keys.

Eight of the buttons are not displayed in inverse. They're used to convert values between decimal and hexadecimal notation. Because there's only so much room on the keyboard, each button shares the same key as the function directly below it. The **[HEX]** and **[DEC]** buttons are pushed by first holding down the Control key and then pressing the Q or W keys, respectively. (The same keys activate **[RCL]** and **[LNX]** when pressed *without* the Control key.)

The **[A]** through **[F]** buttons are active only in HEX mode. Push these buttons by pressing the key corresponding to the button directly below the digit when HEX mode is active. For example, with HEX mode active, press the E key for the [A] button.

The Button Chart, found near the end of this article, describes each button. The buttons are, for the most part, self-explanatory. If you're not sure of a button's purpose, refer to the chart.

Because of the way the keyboard is connected electrically, some of the unused keys may produce unexpected effects. For example, the cursor keys produce digits if pressed. The number keys on the numeric keypad of the Apple IIGS keyboard (and the keypad found on the newer Apple IIe keyboard) are equivalent to those on the top row.

Using Instant Calculator

If you've used a hand-held scientific calculator, you already know how to use Instant Calculator. For example,

sin(30) ^ 2 + cos(30) ^ 2

can be evaluated by pushing the following buttons in Instant Calculator:

Buttons	Display
[3] [0]	30
[SIN]	. 5
[X^2]	.25
[+]	.25
[3] [0]	30
[COS]	.8660254
[X^2]	.75
[=]	1

You enter expressions much the same way you'd write them down. Instant Calculator evaluates the expression as far as it can each time you press one of the function or operator keys. The function keys ([SIN] and [X^2], for instance) perform the function on the value in the display. The operator keys ([+] and [*], for example) evaluate the expression as far as possible. The [=] key performs all pending operations and completely evaluates the expression.

The order in which operations are performed is called *precedence*. Instant Calculator evaluates expressions in the conventional manner. In other words, anything within parentheses is evaluated first. Exponential notation is done second. Multiplication and division are completed next. Finally, addition and subtraction are done.

This list shows the precedence of operations in Instant Calculator. The operator keys are in order, from first performed to last performed. (Operators listed on the same line have the same priority; they're evaluated in the order entered.)

( )
[Y^X] [XRT]
* /
+ −

If the expression you're working on results in an error, the calculator beeps and ERROR appears in the display. Errors can occur for a variety of reasons. You may have tried to divide by zero or your result may have become too large. You may have tried to use a function on an improper value—for example, by trying to take the square root of a negative number. Whatever the reason, error messages can be cleared by pressing the space bar. The display will contain the last value you entered before pressing the space bar.

Instant Calculator lets you convert values from decimal notation to hexadecimal. You may do this by pressing **[HEX]**. The number in the display is immediately converted to hexadecimal notation. The calculator behaves normally, except you can only enter positive integers in hexadecimal, and the results are only displayed in hexadecimal. Many of the function buttons are still available and work in HEX mode, but it really doesn't make sense to use them. Press the **[DEC]** button to return to decimal notation.

You can clear the display and erase all pending operations by pressing the **[CLR]** button. If you discover that you have entered an incorrect value, press the **[CE]** button to reenter it. (This works only if you press [CE] before pressing an operator button; once an operator button is pressed, the mistake cannot be corrected. In that case, you'll have to start the calculation again from the beginning.) Note that [CE] doesn't immediately clear the display. Instead, the new value you enter after pressing [CE] will overwrite the current display value.

Eventually, you'll want to stop using the calculator and return to BASIC. To do so, press the Escape key twice. The screen clears, and you're returned to BASIC.

Calculate In Your Own Programs

The calculator can also be used in conjunction with a BASIC program, and it can even pass a calculated value back to the program. Your BASIC program must include a HIMEM statement to prevent Instant Calculator from being overwritten by BASIC variables, and it must activate Instant Calculator with a special form of the CALL statement. The following sample program illustrates the procedure:

```
10 PRINT CHR$(4);"BLOAD CALC"
20 REM PROTECT CALCULATOR
30 HIMEM:35584
40 REM ACTIVATE CALCULATOR
50 CALL 35584,N
60 REM N CONTAINS RESULT LEFT IN CALCULATOR
UPON EXIT
70 REM MORE PROGRAM
```

Once Instant Calculator is BLOADed into memory and protected by the HIMEM statement, the CALL executes the program. When you exit the calculator and return to BASIC by pressing the Escape key twice, the variable in the CALL statement (N in the example above) receives the value held in the calculator's display. This variable can then be used by your program.

Note: Even if you don't use the result from the calculator, you must *specify a variable in the CALL statement.*

Fast Numbers

Instant Calculator is written in machine language for two reasons: to enhance its speed and to keep it totally independent of any BASIC program calling it. You may be interested in some of the techniques used in the program.

The program uses the floating-point routines in Applesoft ROM for all of the math functions. Some of the functions, such as arc cosine and arc sine, are derived by using several of the built-in Applesoft functions. A good article explaining these routines is "Applesoft Internal Entry Points," in the book *All About Applesoft*, published by Call-A.P.P.L.E.

The precedence of operators is handled by using LIFO (Last In, First Out) stacks. One stack is used to hold the entered values, while another stack holds the entered operators. When the user presses one of the operator keys, the following happens:

- The value on the display is pushed onto the value stack.
- The operator button is compared to the top item in the operator stack. If the top item in the stack is greater or equal in precedence to the operator button just pressed, then the operator on the stack is pulled and executed.
- The items on the stack are compared, pulled, and executed until there are either no operators left on the stack or the operator on the top of the stack is of lower precedence than the operator button just pressed.
- After all the operators on the stack which can be executed have been executed, the operator just pressed is placed on the stack.

Left parentheses are placed on the stack without any comparision. When a right parenthesis is entered, the operators on the stack are pulled and executed until a left parenthesis is found. The left and right parentheses are then discarded. Pressing the equal sign pulls and executes all the operators on the operator stack.

Executing an operation is achieved by pulling the top two values from the value stack. Then the operation—addition, for instance—is performed on the two values, and the resulting value is pushed back on the value stack. After all the operations that can be completed have been completed, the value on the top of the value stack is displayed and the program is ready to receive another keypress.

Error trapping in this program is a little tricky. Most errors occur when the user tries to create an illegal value, such as trying to divide by zero. Since all the math routines are in Applesoft ROM, BASIC tries to take over when an error occurs. When Applesoft BASIC encounters an error, it checks the ON ERR flag to see if the ON ERR . . . GOTO statement has been executed. If it has not, BASIC prints an error message and stops program execution. If ON ERR is active, BASIC GOTOs the line number specified in the ON ERR . . . GOTO statement and executes the statements there.

The problem is that Instant Calculator is a machine language program and errors should be handled within the program, not by some outside BASIC program. The solution is to have a tokenized Applesoft BASIC line embedded in the machine language program. Instant Calculator redirects the appropriate BASIC pointer to the tokenized line so that it is executed when an error occurs.

Button Chart

[STO]	Store displayed value in memory register.
[RCL]	Recall contents of memory register to display.
[SUM]	Add contents of memory register and display, and store result in memory register.
[CE]	Remove last value from stack, but keep all pending operations.
[X^2]	Calculate square of value in display.
[LNX]	Calculate natural logarithm (log to base *e*) of value in display.
[INV]	Change function of next button pressed for some of the buttons.
[D/R]	Switch between degree and radian modes for trig functions.
[SQR]	Calculate square root of value in display.
[E^X]	Raise *e* to power in display.
[SIN]	Calculate sine of value in display.
[PI]	Enter the value of pi (π).
[1/X]	Calculate reciprocal of value in display.
[LOG]	Calculate common logarithm (log to base 10) of value in display.
[COS]	Calculate cosine of value in display.
[( ]	Start expression in parentheses.
[EE]	Enter exponent mode.
[EXP]	Raise 10 to the power in display.
[TAN]	Calculate tangent of value in display.
[ )]	End expression in parentheses.
[INV] [EE]	Exit exponent mode.
[INV] [SIN]	Calculate arc sine of value in display.
[INV] [COS]	Calculate arc cosine of value in the display.
[INV] [TAN]	Calculate arc tangent of value in the display.
[0], [1]	Enter a digit.
[2], [3]	
[4], [5]	
[6], [7]	
[8], [9]	
[A], [B]	Available in HEX mode.
[C], [D]	
[E], [F]	
[.]	Enter decimal part of value.
[+/-]	Negate value in display (switch sign of value).
[*]	Enter multiplication operator.
[-]	Enter subtraction operator.
[+]	Enter addition operator.
[=]	Evaluate expression.
[CLR]	Clear the display and all pending operations.
[/]	Enter division operator.
[XRT]	Enter root operator.
[Y^X]	Enter exponential notation (raise to power) operator.
[HEX]	Enter hex mode (use with Control key).
[DEC]	Return to decimal mode (use with Control key).
Esc	Exit the program (press twice).
Space	Clear ERROR message.

Applesoft pointers are saved in other parts of the machine language code. These pointers are restored when the program is exited. ON ERR is turned on, and the assembler line number of the embedded line is stored in ONERR. The pointer to the beginning of the BASIC program is made to point at the embedded line. Thus all errors execute the embedded BASIC line. The embedded line itself contains a CALL statement to Instant Calculator's error-handling routine. In this way, control always remains with Instant

Calculator, even when an error is encountered.

The Applesoft pointers are restored before the program ends so that a BASIC program remains oblivious to the fact that the pointers were changed at all.

Instant Calculator can add that special touch to your Applesoft programs or can be used as a stand-alone program. Either way, the program is easy to use and very powerful.

Instant Calculator

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
8B00: A5 D8 8D E6 94 A5 F4 8D F2
8B08: E7 94 A5 F5 8D E8 94 A5 2B
8B10: 67 8D E9 94 A5 68 8D EA 99
8B18: 94 A5 75 8D EB 94 A5 76 DD
8B20: 8D EC 94 A5 B8 8D ED 94 92
8B28: A5 B9 8D EE 94 A9 80 85 F2
8B30: D8 A9 EF 85 F4 A9 94 85 71
8B38: F5 A9 F2 85 67 A9 94 85 FB
8B40: 68 20 58 FC A9 06 20 5B 6F
8B48: FB 20 7F 95 A9 01 85 24 2F
8B50: E6 25 20 22 FC A9 A1 20 3C
8B58: ED FD A9 13 85 24 A9 A1 FD
8B60: 20 ED FD E6 25 20 22 FC 1C
8B68: 20 7F 95 A9 0B 20 5B FB 48
8B70: A9 01 85 24 A0 00 B9 FF 08
8B78: 93 20 ED FD C8 C0 12 D0 3D
8B80: F5 A9 0D 20 5B FB A9 09 C7
8B88: 85 24 A0 12 B9 FF 93 20 B5
8B90: ED FD C8 C0 1C D0 F5 A9 FC
8B98: 0A 20 5B FB A9 04 85 EE 3F
8BA0: A9 3F 85 32 A0 00 A9 0A 92
8BA8: 85 EF A9 00 85 24 E6 24 62
8BB0: B9 87 93 20 ED FD C8 B9 AD
8BB8: 87 93 20 ED FD C8 B9 87 69
8BC0: 93 20 ED FD C8 C6 EF D0 59
8BC8: E5 E6 25 20 22 FC C6 EE B4
8BD0: D0 D4 A9 00 85 FD 85 EC D6
8BD8: 85 07 85 06 20 71 93 20 93
8BE0: 86 92 A0 0F A9 B0 91 28 40
8BE8: 20 71 91 A0 94 A2 AC 20 51
8BF0: 2B EB A9 00 85 FC 85 FB F4
8BF8: 85 09 20 0F 8C A4 08 B9 CA
8C00: 43 94 8D 0D 8C C8 B9 43 A0
8C08: 94 8D 0E 8C 4C 0C 8C AD B2
8C10: 00 C0 10 FB 2C 10 C0 C9 08
8C18: 9B D0 6A A0 1E 2C 30 C0 4D
8C20: A9 14 20 A8 FC 88 D0 F5 43
8C28: AD 00 C0 10 FB 2C 10 C0 A2
8C30: C9 9B D0 51 A9 FF 85 32 CE
8C38: 20 58 FC 68 68 AD E6 94 F9
8C40: 85 D8 AD E7 94 85 F4 AD D8
8C48: E8 94 85 F5 AD E9 94 85 CE
8C50: 67 AD EA 94 85 68 AD EB 44
8C58: 94 85 75 AD EC 94 85 76 E1
8C60: C9 FF D0 03 20 00 00 AD 57
8C68: ED 94 85 B8 AD EE 94 85 B1
8C70: B9 20 BE DE 20 E3 DF 20 A4
8C78: 69 91 A6 83 A4 84 20 2B 5A
8C80: EB 20 B7 00 60 A0 00 84 98
8C88: 06 C9 E0 90 02 E9 20 C9 FD
8C90: A0 B0 06 69 40 A0 80 84 87
8C98: 06 A0 27 D9 1B 94 F0 06 72
8CA0: 88 10 F8 4C FA 8B 98 85 A2
8CA8: 08 29 03 0A 18 69 09 24 AD
8CB0: 06 30 02 69 01 20 5B FB EA
8CB8: 98 29 FC 85 24 E6 24 24 89
8CC0: 06 30 0E 20 38 95 20 4F 54
8CC8: 95 20 5D 95 A9 07 4C 5B 17
8CD0: FB 20 5D 95 20 4F 95 20 7E
8CD8: 38 95 A9 07 4C 5B FB 24 05
8CE0: ED 30 0B 20 69 91 20 82 B4
8CE8: EB D0 03 4C FA 8B A2 B0 4D
8CF0: 20 30 92 4C FA 8B A2 B1 3A
8CF8: D0 F6 A2 B2 D0 F2 A2 B3 03
8D00: D0 EE A2 B4 D0 EA A2 B5 0C
8D08: D0 E6 A2 B6 D0 E2 A2 B7 14
8D10: D0 DE A2 B8 D0 DA A2 B9 1C
8D18: D0 D6 46 EB 24 07 30 08 7E
8D20: 24 09 10 07 24 ED 10 03 FD
8D28: 4C FA 8B A2 AE 20 30 92 AC
8D30: 4C FA 8B A9 80 85 EB 4C 7A
8D38: FA 8B A0 05 24 EB 10 02 0B
8D40: A0 10 B1 28 C9 A0 F0 14 2F
8D48: A9 A0 91 28 20 71 91 20 1F
8D50: B5 91 20 82 EB D0 02 46 C3
8D58: 09 4C FA 8B A9 AD D0 EA B3
8D60: 46 09 4C FA 8B 20 69 91 5B
8D68: A0 94 A2 93 20 2B EB 4C 58
8D70: 60 8D 24 06 10 23 20 69 BA
8D78: 91 A9 80 85 07 A5 09 48 58
8D80: 20 BC 91 68 85 09 A0 02 27
8D88: A9 C8 91 28 C8 A9 C5 91 69
8D90: 28 C8 A9 D8 91 28 4C FA 75
8D98: 8B A0 94 A9 93 20 F9 EA CA
8DA0: 20 B5 91 46 09 4C FA 8B CA
8DA8: A0 94 A9 A2 20 F9 EA 20 77
8DB0: B5 91 46 09 4C FA 8B 20 E9
8DB8: 69 91 A0 94 A9 AC 20 7F 0A
8DC0: E9 20 B5 91 46 09 4C FA 92
8DC8: 8B 20 69 91 20 8D EE 20 2D
8DD0: B5 91 46 09 4C FA 8B 24 0E
8DD8: 06 10 17 24 07 10 F5 46 CA
8DE0: 07 20 69 91 A5 09 48 20 CF
8DE8: BC 91 68 85 09 24 EC 4C 2B
8DF0: 1A 8E 20 69 91 20 41 E9 D0
8DF8: 20 B5 91 46 09 4C FA 8B 23
8E00: 20 69 91 A0 94 A9 93 20 56
8E08: BE E7 A0 94 A2 93 20 2B AA
8E10: EB 4C FA 8B A5 EC 49 80 42
8E18: 85 EC 30 08 A0 02 20 71 78
8E20: 93 4C FA 8B A0 02 A9 D2 65
8E28: 91 28 A9 C1 C8 91 28 A9 EF
8E30: C4 C8 91 28 4C FA 8B 24 20
8E38: 07 10 05 A2 C1 4C F0 8C 55
8E40: 20 69 91 20 09 EF 20 B5 F9
8E48: 91 46 09 4C FA 8B A0 F0 DD
8E50: A9 66 20 7F E9 20 63 EB 5A
8E58: A0 94 A9 9D 20 F9 EA 20 D8
8E60: 69 EA 60 24 07 10 05 A2 60
8E68: C4 4C F0 8C 20 69 91 24 CF
8E70: EC 30 03 20 4E 8E 20 F1 51
8E78: EF 20 B5 91 46 09 4C FA 4F
8E80: 8B 24 07 10 05 A2 C5 4C D8
8E88: F0 8C 20 69 91 24 EC 30 03
8E90: 03 20 4E 8E 20 EA EF 20 96
8E98: B5 91 46 09 4C FA 8B 24 D7
8EA0: 07 10 05 A2 C6 4C F0 8C E5
8EA8: 20 69 91 24 EC 30 03 20 F2
8EB0: 4E 8E 20 3A F0 20 B5 91 45
8EB8: 46 09 4C FA 8B 20 69 91 B5
8EC0: A0 E9 A9 13 20 66 EA 20 9F
8EC8: B5 91 46 09 4C FA 8B 24 08
8ED0: 07 10 05 A2 C2 4C F0 8C F5
```

```
8ED8: 20 69 91 20 41 E9 A0 94 1C
8EE0: A9 B1 20 7F E9 20 B5 91 08
8EE8: 46 09 4C FA 8B 24 07 10 AF
8EF0: 05 A2 C3 4C F0 8C 20 69 D9
8EF8: 91 A0 EA A9 50 20 E3 E9 B3
8F00: 20 97 EE 20 B5 91 46 09 7E
8F08: 4C FA 8B A0 94 A9 9D 20 2E
8F10: 7F E9 20 63 EB A0 F0 A9 11
8F18: 66 20 F9 EA 20 69 EA 60 3D
8F20: 20 0F 8C A5 08 C9 1C F0 8F
8F28: 2B C9 24 F0 12 C9 20 F0 CB
8F30: 07 C9 14 F0 6E 4C FD 8B 03
8F38: A9 00 85 EB 4C FA 8B 20 21
8F40: 69 91 20 9E F0 24 EC 30 88
8F48: 03 20 0B 8F 20 B5 91 46 8C
8F50: 09 4C FA 8B 20 71 91 A0 A9
8F58: E9 A9 13 20 B2 EB D0 08 2A
8F60: A9 00 20 93 EB 4C 45 8F 3C
8F68: A0 94 A9 A7 20 B2 EB D0 21
8F70: 0A A0 94 A9 A2 20 F9 EA 5E
8F78: 4C 45 8F A0 94 A9 AC 20 CF
8F80: 7F E9 A0 E9 A9 13 20 A7 0E
8F88: E7 20 8D EE A0 94 A9 AC 9B
8F90: 20 E3 E9 20 69 EA 20 9E CD
8F98: F0 A0 F0 A9 66 20 A7 E7 FB
8FA0: 4C 45 8F 20 71 91 A0 E9 28
8FA8: A9 13 20 B2 EB D0 0A A0 E7
8FB0: F0 A9 66 20 F9 EA 4C 45 DA
8FB8: 8F A0 94 A9 A7 20 B2 EB 04
8FC0: D0 0D A0 F0 A9 66 20 F9 CF
8FC8: EA 20 D0 EE 4C 45 8F A0 A5
8FD0: 94 A9 AC 20 7F E9 A0 E9 0B
8FD8: A9 13 20 A7 E7 20 8D EE D9
8FE0: A0 94 A9 AC 20 E3 E9 20 F9
8FE8: 69 EA 20 9E F0 4C 45 8F 38
8FF0: 20 69 91 20 98 92 A5 FC 06
8FF8: D0 0D A9 01 20 E4 92 20 E2
9000: CE 92 46 09 4C FA 8B 20 0C
9008: ED 92 D0 0B 20 E4 92 A9 F2
9010: 01 20 E4 92 4C 02 90 85 90
9018: FA 20 F6 92 4C F6 8F 20 44
9020: 69 91 20 98 92 A5 FC D0 DD
9028: 0D A9 02 20 E4 92 20 CE FC
9030: 92 46 09 4C FA 8B 20 ED 46
9038: 92 D0 0B 20 E4 92 A9 02 01
9040: 20 E4 92 4C 31 90 85 FA 93
9048: 20 F6 92 4C 25 90 20 69 63
9050: 91 20 98 92 A5 FC D0 0D 4E
9058: A9 03 20 E4 92 20 CE 92 A6
9060: 46 09 4C FA 8B 20 ED 92 6B
9068: C9 03 B0 0B 20 E4 92 A9 59
9070: 03 20 E4 92 4C 60 90 85 6B
9078: FA 20 F6 92 4C 54 90 20 1C
9080: 69 91 20 98 92 A5 FC D0 3E
9088: 0D A9 04 20 E4 92 20 CE 9D
9090: 92 46 09 4C FA 8B 20 ED A6
9098: 92 C9 03 B0 DA 20 E4 92 94
90A0: A9 04 20 E4 92 4C 91 90 63
90A8: 85 FA 20 F6 92 4C 85 90 20
90B0: 20 69 91 20 98 92 A5 FC C7
90B8: D0 0D A9 05 20 E4 92 20 E4
90C0: CE 92 46 09 4C FA 8B 20 CC
90C8: ED 92 C9 05 B0 0B 20 E4 E5
90D0: 92 A9 05 20 E4 92 4C C2 15
90D8: 90 85 FA 20 F6 92 4C B6 56
90E0: 90 20 69 91 20 98 92 A5 C6
90E8: FC D0 0D A9 06 20 E4 92 06
90F0: 20 CE 92 46 09 4C FA 8B 87
90F8: 20 ED 92 C9 05 B0 0B 20 B5
```

```
9100: E4 92 A9 06 20 E4 92 4C D5
9108: F3 90 85 FA 20 F6 92 4C F7
9110: E7 90 A9 00 20 E4 92 46 80
9118: 09 4C FA 8B 20 69 91 20 D4
9120: 98 92 A5 FC D0 0E 20 B7 6F
9128: 92 20 F9 EA 20 B5 91 46 CB
9130: 09 4C FA 8B 20 ED 92 F0 D1
9138: ED 85 FA 20 F6 92 4C 22 D1
9140: 91 20 69 91 20 98 92 A5 A8
9148: FC D0 0E 20 B7 92 20 F9 24
9150: EA 20 B5 91 46 09 4C FA AA
9158: 8B 20 ED 92 D0 03 4C FA 56
9160: 8B 85 FA 20 F6 92 4C 47 ED
9168: 91 A0 94 A9 AC 20 F9 EA 6E
9170: 60 24 07 10 03 4C 6F 95 6C
9178: A2 00 A0 05 B1 28 9D 00 BA
9180: 02 E8 C8 C0 10 D0 F5 A9 5D
9188: C5 9D 00 02 E8 B1 28 9D 12
9190: 00 02 E8 C8 C0 13 D0 F5 C7
9198: 20 39 D5 A9 00 85 B8 A9 A0
91A0: 02 85 B9 20 59 D5 A9 00 D4
91A8: 85 B8 A9 02 85 B9 20 B7 1D
91B0: 00 20 7B DD 60 A0 94 A2 7A
91B8: AC 20 2B EB 20 86 92 A2 41
91C0: 00 86 EE 24 07 10 1E 20 7A
91C8: 52 E7 A0 0C A5 51 20 98 2F
91D0: 95 C8 A5 50 20 98 95 A5 DE
91D8: 51 A4 50 20 7B 95 A0 94 E1
91E0: A2 AC 4C 2B EB 20 34 ED F2
91E8: A9 80 85 FD BD 00 01 F0 72
91F0: 3A 49 80 C9 C5 F0 24 C9 34
91F8: AD F0 12 C9 AE F0 22 C9 55
9200: AB F0 04 AA 20 30 92 E6 30
9208: EE A6 EE D0 DF A0 10 24 FE
9210: EB 30 02 A0 05 A9 AD 91 3D
9218: 28 D0 EC A9 80 85 EB D0 80
9220: E6 A2 AE 86 ED 20 30 92 82
9228: 4C 07 92 A9 00 85 FD 60 94
9230: 24 09 30 05 20 86 92 B0 F0
9238: 26 24 07 10 04 A0 0C D0 E6
9240: 0C 24 EB 30 34 A0 06 24 49
9248: ED 30 02 A0 07 B1 28 C9 D3
9250: A0 F0 01 60 C8 B1 28 88 0E
9258: 91 28 C8 C0 0F 90 F5 A0 BC
9260: 0F 8A 91 28 C9 AE D0 02 11
9268: 85 ED 24 FD 30 0A 20 71 8B
9270: 91 A0 94 A2 AC 20 2B EB 6B
9278: 60 A0 12 B1 28 88 91 28 02
9280: C8 8A 91 28 D0 E4 A0 05 C1
9288: 46 EB 46 ED A9 A0 85 09 57
9290: 91 28 C8 C0 13 90 F9 60 DC
9298: A9 B6 18 65 FB AA A0 94 F9
92A0: 90 01 C8 20 2B EB A5 FB B9
92A8: 18 69 05 C9 28 D0 05 68 68
92B0: 68 4C FF 94 85 FB 60 A5 E8
92B8: FB D0 05 68 68 4C FF 94 40
92C0: 38 E9 05 85 FB 18 69 B6 3F
92C8: A0 94 90 01 C8 60 A5 FB 94
92D0: F0 11 38 E9 05 18 69 B6 6A
92D8: A0 94 90 01 C8 20 F9 EA 3B
92E0: 20 B5 91 60 A4 FC 99 DE E6
92E8: 94 C8 84 FC 60 A4 FC 88 03
92F0: B9 DE 94 84 FC 60 A5 FA 35
92F8: C9 05 F0 51 20 B7 92 20 9C
9300: F9 EA 20 21 EB 20 B7 92 D6
9308: 20 E3 E9 A0 00 A9 93 20 6D
9310: F9 EA A4 FA 88 F0 12 88 E7
9318: F0 18 88 F0 1E 88 F0 24 F6
9320: A5 9D 20 97 EE 20 98 92 BA
```

```
9328: 60 A5 9D 20 C1 E7 20 98 25
9330: 92 60 A5 9D 20 AA E7 20 E2
9338: 98 92 60 A5 9D 20 82 E9 13
9340: 20 98 92 60 A5 9D 20 69 43
9348: EA 20 98 92 60 20 B7 92 AE
9350: 20 F9 EA A0 E9 A9 13 20 A9
9358: 66 EA 20 21 EB 20 B7 92 65
9360: 20 E3 E9 A0 00 A9 93 20 C5
9368: F9 EA 20 97 EE 20 98 92 80
9370: 60 A9 07 20 5B FB A0 02 23
9378: A9 C4 91 28 A9 C5 C8 91 E1
9380: 28 A9 C7 C8 91 28 60 D3 6D
9388: D4 CF D8 DE B2 D3 D1 D2 72
9390: B1 AF D8 C5 C5 A0 A0 B7 9D
9398: A0 A0 B8 A0 A0 B9 A0 A0 27
93A0: AA A0 C3 CC D2 D2 C3 CC C0
93A8: CC CE D8 C5 DE D8 CC CF 25
93B0: C7 C5 D8 D0 A0 B4 A0 A0 0F
93B8: B5 A0 A0 B6 A0 A0 AD A0 E5
93C0: A0 AF A0 D3 D5 CD C9 CE BD
93C8: D6 D3 C9 CE C3 CF D3 D4 50
93D0: C1 CE A0 B1 A0 A0 B2 A0 49
93D8: A0 B3 A0 A0 AB A0 D8 D2 BF
93E0: D4 C3 C5 A0 C4 AF D2 D0 81
93E8: C9 A0 A0 A8 A0 A0 A9 A0 37
93F0: A0 B0 A0 A0 AE A0 AB AF B1
93F8: AD A0 BD A0 D9 DE D8 C8 A5
9400: C5 D8 A0 C4 C5 C3 A0 A0 C1
9408: C1 A0 A0 A0 C2 A0 A0 A0 D2
9410: C3 A0 C4 A0 A0 A0 C5 A0 99
9418: A0 A0 C6 B1 D1 C1 DA B2 AB
9420: D7 D3 D8 B3 C5 C4 C3 B4 FD
9428: D2 C6 D6 B5 D4 C7 C2 B6 A4
9430: D9 C8 CE B7 D5 CA CD B8 FB
9438: C9 CB AC B9 CF CC AE B0 2A
9440: D0 BB AF 65 8D 72 8D 00 5E
9448: 8E 60 8D B7 8D D7 8D 20 05
9450: 8F 14 8E C9 8D 37 8E 63 7E
9458: 8E A8 8D BD 8E CF 8E 81 D2
9460: 8E 12 91 33 8D ED 8E 9F 9B
9468: 8E 1C 91 0E 8D 02 8D F6 79
9470: 8C DF 8C 12 8D 06 8D FA 25
9478: 8C 1A 8D 16 8D 0A 8D FE 30
9480: 8C 3A 8D 4E 90 1F 90 F0 28
9488: 8F 41 91 DF 8B 7F 90 B0 26
9490: 90 E1 90 E1 90 BB AF C4 42
9498: 82 00 00 00 00 87 34 00 89
94A0: 00 00 82 49 0F DA A2 81 59
94A8: 80 00 00 00 81 80 00 00 20
94B0: 00 7F 5E 5B D8 A9 7F 5E 06
94B8: 5B D8 A9 C5 C3 A0 A0 C1 FA
94C0: A0 A0 A0 C2 A0 A0 A0 C3 2F
94C8: A0 C4 A0 A0 A0 C5 A0 A0 8F
94D0: A0 C6 DE D8 00 00 FF FF 65
94D8: 00 00 FF FF 00 00 7F 5E 5F
94E0: 5B D8 A9 C5 C3 A0 7F 5E 7D
94E8: 5B D8 A9 C5 C3 A0 A0 31 9A
94F0: 30 00 01 01 0A 00 8C 33 FE
94F8: 38 31 34 33 00 00 00 20 64
9500: DD FB 20 86 92 A0 0A A9 5A
9508: C5 91 28 C8 A9 D2 91 28 EF
9510: C8 91 28 C8 A9 CF 91 28 6D
9518: C8 A9 D2 91 28 AD 00 C0 3E
9520: C9 A0 D0 F9 2C 10 C0 20 55
9528: 69 91 20 BC 91 A9 00 85 F4
9530: FB 85 FC 85 09 4C FA 8B AD
9538: A4 24 C8 C8 B1 28 49 80 A5
9540: C9 A0 B0 03 18 69 40 91 37
9548: 28 88 C4 24 B0 EE 60 A0 27
9550: 0A 2C 30 C0 A9 28 20 A8 74
9558: FC 88 D0 F5 60 A4 24 C8 44
9560: C8 B1 28 29 3F 91 28 88 0D
9568: C4 24 B0 F5 06 08 60 A0 26
9570: 0C 20 BC 95 AA C8 20 BC 10
9578: 95 A8 8A 20 F2 E2 60 A9 79
9580: 01 85 24 A9 AB 20 ED FD 64
9588: A0 11 A9 AD 20 ED FD 88 95
9590: D0 FA A9 AB 20 ED FD 60 E7
9598: 48 4A 4A 4A 4A C9 0A 90 86
95A0: 05 18 69 B7 90 02 69 B0 0D
95A8: 91 28 68 29 0F C9 0A 90 8A
95B0: 05 18 69 B7 90 02 69 B0 1D
95B8: C8 91 28 60 B1 28 38 E9 40
95C0: A0 F0 0C E9 10 C9 0A 90 E4
95C8: 02 E9 07 0A 0A 0A 0A C8 46
95D0: 85 50 B1 28 38 E9 A0 F0 27
95D8: 08 E9 10 C9 0A 90 02 E9 A1
95E0: 07 18 65 47 60 41 4C 43 9A
```

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NewsWriter

Page Formatter and Printer

Jerry Wickwire

"NewsWriter" formats and prints any Apple text file, turning it into an impressive-looking newsletter complete with a banner headline, headers, variable margins, and multiple columns. Works with Apple IIe, IIc, and IIGS computers using either DOS 3.3 or ProDOS. Requires Apple Super Serial card (or equivalent) and ImageWriter or ImageWriter II printer (or compatible).

Even with the most powerful Apple word processor, the printed page still looks pretty plain. Text is text, and with just a single column and normally a single size of type, one document looks like almost any other.

That means if you're producing a newsletter—for your home, club, school, or work—you're resorting to scissors and glue, cutting and pasting columns of type into some semblance of newspaper-like design. Of course, there are specialized commercial programs available which turn your Apple computer into a desktop printing press. But not everyone needs—or can afford—such software.

"NewsWriter" formats and prints any text file—made by almost any Apple word processor—in a newsletter-like form. It's simple to use, has several options, and produces high-quality results. You can print in one, two, or three columns; use one or two (or no) header lines on each page; include up to ten banner lines on the first page; and print multiple copies of each page. NewsWriter even justifies the length of the columns on the last page so that they're the same length.

Newsletters In DOS Or ProDOS

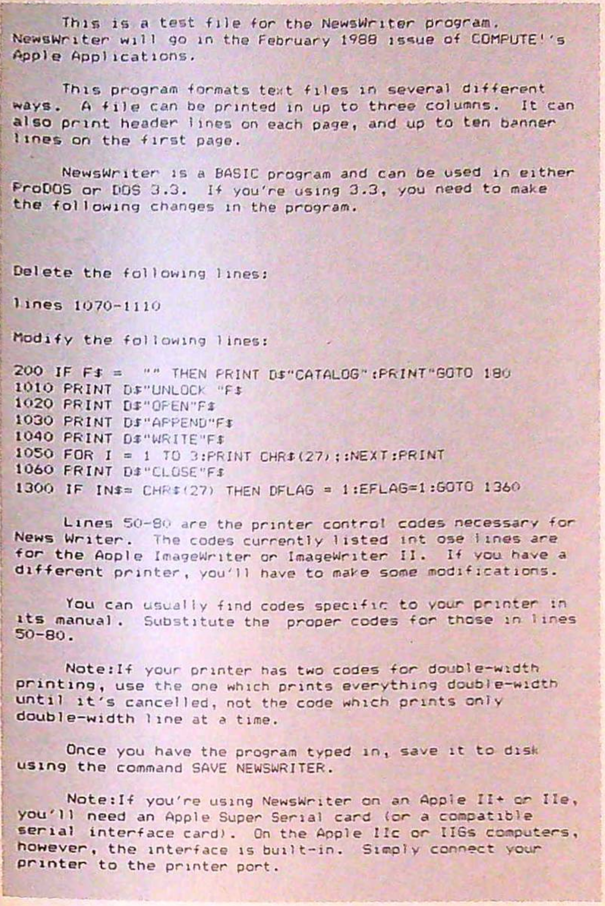
NewsWriter is a BASIC program, so use "Apple Automatic Proofreader," the error-checking utility found elsewhere in this issue, to help you type in the program without mistakes.

The listing at the end of this article is complete and ready to type in if you're entering NewsWriter on a ProDOS-formatted disk. Simply enter the program as it's listed. (If you're typing in NewsWriter on an Apple II+, change all the lowercase characters used in PRINT statements to uppercase.)

However, if you're typing in the program on a DOS 3.3-formatted disk, you'll need to make a few changes to the listing. To use NewsWriter under DOS 3.3:

Delete these lines:

Line 1010
Line 1020
Line 1030
Line 1050
Line 1060
Line 1260



This is a test file for the NewsWriter program. NewsWriter will go in the February 1988 issue of COMPUTE!'s Apple Applications.

This program formats text files in several different ways. A file can be printed in up to three columns. It can also print header lines on each page, and up to ten banner lines on the first page.

NewsWriter is a BASIC program and can be used in either ProDOS or DOS 3.3. If you're using 3.3, you need to make the following changes in the program.

Delete the following lines:

lines 1070-1110

Modify the following lines:

```
200 IF F$ =  "" THEN PRINT D$"CATALOG":PRINT"GOTO 180
1010 PRINT D$"UNLOCK "F$
1020 PRINT D$"OPEN"F$
1030 PRINT D$"APPEND"F$
1040 PRINT D$"WRITE"F$
1050 FOR I = 1 TO 3:PRINT CHR$(27);:NEXT:PRINT
1060 PRINT D$"CLOSE"F$
1300 IF IN$= CHR$(27) THEN DFLAG = 1:EFLAG=1:GOTO 1360
```

Lines 50-80 are the printer control codes necessary for News Writer. The codes currently listed int ose lines are for the Apple ImageWriter or ImageWriter II. If you have a different printer, you'll have to make some modifications.

You can usually find codes specific to your printer in its manual. Substitute the proper codes for those in lines 50-80.

Note:If your printer has two codes for double-width printing, use the one which prints everything double-width until it's cancelled, not the code which prints only double-width line at a time.

Once you have the program typed in, save it to disk using the command SAVE NEWSWRITER.

Note:If you're using NewsWriter on an Apple II+ or IIe, you'll need an Apple Super Serial card (or a compatible serial interface card). On the Apple IIc or IIGs computers, however, the interface is built-in. Simply connect your printer to the printer port.

This text file was created with Apple SpeedScript *and its conversion program, then loaded into* AppleWorks *and printed on an ImageWriter II without any formatting.*

Change these lines:

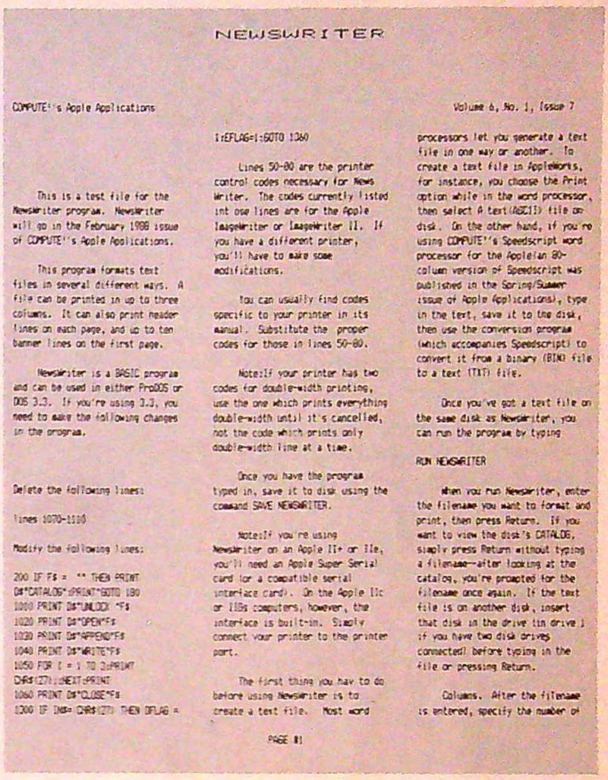
```
F6 170 IF F$ = "" THEN PRINT D$"CATALOG":
       PRINT : GOTO 160
E9 960 PRINT D$"UNLOCK"F$
E8 970 PRINT D$"OPEN"F$
E9 980 PRINT D$"APPEND"F$
93 990 PRINT D$"WRITE"F$
44 1000 PRINT CHR$ (27)
B1 1040 PRINT D$"CLOSE"F$
D6 1240 GET IN$
01 1250 IF IN$ = CHR$ (27) THEN EFLAG = 1:
        GOTO 1330
AB 1470 INVERSE : PRINT : PRINT J;"/"; RIG
        HT$ ("" + STR$ (I),2);: NORMAL : P
        RINT "";L$(I,J)
```

Add these lines:

```
4D 955 ONERR GOTO 3000
40 3000 PRINT : PRINT "THAT FILE IS NOT ON
        THIS DISK": FOR I = 1 TO 2500: NE
        XT : POKE 216,0: GOTO 150
```

And perhaps alter printer codes:

Lines 40–70 are the printer control codes necessary for NewsWriter. The codes currently listed in those lines are for the Apple ImageWriter or ImageWriter II. If you have a different printer, you might have to make some modifications.



NEWSWRITER

COMPUTE!'s Apple Applications

Volume 6, No. 1, Issue 7

This is a test file for the NewsWriter program. NewsWriter will go in the February 1988 issue of COMPUTE!'s Apple Applications.

This program formats text files in several different ways. A file can be printed in up to three columns. It can also print header lines on each page, and up to ten banner lines on the first page.

NewsWriter is a BASIC program and can be used in either ProDOS or DOS 3.3. If you're using 3.3, you need to make the following changes in the program.

Delete the following lines:

lines 1070-1110

Modify the following lines:

```
200 IF F$ =  "" THEN PRINT
D$"CATALOG":PRINT"GOTO 180
1010 PRINT D$"UNLOCK "F$
1020 PRINT D$"OPEN"F$
1030 PRINT D$"APPEND"F$
1040 PRINT D$"WRITE"F$
1050 FOR I = 1 TO 3:PRINT
CHR$(27);:NEXT:PRINT
1060 PRINT D$"CLOSE"F$
1300 IF IN$= CHR$(27) THEN DFLAG =
1:EFLAG=1:GOTO 1360
```

Lines 50-80 are the printer control codes necessary for News Writer. The codes currently listed int ose lines are for the Apple ImageWriter or ImageWriter II. If you have a different printer, you'll have to make some modifications.

You can usually find codes specific to your printer in its manual. Substitute the proper codes for those in lines 50-80.

Note:If your printer has two codes for double-width printing, use the one which prints everything double-width until it's cancelled, not the code which prints only double-width line at a time.

Once you have the program typed in, save it to disk using the command SAVE NEWSWRITER.

Note:If you're using NewsWriter on an Apple II+ or IIe, you'll need an Apple Super Serial card (or a compatible serial interface card). On the Apple IIc or IIGs computers, however, the interface is built-in. Simply connect your printer to the printer port.

The first thing you hav to do before using NewsWriter is to create a text file. Most word processors let you generate a text file in one way or another. To create a text file in AppleWorks, for instance, you choose the Print option while in the word processor, then select A text(ASCII) file on disk. On the other hand, if you're using COMPUTE!'s Speedscript word processor for the Apple(an 80-column version of Speedscript was published in the Spring/Summer issue of Apple Applications), type in the text, save it to the disk, then use the conversion program (which accompanies Speedscript) to convert it from a binary (BIN) file to a text (TXT) file.

Once you've got a text file on the same disk as NewsWriter, you can run the program by typing

RUN NEWSWRITER

When you run NewsWriter, enter the filename you want to format and print, then press Return. If you want to view the disk's CATALOG, simply press Return without typing a filename—after looking at the catalog, you're prompted for the filename once again. If the text file is on another disk, insert that disk in the drive (in drive 1 if you have two disk drives connected) before typing in the file or pressing Return.

Columns. After the filename is entered, specify the number of

PAGE #1

The same text file was formatted and printed with NewsWriter, resulting in a crisp, three-column layout. Note the banner (NEWSWRITER) and the header (COMPUTE!'s Apple Applications...Volume 6, No. 1, Issue 7) near the top, as well as the page number at the bottom.

You can usually find codes specific to your printer in its manual. Substitute the proper codes for those in lines 40–70.

Note: If your printer has two codes for double-width printing, use the one which prints everything double-width until it's canceled, not the code which prints only one double-width line at a time.

Once you have the program typed in, save it to disk using the command SAVE NEWSWRITER.

Note: If you're using NewsWriter on an Apple II+ or IIe, you'll need an Apple Super Serial card (or a compatible serial interface card). On the Apple IIc or IIGS computer, however, the interface is built-in. Simply connect your printer to the printer port.

Write And Print

The first thing you have to do before using NewsWriter is to create a text file. Most word processors let you generate a text file one way or another. To create a text file in *AppleWorks,* for instance, you choose the Print option while in the word processor, then select *A text (ASCII) file on disk.* On the other hand, if you're using

COMPUTE's *SpeedScript* word processor for the Apple (an 80-column version of *SpeedScript* was published in the Spring/Summer issue of Apple Applications), type in the text, save it to the disk, then use the conversion program (which accompanies *SpeedScript*) to convert it from a binary (BIN) file to a text (TXT) file.

Try to avoid using a word processor that automatically puts a carriage return at the end of every line. Some word processors do this when you save a file as text. In fact, *AppleWorks* 2.0 does this, resulting in text files that are almost, but not quite, unusable by NewsWriter. NewsWriter processes such text files, but it reads the carriage return at the end of every line, and so leaves lots of blank space as it creates its columns.

Here's another hint as you create text files: Don't enter blank lines at the beginning of the file. NewsWriter sees those lines and puts them into the first column. The result is a leftmost column shorter than the other column(s).

Once you've got a text file on the same disk as NewsWriter, you can run the program by typing

```
RUN NEWSWRITER
```

When you run NewsWriter, enter the filename you want to format and print; then press Return. If you want to view the disk's CATALOG, simply press Return without typing a filename—after looking at the catalog, you're prompted for the filename once again. If the text file is on another disk, insert that disk in the drive (in drive 1 if you have two disk drives connected) before typing in the filename or pressing Return.

Columns. After the filename is entered, specify the number of columns—one, two, or three—by pressing 1, 2, or 3 and hitting Return. As with most of the options in NewsWriter, there is a default column number built into the program. Pressing Return without entering a number uses the default for that selection. In the case of the column number, the default is 2.

Lines/Page. Next you're asked to indicate the number of lines on the page. The default is 66, the number for a 8½ × 11 inch sheet of paper. You can enter as many as 88 lines (for 8½ × 14 inch legal-sized paper) or as few as 14 lines.

Top Margin. The next entry specifies the number of lines in the top margin. Its range is 1–9, with a default of 6.

Bottom Margin. Enter the bottom margin similarly. Ranging from 2 to 9, the default is also 6. (The minimum bottom margin is 2, to allow for printing the page number at the bottom of the page.)

Page Header Lines. Next, type in the number of header lines you want on each page. A header can take up zero, one, or two lines. If you elect to use them, the header lines appear at the top of every page. The default number of header lines is 2.

Number Of Banner Lines. Enter the number of banner lines next. These lines contain up to 30 characters each and appear on the first page, centered, in double-wide pica type. You can select 0 to 10 of these lines. You don't have to enter anything in any of the lines—this lets you use preprinted letterhead, for instance, by entering 10 here, then making all ten lines blank. In effect, this makes the letterhead the banner on the first page. The default number of banner lines is 0.

Number Of Copies. Finally, indicate the number of copies you'd like printed of each page. The default here is 1.

After you've entered a value in each of these areas, the program asks you to confirm your answers. Press the Y key or Return if you wish to use these settings; pressing the N key returns you to the top of the screen to answer each question again.

Banners And Headers

With approved settings entered, the next step with NewsWriter is to type in the banner lines. An underline indicating the maximum length for each is displayed on the screen. However, note that although there is an underline on the screen to indicate the length of the banner line, the program uses a BASIC INPUT statement to get your entry. Make sure you don't type beyond the underline. If you want to enter commas or colons, begin the line with a double quotation mark ("). It isn't necessary to use the closing quotation mark—you can go one space to the right of the underline if you use the open quotation mark.

Press Return without entering any text to insert a blank banner line.

After the last banner line is typed in, you'll enter the header lines (if you're using any). The underline which shows the length takes up two or three lines on the screen—if you're printing in three columns, a single header line appears as three lines on the screen). Don't insert extra spaces to move a word to the next line—the program sees *every* character or space, and connects words split with spaces when it prints them.

Use the spacebar (not an arrow key) to move the cursor as you write multiword banner and header lines. This erases the underlines between words. If you don't use the spacebar, the underlines print (no need to worry about any remaining underline to the right of the cursor when the Return key is pressed).

Printing

Align the printer's print head with the top of the paper (or the perforation), insert the disk which contains the text file you're printing, turn on the printer, and press any key to begin. The screen clears, the program checks for the file, and then it begins to construct the individual lines. The lines are displayed on the screen as they're put together. When all the lines for a page have been built from the text file, the printer is turned on and that page is printed.

If you're printing multiple copies of each page, the program prints all copies of that page before it begins building the next page. For example, if you want two copies of each page, the printer will create two copies of page 1 first, then two copies of page 2, and so on.

NewsWriter

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
74 5 REM COPYRIGHT 1988 COMPUTE! PUBLICATI
     ONS, INC. ALL RIGHTS RESERVED.
A5 10 HOME : TEXT : VTAB 9: HTAB 13: PRINT
       "COPYRIGHT 1988": HTAB 7: PRINT "CO
      MPUTE! PUBLICATIONS, INC.": HTAB 10:
       PRINT "ALL RIGHTS RESERVED."
50 15 FOR I = 1 TO 1500: NEXT
BA 20 PRINT CHR$ (21): TEXT : HOME
BC 30 D$ = CHR$ (4):FLAG = 0:PG = 1:LL = 3
      2:FL = 0:F$ = "":CNT = FL
02 40 PC$ = CHR$ (27) + CHR$ (78): REM PIC
      A TYPE FOR APPLE IMAGEWRITER
7B 50 CD$ = CHR$ (27) + CHR$ (81): REM CON
      DENSED TYPE FOR APPLE IMAGEWRITER
9E 60 DW$ = CHR$ (14): REM BEGIN DOUBLE-WI
      DE TYPE
18 70 SW$ = CHR$ (15): REM CANCEL DOUBLE-W
      IDE TYPE
66 80 FOR I = 1 TO 13:SP$ = SP$ + "
          ": NEXT : REM 10 SPACES
BD 90 DIM L$(88,3),TL$(10),JU$(264)
B8 100 FOR I = 1 TO 15:UL$ = UL$ + "______
       ____": NEXT : REM 10 UNDERLINES
B6 110 T$ = "* N E W S W R I T E R *"
04 120 POKE 36,(40 - LEN (T$)) / 2: PRINT
       T$
CD 130 FOR I = 1 TO 40: PRINT "_";: NEXT
67 140 PRINT : PRINT : POKE 34,3
FE 150 HOME :FF$ = ""
94 160 F$ = "": PRINT "ENTER FILENAME: ";:
        INPUT "";F$
E5 170 IF F$ = "" THEN PRINT D$"CAT": GOTO
        160
81 180 FOR I = 1 TO LEN (F$)
26 190 A = ASC ( MID$ (F$,I,1))
7A 200 FF$ = FF$ + CHR$ (A - 32 * (A > 96
       AND A < 127))
F0 210 NEXT :F$ = FF$ + LEFT$ (SP$,15 - LE
       N (FF$))
85 220 HOME : PRINT "File = ";F$
5F 230 PRINT : PRINT "Enter Number of Col.
        (1-3) ";
28 240 VV = 5
BC 250 INPUT "";IN$
92 260 IF IN$ = "" THEN IN$ = "2"
2B 270 IF VAL (IN$) < 1 OR VAL (IN$) > 3 T
       HEN GOSUB 1540: GOTO 250
EE 280 VTAB VV: CALL - 958: PRINT "Number
       of Columns = "IN$
B0 290 COL = VAL (IN$)
89 300 PRINT : PRINT "Enter Total Lines /
       Page (4 to 88) ";
4C 310 INPUT "";PL$: IF PL$ = "" THEN PL$
       = "66"
6A 320 IF VAL (PL$) < 4 OR VAL (PL$) > 88
       THEN GOSUB 1540: GOTO 310
28 330 VV = 6: VTAB VV: CALL - 958: PRINT
       "Lines / Page = "PL$
81 340 PRINT : PRINT "Enter Top Margin. (1
        - 9) ";
9D 350 INPUT "";TM$: IF VAL (TM$) > 9 THEN
        GOSUB 1540: GOTO 350
C5 360 IF TM$ < > "" AND VAL (TM$) = 0 THE
       N GOSUB 1540: GOTO 350
7B 370 IF TM$ = "" THEN TM$ = "6"
CD 380 VV = VV + 1: VTAB VV: CALL - 958: P
       RINT "Top Margin = "TM$
88 390 PRINT : PRINT "Enter Bottom Margin
       (2 - 9) ";
A0 400 INPUT "";BM$: IF VAL (BM$) > 9 THEN
        GOSUB 1540: GOTO 400
25 410 IF BM$ = "" THEN BM$ = "6"
33 420 IF VAL (BM$) < 2 THEN GOSUB 1540: G
       OTO 400
21 430 VV = VV + 1: VTAB VV: CALL - 958: P
       RINT "Bottom Margin = "BM$
77 440 PRINT : PRINT "Enter Number of Head
       er Lines (max=2): ";
70 450 INPUT "";HL$: IF VAL (HL$) > 2 THEN
        GOSUB 1540: GOTO 450
3A 460 IF HL$ < > "" AND HL$ < > "0" AND H
       L$ < > "1" AND HL$ < > "2" THEN GOS
       UB 1540: GOTO 450
73 470 IF HL$ = "" THEN HL$ = "2"
04 480 VV = VV + 1: VTAB VV: CALL - 958: P
       RINT "Page Header Lines = "HL$
DE 490 IF VAL (PL$) - VAL (TM$) - VAL (BM$
       ) - VAL (HL$) < 1 THEN PRINT : PRIN
       T "PROBLEM: " CHR$ (7)"WITH THE MAR
       GINS ENTERED,": PRINT "THERE ARE NO
        LINES TO PRINT PER PAGE. ": PRINT
       "PLEASE RE-ENTER": GOTO 300
06 500 VV = VV + 1: VTAB VV: CALL - 958: P
       RINT "Lines To Print = " VAL (PL$)
       - VAL (TM$) - VAL (BM$) - VAL (HL$)
36 510 PRINT : PRINT "Enter Up To 10 Banne
       r Lines: ";
B9 520 INPUT "";IN$
9B 530 IF VAL (IN$) > VAL (PL$) - VAL (TM$
       ) - VAL (BM$) - VAL (HL$) - 1 THEN
       GOSUB 1870: GOSUB 1540: GOTO 520
37 540 IF VAL (IN$) > 10 THEN GOSUB 1540:
       GOTO 520
3C 550 IF IN$ < > "" AND VAL (IN$) = 0 THE
       N GOSUB 1540: GOTO 520
E2 560 TL = VAL (IN$)
88 570 VV = VV + 1: VTAB VV: CALL - 958: P
       RINT "Number Of Banner Lines = "TL
9D 580 PRINT : PRINT "Enter Number of Copi
       es To Print: ";
AE 590 INPUT "";NUM$
6B 600 NUM = VAL (NUM$): IF NUM < 1 THEN N
       UM = 1
5E 610 VV = VV + 1: VTAB VV: CALL - 958: P
       RINT "Number Of Copies / Page = "NU
       M
```

```
4A 620 PRINT : PRINT "Are These Values OK?
        (Y/N) ";
A5 630 GET IN$: IF IN$ < > "Y" AND IN$ < >
        "y" AND IN$ < > "N" AND IN$ < > "n
       " AND IN$ < > CHR$ (13) THEN 630
D1 640 IF IN$ = CHR$ (13) THEN IN$ = "Y"
D1 650 PRINT IN$: IF IN$ = "N" OR IN$ = "n
       " THEN 150
6B 660 PL = VAL (PL$):TM = VAL (TM$):HL =
       VAL (HL$):BM = VAL (BM$):LP = PL -
       TM - BM - HL
94 670 IF NOT TL THEN 770
2E 680 HOME : VTAB 3: PRINT "Enter Banner
       Lines"
D9 690 FOR I = 1 TO TL
BC 700 V = I * 2 + 2
F7 710 VTAB V: IF I < 10 THEN PRINT " ";
BE 720 PRINT I;": "; LEFT$ (UL$,30)
46 730 VTAB V: HTAB 5: INPUT "";TL$(I)
07 740 NEXT
06 750 PRINT "ARE THESE OK? (Y/N) ";: INPU
       T "";G$: IF G$ < > "Y" AND G$ < > "
       y" AND G$ < > "" THEN 680
23 760 VTAB 3: CALL - 868
B6 770 IF NOT HL THEN 900
E1 780 HOME : PRINT "Enter Page Header Lin
       es"
7A 790 FOR I = 1 TO HL
40 800 V = I * 3 + 3
37 810 VTAB V
B6 820 PRINT I": ";
FB 825 IF COL = 1 THEN LN = 60
ED 830 IF COL = 2 THEN LN = 70
9F 840 IF COL = 3 THEN LN = 116
89 850 PRINT LEFT$ (UL$,LN)
2D 860 VTAB V: HTAB 4: INPUT "";HR$(I)
D6 862 CALL - 958
0E 870 NEXT
83 880 PRINT : PRINT : PRINT "ARE THESE OK
       ? (Y/N) ";
59 890 INPUT "";G$: IF G$ < > "Y" AND G$ <
        > "y" AND G$ < > "" THEN 780
C5 900 VTAB 3: CALL - 868: HOME
73 910 PRINT "INSERT DISK WITH "F$
A5 920 PRINT "TURN ON PRINTER,"
CC 930 PRINT "AND PRESS ANY KEY TO CONTINU
       E,"
D1 940 PRINT "OR PRESS <ESC> TO EXIT. ";:
       GET G$: PRINT
F2 950 IF G$ = CHR$ (27) THEN TEXT : HOME
       : END
ED 960 PRINT D$"PREFIX": INPUT "";PR$
BA 970 PRINT D$"OPEN"PR$",TDIR"
48 980 PRINT D$"READ"PR$
DF 990 FOR I = 1 TO 3: INPUT IN$: NEXT
D8 1000 INPUT IN$: IF IN$ = "" THEN 1040
8F 1020 IF F$ = MID$ (IN$,2,15) THEN FL$ =
        IN$: GOTO 1040
56 1030 GOTO 1000
71 1040 PRINT D$"CLOSE"
3B 1050 IF FL$ = "" THEN PRINT "THAT FILE
        IS NOT ON THIS DISK." + CHR$ (7):
        FOR I = 1 TO 3000: NEXT : GOTO 150
B2 1060 FL = VAL ( MID$ (FL$,63,9))
83 1070 IF COL = 1 THEN LL = 60
8F 1080 IF COL = 2 THEN LL = 32
AF 1090 IF COL = 3 THEN LL = 35
57 1100 PRINT D$"OPEN"F$
36 1110 P = 1:DFLAG = 0:EFLAG = 0
C1 1120 HOME : INVERSE : PRINT "CONSTRUCTI
        NG LINES ...": NORMAL
2C 1130 PRINT D$"READ"F$
F1 1140 GOSUB 1340: REM MAKE LINE FROM WOR
        D STRINGS
55 1150 IF EFLAG AND (COL > 1) THEN GOSUB
        1910
5E 1160 FOR NN = 1 TO NUM: GOSUB 1560: NEX
        T NN: IF NOT EFLAG THEN P = P + 1:
         GOTO 1120
5A 1170 HOME : PRINT "More To Do? (Y/N) ";
56 1180 INPUT "";B$
D8 1190 IF B$ = "" THEN 1210
CC 1200 IF LEFT$ (B$,1) = "Y" OR LEFT$ (B$
        ,1) = "y" THEN RUN
55 1210 TEXT : HOME : END
B5 1220 REM MAKE UP WORD STRING FROM TXT F
        ILE
26 1230 W$ = "":DFLAG = 0
6D 1240 GET IN$:CNT = CNT + 1
F8 1250 IF CNT = FL AND IN$ < > CHR$ (13)
        THEN W$ = W$ + IN$:EFLAG = 1: GOTO
         1330
F8 1260 IF CNT = FL THEN EFLAG = 1: GOTO 1
        330
2B 1270 IF IN$ = CHR$ (13) THEN W$ = W$ +
        " ":DFLAG = 1: RETURN
F5 1280 IF IN$ = " " THEN W$ = W$ + IN$: R
        ETURN
E3 1290 IF IN$ = "-" THEN W$ = W$ + IN$: R
        ETURN
4D 1300 IF IN$ = CHR$ (9) THEN IN$ = "
         "
B6 1310 W$ = W$ + IN$
6C 1320 GOTO 1240
99 1330 PRINT D$"CLOSE": RETURN
BE 1340 FOR J = 1 TO COL: FOR I = 1 TO LP
         - TL * (P = 1):L$(I,J) = ""
2D 1350 IF EFLAG THEN GOSUB 1490: GOTO 147
        0
2B 1360 IF LEN (H$) > LL THEN L$(I,J) = LE
        FT$ (H$,LL):H$ = MID$ (H$,LL + 1):
         GOTO 1380
B8 1370 L$(I,J) = H$:H$ = ""
BB 1380 IF DFLAG THEN DFLAG = 0: GOTO 1460
F8 1390 GOSUB 1230: REM GET NEXT WORD$
49 1400 IF LEN (W$) > LL THEN H$ = MID$ (W
        $,LL + 1):W$ = LEFT$ (W$,LL)
4D 1410 IF LEN (L$(I,J)) + LEN (W$) > LL +
         1 THEN H$ = W$: GOTO 1460
7B 1420 L$(I,J) = L$(I,J) + W$
A9 1430 IF DFLAG THEN DFLAG = 0: GOTO 1460
42 1440 IF EFLAG THEN W$ = "": GOTO 1460
90 1450 GOTO 1390
F6 1460 IF LEN (L$(I,J)) < LL + 1 THEN L$(
        I,J) = L$(I,J) + LEFT$ (SP$,LL - L
        EN (L$(I,J)) + 1)
9E 1470 INVERSE : PRINT J;"/"; RIGHT$ ("
        " + STR$ (I),2);: NORMAL : PRINT "
         ";L$(I,J)
64 1480 NEXT I,J: RETURN
79 1490 L$(I,J) = L$(I,J) + H$:H$ = ""
7A 1500 IF LEN (L$(I,J)) + LEN (W$) > LL +
         1 THEN H$ = W$:W$ = "": RETURN
D3 1510 L$(I,J) = L$(I,J) + W$:W$ = ""
C5 1520 IF L$(I,J) = "" THEN L$(I,J) = LEF
        T$ (SP$,LL)
E7 1530 RETURN
54 1540 PRINT "RE-ENTER: ";: RETURN
DB 1550 REM PRINT PAGE AND ALL NECESSARY H
        EADERS
A6 1560 HOME : VTAB 12:T$ = "Printing Page
         #" + STR$ (P): POKE 36,(40 - LEN
        (T$)) / 2: PRINT T$
21 1570 IF COL = 1 THEN LM$ = "
        ":CM$ = ""
29 1580 IF COL = 2 THEN LM$ = "      ":CM$
        = "     "
```

```
31 1590 IF COL = 3 THEN LM$ = "            "
       :CM$ = "     "
DF 1600 PRINT D$"PR#1": REM  TURN ON PRINT
       ER
64 1610 PRINT CHR$ (9)"132N";PC$;
02 1620 FOR I = 1 TO TM: PRINT : NEXT : RE
       M PRINT TOP MARGIN
BF 1630 IF TL > 0 AND P = 1 THEN GOSUB 171
       0: REM PRINT BANNER LINES ON PAGE
       #1
26 1640 IF COL = 3 THEN PRINT CD$;: GOTO 1
       660
23 1650 PRINT PC$;
AB 1660 IF HL THEN GOSUB 1780: REM PRINT H
       EADER LINES
F2 1670 GOSUB 1790: REM PRINT TEXT INTO CO
       LUMNS
EF 1680 PRINT : PRINT LEFT$ (SP$,40 + 22 *
        (COL = 3));"PAGE #"P: FOR I = 1 T
       O BM - 2: PRINT : NEXT
56 1690 PRINT D$"PR#0": PRINT CHR$ (21): R
       EM FORGET ? CHR$(21)
DF 1700 RETURN
47 1710 FOR I = 1 TO TL
A9 1720 XY$ = LEFT$ (SP$,20 - ( LEN (TL$(I
       )) / 2))
55 1730 PRINT DW$;
6A 1740 PRINT XY$;TL$(I);
BF 1750 PRINT SW$
C7 1760 NEXT
FB 1770 RETURN
D4 1780 FOR I = 1 TO HL: PRINT LM$;HR$(I):
        NEXT : RETURN
05 1790 FOR I = 1 TO LP - TL * (P = 1)
33 1800 PRINT LM$;
4C 1810 FOR J = 1 TO COL
70 1820 PRINT L$(I,J);
74 1830 IF J = COL THEN 1850
31 1840 PRINT CM$;
E9 1850 NEXT J: PRINT : NEXT I
F9 1860 RETURN
C6 1870 PRINT : PRINT "PROBLEM: " CHR$ (7)
       " YOU HAVE ENTERED": PRINT "MORE B
       ANNER LINES"
7D 1880 PRINT "THAN WILL FIT ON THIS SHORT
        A"
9F 1890 PRINT "PAGE. YOU CAN ENTER UP TO"
25 1900 PRINT VAL (PL$) - VAL (TM$) - VAL
       (BM$) - VAL (HL$) - 1" BANNER LINE
       S. ";: RETURN
D1 1910 HOME : VTAB 12:T$ = "Justifying La
       st Page Columns": POKE 36,(40 - LE
       N (T$)) / 2: PRINT T$
B2 1918 M = 1
D1 1920 FOR I = 1 TO COL
71 1930 FOR J = 1 TO LP - TL * (P = 1)
66 1940 JU$(M) = L$(J,I)
11 1950 M = M + 1
E0 1960 IF L$(J,I) < > LEFT$ (SP$,LL) THEN
        K = I:L = J
1B 1970 NEXT J,I
1F 1980 LK = ((LP - TL * (P = 1)) * (K - 1
       ) + L) / COL
3A 1990 IF LK > INT (LK) THEN LK = LK + 1
5D 2000 M = 1
BC 2010 FOR I = 1 TO COL
5C 2020 FOR J = 1 TO LP - TL * (P = 1)
57 2030 IF J > LK THEN L$(J,I) = LEFT$ (SP
       $,LL): GOTO 2050
EA 2040 L$(J,I) = JU$(M):M = M + 1
02 2050 NEXT J,I
EA 2060 RETURN
```

PRINTER MANIA

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PS Draw

Jose M. Arevalo

Print Shop *is one of the most widely-used commercial programs for the Apple II–series computers. With hundreds of* Print Shop–*compatible graphics available, it was only a matter of time before someone figured out how to use them in BASIC programs. This short machine language routine creates a new BASIC command which lets you read* Print Shop *graphics from disk and place them anywhere on the screen. Can be used with any Apple II computer with either DOS 3.3 or ProDOS.*

If you use *Print Shop*, you probably have a large collection of *Print Shop*-compatible graphics. Some you may have bought from commercial software publishers like Brøderbund, Epyx, or Springboard. Or you may have collected public domain graphics from bulletin boards or user groups. Whatever their source, they may number in the hundreds.

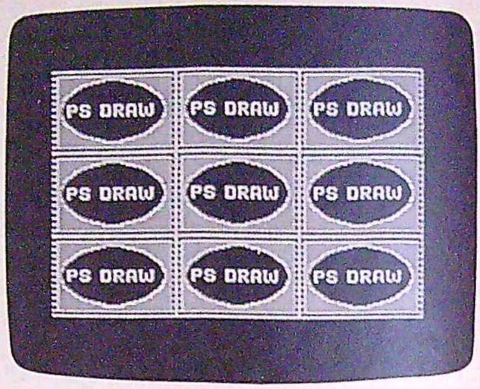
Now you can use those great graphics in programs other than *Print Shop*. To be exact, with "PS Draw" you can use them in your own BASIC program creations. PS Draw adds a new command to Applesoft BASIC using the ampersand (&). With PS Draw, you can easily draw *Print Shop* graphics on any Apple hi-res screen.

Typing In The Program

Although PS Draw is written in machine language, you don't need to know machine language to use it. To enter the program, use the "Apple MLX" machine language entry program found elsewhere in this issue. Load and run Apple MLX and enter these addresses:

```
STARTING ADDRESS? 0300
ENDING ADDRESS?   03E7
```

When you see the Apple MLX options menu, press E to enter the program, and then type in the address where you'd like to start typing. PS Draw is so short that you won't have any problem entering it in one session. Type **300**, the first address in the listing; then type in the data shown in Program 1's listing. Save the program with the name *PSDRAW*.



It's easy to position and display Print Shop *graphics anywhere on the screen with PS Draw. This repeated graphic was called from a short BASIC program.*

Drawing With PS Draw

To use PS Draw, type

```
BRUN PSDRAW
```

(If you named it something besides PSDRAW, change the BRUN command accordingly.) The program sets the ampersand vector—the new command is immediately ready to use.

The command's format is:

```
&ADDRESS,X,Y
```

- **ADDRESS** is the memory address (in decimal) where the *Print Shop* graphic was loaded.
- **X** is the *x*-coordinate of the upper left corner of the graphic. It can be any integer value between 0 and 279.
- **Y** is the *y*-coordinate of the upper left corner of the graphic. It can be any integer value between 0 and 191.

All three parameters *must* be specified. The parameters can be numbers, variables, or expressions.

Print Shop graphics are 88 pixels wide by 52 pixels high. Thus, drawing a *Print Shop* graphic with PS Draw is like drawing a square where you specify the coordinates of the upper left corner.

PS Draw's ampersand command draws the graphic loaded at ADDRESS in the active hi-res screen in the current color.

Draw One

Let's try it out. First, load a *Print Shop* graphic. Type **BLOAD** ***Name*****,A24576** and press Return. *Name* is the name of the graphic you want to draw. The graphic must be on a disk in the disk drive. *A24576* is the memory address where the graphic is loaded (location 24576 in decimal).

Now go to a hi-res screen. Type **HGR : HCOLOR = 3** and press Return. The active hires screen is page 1, and the color is white (setting HCOLOR is necessary even with a monochrome monitor).

Draw the graphic with its upper left corner starting at horizontal location (X) at 20 and the vertical location (Y) at 100. Type **&24576,20,100** and press Return. The *Print Shop* graphic appears.

Draw the graphic again at another spot on the screen. To put its upper left corner at 140,0, for instance, you'd type **&24576,140,0** and press Return. Notice that the first drawing remains on the screen.

How about one more time? Type **&24576,240,10** and press Return to put the graphic's upper left corner at 240,10. See what happened? The graphic exceeded the limits for the *x*-coordinate and overlapped to the left. (Although you can start the graphic at any X location up to 279, a *Print Shop* graphic will "spill over" onto the left side of the screen if you specify an X value greater than 191.)

The same thing happens when you exceed the limits of the *y*-coordinate. Y values greater than 140 place part of the graphic at the bottom of the screen, part of it at the top of the screen. (To eliminate the four lines of text at the bottom of an HGR screen, type **POKE 16302,0.**) You can draw graphics on the second hi-res screen just as easily (type **HGR2** before using the ampersand).

Add *Print Shop* Graphics To Your Programs

It's as easy to use this ampersand command within your own Applesoft BASIC programs as it is from direct mode. Type in and run Program 2, "Sample." Make sure that the file PSDRAW is on the same disk. When prompted for the graphic's name, enter the filename, put the disk which contains this graphic in the drive, and press Return. The selected graphic is drawn nine times on the screen. Press Control-Reset to exit the program.

Study Program 2—see how easy it is to write programs that use the new command?

Remember that each *Print Shop* graphic occupies 572 bytes. Take care in selecting a location to load these graphics. Hi-res page 1 (HGR) occupies locations 8192–16383, and page 2 (HGR2) occupies addresses 16384–24575. If you're not using one of the hi-res screens, it is a good place to load the graphics. Also remember to activate the desired hi-res page with the HGR or HGR2 command, and select a color with the HCOLOR command. The graphics look best when drawn in white on a black background or black with a white background.

For Machine Language Programmers

PS Draw is located at memory addresses $0300–$03E2 (although it actually ends at location $03E2, the ending address for entering PS Draw with Apple MLX is padded to $03E7). If you want to use PS Draw from another machine language program, all you have to do is set up certain memory locations and call the subroutine with a JSR instruction. The memory locations are

$06	Low byte of ADDRESS (address where the graphic is in memory)
$07	High byte of ADDRESS
$301	Low byte of X (horizontal position of graphic's upper left corner)
$302	High byte of X
$303	Y (vertical position of graphic's upper left corner)

Once you've stored values in these locations, do a JSR $310 and the graphic will be drawn on the active hi-res screen in the active color.

Program 1: PS Draw

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
0300: A9 4C 8D F5 03 A9 10 8D 6B
0308: F6 03 A9 03 8D F7 03 60 62
0310: 18 90 03 4C 99 E1 20 67 67
0318: DD 20 52 E7 84 06 85 07 2C
0320: 20 BE DE 20 67 DD 20 52 09
0328: E7 C9 00 F0 08 C9 01 D0 DD
0330: E2 C0 18 B0 DE 8C 01 03 14
0338: 8D 02 03 20 BE DE 20 67 01
0340: DD 20 52 E7 C9 00 D0 CB C1
0348: C0 C0 B0 C7 8C 03 03 AD 95
0350: 01 03 8D 04 03 AD 02 03 5F
0358: 8D 05 03 AD 03 03 8D 06 E6
0360: 03 A9 34 8D 08 03 A9 0B 5C
0368: 8D 07 03 A0 00 B1 06 8D C1
0370: 0A 03 A9 08 8D 09 03 AD 36
0378: 0A 03 10 0C AD 06 03 AE 41
0380: 04 03 AC 05 03 20 57 F4 6B
0388: 2E 0A 03 EE 04 03 D0 03 48
0390: EE 05 03 AD 05 03 C9 00 52
0398: F0 0F AD 04 03 C9 17 90 CE
03A0: 08 A9 00 8D 04 03 8D 05 3A
03A8: 03 CE 09 03 F0 03 4C 77 D8
03B0: 03 E6 06 D0 02 E6 07 CE 48
03B8: 07 03 F0 03 4C 6B 03 CE 36
03C0: 08 03 F0 1E EE 06 03 AD CE
03C8: 06 03 C9 C0 90 05 A9 00 C3
03D0: 8D 06 03 AD 01 03 8D 04 8D
03D8: 03 AD 02 03 8D 05 03 4C 0F
03E0: 66 03 60 AD C2 AA AC C1 9D
```

Program 2: PS Draw Sample

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
54 100 TEXT : HOME
F0 110 AD = 24576
5F 120 PRINT CHR$ (4);"BRUN PSDRAW"
2D 130 INPUT "GRAPHIC : ";NA$
C3 140 PRINT CHR$ (4);"BLOAD ";NA$;",A";AD
3D 300 HGR : POKE - 16302,0: HCOLOR= 3
E7 310 FOR I = 0 TO 2
2A 320 FOR J = 0 TO 2
99 330 X = J * 88
FB 340 Y = I * 52
C3 350 & AD,X,Y
AC 360 NEXT J,I
```

Disk Alarm

Bruce E. Howell

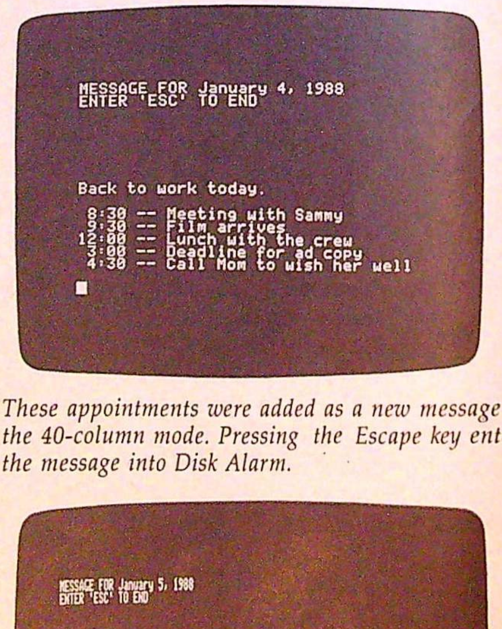
Your computer becomes your personal secretary when you use "Disk Alarm," a message taker and message reminder that automatically checks for and displays current and past messages when you turn on your Apple computer. Works on all Apple II–series computers under both DOS 3.3 and ProDOS. An 80-column card (or the equivalent) necessary. Requires 64K of memory.

Some people have a secretary to remind them of important dates or appointments. Others have an exceptional memory.

Most of us, though, have neither. That's why you'll find "Disk Alarm" so valuable. It's a BASIC program that, when run, checks for and displays any messages assigned to the current date, as well as shows any old messages not yet deleted. It then allows you to add, change, view, or delete messages for any specified date. And with a simple filename change, Disk Alarm can load and run automatically when you turn on your computer.

Run On Command, Run Automatically

Since Disk Alarm is a BASIC program, you should use "Apple Automatic Proofreader," to type it in. The Automatic Proofreader is an error-checking typing utility found elsewhere in this issue which makes it almost impossible for typing mistakes to creep into a BASIC program listing.



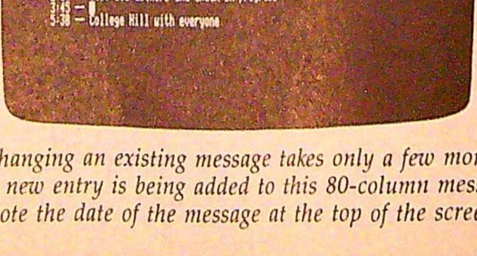
```
MESSAGE FOR January 4, 1988
ENTER 'ESC' TO END



Back to work today.

  8:30 -- Meeting with Sammy
  9:30 -- Film arrives
 12:00 -- Lunch with the crew
  3:00 -- Deadline for ad copy
  4:30 -- Call Mom to wish her well
```

These appointments were added as a new message in the 40-column mode. Pressing the Escape key enters the message into Disk Alarm.



```
MESSAGE FOR January 5, 1988
ENTER 'ESC' TO END



SCHEDULE FOR TODAY

 9:00 -- Make sure all art is in; call free-lancer for estimates on costs
11:00 -- Spend time taking to Keith. Make sure he's on track with article
12:30 -- No lunch today. Go swim at the YMCA
 2:30 -- Call all authors and check on progress
 3:45 --
 5:30 -- College Hill with everyone
```

Changing an existing message takes only a few moments. A new entry is being added to this 80-column message. Note the date of the message at the top of the screen.

Type in Disk Alarm. (Apple II+ users should change the month names in line 540 to uppercase letters). When you're ready to save it to disk, decide whether you want it to run on your command or to run automatically when the computer is turned on and the disk is in the drive.

Run on command. If *you* want to decide when to run Disk Alarm, save it to a formatted disk with the filename *DISK.ALARM*. To run the program, then, you'd type

```
RUN DISK.ALARM
```

Run automatically. If you want Disk Alarm to run as soon as you put the disk in the drive and turn on the computer (or when you do a *warm boot,* accomplished by pressing the Open Apple–Control–Reset keys at the same time), save it to a formatted disk with the filename

STARTUP	On a ProDOS-formatted disk
HELLO	On a DOS 3.3-formatted disk

If you choose this option, simply put the disk containing Disk Alarm in the disk drive and turn on the computer. Disk Alarm automatically loads and runs. You don't have to touch a thing.

Setting A Date

No matter how you run Disk Alarm—at your discretion or automatically—the program begins by checking to see if your computer has a clock card installed. This is only appropriate if you're running Disk Alarm from a ProDOS-formatted disk. Note—Apple IIGS owners don't have a clock card per se, but there *is* a clock in the computer. Disk Alarm will read it as if it were a normal clock card.

If you're using ProDOS and *if* your computer has a clock card, Disk Alarm puts the current date at the top of the screen and asks you to confirm it. Press Return or Y if it's okay, N if it's not. In the latter situation, you'll have a chance to enter the correct date (perhaps your clock card isn't keeping accurate time for some reason).

If your computer doesn't have a clock card, or if you're using Disk Alarm under DOS 3.3, you must enter the date manually. The date is in the form

```
MMDDYY
```

where *MM* is the month in numerals (01 is January, 12 is December), *DD* is the date (01 for the first of the month), and *YY* is the year (last two digits of any year from 1987 to 1999).

Use the left- and right-arrow keys to move through the date to make corrections. When you finish entering the year, a prompt appears asking you to confirm the date; answer by pressing Y or N. In the second case, you'll have another opportunity to type in the correct date.

Disk Alarm does not ensure that the date is a possible one. In other words, you can *enter* 023088 *for the fictitious day of February 30, 1988. Disk Alarm doesn't mind or even bring it to your attention.*

Past And Present Messages

Once the date is verified, Disk Alarm displays the current and old messages (in that order). You can delete the displayed message by pressing the Y key, or retain it by pressing the N key.

The messages are displayed in the format they were written in. Those messages written in the 40-column mode, for instance, are displayed in 40-column mode when they appear here.

Message Menu

With the old messages read and disposed of, Disk Alarm presents its main menu.

```
A   ADD ALARM ENTRY
B   CHANGE ALARM ENTRY
C   DELETE ALARM ENTRY
D   VIEW ENTRIES
E   QUIT
```

Press the left- or right-arrow keys to scroll the highlighted bar up and down through the five options (Apple IIc, IIe, and IIGS users can also use the up- and down-arrow keys). Press Return when the desired option is lit. You can also access each option directly by pressing the appropriate letter key (A–E). The Caps Lock key must be down for this to work, however.

ADD. The first option lets you add new messages to Disk Alarm's data file. Enter the message date and specify whether you'll type it in 40- or 80-column mode. You're presented with a ten-line screen editor, where the right-, left-, up-, and down-arrow keys move the cursor around the text window (Apple II+ users can use Ctrl-A to move up and Ctrl-Z for down). Pressing the Return key truncates the current line from the cursor's position on and advances the cursor to the next line. When you're through typing in the message, press the Escape key.

As you're entering messages, you'll notice that there is no *word-wrap* feature to this simple text editor. Unlike most word processors, which automatically move whole words to the next line when the current line is full, Disk Alarm's message writer simply cuts a word if it's too long to fit on the remainder of a line. The best thing to do, then, is to press the Return key when the cursor is close to the end of the line. This is just like typing on a typewriter, where you manually hit Return to shift to the next line.

In certain circumstances—notably when a line ends with a space, not a character or Return—the message can look odd when you later view it or try to change it. This is one of the main reasons why you should end all lines in the message writing area by pressing the Return key.

As new messages are added, deleted messages are overwritten first. Only after those old "spaces" are occupied are new disk records created for the messages.

Disk Alarm can contain up to 365 active messages at any one time. Note, also, that you can have multiple messages for any one date.

CHANGE. The second option, CHANGE ALARM ENTRY, displays a list of messages and their dates across the top of the screen. Simply type in the *number* of the message (not its date) and press Return.

The cursor appears at the left of the topmost line. Use the arrow keys to move the cursor through the message, making changes or adding more to the message. Note that whatever you type erases the character underneath the cursor. There's no easy way to insert characters in the middle of a line, for instance.

Press the Escape key when you're finished making changes, and indicate whether the changed message should be saved. Pressing either Y or N at this point sends you back to the first CHANGE screen.

Pressing Return without entering a message number takes you back to the main menu.

DELETE. The third option, DELETE ALARM ENTRY, is similar to the change option. Select the message by entering its number and confirm the deletion by pressing the Y key. Hitting N here aborts the process. Notice that deleted messages are marked by the label *DELETED*—message numbers marked like this are used by new messages as they're added.

VIEW. The fourth option in Disk Alarm lets you look at, but not change or delete, any message. As with the two previous options, this one starts out by showing the complete message list. Choose the message by entering its number and pressing Return. At any time while you're reading a message, you can press Escape to return to the main menu. Pressing Return takes you to the first VIEW screen so that you can look at additional messages.

QUIT. Always exit Disk Alarm by choosing the fifth option—before leaving the program, the data file is saved to the disk in drive 1. If you leave Disk Alarm in another fashion, changes you've made will not be present when you next use the program.

The data file containing Disk Alarm's messages is named *ALARM.DATA;* make sure you don't accidentally delete or rename it. If you do rename it, Disk Alarm won't be able to find your messages.

Before quitting, Disk Alarm prompts you for the name of the next program you wish to run. Press return to exit to the operating system.

Disk Alarm

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
48 5 I$ = ""
75 6 REM  COPYRIGHT 1988 COMPUTE! PUBLICAT
     IONS, INC. ALL RIGHTS RESERVED.
31 7 HOME : VTAB 9: HTAB 13: PRINT "COPYRI
     GHT 1988": HTAB 7: PRINT "COMPUTE! PU
     BLICATIONS, INC.": HTAB 10: PRINT "AL
     L RIGHTS RESERVED."
E6 8 FOR X = 1 TO 1500: NEXT : GOTO 520
FC 9 PRINT CHR$ (4);"SAVE DISK.ALARM": END
3B 10 REM FULL SCREEN EDITOR
B0 20 MX = LEN (I$): FOR A = 512 TO 512 +
      W: POKE A,32: NEXT : IF MX > 0 THEN
      FOR A = 1 TO MX: POKE A + 511, ASC (
       MID$ (I$,A)): NEXT : VTAB (V - 1):
      PRINT : PRINT I$
59 30 VTAB (V - 1): PRINT :AD = 0
E1 40 A = PEEK (AD + 512): INVERSE : PRINT
       CHR$ (A); CHR$ (8);: NORMAL
BF 50 A = PEEK (49152): IF A < 128 THEN 50
77 60 POKE 49168,0:A = A - 128
3D 70 IF A = 1 THEN A = 11
DF 80 IF A = 26 THEN A = 10
A7 90 IF A = 10 OR A = 11 OR A = 27 THEN P
      RINT CHR$ ( PEEK (AD + 512));:AD = M
      X: GOTO 160
5E 100 IF A = 8 AND AD > 0 THEN A = PEEK (
       AD + 512):AD = AD - 1: PRINT CHR$ (
       A); CHR$ (8); CHR$ (8);: GOTO 40
28 110 IF A = 13 THEN PRINT CHR$ (29): GOT
       O 160
3D 120 IF A = 21 THEN A = PEEK (AD + 512)
B7 130 IF A < 32 AND A < > 7 THEN PRINT G$
       ;: GOTO 40
3B 140 PRINT CHR$ (A);: POKE AD + 512,A:AD
        = AD + 1: IF AD > MX THEN MX = AD
E4 150 IF AD < W THEN 40
AF 160 POKE 775,AD: CALL 784:I$ = I$ + "":
        PRINT : RETURN
CD 170 REM GET DATE
7C 180 I$ = "MMDDYY":V = 5:W = 6: GOSUB 20
       : IF A = 27 THEN RETURN
FF 190 DA$(FP) = I$
6A 200 CM = VAL ( LEFT$ (DA$(FP),2)): IF C
       M < 1 OR CM > 12 THEN VTAB (23): PR
       INT : PRINT G$;"MONTH MUST BE BETWE
       EN 1 AND 12";: GOTO 180
CF 210 CD = VAL ( MID$ (DA$(FP),3,2)): IF
       CD < 1 OR CD > 31 THEN VTAB (23): P
       RINT : PRINT G$;"DAY MUST BE BETWEE
       N 1 AND 31  ";: GOTO 180
2F 220 CY = VAL ( RIGHT$ (DA$(FP),2)): IF
       CY < 87 THEN VTAB (23): PRINT : PRI
       NT G$;"YEARS BEFORE 1987 NOT VALID
         ";: GOTO 180
73 230 TD$ = MID$ (MO$,MO(CM - 1),MO(CM) -
        MO(CM - 1)) + " " + STR$ (CD) + ",
        19" + RIGHT$ ("00" + STR$ (CY),2):
        RETURN
79 240 REM DELETE
02 250 DA$(FP) = "000000":W = 0: FOR I = 0
        TO 9:S$(I) = "": NEXT
```

```
A4 260 REM WRITE DATA FILE
B2 270 PRINT D$;"WRITE ALARM.DATA,R";FP
1E 280 PRINT DA$(FP): PRINT W: FOR I = 0 T
       O 9: PRINT S$(I): NEXT : PRINT D$:
       RETURN
0E 290 REM READ DATA FILE
C1 300 HOME : PRINT D$;"READ ALARM.DATA,R"
       ;FP
38 310 INPUT DA$(FP): INPUT W: FOR I = 0 T
       O 9: CALL 776:S$(I) = I$ + "": NEXT
        : PRINT D$: RETURN
CD 320 REM GET MESSAGE
81 330 VTAB (6): PRINT : PRINT "FORTY (4)
       OR EIGHTY (8) COLUMNS:";: GET I$: P
       RINT I$:W = VAL (I$) * 10: IF W < >
        40 AND W < > 80 THEN VTAB (23): PR
       INT G$: PRINT "PLEASE ENTER '4' OR
       '8' ONLY   ";: GOTO 330
93 340 HOME : PRINT EC$: IF W = 40 THEN PR
       INT FC$;
9D 350 GOSUB 200: VTAB (1): PRINT : PRINT
       "MESSAGE FOR ";TD$: PRINT "ENTER 'E
       SC' TO END":L = 0: GOSUB 440
32 360 I$ = S$(L):V = L + 10: GOSUB 20:S$(
       L) = I$: IF A = 13 AND L < 9 THEN L
        = L + 1
A2 370 IF A = 11 AND L > 0 THEN L = L - 1
FA 380 IF (A = 10 OR AD = W) AND L < 9 THE
       N L = L + 1
56 390 IF A < > 27 THEN 360
14 400 RETURN
AB 410 REM DISPLAY MESSAGE
1C 420 PRINT EC$: IF W = 40 THEN PRINT FC$
       ;
52 430 GOSUB 200: VTAB (3): PRINT "MESSAGE
        FOR ";TD$
E7 440 VTAB (10): FOR I = 0 TO 9: PRINT S$
       (I): NEXT : RETURN
E1 450 REM SHOW ALL DATES PRESENT
A0 460 IF ND = 0 THEN VTAB (19): PRINT : P
       RINT "NO ENTRIES PRESENT.  CAN ONLY
        ADD.": POP : POP : GOTO 920
E0 470 HOME : PRINT EC$:V = 1:H = 2: FOR F
       P = 1 TO ND: VTAB (V): HTAB (H): PR
       INT RIGHT$ ("0" + STR$ (FP),2);"  "
       ;
3A 480 IF DA$(FP) = "000000" THEN PRINT "D
       ELETED": GOTO 500
AA 490 PRINT LEFT$ (DA$(FP),2);"/"; MID$ (
       DA$(FP),3,2);"/"; RIGHT$ (DA$(FP),2
       )
55 500 H = H + 16: IF H > 80 THEN V = V +
       1:H = 2
C3 510 NEXT : RETURN
33 520 DIM MO(12),DA$(365)
E5 530 D$ = CHR$ (4):OV = 1:G$ = CHR$ (7)
       + CHR$ (7) + CHR$ (7):FC$ = CHR$ (1
       7):EC$ = CHR$ (18): PRINT D$;"PR#3"
       : PRINT FC$
34 540 MO$ = "JanuaryFebruaryMarchAprilMay
       JuneJulyAugustSeptemberOctoberNovem
       berDecember": FOR I = 0 TO 12: READ
        MO(I): NEXT
82 550 FOR I = 768 TO 801: READ C: POKE I,
       C: NEXT : FOR N = 1 TO 5: READ O$(N
       ): NEXT :N = 5
12 560 DATA 1,8,16,21,26,29,33,37,43,52,59
       ,67,75
88 570 DATA 32,0,191,130,96,96,96,234,162,
       0,32,117,253,142,7,3,173,7,3,160,2,
       145,105,200,169,0,145,105,200,169,2
       ,145,105,96
64 580 DATA ADD ALARM ENTRY,CHANGE ALARM E
       NTRY,DELETE ALARM ENTRY,VIEW ENTRIE
       S,QUIT
58 590 IF PEEK (48896) = 76 THEN PD = 4904
       0:CD = PEEK (PD) - INT ( PEEK (PD)
       / 32) * 32:CY = INT ( PEEK (PD + 1)
        / 2):CM = ( PEEK (PD + 1) - CY * 2
       ) * 8 + INT ( PEEK (PD) / 32): GOTO
        660
29 600 V(0) = 8:V(1) = 40:V(2) = 88:V(3) =
        112: REM VALUES FOR CLOCK
E8 610 FOR S = 1 TO 7:I = 0: FOR A = 49152
        TO 49158 STEP 2
3F 620 IF PEEK (A + (S * 256)) < > V(I) TH
       EN A = 49158: NEXT : NEXT : GOTO 66
       0
E0 630 I = I + 1: NEXT :SL = S:S = 7: NEXT
F2 640 PRINT D$;"PR#";SL: PRINT D$;"IN#";S
       L: INPUT DA$: PRINT D$;"PR#3": PRIN
       T D$;"IN#0"
90 650 CM = VAL ( LEFT$ (DA$,2)):CD = VAL
       ( MID$ (DA$,4,2)):CY = VAL ( RIGHT$
        (DA$,2))
EE 660 IF CM < 1 OR CM > 12 OR CD < 1 OR C
       D > 31 OR CY < 87 THEN HOME : PRINT
        FC$: VTAB (1): PRINT "PLEASE ENTER
        TODAY'S DATE": GOSUB 180: GOTO 660
71 670 GOSUB 230: HOME : PRINT FC$: VTAB (
       1): PRINT "THE CURRENT DATE IS:";TD
       $: PRINT : PRINT "IS THAT CORRECT?"
       ;: GET I$: PRINT I$: IF I$ = "N" OR
        I$ = "n" THEN CM = 0: GOTO 660
44 680 ONERR GOTO 710
2E 690 TCD$ = TD$: PRINT D$;"OPEN ALARM.DA
       TA,L810"
F2 700 PRINT D$;"READ ALARM.DATA,R0": INPU
       T ND: PRINT D$: GOTO 790
69 710 A = PEEK (222): IF PEEK (48896) = 7
       6 AND A = 5 THEN 790
FE 720 POKE 216,0
BD 730 PRINT D$;"CLOSE"
A0 740 IF A < > 5 THEN 690
01 750 PRINT D$;"DELETE ALARM.DATA"
63 760 PRINT D$;"OPEN ALARM.DATA,L810"
FE 770 PRINT D$;"WRITE ALARM.DATA,R0"
53 780 PRINT ND: PRINT D$
DD 790 POKE 216,0: HOME : PRINT FC$
56 800 IF ND = 0 THEN 920
7E 810 T$ = RIGHT$ ("0" + STR$ (CM),2) + R
       IGHT$ ("0" + STR$ (CD),2) + RIGHT$
       ("0" + STR$ (CY),2):DD$ = RIGHT$ (T
       $,2) + LEFT$ (T$,4)
BE 820 FOR FP = 1 TO ND: PRINT D$;"READ AL
       ARM.DATA,R";FP
58 830 INPUT DA$(FP): PRINT D$: IF DA$(FP)
        < > T$ THEN 860
1C 840 GOSUB 300: HOME : PRINT : PRINT EC$
       : IF W = 40 THEN PRINT FC$;
16 850 VTAB (1): PRINT "DISK ALARM MESSAGE
       S FOR TODAY": GOSUB 430: VTAB (23):
        PRINT : PRINT "DELETE THIS MESSAGE
        (Y/N)?";: GET I$: PRINT I$: IF I$
       = "Y" OR I$ = "y" THEN GOSUB 250
0C 860 NEXT
FE 870 FOR FP = 1 TO ND: IF DA$(FP) = "000
       000" THEN 910
0D 880 IF RIGHT$ (DA$(FP),2) + LEFT$ (DA$(
       FP),4) > = DD$ THEN 910
26 890 GOSUB 300: HOME : PRINT : PRINT EC$
       : IF W = 40 THEN PRINT FC$;
17 900 VTAB (1): PRINT "OLD MESSAGES STILL
        ON FILE": GOSUB 430: VTAB (23): PR
       INT : PRINT "DELETE THIS MESSAGE (Y
       /N)?";: GET I$: PRINT I$: IF I$ = "
       Y" OR I$ = "y" THEN GOSUB 250
```

```
58 910 NEXT : HOME : PRINT FC$: NORMAL
A6 920 PRINT FC$: VTAB 24: PRINT TCD$: HTA
       B 31: INVERSE : PRINT ">SELECT<";:
       NORMAL : VTAB (1): HTAB (1): PRINT
       "DISK ALARM MENU"
63 930 PRINT CHR$ (24): FOR V = 1 TO N: VT
       AB (V + 2): PRINT CHR$ (V + 64);" "
       ;O$(V): NEXT
BC 940 INVERSE : VTAB (OV + 2): HTAB (3):
       PRINT O$(OV);: NORMAL
35 950 IF PEEK (49152) > 127 THEN O = PEEK
        (49152) - 192: POKE 49168,0: GOTO
       1000
40 960 IF PEEK (48896) < > 76 THEN 950: RE
       M NOT PRODOS, NO TIME HERE
2B 970 CALL 768:A$ = "a":M = PEEK (PD + 2)
       :H = PEEK (PD + 3): IF H > 12 THEN
       H = H - 12:A$ = "p"
28 980 IF H = 0 OR M = 0 THEN 950: REM NO
       CLOCK
2B 990 VTAB (24): HTAB (20): PRINT RIGHT$
       ("  " + STR$ (H),2);":"; RIGHT$ ("0
       0" + STR$ (M),2);"  ";A$;"m";: GOTO
        950
EF 1000 VTAB (OV + 2): HTAB (3): PRINT O$(
        OV)
A0 1010 IF O = - 51 THEN O = OV: GOTO 1050
6E 1020 IF O = - 56 OR O = - 53 THEN OV =
        OV - 1: IF OV < 1 THEN OV = N
5E 1030 IF O = - 43 OR O = - 54 THEN OV =
        OV + 1: IF OV > N THEN OV = 1
A8 1040 IF O < 1 OR O > N THEN 940
A8 1050 HOME : PRINT FC$: ON O GOSUB 1070,
        1130,1200,1270,1340: HOME : PRINT
        FC$: GOTO 920
```

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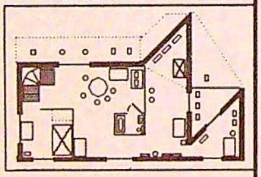

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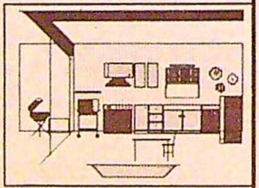

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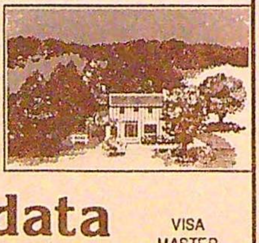

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```
FB 1060 REM ADD
6B 1070 FP = 0: FOR I = 1 TO ND: IF DA$(I)
         = "000000" THEN FP = I:I = ND
E2 1080 NEXT : IF FP = 0 AND ND > 364 THEN
         VTAB (20): PRINT G$;"SORRY, ONLY
        365 MESSAGES ALLOWED:" GOTO 1140
50 1090 VTAB (1): PRINT "ADD ALARM ENTRY":
         PRINT "ENTER DATE OF MESSAGE OR '
        ESC' TO EXIT": FOR I = 0 TO 9:S$(I
        ) = "": NEXT : GOSUB 180: IF A = 2
        7 THEN RETURN
4A 1100 GOSUB 330: IF FP = 0 THEN ND = ND
        + 1:FP = ND:DA$(FP) = DA$(0)
DC 1110 GOSUB 270: RETURN
C2 1120 REM CHANGE
4C 1130 GOSUB 460
A4 1140 VTAB (23): INPUT "ENTER THE NUMBER
         OF THE MESSAGE TO CHANGE OR 'RETU
        RN':";I$: IF I$ = "" THEN RETURN
0B 1150 FP = VAL (I$): IF FP < 1 OR FP > N
        D THEN PRINT G$;: GOTO 1140
11 1160 IF DA$(FP) = "000000" THEN VTAB (2
        0): PRINT G$;"CAN'T CHANGE A DELET
        ED MESSAGE.": GOTO 1140
82 1170 GOSUB 300: GOSUB 340: VTAB (23): P
        RINT : PRINT "SAVE THESE CHANGES (
        Y/N):";: GET I$: PRINT : IF I$ = "
        Y" OR I$ = "y" THEN GOSUB 270
7A 1180 GOTO 1130
B6 1190 REM DELETE
42 1200 GOSUB 460
72 1210 VTAB (23): INPUT "ENTER THE NUMBER
         OF THE MESSAGE TO DELETE OR 'RETU
        RN':";I$: IF I$ = "" THEN RETURN
BC 1220 FP = VAL (I$): IF FP < 1 OR FP > N
        D THEN PRINT G$;: GOTO 1210
32 1230 IF DA$(FP) = "000000" THEN VTAB (2
        0): PRINT G$;"THAT MESSAGE ALREADY
         DELETED.": GOTO 1210
28 1240 GOSUB 300: GOSUB 420: VTAB (24): P
        RINT "REALLY DELETE THIS MESSAGE (
        Y/N):";: GET I$: PRINT I$: IF ASC
        (I$) = 27 OR I$ = "Y" OR I$ = "y"
        THEN GOSUB 250
E9 1250 RETURN
F0 1260 REM VIEW
5E 1270 GOSUB 460
B7 1280 VTAB (23): INPUT "ENTER THE NUMBER
         OF THE MESSAGE TO VIEW OR 'RETURN
        ':";I$: IF I$ = "" THEN RETURN
5C 1290 FP = VAL (I$): IF FP < 1 OR FP > N
        D THEN PRINT G$;: GOTO 1280
97 1300 IF DA$(FP) = "000000" THEN VTAB (2
        0): PRINT G$;"CAN'T VIEW A DELETED
         MESSAGE.": GOTO 1280
6D 1310 GOSUB 300: GOSUB 420: VTAB (24): P
        RINT "PRESS ANY KEY FOR MORE OR 'E
        SC':";: GET I$: IF ASC (I$) = 27 T
        HEN RETURN
7B 1320 GOTO 1270
6C 1330 REM QUIT
2F 1340 PRINT D$;"WRITE ALARM.DATA,R0": PR
        INT ND
2D 1350 PRINT D$;"CLOSE"
C6 1360 HOME : PRINT CHR$ (21): VTAB (1):
        PRINT "ENTER NAME OF NEXT APPLICAT
        ION OR RETURN": INPUT "";I$: IF I$
         < > "" THEN PRINT D$;"RUN";I$
02 1370 HOME : END
```

aa

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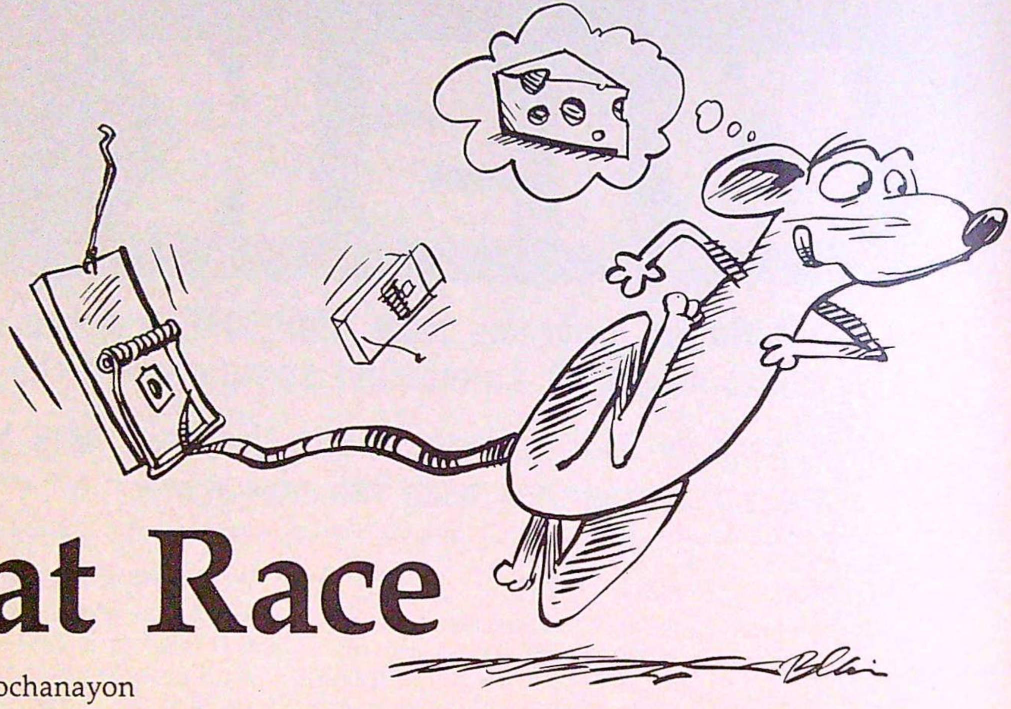


Rat Race

Adisak Pochanayon

Fast action and faster reaction are the highlights of this quick-playing arcade game for any Apple II computer. Avoid the rat traps as you guide the rat in its search for the cheesiest houses in town. Plays under both DOS 3.3 and ProDOS.

You're a rat, a special rat. Invisibility keeps the cats away, but it comes at a price. You can't tell where you are except by the tracks you've made.

Keeping the tracks straight, knowing which is old and which is new is tough enough. But add to that the fact that you're hungry—voraciously hungry—and staying alive is doubly difficult. You must have cheese. More and more cheese.

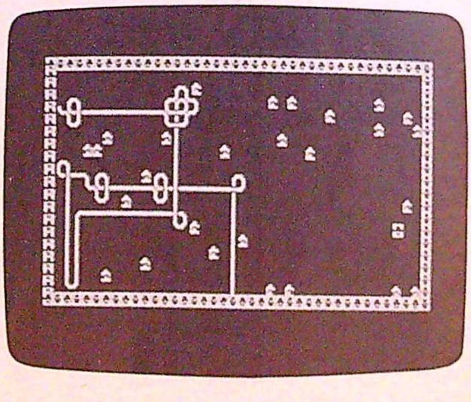
Fortunately, there's lots to be had. Every house has some. But scattered here and there among the houses are nasty rat traps.

"Rat Race" is every rat's dream—and nightmare.

Type, Rat, Type

Rat Race comes in two parts, one BASIC listing and one machine language routine. Both are necessary to play the game.

Type in Program 1, "Rat Race." Since it's a BASIC program, you can use "Apple Automatic Proofreader" (included in this issue) to help you enter it without errors. Save Program 1 to disk with the name *RAT.RACE*.



Long tracks have led this rat through several cheese-filled houses and near the dangerous border made up of rat traps.

Next, type in Program 2, "RATB." It's a machine language listing that you'll have to enter with "Apple MLX," the entry utility found elsewhere in this issue. Type in and save Apple MLX. Run MLX and answer the two prompts with:

```
STARTING ADDRESS? 6000
ENDING ADDRESS?   628F
```

When Apple MLX displays its options menu, choose E to enter the program; then type the address where you'd like to start. (If you're just beginning to enter Prorgam 2, type **6000**, the first address in the listing.) Type in the data and save this file as *RATB*. Save it to the same disk which contains Program 1. It's vital that you save Program 2 as RATB, since that's the filename Program 1 will look for.

Ratty Features

Rat Race is an action game that can challenge any player. In its fastest level, you'll need extremely quick reflexes and excellent hand-eye coordination.

Rat Race includes a number of top-quality features left out of many games for Apple II-series computers:

- Background music and sounds
- Options to make the game harder or easier
- Fast and flicker-free high-resolution graphics
- Scoring and difficulty that increase with each game level
- Machine language speed that makes the game much faster than BASIC games

Be A Rat

To play Rat Race, type

```
RUN RAT.RACE
```

After Program 1 has BLOADed RATB, it will ask if you want to change the default settings. These settings control the speed, danger level (number of rat traps), the maximum number of houses your rat can raid per level, and the maximum length of your rat tracks per level.

Speed. 1–8, from Practice to Rat's Nightmare. The higher the number, the faster the speed of your rat.

Danger Level. 1–3. The higher the number, the more rat traps appear in each level. (Number of rat traps = Stage * Danger Level.)

Houses. 5–25. When your rat has raided the specified number of houses, the level ends. The higher the number, the more difficult each level becomes.

Rat Tracks. 25–200. The maximum length of your tracks. You must strike a balance between a short track (which wouldn't let you raid the required number of houses) and a longer track (which presents more possibilities of running into a rat trap).

The default settings—those used if you respond by pressing N at the prompt *WOULD YOU LIKE TO CHANGE ESTABLISHED SETTINGS (Y/N)?* when you first run the program—are

Speed	Rat's Nightmare
Danger	3
Houses	25
Rat Tracks	128

You can permanently change the default settings by modifying and saving the program. To set a new default Danger level, change line 30 to read

```
30 DL = x
```

where *x* is 1, 2, or 3. The higher the Danger level, the more traps are on each stage.

To set the number of Houses or Speed settings, alter line 121 as follows:

```
121 POKE 25203, x: POKE 24850, 100 - y * 10
```

where *x* is the number of houses (1–255), and *y* is your speed (1–8). The higher the number for *y*, the faster you'll move.

Finally, to set the length of your Rat Tracks, change line 122 to

```
122 POKE 25218, x
```

where *x* is the length of your Rat Tracks (1–255). After you've made these changes, be sure to save the program under a different name in case you've made mistakes.

Once you've chosen your settings (or decided to use the default settings), indicate whether you'd like music to accompany your game play. Pressing S disables the sound, while pressing the M key leaves it on (or turns it back on if it was turned off earlier).

Run, Rat, Run

You control your rat in three ways:

Go straight. Press the space bar (most other keys also make you go straight).

Turn clockwise. Press the right-arrow key.

Turn counter-clockwise. Press the left-arrow key.

Game play in Rat Race is simple. Raid houses by running through them with your rat track. Running into a rat trap (or the playing field border, which is made up of rat traps) ends the game. You then have the option of playing another game or of quitting Rat Race.

If you reach the maximum rat-track length or your maximum goal of houses, you advance to the next stage, and the point values for raided houses increase.

Faster IIGS Rats

If you have an Apple IIGS, you can speed up the game by following these steps:

- Go to the Control Panel.
- Set the System speed to *Fast*.
- Exit the Control Panel.
- Type **RUN RAT.RACE** and select the highest speed.

If you follow these steps, Rat Race runs at unbelievably high speeds.

Program 1: Rat Race

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
74 5 REM COPYRIGHT 1988 COMPUTE! PUBLICATI
     ONS, INC. ALL RIGHTS RESERVED.
80 6 HOME : TEXT : VTAB 9: HTAB 13: PRINT
     "COPYRIGHT 1988": HTAB 7: PRINT "COMP
     UTE! PUBLICATIONS, INC."
95 7 HTAB 10: PRINT "ALL RIGHTS RESERVED."
     : FOR I = 1 TO 1500: NEXT
29 9 PRINT CHR$ (4);"NOMON C,I,O"
BF 10 FOR I = 770 TO 794: READ A: POKE I,A
      : NEXT I: DATA 152,72,173,48,192,136
      ,208,5,206,1,3,240,9,202,208,245,174
      ,0,3,76,4,3,104,168,96
54 15 HOME
E0 30 DL = 3
B8 120 PRINT CHR$ (4);"BLOAD RATB": PRINT
       "      PRESS ANY KEY": POKE - 16368,
       0
FF 121 POKE 25203,25: POKE 24850,20
5B 122 POKE 25218,128
12 130 IF PEEK ( - 16384) < 128 THEN 130
F5 131 SC = 0:ST = 0
4A 135 PRINT : PRINT : PRINT "   WOULD YOU
        LIKE TO CHANGE ": PRINT "   ESTABL
       ISHED SETTINGS (Y/N)?";
4A 140 GET A$: IF A$ < > "Y" AND A$ < > "N
       " THEN 140
9D 142 IF A$ = "Y" THEN GOSUB 340: GOTO 14
       4
93 144 HOME : VTAB 9: HTAB 4: PRINT "TO TU
       RN OFF MUSIC, PRESS S.": HTAB 4: PR
       INT "TO LEAVE MUSIC ON, PRESS M.";
6B 145 GET A$: IF A$ < > "S" AND A$ < > "M
       " THEN 145
60 148 POKE 774,192: IF A$ = "S" THEN POKE
        774,64
3E 150 ST = ST + 1: TEXT : HOME : VTAB (12
       ): HTAB (17): PRINT "STAGE:";ST: HT
       AB (17): PRINT "SCORE:";SC: VTAB (2
       0): HTAB (10): PRINT "PRESS ANY KEY
       "; CHR$ (7): POKE - 16368,0
24 160 IF PEEK ( - 16384) < 128 THEN 160
6A 170 HOME : HGR : POKE 24579,11: FOR I =
        0 TO 39: POKE 24578,0: POKE 24577,
       I: CALL 24984: POKE 24578,19: CALL
       24984: NEXT I
AA 180 FOR I = 0 TO 19: POKE 24577,0: POKE
        24578,I: CALL 24984: POKE 24577,39
       : CALL 24984: NEXT I
69 190 Q = ST * DL: IF Q > 100 THEN Q = 10
       0: IF PEEK (24850) > 10 THEN POKE 2
       4850, PEEK (24850) - 4
DE 200 FOR I = 1 TO Q
03 210 X = INT ( RND (1) * 40):Y = INT ( R
       ND (1) * 20): IF X = 19 AND Y > 13
       THEN 210
F1 220 POKE 24577,X: POKE 24578,Y: CALL 24
       903: IF PEEK (24579) < > 0 THEN 210
79 230 POKE 24579,11: CALL 24984: NEXT I:
       FOR I = 1 TO 30
FE 240 POKE 24577, INT ( RND (1) * 40): PO
       KE 24578, INT ( RND (1) * 20): CALL
        24903: IF PEEK (24579) < > 0 THEN
       240
BD 250 CALL 24984: NEXT I
FC 260 POKE 24576,0: POKE 24580,0: POKE 24
       581,0: POKE 24582,0: POKE 24583,19:
        POKE 24584,18
87 270 CALL 25035:SC = SC + ST * PEEK (245
       80): IF PEEK (24579) < > 18 THEN 150
3A 280 HGR : TEXT : HOME : VTAB (4): HTAB
       (17): PRINT "SCORE:";SC: HTAB (17):
        PRINT "STAGE:";ST
25 290 VTAB (12): HTAB (4): PRINT "WATCH O
       UT FOR THOSE RAT TRAPS!"; CHR$ (7)
F6 300 A$ = "                  PLAY AGAIN? (Y/
       N)                          ": FOR I
       = 1 TO LEN (A$) - 41: HTAB 1: VTAB
       20: PRINT MID$ (A$,I,39): POKE 768,
       10: POKE 769,10: CALL 770: NEXT
B1 310 HTAB (20): VTAB 20: GET A$: IF A$ =
        "Y" THEN HOME : GOTO 131
C1 320 IF A$ < > "N" THEN 300
91 330 END
6B 340 HOME : PRINT "              CHOOSE YOUR
        SPEED": PRINT : PRINT : PRINT "1 P
       RACTICE": PRINT "2 BEGINNER": PRINT
        "3 NOVICE": PRINT "4 ADEPT": PRINT
        "5 PRO": PRINT "6 MASTER": PRINT "
       7 BLITZ": PRINT "8 RAT'S NIGHTMARE"
       : PRINT : PRINT
A7 350 INPUT "ENTER YOUR CHOICE:";A: IF A
       < 1 OR A > 8 OR A < > INT (A) THEN
       340
EE 360 POKE 24850,100 - A * 10: POKE 795,1
       00 - A * 10
A1 365 HOME : VTAB (10): INPUT "ENTER DANG
       ER LEVEL: 1, 2, OR 3. ";DL: IF DL <
        1 OR DL > 3 OR DL < > INT (DL) THE
       N 365
D6 370 HOME : VTAB (10): INPUT "ENTER GOAL
        FOR HOUSES: 5-25 ";A: IF A < 5 OR
       A > 25 OR A < > INT (A) THEN 370
30 371 POKE 25203,A
15 380 HOME : VTAB (10): INPUT "ENTER LENG
       TH OF RAT TRACKS: 25-200 ";A: IF A
       < 25 OR A > 200 OR A < > INT (A) TH
       EN 380
5E 381 POKE 25218,A
76 390 POKE 768,127: POKE 769,50: CALL 770
       : POKE 768,96: POKE 769,50: CALL 77
       0: POKE 768,76: POKE 769,50: CALL 7
       70: POKE 768,63: POKE 769,75: CALL
       770: POKE 769,25: CALL 770: POKE 76
       9,50
E9 391 CALL 770
2C 400 POKE 768,96: POKE 769,50: CALL 770:
        POKE 768,76: POKE 769,50: CALL 770
       : POKE 769,96: POKE 769,50: CALL 77
       0: POKE 768,127: POKE 769,240: CALL
        770
16 410 RETURN
```

Program 2: RATB

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
6000: 00 00 00 00 00 00 00 00 C0
6008: 00 86 43 50 5A 50 72 6B 3C
6010: 86 43 50 55 50 55 50 6B 28
6018: 5A 65 78 86 5A 50 86 5A 52
6020: 50 50 50 86 5A 50 86 5A 0B
6028: 50 50 50 86 5A 50 86 5A 13
6030: 50 50 50 86 86 43 86 55 43
6038: 55 55 55 00 80 00 80 00 A8
6040: 80 00 80 28 A8 28 A8 28 33
6048: A8 28 A8 50 D0 50 D0 50 3B
6050: D0 50 D0 20 20 21 21 22 93
6058: 22 23 23 20 20 21 21 22 43
6060: 22 23 23 20 20 21 21 22 4B
6068: 22 23 23 01 04 00 05 06 A7
```

```
6070: 02 05 00 00 03 01 06 03 9E
6078: 00 04 02 00 01 00 03 00 88
6080: 00 02 00 03 02 00 00 00 02
6088: 00 03 00 00 00 01 00 01 0F
6090: 00 00 02 08 07 0A 09 0A 8E
6098: 09 00 0C 1E 3F 21 2D 2D 47
60A0: 3F 0C 0C 0C 0C 0C 0C 0C FA
60A8: 0C 00 00 00 7F 7F 00 00 69
60B0: 00 0C 0C 1C 78 70 00 00 3D
60B8: 00 00 00 00 70 78 1C 0C 23
60C0: 0C 00 00 00 03 07 0E 0C E3
60C8: 0C 0C 0C 0E 07 03 00 00 39
60D0: 00 0C 0C 0C 6D 6D 0C 0C 1C
60D8: 0C 0C 0C 00 7F 7F 00 0C 2A
60E0: 0C 0C 0C 0E 77 7B 1C 0C FA
60E8: 0C 0C 0C 1C 7B 77 0E 0C D7
60F0: 0C 7F 63 63 55 49 6B 63 44
60F8: 7F 8D 00 03 A9 0F 8D 01 B2
6100: 03 20 02 03 60 AD 00 60 D6
6108: 29 1F A8 B9 1B 60 8D 00 4D
6110: 03 A9 14 8D 01 03 EE 00 0C
6118: 60 20 02 03 60 AD 00 60 9D
6120: 29 1F F0 06 20 05 61 4C E1
6128: 1D 61 60 AD 03 60 8D 34 A1
6130: 61 A0 00 B9 12 60 8D 00 94
6138: 03 A9 60 8D 01 03 20 02 22
6140: 03 C8 C0 09 D0 ED 60 AC 0B
6148: 02 60 B9 3B 60 18 6D 01 4E
6150: 60 8D 5E 61 B9 53 60 18 7C
6158: 69 0C 8D 5F 61 AD 12 2C 8C
6160: A8 C9 0C D0 05 A0 01 4C 71
6168: 94 61 C9 7F D0 05 A0 02 DC
6170: 4C 94 61 C9 78 D0 05 A0 F8
6178: 03 4C 94 61 C9 70 D0 05 2F
6180: A0 04 4C 94 61 C9 03 D0 70
6188: 05 A0 05 4C 94 61 C9 07 20
6190: D0 02 A0 06 8C 03 60 60 42
6198: AD 03 60 0A 0A 0A AA AC 1A
61A0: 02 60 B9 3B 60 18 6D 01 A6
61A8: 60 8D B6 61 B9 53 60 8D 55
61B0: B7 61 BD 99 60 8D 92 40 97
61B8: E8 EE B7 61 EE B7 61 EE C0
61C0: B7 61 EE B7 61 8A 29 07 9F
61C8: D0 E8 60 2C 10 C0 AD 07 E2
61D0: 60 8D 01 60 AD 08 60 8D 29
61D8: 02 60 20 47 61 AD 03 60 55
61E0: C9 3F D0 1A EE 04 60 A9 06
61E8: 86 20 F9 60 A9 6B 20 F9 71
61F0: 60 A9 5A 20 F9 60 A9 43 83
61F8: 20 F9 60 4C 02 62 C9 00 48
6200: D0 29 AD 05 60 A8 0A 0A 41
6208: 8D 20 62 AD 00 C0 C9 95 EE
6210: D0 01 C8 C9 88 D0 01 88 45
6218: 98 29 03 8D 05 60 18 69 EF
6220: 00 A8 B9 6B 60 8D 03 60 9C
6228: 4C 4C 62 C9 55 D0 08 A9 B6
6230: 12 8D 03 60 4C 2B 61 A8 42
6238: B9 92 60 8D 03 60 98 0A 38
6240: 0A 18 6D 05 60 A8 B9 77 9E
6248: 60 8D 05 60 20 98 61 AC 1A
6250: 05 60 D0 03 CE 08 60 88 D9
6258: D0 03 EE 07 60 88 D0 03 5E
6260: EE 08 60 88 D0 03 CE 07 6A
6268: 60 20 05 61 EE 06 60 AD 1A
6270: 04 60 C9 0C D0 08 A9 09 4C
6278: 8D 03 60 4C 2B 61 AD 06 D5
6280: 60 C9 80 D0 03 4C 1D 61 E9
6288: 4C CE 61 00 FF FF 00 00 53
```

aa

Who?

Where?

What?

When?

Sports Scheduler

One of the joys of being a parent is watching your child play sports in an organized league. However, errors in scheduling can spoil the fun. Now you can:

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Triad

Robert Engel

Think before you connect the dots in "Triad," a strategy game long played with colored pencils and paper. In this computerized version, you can play the computer or another opponent. Plays on all Apple II computers under DOS 3.3 or ProDOS.

"Triad" is deceivingly simple. Although it appears to be an easy-to-master connect-the-dots game for two, it's actually a complex strategy game that requires thought and planning.

In Triad, each player connects two dots each turn, trying to draw lines that won't form a triangle. The first player to form a triangle by connecting three dots *with his or her lines* loses the game. Sounds as simple as tic-tac-toe, doesn't it?

But without some careful consideration, you can easily make a wrong move and lose the game. You need to make the right moves to outsmart your opponent.

Triad is a superb educational game—one that teaches careful examination of possibilities and stresses the need to think ahead. At the same time, it's quick-paced and fun.

Fun at school and at home, Triad can be enjoyed by the whole family.

Typing In The Triangles

Triad is a BASIC program, so you can use "Apple Automatic Proofreader" to insure that it's typed in correctly.

Type in the game and save it to disk as *TRIAD*. When you want to play a round, press down the Caps Lock key and type

RUN TRIAD

Connect The Dots

At the player-selection screen, choose whether you'll play another person or the computer by pressing the appropriate key. Type in your name if you're playing the computer; enter both players' names if you have a human opponent.

Triad's game screen appears, with the playing field at the top. The six dots are clearly labeled. Rules are simple. Each player connects two dots each turn. The first player to connect three dots with his or her own lines to form a triangle loses the game.

The mechanics of the game are just as simple. At the bottom of the screen is the command area where you enter your move. If you're playing the Apple, you move first in the first game (there's no special benefit to moving either first or second). Press a number key between 1 and 6 to indicate the starting point of your line; press a second number key in the 1–6 range to indicate the line's ending point. A line consisting of small, hollow boxes is drawn between those two dots.

The first player's lines are always drawn with hollow boxes, while the second player's lines are always made up of solid boxes.

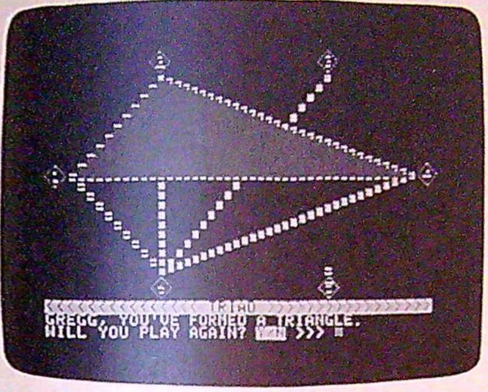
The second player—whether computer or human—makes a move in a similar fashion. When you're playing the computer, watch the screen carefully to see where the new line is placed—the line simply appears without any display of a starting and ending location.

Take care when choosing starting and ending locations, since you can't change your mind once you enter a number. (One way to change an incorrect *starting* point is to enter the same number as the *ending* point—the program returns you to the first prompt for another entry.) If you make an illegal move, however, like specifying a line that's already been drawn, you'll be asked to enter a different pair of numbers.

Lines are drawn until one player creates a triangle, at which point the program will ask if you want to play again, and if so, whether you want to change opponents. Play another game and the players switch positions—the first player goes second, and the second goes first.

Triad Strategy

Since each game is won or lost on the basis of concentration and planning, there's no guaranteed strategy for Triad. The only thing that



```
GREGG, YOU'VE FORMED A TRIANGLE.
WILL YOU PLAY AGAIN? >>>
```

Gregg has foolishly drawn a line from point 2 to point 4, and in the process he has drawn a triangle and lost the game. There were several other line opportunities still available.

seems to work—and then only sometimes—is that if your opponent is drawing *inside* lines (from location 3 to location 6, for instance), your best bet is to draw an *outside* line (from location 3 to location 4, for example).

Triad

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
E7 10 REM COPYRIGHT 1988 COMPUTE! PUBLICAT
      IONS, INC. - ALL RIGHTS RESERVED
CB 20 TEXT : HOME : VTAB 9: HTAB 13: PRINT
       "COPYRIGHT 1988": HTAB 7: PRINT "CO
      MPUTE! PUBLICATIONS, INC."
88 25 HTAB 10: PRINT "ALL RIGHTS RESERVED.
      "
5F 30 LOC = 16384:HA = LOC / 256:LA = LOC
       - HA * 256: POKE LOC - 1,0
BE 40 IF ( PEEK (103) = LA) AND ( PEEK (10
      4) = HA) THEN 70
E6 50 POKE 103,LA: POKE 104,HA
0D 60 PRINT CHR$ (4)"RUN TRIAD"
4E 70 GOSUB 710
D7 80 GOSUB 890
D2 90 GOSUB 640
B4 100 VTAB 21:W = Z: INVERSE : PRINT "<<<
       <<<<<<<<<<<<< TRIAD >>>>>>>>>>>>>>>>>
       >": NORMAL
3D 110 W = ABS (W - 3):K(1) = 0:K(2) = 0
96 120 VTAB 22: HTAB 1: CALL - 958: PRINT
       NA$(W)"'S TURN."
51 130 IF NA$(W) = "COMPUTER" THEN GOSUB 1
       100: GOTO 210
F7 140 K(1) = 0:K(2) = 0: FOR P = 1 TO 2
32 150 VTAB 22 + P: HTAB 1: PRINT "SELECTI
       ON NO.";: INVERSE : PRINT P;: NORMA
       L : PRINT "..1-6 >>  " CHR$ (8);
29 160 GET ANS$: IF ANS$ < "1" OR ANS$ > "
       6" THEN 160
06 170 PRINT ANS$;:K(P) = VAL (ANS$)
FB 180 IF K(2) = K(1) THEN 140
0B 190 NEXT
6B 200 IF LN(K(1),K(2)) < > 0 THEN VTAB 22
       : HTAB 1: CALL - 868: PRINT "DIFFER
       ENT SET OF NUMBERS PLEASE.": FOR T
       = 1 TO 2500: NEXT : GOTO 120
E7 210 LN(K(1),K(2)) = W:LN(K(2),K(1)) = W
       : ON LV(K(1),K(2)) GOSUB 250,260,27
       0,280,290,300,310,320,330,340,350,3
       60,370,380,390
44 220 X = 0: FOR I = 1 TO 6: IF I < > K(2
       ) THEN IF LN(K(1),I) = W THEN IF LN
       (K(2),I) = W THEN X = I
3F 230 NEXT : IF X = 0 THEN 110
F7 240 VTAB 22: HTAB 1: CALL - 958: PRINT
       NA$(W)", YOU'VE FORMED A TRIANGLE."
       : HCOLOR= 1: GOSUB 400: GOTO 1040
A6 250 Y = 79: FOR X = 17 TO 77 STEP 6: DR
       AW W AT X,Y:Y = Y - 6: NEXT : RETUR
       N
B1 260 Y = 79: FOR X = 17 TO 197 STEP 6: D
       RAW W AT X,Y:Y = Y - 2: NEXT : RETU
       RN
3F 270 FOR X = 17 TO 257 STEP 6: DRAW W AT
        X,79: NEXT : RETURN
B3 280 Y = 79: FOR X = 17 TO 197 STEP 6: D
       RAW W AT X,Y:Y = Y + 2: NEXT : RETU
       RN
AD 290 Y = 79: FOR X = 17 TO 77 STEP 6: DR
       AW W AT X,Y:Y = Y + 6: NEXT : RETUR
       N
27 300 FOR X = 77 TO 197 STEP 6: DRAW W AT
        X,19: NEXT : RETURN
95 310 Y = 79: FOR X = 257 TO 77 STEP - 6:
        DRAW W AT X,Y:Y = Y - 2: NEXT : RE
       TURN
B0 320 Y = 19: FOR X = 77 TO 197 STEP 6: D
       RAW W AT X,Y:Y = Y + 6: NEXT : RETU
       RN
49 330 FOR Y = 19 TO 139 STEP 6: DRAW W AT
        77,Y: NEXT : RETURN
78 340 Y = 79: FOR X = 257 TO 197 STEP - 6
       : DRAW W AT X,Y:Y = Y - 6: NEXT : R
       ETURN
E7 350 FOR Y = 19 TO 139 STEP 6: DRAW W AT
        197,Y: NEXT : RETURN
9D 360 Y = 139: FOR X = 77 TO 197 STEP 6:
       DRAW W AT X,Y:Y = Y - 6: NEXT : RET
       URN
76 370 Y = 79: FOR X = 257 TO 197 STEP - 6
       : DRAW W AT X,Y:Y = Y + 6: NEXT : R
       ETURN
9F 380 Y = 79: FOR X = 257 TO 77 STEP - 6:
        DRAW W AT X,Y:Y = Y + 2: NEXT : RE
       TURN
A4 390 FOR X = 77 TO 197 STEP 6: DRAW W AT
        X,139: NEXT : RETURN
62 400 P(1) = K(1):P(2) = K(2):P(3) = X: F
       OR I = 1 TO 2: IF P(I) < P(3) THEN
       420
D7 410 X = P(I):P(I) = P(3):P(3) = X
B7 420 NEXT :Z = ABS (Z - 3)
FB 430 ON TV(P(1),P(2),P(3)) GOSUB 440,450
       ,460,470,480,490,500,510,520,530,54
       0,550,560,570,580,590,600,610,620,6
       30: RETURN
DD 440 X = 79: FOR Y = 21 TO 81: HPLOT 199
       ,21 TO X,Y:X = X - 1: NEXT : RETURN
92 450 X = 79: FOR Y = 21 TO 81: HPLOT 259
       ,81 TO X,Y:X = X - 1: NEXT : RETURN
4F 460 X = 79: FOR Y = 21 TO 81: HPLOT 199
       ,141 TO X,Y:X = X - 1: NEXT : RETUR
       N
FE 470 FOR Y = 21 TO 141: HPLOT 19,81 TO 7
       9,Y: NEXT : RETURN
98 480 X = 199: FOR Y = 21 TO 81: HPLOT 19
       ,81 TO X,Y:X = X + 1: NEXT : RETURN
DD 490 FOR Y = 21 TO 141: HPLOT 19,81 TO 1
       99,Y: NEXT : RETURN
64 500 X = 19: FOR Y = 81 TO 141: HPLOT 19
       9,21 TO X,Y:X = X + 1: NEXT : RETUR
       N
```

```
F4 510 X = 259: FOR Y = 81 TO 141: HPLOT 1
       9,81 TO X,Y:X = X - 1: NEXT : RETUR
       N
CD 520 X = 19: FOR Y = 81 TO 141: HPLOT 25
       9,81 TO X,Y:X = X + 1: NEXT : RETUR
       N
41 530 X = 19: FOR Y = 81 TO 141: HPLOT 19
       9,141 TO X,Y:X = X + 1: NEXT : RETU
       RN
EC 540 FOR X = 79 TO 199: HPLOT 259,81 TO
       X,21: NEXT : RETURN
91 550 FOR Y = 21 TO 141: HPLOT 79,21 TO 1
       99,Y: NEXT : RETURN
92 560 FOR Y = 21 TO 141: HPLOT 199,21 TO
       79,Y: NEXT : RETURN
AF 570 X = 259: FOR Y = 81 TO 141: HPLOT 7

       9,21 TO X,Y:X = X - 1: NEXT : RETUR
       N
C1 580 FOR Y = 21 TO 141: HPLOT 259,81 TO
       79,Y: NEXT : RETURN
D2 590 FOR Y = 21 TO 141: HPLOT 199,141 TO
        79,Y: NEXT : RETURN
6B 600 FOR Y = 21 TO 141: HPLOT 259,81 TO
       199,Y: NEXT : RETURN
4F 610 X = 199: FOR Y = 21 TO 81: HPLOT 79
       ,141 TO X,Y:X = X + 1: NEXT : RETUR
       N
84 620 FOR Y = 21 TO 141: HPLOT 79,141 TO
       199,Y: NEXT : RETURN
3B 630 FOR X = 79 TO 199: HPLOT 259,81 TO
       X,141: NEXT : RETURN
BC 640 HGR : HCOLOR= 3: SCALE= 1: ROT= 0
52 650 DRAW 9 AT 7,73: DRAW 3 AT 6,78: DRA
       W 9 AT 78,3: DRAW 4 AT 76,8
3F 660 DRAW 9 AT 199,3: DRAW 5 AT 197,8: D
       RAW 9 AT 270,73: DRAW 6 AT 271,83
3D 670 DRAW 9 AT 199,144: DRAW 7 AT 201,14
       8: DRAW 9 AT 78,144: DRAW 8 AT 79,1
       48
19 680 DRAW 1 AT 17,79: DRAW 1 AT 77,19: D
       RAW 1 AT 197,19: DRAW 1 AT 257,79:
       DRAW 1 AT 197,139: DRAW 1 AT 77,139
E4 690 FOR I = 1 TO 6: FOR J = 1 TO 6:LN(I
       ,J) = 0: NEXT : NEXT
17 700 RETURN
1C 710 DIM LN(6,6),LV(6,6),TV(6,6,6)
BA 720 R = PEEK (78) + 256 * PEEK (79):R =
        RND ( - R):Z = 2
DC 730 X = 0: FOR I = 1 TO 5: FOR J = I +
       1 TO 6:X = X + 1:LV(I,J) = X:LV(J,I
       ) = X: NEXT : NEXT
71 740 X = 0: FOR I = 1 TO 4: FOR J = I +
       1 TO 5: FOR K = J + 1 TO 6:X = X +
       1:TV(I,J,K) = X: NEXT : NEXT : NEXT
E3 750 FOR I = 768 TO 893: READ J: POKE I,
       J: NEXT
23 760 DATA 09,00,20,00,27,00,36,00,43,00,
       53,00,64,00,75,00,86,00,97,00
D2 770 DATA 45,53,54,63,39,36,00
A2 780 DATA 45,53,63,55,45,53,63,39,00
B5 790 DATA 12,54,54,54,253,05,00
D4 800 DATA 12,45,21,246,191,30,46,45,37,0
       0
A5 810 DATA 12,45,21,246,111,50,30,63,28,0
       4,00
12 820 DATA 36,36,36,23,23,23,23,45,45,37,
       00
C9 830 DATA 63,63,54,45,45,50,54,59,39,35,
       00
D3 840 DATA 30,30,30,54,14,45,12,60,56,63,
       00
79 850 DATA 30,30,30,30,30,30,30,21,21,21,
       21,21,21,21
34 860 DATA 12,12,12,12,12,12,12
D7 870 DATA 28,28,28,28,28,28,04,00
92 880 POKE 233,3: POKE 232,0: RETURN
F2 890 TEXT : HOME : PRINT "WELCOME TO THE
        GAME OF TRIAD."
11 900 VTAB 3: PRINT "PLEASE SELECT WHICH
       YOU WILL PLAY...": PRINT
DD 910 PRINT TAB( 10)"1. A HUMAN": PRINT T
       AB( 10)"2. YOUR COMPUTER"
76 920 VTAB 8: HTAB 1: PRINT "ENTER NUMBER
        1 OR 2 ";: INVERSE : PRINT ">>";:
       NORMAL : PRINT " ";: GET ANS$: PRIN
       T ANS$:ANS = VAL (ANS$): ON ANS < 1
        OR ANS > 2 GOTO 920
AE 930 VTAB 10: HTAB 1: PRINT "PLEASE ENTE
       R YOUR NAME..":
44 940 VTAB 11: HTAB 5: PRINT "AND ";: INV
       ERSE : PRINT "RETURN";: NORMAL : IN
       PUT ">>> ";NA$(1): ON NA$(1) = "" G
       OTO 940
9F 950 PRINT : PRINT "THANK YOU, "NA$(1)".
       ": PRINT
46 960 IF ANS = 2 THEN 1020
14 970 PRINT : PRINT "NOW FOR THE HUMAN PL
       AYER..": PRINT
A4 980 PRINT "PLEASE ENTER YOUR NAME..":
AC 990 VTAB 19: HTAB 5: PRINT "AND ";: INV
       ERSE : PRINT "RETURN";: NORMAL : IN
       PUT ">>> ";NA$(2): ON NA$(2) = "" G
       OTO 990
0B 1000 PRINT : PRINT "THANK YOU, "NA$(2)"
        .": PRINT
42 1010 FOR T = 1 TO 1000: NEXT : RETURN
A3 1020 PRINT NA$(1)", YOU WILL PLAY THE C
        OMPUTER...."
A8 1030 NA$(2) = "COMPUTER": FOR T = 1 TO
        2000: NEXT : RETURN
1D 1040 FOR T = 1 TO 1000: NEXT
28 1050 VTAB 23: HTAB 1: CALL - 868: PRINT
         "WILL YOU PLAY AGAIN? ";: INVERSE
         : PRINT "Y/N";: NORMAL : PRINT "
        >>> ";: GET ANS$:ANS = ASC (ANS$):
         ON ANS < > 89 AND ANS < > 78 GOTO
         1050
39 1060 IF ANS = 78 THEN VTAB 23: HTAB 1:
        CALL - 868: HTAB 8: INVERSE : PRIN
        T "THANKS";: NORMAL : PRINT " FOR
        PLAYING.": FOR T = 1 TO 2000: NEXT
         : TEXT : HOME : POKE 103,1: POKE
        104,8: POKE 2048,0: END
68 1070 VTAB 23: HTAB 1: CALL - 868: PRINT
         "SAME OPPONENT? ";: INVERSE : PRI
        NT "Y/N";: NORMAL : PRINT " >>> ";
        : GET ANS$:ANS = ASC (ANS$): ON AN
        S < > 89 AND ANS < > 78 GOTO 1070
23 1080 IF ANS = 89 THEN 90
2D 1090 GOTO 80
B6 1100 LM$ = "":GM$ = "": FOR I = 1 TO 5:
         FOR J = I + 1 TO 6: IF LN(I,J) <
        > 0 THEN 1140
81 1110 LM$ = LM$ + CHR$ (I * 16 + J)
58 1120 X = 0: FOR K = 1 TO 6: IF K < > I
        THEN IF LN(I,K) = W THEN IF LN(J,K
        ) = W THEN X = K
F3 1130 NEXT : IF X = 0 THEN GM$ = GM$ + R
        IGHT$ (LM$,1)
37 1140 NEXT : NEXT
52 1150 IF GM$ = "" THEN GM$ = LM$
5E 1160 R = INT ( RND (1) * LEN (GM$)) + 1
        :MV$ = MID$ (GM$,R,1)
2A 1170 K(1) = INT ( ASC (MV$) / 16):K(2)
        = ASC (MV$) - K(1) * 16
F3 1180 RETURN
```

aa

Scannit And ThunderScan

Bruce E. Howell

Not everyone can be an electronic artist. Just because you have a great drawing or painting program for your Apple II computer doesn't mean you'll be turning out masterpieces, or even recognizable portraits, in moments.

That's why scanners—devices that "read" graphics on paper and translate them into information your computer and software can understand—are so fascinating to so many of us. With a scanner, you can digitize an illustration, a photo, or almost anything else on paper. Once digitized, it can be loaded into a graphics program to be changed, printed, or just admired.

Two such scanning digitizers are now available for the Apple II line. One of these scanners, made by a small company in Ohio, has been available in its present form for over a year. The other scanner, more recently introduced, comes from a company made famous by a similar device for the Macintosh.

Economy Cars And Porches

In late 1986, JED design introduced Scannit, a low-cost scanning digitizer for the Apple II computer line. Scannit, a combination of hardware and software, consists of a device, which you connect to your printer, that lets you digitize any document or picture you can feed through the printer platen. Its software offers five different degrees of magnification, lets you adjust the area of the document to scan, and can switch between normal high-res and double high-res scanning. Hardware controls on the unit control the focus, brightness level, and contrast. Although the quality of certain pictures, when digitized, is not ideal, the digitizing process is fast, and the software is easy to use.

But, if scanning digitizers were cars, and Scannit was an economy sedan, ThunderScan by Thunderware would be the Porsche, with most of the bells, whistles, and other extras you would expect. The hardware is more compact, the software is more versatile, and the digitized quality is better. Because of its greater abilities, however, the software is slightly harder to use. To compensate, Thunderware provides a well-written and well-illustrated manual.

Reading Optically

Both Scannit and ThunderScan depend on an optical reader which connects to the print head of your printer. Scannit includes a small mounting bracket that you permanently attach to the ImageWriter II print head. (A version of Scannit is also available for the original ImageWriter and Epson LX-80 printers.) When you use the scanner, you first remove the printer's ribbon, then slide the optical reader over the mounting bracket. Scannit's electronics are in a free-standing box connected by wire to the optical reader. The box, which has an on/off switch, and level- (brightness) and contrast-control knobs, sits beside your computer.

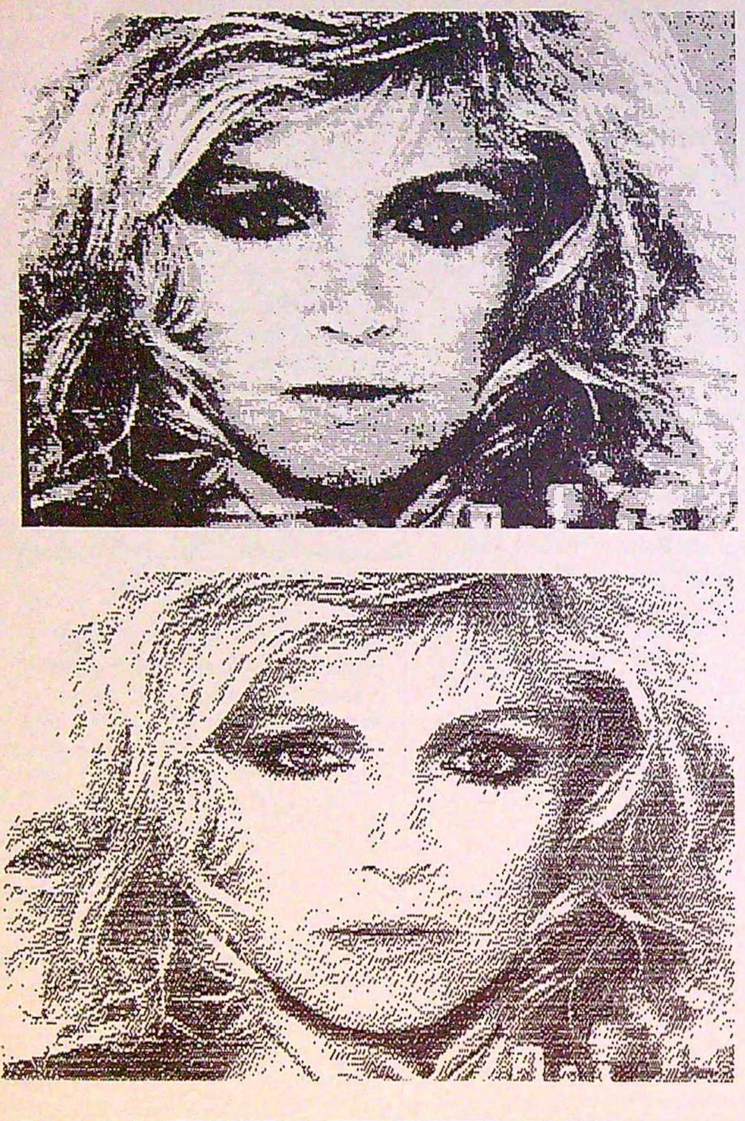
ThunderScan's optical reader and its electronics are all contained in a dummy ribbon cartridge that takes the place of the normal ribbon in the printer. ThunderScan works with all versions of the ImageWriter printer, including the 15-inch-wide carriage model (but only ImageWriter printers, no others). Both scanners connect to the Apple via the 9-pin joystick port.

Both Scannit and ThunderScan require that the plexiglass window on the ImageWriter II cover be removed to allow free travel of the connecting wire. A better solution for both would be to provide a magnet to defeat the printer's cover switch, rather than partially disassembling the printer. The ThunderScan unit provided such a magnet, but it's adapted to fit the original ImageWriters.

With Help From Software

Running the Scannit software presents an easy-to-use menu with onscreen help, which is supplemented by a short user's guide. The first step to digitizing a picture requires that you focus the optical reader. The onscreen help directs you to turn an adjusting screw on the back of the optical device until the highest number on the screen is achieved. Normally, this focusing is done only once. After selecting either normal- or double-hi-res, the scanning begins. As the print head passes back and forth across your document, the screen is filled with the image.

Certain keyboard keys adjust the degree of magnification and location on the document where digitizing is to be performed. The changes take place as you scan. You'll probably have to adjust the level and contrast on the Scannit box several times in order to obtain the best picture. Once this is achieved, a convenient restart command prompts you to reposition the paper, and scanning restarts at the current settings. After scanning, the image can be saved to disk for use by other graphics programs, such as *MousePaint*, or viewed on screen using JED's included *GALLERY* software. A conversion program is also included to convert images to work with Beagle Bros. graphics program. The major option lacking in the software is the ability to print the



The same photo—digitized on an Apple IIGS with ThunderScan in super-hi-res mode (top), ThunderScan in double-hi-res mode (center), and Scannit in double-hi-res mode (bottom)—shows a substantial difference in the range of gray scales.

image on paper directly from the Scannit software. Instead, you must load the image into another software package.

ThunderScan also boots to a menu, with most of the commands documented on screen. The user's guide, however, goes into great detail to explain the use of the scanner with a chart, table, or picture on nearly every other page. From the menu, selecting *New scan* presents a hi-res picture on the right of the screen of a ruled 7 × 8-inch sheet of paper. Two boxes display the degree of magnification and the position on the paper to scan. Help, on the left of the screen, shows you how to change the size and location of the boxes relative to the document you're scanning.

A major difference between the two scanners is that ThunderScan permits you to digitize an entire page while viewing just a portion on the current screen. After digitizing, you can move your viewing window around the full-page until you have the image you want.

Help on the bottom of the screen lets you select between the following formats: normal-hi-res; double-hi-res; super-res (320 × 200, 16 grays or colors, IIGS) or ultra-res (640 × 200, 4 grays or colors, IIGS). Four different modes can be selected: halftones, which use different densities of black or white dots to represent shades of gray; line art, where images appear in high contrast of either all black or all white; grays, in which the IIGS can display actual shades of gray (16 shades in super-res and 4 in ultra-res); and color, used on color monitors, when shades of gray can be assigned different colors.

ThunderScan can work at two different speeds controlled by the Quality parameter. Normal quality provides the fastest speed, while high quality provides a better picture at a slightly slower scan speed. Two options are also allowed for the type of document edge. A clean, straight, white left margin improves the quality of the scanned image. If not available, you can place a provided white edge-sensing tape to the left edge of the printer's platen. If neither is provided, the rough edge option must be specified.

The optical reader on ThunderScan is focused like the Scannit reader. Although an easier thumb-wheel is used, the software forces you to refocus *before* each scan, instead of as needed, as with Scannit. After focusing, scanning proceeds—with the digitized image appearing on the screen. Unlike Scannit, once digitizing begins, no changes can be made in scanning location or magnification. If changes are needed, the Escape key returns you to the main menu and you must start the entire process over again. A restart option, such as the one included in Scannit, would be a nice addition to the ThunderScan software.

Dithering With The Digitized Image

Once scanned, the ThunderScan image can be changed in several ways. First, since you can digitize an area larger than the viewing screen, you can move your viewing window around, on the digitized image in memory, until you have it positioned exactly. The scanning formats (hi-res, double-hi-res, super-res, and so on) and modes (half-tones, line art, grays, color) can be changed, and the new image appears on the screen without rescanning. Contrast and brightness are changed after scanning and are under software, not hardware, control. A series of filters modifies the image on the screen. Each of the 16 shades of gray (or half-tone distributions) can be assigned a different shade of gray, or even a color. The image can then be stored to disk in several formats, such as a single-screen hi-res or double-hi-res file compatible with *MousePaint* and *Dazzle Draw;* in two *Paintworks Plus* formats; and in *DeluxePaint II* file formats.

The last important option in ThunderScan's software is the ability to print the displayed image without leaving the program. Printing can be done in either normal or high density. The filters can be used, as can changes in the format and mode. You also have the option of printing the image in blue and white, red and white, or any of the other colors ImageWriter II can produce.

Scanner, Your Choice

Although the Scannit software is more limited, it does provide a quick and easy way to digitize a picture or other document. Prototype software exists, and will soon be released, for Scannit, that will support all 16 gray levels of the IIGS, as well as offer full-page scanning similar to ThunderScan. A lower priced model, Scannit 25, due to be released soon, will also include this new software.

At the moment, however, the best choice for high-resolution optical scanning for the Apple II, especially the Apple IIGS, has to be ThunderScan.

Scannit
JED design
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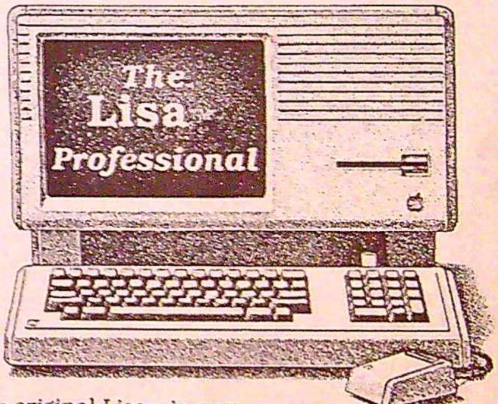

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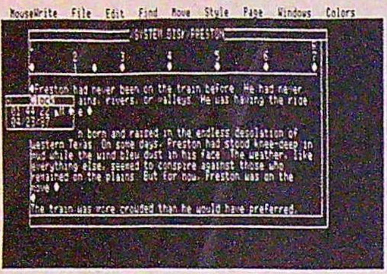
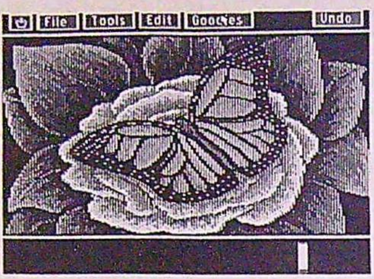
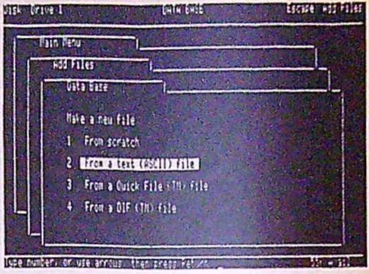


Preston had never been on the train before. He had never ... ains, rivers, or valleys. He was having the ride ... e

... n born and raised in the endless desolation of Western Texas. On some days, Preston had stood knee-deep in mud while the wind blew dust in his face. The weather, like everything else, seemed to conspire against those who remained on the plains. But for now, Preston was on the move.

The train was more crowded than he would have preferred.





Make a new file

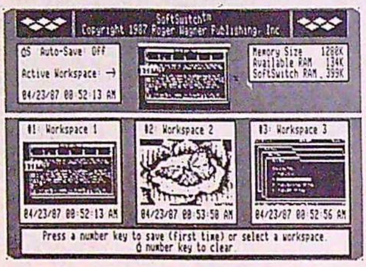
1 From scratch

2 From a text (ASCII) file

3 From a Quick File (TM) file

4 From a DIF (TM) file

Type number, or use arrows, then press Return



S Auto-Save: Off

Active Workspace: →

04/23/87 08:52:13 AM

Memory Size 1280K
Available RAM 134K
SoftSwitch RAM 399K

04/23/87 08:52:13 AM

04/23/87 08:53:58 AM

04/23/87 08:52:56 AM

Press a number key to save (first time) or select a workspace.
number key to clear.

SoftSwitch *shows you the contents of the various workspaces you've established. Here, Workspace 1 holds* MouseWrite, *Workspace 2 contains* Dazzle Draw, *and Workspace 3 holds* AppleWorks.

SoftSwitch

David Stanton

The Apple IIGS is amazing. It runs just about any software written for the earlier Apple II computers. And it has impressive sound and graphics, making it a natural for graphics, music, and games.

But it's also much more expensive than the workhorse Apple, the IIe. And hard-nosed, working computer users demand machines with substance (read *power* and *productivity*). They're not so impressed with dazzling art or booming sound.

So why trade your veteran IIe for an Apple IIGS? *SoftSwitch* is one very persuasive reason.

Save The Universe Or Save Your Job?

In its simplest form, *SoftSwitch* is a program switcher for the Apple IIGS, an application that lets you load three different programs into your expansion memory card and move freely from one to the other and back again. Since the programs are stored in RAM, not on disk, each move takes only a couple of seconds.

Those who have never experienced the luxury of abundant RAM might be impressed by this feature alone. Others may suspect that the ramdisk capability built into the Apple IIGS could provide similar results.

Actually, though, *SoftSwitch* is far more than a mere program switcher. In fact, it's like having three computers running at the same time.

Consider this: You're at work. It's your lunch hour, so you load your favorite game and play all the way to level 33. No one has ever been this far before. You hear the clock click—one o'clock. Should you save the world or save your job?

Instead of facing this dilemma, you simply press the Open Apple–Control–Escape sequence on your business-bound Apple IIGS. Now you're inside the Desk Accessory Menu. In addition to the usual Control Panel and Alternate Screen options, you see *SoftSwitch* listed as a Classic Desk Accessory.

You enter the *SoftSwitch* screen and press a few keys. Suddenly you're back in your word-processor, exactly where you left off an hour before.

Suspended Animation

Unlike a ramdisk, *SoftSwitch* stores the entire contents of the computer's active memory in one of three *SoftSwitch* workspaces on the expansion memory card. When you want to revert to a previously saved application, that workspace is restored to the active memory area in exactly the same condition as it was when you left it.

You can stop work on a program at any point and save it in a state of suspended animation. When you switch back to that program, everything is just as it was before. This is the major benefit of *SoftSwitch*.

It's not hard to think of some potential applications. Load a word processor and a spelling checker. After a little practice, they'll work together so smoothly you'll forget they're separate programs. Let a co-worker or friend use your computer, without the inconvenience of saving your data or text files and rebooting later. As the mood strikes, you can play a game, write a program, and update your database without missing a beat as you juggle jobs.

More Than A Switcher

As noted earlier, however, *SoftSwitch* isn't just a program switcher. Part of the package is several utilities to simplify a variety of tasks.

Install adds *SoftSwitch* to a hard disk or any ProDOS-16 System Disk. The entire process takes about five minutes. Once done, *SoftSwitch* automatically loads whenever that disk boots. In effect, *SoftSwitch* becomes an integral part of your Apple's operating environment, always available from the Desk Accessories Menu.

Have you ever wished you could capture a hi-res screen from one program and then paste it into another? *SoftSwitch*'s *Screen Manager* captures and moves hi-res and double-hi-res screens, as well as 40- and 80-column text screens. Captured screens can be saved directly to disk or passed between graphics utilities.

Screen Manager can even transport graphics from one operating system to another. For instance, you could create a picture with Baudville's *Blazing Paddles* (DOS 3.3) and move it to Brøderbund's *Dazzle Draw* (ProDOS). Once the graphic is pasted in, the receiving program can manipulate the image just as if it was an original creation.

Keepsake, another utility on the *SoftSwitch* System Disk, saves the entire contents of a *SoftSwitch* workspace on a 3½-inch disk.

That means you can keep that interrupted game indefinitely. When time permits, you can use *Keepsake* to reload the game at the exact point you left. This ability to trap and save the entire contents of active memory suggests several other more mundane, though practical, possibilities.

Lots Of Memory

Two characteristics distinguish great utilities from the merely interesting: usefulness and versatility. The more experienced you become with *SoftSwitch,* the more uses you'll find for it.

However, any program that tries to interact with the overwhelming array of operating systems and software available for the Apple II line is bound to encounter some incompatibilities.

SoftSwitch works with DOS 3.3, ProDOS 8, and most earlier versions of ProDOS. It's *not* compatible with ProDOS 1.1.1 since that version prevents normal access to the Apple IIGS Desk Accessory Menu.

Nevertheless, it's usually quite simple to replace ProDOS 1.1.1 with a different version or to bypass that operating system by loading programs from the DeskTop.

Likewise, *SoftSwitch* cannot switch ProDOS-16 Applications. Those programs often require massive amounts of memory—usually 512K or more. To support the three auxiliary workspaces and the active workspace under such conditions would require two megabytes (or more) of expansion memory. Most Apple IIGS owners just don't have that much RAM.

Even without supporting ProDOS-16, *SoftSwitch* gobbles memory in large blocks. Each workspace demands 133K of expansion card RAM. Therefore, a IIGS with a total of 512K can use only one of the three available storage workspaces. Under this condition, true switching is impossible.

SoftSwitch's publisher suggests a minimum of 512K RAM on the expansion card. When added to the motherboard's standard 256K, this means a minimum total of 768K. Users who want to maintain a small ramdisk and use *SoftSwitch* to full advantage will need a full megabyte or more of extra RAM.

Nasty Combinations

There are other incompatibilities as well. A few programs prevent access to the IIGS Desk Accessory Menu, making *SoftSwitch* inaccessible. *AppleWorks* 2.0 needs kid-glove treatment because it interferes somewhat with the normal operation of *SoftSwitch. Flight Simulator* just doesn't function.

Some protected programs force you to use their Quit option before going on to other software. In addition to booting the next disk, these Quit routines sometimes clear all RAM.

For these, and most other compatibility problems, the thorough manual suggests relatively simple fixes. More serious problems are explained with refreshing candor.

To help familiarize users with *SoftSwitch,* the manual also includes an excellent, step-by-step tutorial. Once you've finished the tutorial, you should have little trouble using this utility with your own combination of programs.

On the whole, *SoftSwitch* is a thoughtfully designed and skillfully implemented utility that provides impressive capabilities never before available to Apple users. Good value for the money, a 30-day "unconditional guarantee of satisfaction," and long-term technical support make it a noteworthy bargain.

SoftSwitch
Apple IIGS (Requires a 3½-inch disk drive and a minimum 512K on the expansion card. A one-megabyte card is preferred.)
Roger Wagner Publishing
1050 Pioneer Way, Ste. P
El Cajon, CA 92020
$59.95

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The Print Shop IIGS

Gregg Keizer, Editor

You may not realize it, but you've probably seen something created with *Print Shop*. Perhaps it was a sign advertising a yard sale, pinned to a bulletin board at the market. Or an invitation your child received to a friend's birthday party. Or maybe even the cover design for the school play.

Print Shop is, without question, the most popular graphics program ever. More people have made cards, banners, signs, and other printed products with this program than with any other piece of software. In fact, although computers promised a paperless office (and home), it's software like *Print Shop* that proved that promise false. Computers and their accomplices, the dot-matrix printer, have proven perfect in producing paper and more paper, to everyone's delight.

If you have an Apple II computer, odds are that you also have a copy of *Print Shop*. But if you have an Apple IIGS, you've had to contend with older, more primitive versions of the program. Black-and-white on the screen; keyboard manuevering when you've just learned mouse dexterity; and graphics resolutions that made you squint.

Not anymore. *The Print Shop IIGS*, Brøderbund Software's adaptation of its best-selling program, takes the personal printing standard into its next generation.

Color And Clicking

The Print Shop IIGS, as its name implies, only works on the Apple IIGS. Requiring 512K, the program automatically loads and runs when you put the 3½-inch disk in the drive and turn on the computer. If your IIGS has at least 768K of RAM (in other words, the memory expansion card has at least 512K on it), you can access *Print Shop* through the Program Launcher.

The program's interface—the way it presents its choices and lets you make your selections—is colorful, straightforward, and almost totally mouse-driven. The easiest way to make a menu selection is to double click on the desired choice. Simply place the mouse cursor over the option and click twice in quick succession.

At every step, you can select the *Go Back* button, which takes you back one menu level. By repeatedly clicking on this button, you can retreat until you reach the desired menu, perhaps to change a setting or graphics selection. *Go Forward* also appears on virtually every screen to let you move to the next menu level. The third choice always offered is *Preview*, which shows your work in progress. Be prepared for a short wait (if things seem *really* slow, check System Speed in the IIGS's Control Panel—it may be set to *Normal*. Change it to *Fast*.)

Make A Card, Make A Sign

The Print Shop IIGS, like its ancestor, helps you design and create four basic printed products—greeting cards, signs, letterheads, and banners. Greeting cards and signs are quite similar; signs are simply larger versions of the inside or outside of a card. The letterhead is less graphics-intensive, and banners are simpler still, though quite a bit larger.

The process of designing one of these products is not a difficult one. In fact, the program presents the steps in a preset order, so all you have to do is make your selections from the choices offered. Creating customized stationery, for instance, always uses the same procedure. After choosing a background-panel type, you select a pattern and graphic(s), then decide on how you want the graphic(s) placed. Next, you pick the font you want to use for your text. Type in your name and up to three lines for your address (or anything else, really), then center the text from top to bottom if you want. The bottom of the stationery is designed in just the same way (or you can leave it blank by clicking on *Go Forward* at every step).

Cards, signs, and banners are created in much the same fashion. And though you can't change the order in which the steps are presented in *Print Shop*, that also means you have to work very hard to get lost.

Mix And Match Graphics

The key to many graphics programs, *The Print Shop IIGS* included, is the premade artwork that you can load from disk. After all, if we could draw, sketch, and paint with our computer—and get excellent, professional results—we probably wouldn't be using *Print Shop* anyway.

The better the art and the better its selection, the better the software. That's true with this program as well. Although much can be made with the Graphic Editor (see "Make Your Own," below), if you're like the vast majority of *Print Shop* owners, you'll stick to mixing and matching the various graphics elements available on the disk.

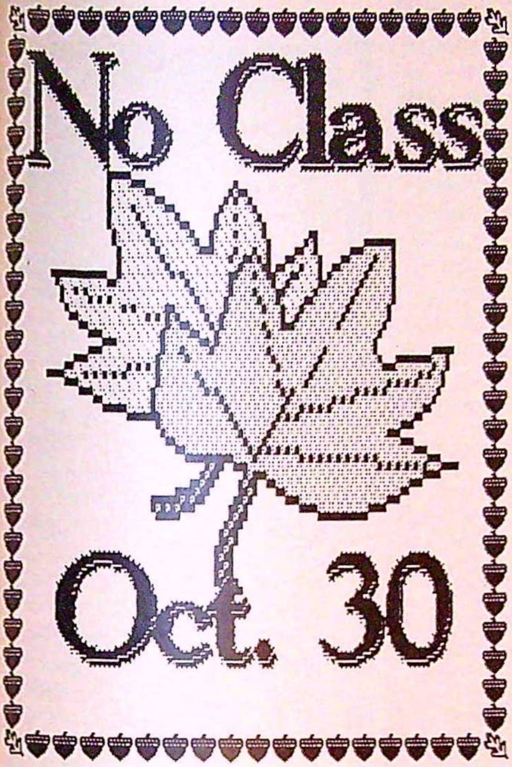
That disk includes 64 small graphics, 8 full-panel designs (as big as the cover of a greeting card or the complete size of a sign), 8 letterhead panel designs, 12 single-color borders, and 12 multicolored borders. Also on the disk are 12 different type fonts, in both upper- and lowercase.

The graphics are, to say the least, colorful. Their resolution is generally excellent, and their colors are bright. Not all are cartoonlike, though like many other *Print Shop* graphics, there is certainly an element of that to some.

The full-panel designs—for signs and cards, and for the letterhead—are by far the most impressive. The artists who created these (like the rest of the graphics, on Commodore Amiga computers using *Deluxe Paint II*, of all things) outdid themselves. Personal favorites are *Dancers* in the full-panel cards and signs category, and *Flamingos* in the full-panel letterhead.

Single-color borders range from a simple thin line to rows of books; all can be printed in one of eight colors. The multicolored borders, however, are more extravagant, running from a picnic motif to a ring of flame.

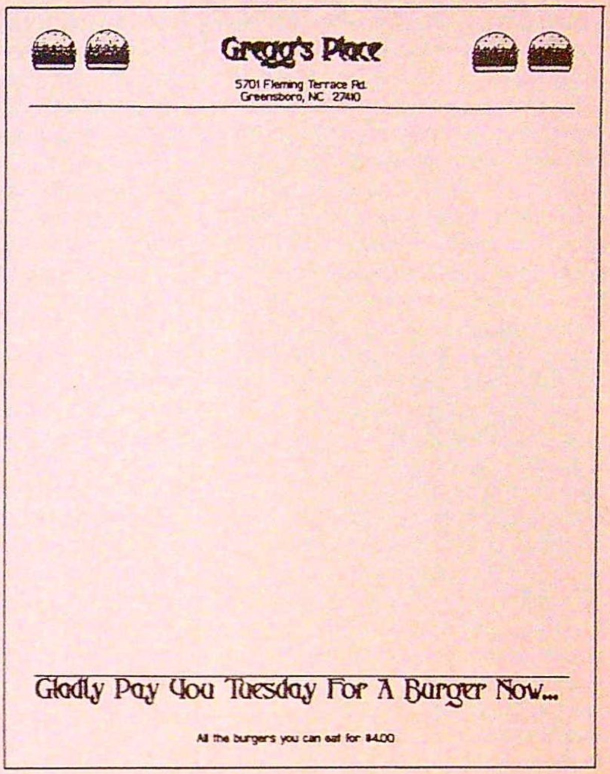
The fonts you have to choose from are primarily decorative—you wouldn't want to read a lot of text in any of them. In small doses, as in *Print Shop*, they make almost any text stand out. Choose from the squat Yolo or the relaxed Sutter or even the funky Marin (you can tell the program was cre-



No Class

Oct. 30

You can make simple signs like this in just minutes with The Print Shop IIGS.



Gregg's Place

5701 Fleming Terrace Rd.
Greensboro, NC 27410

Gladly Pay You Tuesday For A Burger Now...

All the burgers you can eat for $4.00

Design personalized stationary by mixing graphics and text in the Letterhead area of Print Shop.

ated in California).

And if you have other *Print Shop*–compatible graphics from Brøderbund or other Apple II software publishers, you can call those elements as well, simply by selecting *From Other Disk* at several of the menus. Of course, these won't be in color (but you can add color to them—see "Make Your Own").

Additional IIGS graphics collections are to be forthcoming from Brøderbund, including a $34.95 package called *Print Shop Companion Library Sampler*.

Get Small

The final product of *Print Shop* must come out of the printer. The program supports almost 70 different printers, and in its Setup area, lets you indicate your dot-matrix. Here you also tell the software how the printer is connected—through the IIGS's printer or modem port, or through a serial card of some sort. If the latter, you must also inform the program of the serial card's slot. Don't forget to set the appropriate slot in the IIGS Control Panel to *Your card*.

Two of the more interesting features of the printing process are printing backward and printing at reduced sizes. The first can be used to print a variety of iron-on transfer designs for T-shirts (see "Print It," an article in this issue which illustrates a number of *Print Shop* projects). The second can be used to generate countless printed items in sizes other than the standard card, sign, letterhead, or even banner.

Size reduction can be specified to the percent. Want to reduce that banner to half its normal size? Just enter 50 in the box. Shrink that greeting card down to gift-tag size? Simple, just type in 25 to make it one-fourth its normal size.

This feature of *The Print Shop IIGS* opens up limitless possibilities. Using the reduction feature, you can create in normal size, then design anything from a business card to a bumper sticker.

Printing quality depends on your printer. If you're like most IIGS owners, you have an ImageWriter II. Its output is normally very good (though some argue that the original ImageWriter's printing is slightly darker and more even). And if you have an ImageWriter II (or one of the other eight printers that support color), you can print your creations in approximations of the vibrant colors you saw on your RGB screen.

No question that the ImageWriter II with color ribbon can produce colorful *Print Shop* designs. But if you haven't done much color printing before, be prepared for a disappointment. There's no way the printer can duplicate the richness of color you see on the IIGS monitor screen.

The result, however, is still striking—all the more so if you've been using *Print Shop* in black-and-white all these years.

(Note: If you're printing in black-and-white, avoid using color for most text—the characters may come out faint or blurry, depending on the shade you select.)

Make Your Own

If you're artistically inclined, or if you just like to change premade graphics, *The Print Shop IIGS* has something you'll enjoy—the Graphic Editor.

You have a set of drawing tools available: shape makers to create lines, squares, circles, and polygons; text; pen for freehand drawing; filling; cutting; stretching; copying; flipping; and color-reversing tools.

Creating from scratch is, as with all paint/draw software, easy to do in the simplest forms, extremely difficult to master and make look professional. Geometric shapes are easiest; drawing freehand is the hardest.

Altering existing graphics is simpler. Load the graphic, change something here, something there, and save it back to disk under a different name. Perhaps change the color of the balloons or the name on the baby-food jar.

Substantially altering existing graphics, though, is as tough as starting from scratch. Copying and pasting those copies is probably the simplest way to make major modifications. One of the best tools is the stretcher, which can expand or contract an outlined area. The results can be hilarious.

Better yet is the ability to import black and white *Print Shop*–compatible graphics and tint them. As you bring the graphic into the Editor, you'll be asked to specify a color for it. Once in the Editor, of course, you can use all the tools available to change the formerly dull and drab artwork into something dazzling.

No Comparison

The Apple IIGS was made for graphics, and *The Print Shop IIGS* demonstrates that.

Not to say that everything about the program is perfect. If you're familiar with more free-form software such as the desktop publishing programs now available for the Macintosh and just beginning to appear for the Apple II line, you'll find yourself frustrated by the lock-step attitude *Print Shop* takes. If you want a sign with one large graphic, for instance, there's only one place it can be—in the middle of the page. You can't move it slightly lower, or a bit to one side. It stays right where *Print Shop* wants it.

Previewing your creations is slow, even on the IIGS. And when you're trying to exactly place a line of text, it can be frustrating as you're forced to repeatedly click *Preview*, then wait several moments, to see that the message is still in the wrong place.

Entering text is often awkward. You can enter the entire message, then format it (large/small, outline, underline, shadowed, italic), but risk losing some of the text if you change from small to large-sized text. Or you can format as you go, which means you have to return to the text customizing boxes and make selections after each press of the Return key. A better, smoother way would have been to allow for selection of entire sections of the text by clicking and dragging (as in many word processors) for formatting.

Over all, however, *The Print Shop IIGS* is a long-awaited program for the IIGS, one that shows how different a GS version must be from its predecessor to really work.

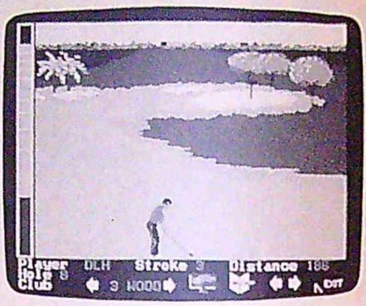
Print Shop may have its look-alikes on other computers, but for now and probably some time to come, there's nothing quite like this.

The Print Shop IIGS
Brøderbund Software
17 Paul Dr.
San Rafael, CA 94903
$59.95
(Owners of the Apple II version of The Print Shop *can upgrade to* The Print Shop IIGS *by mailing their original disk and a check for $20 to Brøderbund at the address above.)*

Mean 18

David Hensley, Jr.
Submissions Reviewer

Every good computer simulation, whether it puts you in the cockpit of a jet fighter or on the green at Augusta National, pays particular attention to two things—realism and detail. *Mean 18*, a new golf simulation from Accolade for the Apple IIGS, fits both bills. It's an extraordinarily true-to-life simulation, realistic because of its devotion to duplicating the mechanics of golf. And *Mean 18* has the details—great graphics, courtesy of the IIGS's super-hi-res mode, and digitized sound effects from the computer's state-of-the-art sound chip—to make the simulation complete.



Not only can you play the three courses included with Mean 18, *but you can load any one of the several courses available in Accolade's* Famous Course Disk *series. This player is getting ready to hit his third shot onto the green at the eighth hole of the Doral (FL) Country Club.*

The package includes one 3½-inch disk that contains the golf program, a course architect, and three world-famous golf courses: Augusta National, Pebble Beach, and the Royal and Ancient Golf Club at St. Andrews.

After booting the program (like much Apple IIGS software, a somewhat tedious process), you select the course you want to play. Once you've entered the players' names (up to a foursome can play), you have the option of playing from the pro or regulation tees. Next, you select either beginner or expert level. At the beginner level, *Mean 18* provides you with an imaginary caddy which shows you the correct line to the hole and suggests the best club to use. Expert players must choose their own clubs and execute shots more accurately. Next, you select a scoring method of which there are three options: stroke or medal play, two-player match play, and two-team/four-player best ball (low score for the team wins).

Make your choices and prepare to swing away. From this point, every control is mouse driven. You can go to the practice tee or putting green, practice an entire hole from the chosen course, or start an 18-hole round from the first tee.

In real golf, professionals spend hours on the practice tee and green. *Mean 18* provides both the practice tee and greens option for much the same reason—practice.

Spend some time at both before embarking on an entire round. On the practice tee, you can try every club in your golf bag except the sand wedge. After every practice shot, *Mean 18* shows the total distance your ball carried and its degree of deviation from the center of the fairway. This information is especially helpful as you practice slices, fades, hooks, and draws (the instruction manual offers tips on how to achieve these results). On the practice green, you can search for the same consistant putting stroke the pros strive for, and you control both the flag and the ball placement.

Tee Up

Once you choose to start a round, you move to the first tee. A sign showing the layout of the hole (as well as the hole number, par, and distance to the green) appears at every tee. Click the mouse to clear the screen—you're now looking at the hole from behind the tee.

The golfer is completely controlled with the mouse. The swing is gauged by a bar graph on the left side of the screen. When you click the mouse, the bar starts to move upward; at the same time, the golfer begins his backswing. To control the power and distance of the swing, click the mouse again. This is when the golfer begins his downswing. The higher the bar, the longer and more powerful the swing. A third click determines the wrist snap at impact, which is most crucial. Clicking the mouse early hooks or draws your shot; clicking late slices or fades it. Three mouse clicks are all you need to send the ball sailing through the air.

On the course, you must contend with almost every aspect of a real golf course (Figure 1). Precise timing and execution are the keys to avoiding the looming hazards—sandtraps, water hazards, trees, deep and shallow rough—but all make for a beautiful setting.

The sound effects in *Mean 18* are amazing. The *swoosh* of the drive and the impact when the club face meets the ball are especially realistic. You'll actually feel your spirit sink as you hear your ball splash in the water, but your skin will tingle when you hear the crowd cheer at a good shot or gasp at a near-missed putt.

Golf Is A Game Of Numbers

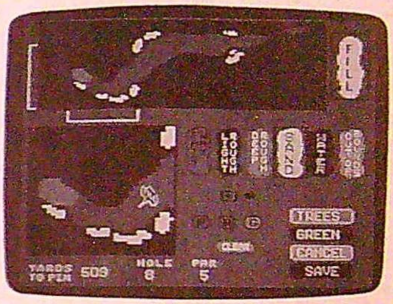
Mean 18 provides you with several conveniences not found on your local course. Any time during the round, you can click on the layout icon and see the flight of your ball graphically represented on an overhead view of the hole. This can be extremely helpful when you're hitting trouble shots. Whenever you want to view your score, click on the scorecard icon. After every hole, the scorecard automatically appears; click on STATS here for a mini-summary of your round.

Again, *Mean 18* acts as your caddy and supplies you with various information, such as your longest drive, your drive closest to the pin (on par three's), fairways and greens reached in regulation, the number of putts in the round, and total birdies you made. You can use this information to determine the weak points of your game and decide which areas need practice. If time prevents you from finishing a game (a round takes approximately 45 minutes to an hour), you can save the game to disk—up to the last hole completed.

After your round, you may want to enter your score in the *Mean 18* Hall of Fame, which stores the top scores and dates they were achieved, in a separate file. After completing a round, you can print out your scorecard and statistics—and Hall of Fame, for posterity.

Make It An Even Meaner 18

After you've mastered the three courses supplied, you may want to design your own golf course using the course architect (Photo 2). You can modify practically every aspect of any of the existing courses; you may wish to start with the background, or the trees, or just concentrate on the layout. There's even an option to clear entire holes if you want to start from scratch. You can design an aesthetically beautiful course that's a joy to play, or create a devilish tract that even a Hogan, Nicklaus, or Sneed couldn't master without difficulty. Fill options and a zoom mode make your role as a course architect easy. But since the courses themselves are not copy-protected, it's a good idea to make backups before you begin modifying. This also makes it possible to share courses with other *Mean 18* golfers. Many bulletin boards around the country already have sections devoted to *Mean 18* courses.



Mean 18's *Course Architect lets you construct your own courses, or modify existing ones, with paint program–like tools. Here, the same eighth hole at Doral is being altered. Note the expanded view at left.*

Mean 18 does have a few minor drawbacks. The absence of wind absolves some indecision over which direction to aim. Although the overhead view of the putting green indicates your ball in relation to the hole and your opponent, some players may find it a bit bothersome after a few rounds.

The *Mean 18* simulation is so realistic and fun to play, you'll find yourself spending more and more time on the computer links. If you like challenging games with excellent sound graphics and playability, consider *Mean 18*. With a golf similation this good, it can only be a matter of time before the *Mean 18* Pro Tour is formed.

Mean 18
Apple IIGS with 512K, printer optional
Accolade
20833 Stevens Creek Blvd.
Cupertino, CA 95014
$44.95

The Tower Of Myraglen

James V. Trunzo

The agonized howl of the despairing ghosts sends shivers coursing through your back. The incessant squealing of giant rats disgusts you. And the sound of your own pain in combat reminds you just how deadly *The Tower of Myraglen* can really be, no matter how brave and skilled a warrior you are.

The Tower of Myraglen (pronounced mear-a-glin) is the first Apple IIGS-specific arcade adventure game to reach the market. Unlike many other software firsts, *Tower of Myraglen* is an enjoyable and challenging hybrid that's sure to excite IIGS owners. Yet the game play, as good as it is, is certain to take a backseat to the game's sound effects.

Stereophonic Slime Monsters

The highlight of *Tower of Myraglen* is its sound. The game includes a digitized sound track and calls on the power of the IIGS's Ensoniq sound chip to literally blast at your auditory senses. The opening title screen alone is worth the price of the program—a knight on horseback, silhouetted by the moon's glow, gazes across a bridged ravine at the foreboding Tower of Myraglen. Suddenly, the orchestrated music trumpets the challenge, the music punctuated by claps of thunder and the flash of hi-res lightning. Then, when the title screen disappears, the player comes face to face with, not a drawing, but a fully digitized image of a bearded wizard. As you stare, you hear him speak, beckoning you enter the Tower of Myraglen.

The game supports the SuperSonic stereo card from MIDIdeas, adding stereo sound if you connect speakers or plug in headphones. Hearing the stereophonic squish of slime monsters, the bird-like cackle of the Axebeak, or even your own character's scream is an experience that makes you appreciate the potential of the Apple IIGS. But if you don't possess a stereo card, don't be dismayed. The sound effects surpass anything you've heard in game software even if heard only through the small speaker inside the IIGS. Doors creak, lids of treasure chests slam open, and grandfather clocks strike the hour in most admirable fashion.

The Knight Of Justice

While the sound effects, because of their quality and uniqueness, will most likely garner much of your attention, the game itself can hold its own. Billed as a role-playing adventure, *Tower of Myraglen* is actually a cross between an arcade game and an adventure game.

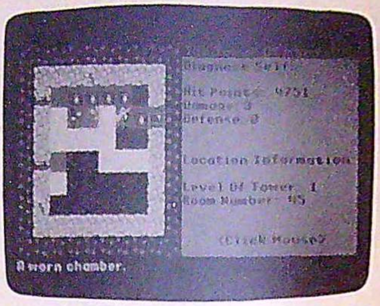
The Tower houses a powerful artifact, the Medallion of Soul Stealing, which must be regained if evil is not to prevail. Only the purest and most intelligent Knight of Justice (that's you) can survive the deadly mazes and chambers which make up the Tower. In fact, the manual clearly explains that purity and altruism are necessary to claim the medallion—overly greedy players have several unpleasant surprises awaiting them.

As a Knight of Justice, you enter the tower armed with a magical Ring of Unlimited Arrows. The weapon can fire in all directions, even when your knight is in a hand-to-hand struggle. Once you've mastered using the mouse to melee (fight hand-to-hand) and the keyboard to fire the arrows, you can fight several monsters at once. You'll need to on the higher levels of the game.

At least one major puzzle exists on each of the seven levels; the puzzle must be solved to advance. The first level is relatively easy and introduces the player to the mechanics of the game.The puzzle, however, is one of the toughest in the game. The people at PBI are more than willing to help out the desperate (I was one), but I'll save you a phone call by offering this hint: Be in a certain room during the "witching" hour.

Mechanics Of The Quest

Animation in the game is smooth and the action fluid. The monsters are clearly individuals, with differences in their attributes, attacks, and appearance. Keep in mind that in many ways this is an arcade-style game—the graphics fit that mode. Except for the title screen, you won't see full-screen graphics or hi-res pictures a'la *The Bard's Tale* IIGS version. Nevertheless, visuals like detailed stone walls, rippling pools of water, and sparkling jewels enhance the game.



Although sophisticated sound effects highlight The Tower of Myraglen, *the game itself is a enjoyable combination of adventure and arcade action. Here, the Knight has paused to check his condition and position.*

Tower of Myraglen makes good use of the Apple IIGS's mouse, pull-down menus, and the like. The keyboard can also be used, either exclusively or in conjunction with the mouse (a combination that seems to work best). The program has several nice features besides the obvious. It automatically saves the game each time a level is successfully completed, for example. As with many long-playing games, it's a good idea to save the game periodically. Your character's death is inevitable early on, and hours of game play can be lost without judicious use of the save feature.

Tower of Myraglen also possesses a vanity board, the Hall of Honor, which displays the top ten scores of the knights who met their untimely end. The board can be cleared at any time.

A bit like SSI's *Genstone Warrior*, and reminiscent of Epyx's *Temple of Apshai* series, PBI's *Tower of Myraglen* breaks new ground with its stereo sound and enhanced graphics. Enjoyable entertainment, *Tower of Myraglen* will earn your respect as both a game and an impressive piece of programming.

Tower of Myraglen
PBI Software, Inc.
1163 Triton Dr.
Foster City, CA 94404
Apple IIGS with a 512K (less than 768K restricts some of the sound effects)
$54.95

New Products

Tax Prep

HowardSoft has released the 1988 edition of *Tax Preparer*, a federal income tax preparation program, which automatically creates many supporting forms and schedules based on raw data entered on the specially-designed 1040 form. The program has the Tax Reform Act built-in past 1990.

The program supports over 20 IRS forms and schedules, including Form 2210 for tax penalties and Form 1040-ES for estimating next year's taxes. Each entry is checked against the tax code to make sure the legal limits are not exceeded.

Features include machine language for high-speed calculations, split screens, and windows to aid the user in traveling through the forms.

Tax Preparer is available for the Apple II series for a suggested retail price of $250.

HowardSoft, 1224 Prospect St., Suite 150, La Jolla, CA 92037

Circle Reader Service Number 165.

Mindscape Riddles And Power Plays

Mindscape has introduced *Riddle Magic* for the Apple II family of computers and *Trust and Betrayal: The Legacy of Siboot* for the Macintosh.

Riddle Magic is designed to be a language arts teaching tool for both educators and parents. The program encourages students in creative writing, research skill development, and the use of synonyms and rhyming words. Students follow a formula to create and illustrate their own riddles. The program contains a built-in dictionary of over 1800 words and three variations of the basic riddle-making method.

Intended for students in grades 2 to 12, the program is available for the Apple II series at the suggested retail price of $49.95.

In *Trust and Betrayal: The Legacy of Siboot*, players find themselves on Kira, a moon of the planet Lamina, where a colony with members from each of the Seven Species of Lamina reside. Players must communicate with characters in an alien language as they make deals, ask and answer questions, beg, make promises, and gossip. The colony ruler, the Shepherd of Kira, is the spiritual leader and final arbiter of all disputes on Lamina. The Fourth Shepherd has just died, so the player must strive to acquire power to win the game and become the next Shepherd of Kira.

The game is designed by Chris Crawford, the author of Mindscape's *Balance of Power*, and is available for the Macintosh for a suggested retail price of $49.95.

Mindscape, 3444 Dundee Rd., Northbrook, IL 60062

Circle Reader Service Number 166.

Brøderbund IIGS Upgrades For $20

Brøderbund Software is offering upgrades of *Fantavision* and *The Print Shop* to Apple IIGS owners who currently use Apple II versions. The IIGS versions have been designed to take advantage of IIGS graphics and color capabilities. *The Print Shop* can be used with Apple II versions of *The Print Shop Companion* and *The Print Shop Graphics Library* disks. Upgrades for *The Print Shop* and *Fantavision* can be obtained by sending in the original Apple II program disks along with $20 for each program. School Edition upgrades are $30 for each program

Brøderbund has released a Macintosh version of *Type!*. The program teaches typing with real text and sentences and includes Type!-Athon, an arcade-style game. The program, which has been previously available for Apple II computers, now features pull-down menus and a tutorial that uses animated hands to show proper hand placement. The suggested retail price for the Macintosh version is $49.95.

Jam Session is another recent release from Brøderbund. The program allows users to play music on their Macintosh computers by choosing from several different song styles including rock and roll, rhythm and blues, and classical. Animated musicians appear on the screen and the selected music starts playing in digitized sound.

The program selects notes and riffs that sound appropriate for the music despite which keys are struck or in what order or what tempo they are struck. Song creations can be recorded and saved on disk.

Suggested retail price is $49.95.

Brøderbund Software, 17 Paul Dr., San Rafael, CA 94903-2101

Circle Reader Service Number 167.

1-2-3 For The Mac

Lotus Development Corporation has announced that it will develop a new version of *1-2-3*, a business spreadsheet software program for the Macintosh. Lotus is also releasing *Modern Jazz*, a six-function integrated software product.

Details regarding the availability of *1-2-3* will be announced later this year.

Lotus Development Corporation, 55 Cambridge Pkwy., Cambridge, MA 02142

Circle Reader Service Number 168.

Be An Investigative Reader

DLM has announced the release of *Scoop Mahoney: Investigative Reader*, which is designed to help students develop, practice, and improve their reading comprehension skills. The two-disk program has four sequentially designed levels of difficulty with five stories per level. Stories are either based on fictitious or factual topics. Students must complete story assignments by discovering sources of information built into the program such as key words, simulated telephone calls, and interviews.

The emphasis in the story gradually shifts form literal to inferential comprehension. Teachers have the option to determine the percentage of correct answers needed for the program's automatic branching feature or choose to have stories randomly generated.

Students are given prereading questions that focus attention on the upcoming story and post-reading questions that test the students' comprehension and retention. Notes on the story can be printed or read onscreen. The program features graphics and sound effects. A management system for 40 students is also included.

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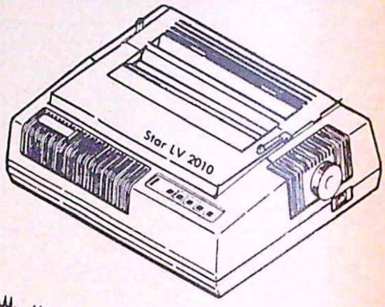

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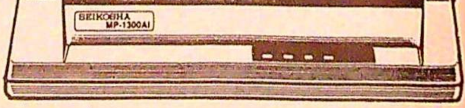

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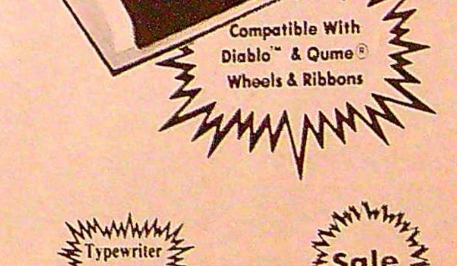

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The program is designed for the Apple II family of computers including the IIGS and requires 64K of memory. Suggested retail price is $46.00.

DLM Teaching Resources, One DLM Park, Allen, TX 75002

Circle Reader Service Number 169.

Dive The Boat!

Silent Service, a submarine simulation game, is the first Apple IIGS title to be released by MicroProse. The user becomes the captain of a World War II submarine in the South Pacific. Combat scenarios include single-ship attack and multi-patrol missions with heavily escorted convoys. The player can choose from several levels of difficulty.

This version was designed to take advantage of Apple IIGS graphics, sound, and speed capabilities. Both a detailed map system and enemy targets are included in the program along with a detailed reproduction of the instrumentation and submarine interior.

The program requires a minimum of 256K and one 3½-inch disk drive. It can be played on a black-and-white, RGB color, or composite color monitor. Suggested retail price is $39.95.

MicroProse, 120 Lakefront Dr., Hunt Valley, MD 21030

Circle Reader Service Number 170.

IIGS DAs

On Three has released *The Desktop Manager*, a desk accessory package for the Apple IIGS. The program can be used by almost all ProDOS 8 and ProDOS 16 applications. Accessories include a note pad, an appointment calendar, a calculator, an envelope labeler, a printer manager, a typewriter, and an ASCII chart. The user has both the ability to pickup and paste information between different applications and the option to save the current text or graphics screen and print the current text screen at any time.

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A single keystroke can take the user from any ProDOS program to *The Desktop Manager's* pop-up menu, where an accessory may be selected. Users can set up appointments with the program, which notifies the user when the appointment is scheduled.

The program features *AppleWorks*-style folders and input, and built-in help screens. An open-architecture feature allows the user to write his or her own custom accessories. The program is not copy-protected and supports all floppy and hard disks and all ramdisks.

An Apple IIGS, or IIe upgraded to IIGS, with a minimum of 512K and one 3½-inch drive is required to run the program. Suggested retail price is $89.95.

On Three, 4478 Market St., Suites 701-702, Ventura, CA 93003

Circle Reader Service Number 171.

Be Diversified

Diversified Software Research has released three new programs for the Apple IIGS. *Diversi-Key* allows users to add macro control and mouse functions to any other program, running on any operating system. The program includes a full set of *AppleWorks* 2.0 macros. *Diversi-Key* sends its macro keystrokes just as the user types them, requiring no patching of programs. It also works with other *Appleworks* enhancements, including Pinpoint. Suggested retail price is $45.

Diversi-Cache boosts the new Apple Disk 3.5 to ramdisk speed without loading and saving each ramdisk file. It also doubles the speed of writing to the Disk 3.5 under ProDOS. The program requires a IIGS-type memory card with a minimum of 256K. *Diversi-Cache* uses up to 800K, therefore 1 megabyte or more is recommended. Suggested retail price is $35.

Included with each *Diversi-Key* and *Diversi-Cache* is *Diversi-Hack*, a IIGS desk accessory that allows users to interrupt any program, enter the IIGS monitor, print the 80- or 40-column text screen, or send control characters directly to the printer, and then continue the program.

Another new product from Diversified Software Research is *Diversi-Copy*, which copies any unprotected 5¼- or 3½-inch Apple II disk at maximum speed. The program loads disk data into all available memory. It works with all memory cards sold by Apple, Applied Engineering, or compatibles, including cards for the IIe, IIc, or IIGS. Suggested retail price is $30.

Diversified Software Research, 34880 Bunker Hill, Farmington, MI 48018-2728

Circle Reader Service Number 172.

Deluxe Grading

EduSoft has released a new enhanced version of *GradeBook Deluxe* to take advantage of Apple IIGS capabilities. Version 3.4 is available in either 3½- or 5¼-inch disk formats.

The program can print student names on labels; personalize report comments with each student's name; and allow teachers to select and substitute a minimum topic average, minimum report period average or minimum overall average if a student's score falls below the minimum.

Up to 18 classes with 40 students per class and 255 grades per student can be handled. The program uses letter grades, points or percentages, and accepts missing or excused grades. It calculates class median, mean, standard deviation, and grade distribution. It also weights or curves grades.

The program can print five different reports by name or ID code with personalized teacher comments. It can also score and enter grades for multiple choice tests using a Scantron data terminal.

GradeBook Deluxe is available for the Apple II+, IIe, IIc, and IIGS with 64K memory and two disk drives. Suggested retail price is $59.95.

EduSoft, P.O. Box 2560, Berkeley, CA 94702

Circle Reader Service Number 173.

Chest-Top Publishing

Unison World has introduced *Chest-Top Publishing*, which permits Macintosh users to create and print their own iron-on T-shirt transfers. The publishing kit includes over 40 detailed designs on disk, a heat transfer ribbon, eight iron-on fabric crayons, and *The Computer T-Shirt Guide* by Richard A. Milewski.

The program requires *MacPaint* or another compatible paint program. The user can combine text and art in any manner desired to create a custom design. When the design is finished, the user prints it out on standard computer paper either on an Imagewriter I or II printer using the heat transfer ribbon included with the kit. The print out can then be ironed on a T-shirt. Additional colors can be added with the fabric crayons.

Suggested retail price is $59.95.

Unison World, 2150 Shattuck Ave., Berkeley, CA 94704

Circle Reader Service Number 174.

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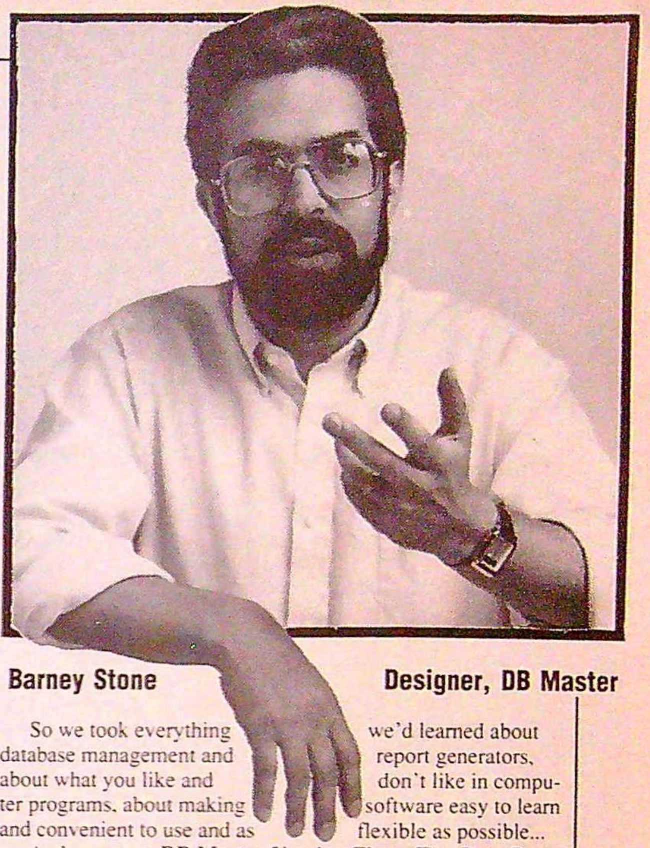

Barney Stone **Designer, DB Master**

Sure DB Master was great back in 1980 when we first introduced it. After all, it was the first serious data base management program for the Apple //. In fact, two years later, Softalk magazine reported that "many Apple dealers are selling a copy of DB Master with every computer they sell." And yes, we fixed it and added to it and improved it over the years, as we watched all of the serious software development move to other computers.

But when the time came to improve the program one more time, we decided it just wasn't worth it. If we were going to the trouble, then the only thing to do was throw it away, and start over. After all, we've learned a lot in the last seven years, and the Apple // has improved a lot, too. This time we'd really do it right.

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- 30 screen pages/record
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Field Types:
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- Numeric—3 types
- Dollar/cents, to $99,999,999,999,999.99
- Yes/No—only accepts "Y" or "N"
- Date—11 formats available
- Add Date—date when record was added
- Edit Date—last date when record edited
- Add Time—time when record was added
- Edit Time—time when record last edited
- User Defined—for phone & social security numbers, part #'s, etc., 2-20 characters, control over type of characters allowed in each position
- Label Only—no input area—useful for customizing screens

Computed Fields:
Floating point numeric, dollar & date fields can be computed fields.

Examples: (the F stands for Field)
F10 = F7+F8+F9+.06*F12
F28 = F10*(F50>=F10)+F50*(F50<F10)
F5 = (F10>100 AND F20<1000) OR (F27 > F26)

Report Generator:
- report width: 20 - 255 characters
- up to 255 lines/record on up to 3 pages
- up to 255 fields per report
- print labels up to 5 across
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- column subtotals and totals, page #s, record #s, & date or time report is printed can be printed anywhere on the page or in header and/or footer lines
- set justification, printstyles, case conversion, number formatting, statistics, date formats, etc. on field-by-field basis
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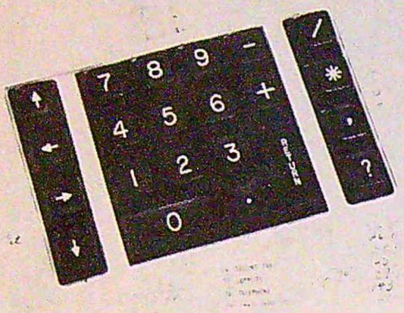

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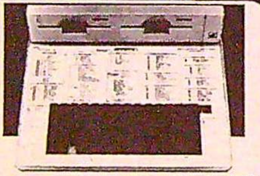

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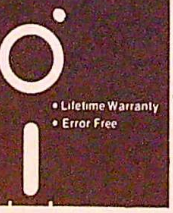

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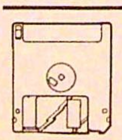

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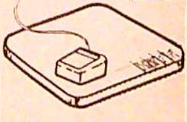

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Apple MLX

Machine Language Entry Program

Tim Victor, Editorial Programmer

"Apple MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs on the Apple computer. It runs on the II, II+, IIe, and IIc, and IIGS, with either DOS 3.3 or ProDOS.

Note: This is a new version of Apple MLX, with some slight changes. Be sure to use this version to type in all machine language programs in this and future issues of COMPUTE!'s Apple Applications.

A machine language program is usually listed as a long series of numbers. It's hard to keep your place and even harder to avoid making mistakes as you type in the listing, since an incorrect line looks almost the same as a correct one. To reduce the problems associated with typing in machine language programs, we've presented them as MLX listings which can be entered using the "Apple MLX" editor.

MLX checks your typing on a line-by-line basis. It won't let you enter inappropriate characters, and it won't let you continue if there's a mistake in a line or even if you're trying to enter a line or digit out of sequence. You don't have to know anything about machine language to use it. In other words, MLX makes machine language program entry almost foolproof.

Using MLX

Type in and save MLX to disk (you'll want to use it to enter programs in this and future issues of *COMPUTE!'s Apple Applications*, as well as programs in COMPUTE! magazine and Apple-specific books from COMPUTE! Publications). It doesn't matter whether you type it in on a disk formatted for DOS 3.3 or ProDOS. Programs entered with MLX, however, must be saved to a disk formatted with the same operating system as MLX itself.

If you have an Apple IIe, IIc, or IIGS, make sure that the key marked Caps Lock is in the down position. Type RUN. You'll be asked for the starting and ending addresses of the machine language program. These values are given at the beginning of the machine language program listing and in the program's accompanying article. Find them and type them in.

The next thing you'll see is a menu asking you to select a function. The first is (E)nter Data. If you're just starting to type in a program, choose this function. Press the E key, and the program asks for the address where you want to begin entering data. Type the first number in the first line of the program listing if you're just starting, or the line number where you left off if you've already typed in part of a program. Hit the Return key and begin entering the data.

Once you're in enter mode, MLX will print the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight bytes and a checksum. When you enter a line and hit Return, MLX recalculates the checksum from the eight bytes and the address. If you enter more than or fewer than nine numbers, or if the checksum doesn't exactly match, MLX erases the line you just entered and prompts you again for the same line.

Invalid Characters Banned

MLX is fairly flexible about how you type in the numbers. You can put extra spaces between numbers or leave the spaces out entirely, compressing a line into 18 keypresses. Be careful not to put a space between two digits in the middle of a number. MLX will read two single-digit numbers instead of one two-digit number (F 6 means F *and* 6, not F6).

You can't enter an inappropriate character with MLX. Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), nothing happens. This safeguards against entering extraneous characters. Even better, MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake.

MLX also checks to make sure you're typing in the right line. The address (the number to the left of the colon) is part of the checksum recalculation. If you accidentally skip a line and try to enter incorrect values, MLX won't let you continue. Just make sure you enter the correct starting address; if you don't, you won't be able to enter any of the following lines. MLX will stop you.

Editing Features

MLX also includes some editing features. The left- and right-arrow keys allow you to back up and go forward on the line you're entering so that you can retype data. Pressing the Ctrl (*Control*) key and the D (*Delete*) key at the same time removes the character under the cursor, shortening the line by one character. Pressing the Ctrl key and the I (*Insert*) key simultaneously puts a space under the cursor and shifts the rest of the line to the right, making the line one character longer. If the cursor is at the right end of the line, neither Ctrl-D nor Ctrl-I has any effect.

When you've entered the entire listing (up to the ending address that you specified earlier), MLX automatically leaves Enter mode and redisplays the functions menu. If you want to leave Enter mode before then, press the Return key when MLX prompts you with the address of a new line.

Display Data

The second menu choice, (D)isplay Data, examines memory and shows the contents in the same format as the program listing. You can use it to check your work or to see how far you've gotten. When you press the D key, MLX asks you for a starting address. Type in the address of the first line that you want to see and hit Return. MLX displays program lines until you press any key or until it reaches the end of the program.

Save and Load

Other menu selections are provided to let you save programs to disk and load them back into the computer. These are (S)ave File and (L)oad File. MLX asks you for the name of the file which contains the program. The first time you save a machine language program, there won't be a file on the disk containing the program. Whatever name you type in will be the name of a new file that's created.

The message DISK ERROR appears during a SAVE or LOAD if a problem is detected. If you're not sure why a disk error has occurred, check the disk drive. Make sure there's a formatted disk in the drive and that it was formatted by the same operating system that you're using for MLX (ProDOS or DOS 3.3). If you're trying to save a file and see an error message, the disk might be full. Either save the file on another disk or quit MLX (by pressing Q), delete an old file or two, and then run MLX again. Your typing should still be safe in memory. If the error message appears during a load, you may have specified a filename that doesn't exist on the disk.

Quit

The (Q)uit menu option has the obvious effect—it stops MLX and enters BASIC. (Of course, you can also press Ctrl-Reset to get out of MLX.)

The Finished Product

When you've finished typing all the data for a machine language program and have saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. You'll almost always load and run an MLX-generated program by typing BRUN *filename* (or sometimes just BLOAD).

An Ounce Of Prevention

By the time you finish typing in the data for a long program, you may have several hours invested in the project. Don't take chances—use the "Apple Automatic Proofreader" to enter MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses; then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to insure that you can recall your work from disk. Don't let a simple typing error in MLX cost you several nights of hard work.

Line 100 of MLX traps all errors to line 610. If MLX is typed in correctly, only disk errors should be encountered. A disk-error message when you're not trying to access the drive—for example, when you first start entering data—indicates a typing error in the MLX program itself. If this occurs, hit Ctrl-Reset to break out of MLX and carefully compare your entry against the printed listing.

Apple MLX: Version 1.1

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
100 N = 9: HOME : NORMAL : PRINT CHR$ (
    17);"APPLE MLX V1.1": POKE 34,2: ON
    ERR GOTO 610
110 VTAB 1: HTAB 20: PRINT "START ADDRE
    SS";: GOSUB 530: IF A = 0 THEN PRIN
    T CHR$ (7): GOTO 110
120 S = A
130 VTAB 2: HTAB 20: PRINT "END ADDRESS
     ";: GOSUB 530: IF S > = A OR A =
    0 THEN PRINT CHR$ (7): GOTO 130
140 E = A
150 PRINT : PRINT "CHOOSE:(E)NTER DATA"
    ;: HTAB 22: PRINT "(D)ISPLAY DATA":
     HTAB 8: PRINT "(L)OAD FILE  (S)AVE
     FILE  (Q)UIT": PRINT
160 GET A$: FOR I = 1 TO 5: IF A$ < > M
    ID$ ("EDLSQ",I,1) THEN NEXT : GOTO
    160
170 ON I GOTO 270,220,180,200: POKE 34,
    0: END
180 INPUT "FILENAME: ";A$: IF A$ < > ""
     THEN PRINT CHR$ (4);"BLOAD";A$;",A
    ";S
190 GOTO 150
200 INPUT "FILENAME: ";A$: IF A$ < > ""
     THEN PRINT CHR$ (4);"BSAVE";A$;",A
    ";S;",L";E - S
210 GOTO 150
220 GOSUB 590: IF B = 0 THEN 150
230 FOR B = B TO E STEP 8:L = 4:A = B:
    GOSUB 580: PRINT A$;": ";:L = 2
240 FOR F = 0 TO 7:V(F + 1) = PEEK (B +
     F): NEXT : GOSUB 560:V(9) = C
250 FOR F = 1 TO N:A = V(F): GOSUB 580:
     PRINT A$" ";: NEXT : PRINT : IF PE
    EK (49152) < 128 THEN NEXT
260 POKE 49168,0: GOTO 150
270 GOSUB 590: IF B = 0 THEN 150
280 FOR B = B TO E STEP 8
290 HTAB 1:A = B:L = 4: GOSUB 580: PRIN
    T A$;": ";: CALL 64668:A$ = "":P =
    0: GOSUB 330: IF L = 0 THEN 150
300 GOSUB 470: IF F < > N THEN PRINT CH
    R$ (7);: GOTO 290
27 310 IF N = 9 THEN GOSUB 560: IF C < > V
    (9) THEN PRINT CHR$ (7);: GOTO 290
72 320 FOR F = 1 TO 8: POKE B + F - 1,V(F)
    : NEXT : PRINT : NEXT : GOTO 150
8E 330 IF LEN (A$) = 33 THEN A$ = O$:P = O
    : PRINT CHR$ (7);
22 340 L = LEN (A$):O$ = A$:O = P:L$ = "":
     IF P > 0 THEN L$ = LEFT$ (A$,P)
E0 350 R$ = "": IF P < L - 1 THEN R$ = RIG
    HT$ (A$,L - P - 1)
55 360 HTAB 7: PRINT L$;: FLASH : IF P < L
     THEN PRINT MID$ (A$,P + 1,1);: NOR
    MAL : PRINT R$;
7B 370 PRINT " ";: NORMAL
E6 380 K = PEEK (49152): IF K < 128 THEN 3
    80
C1 390 POKE 49168,0:K = K - 128
5B 400 IF K = 13 THEN HTAB 7: PRINT A$;" "
    ;: RETURN
A7 410 IF K = 32 OR K > 47 AND K < 58 OR K
     > 64 AND K < 71 THEN A$ = L$ + CHR
    $ (K) + R$:P = P + 1: GOTO 330
C7 420 I = FRE (0): IF K = 4 THEN A$ = L$
    + R$
5F 430 IF K = 9 THEN A$ = L$ + " " + MI"$
    (A$,P + 1,1) + R$
0A 440 IF K = 8 THEN P = P - (P > 0)
93 450 IF K = 21 THEN P = P + (P < L)
9D 460 GOTO 330
37 470 F = 1:D = 0: FOR P = 1 TO LEN (A$):
    C$ = MID$ (A$,P,1): IF F > N AND C$
     < > " " THEN RETURN
BB 480 IF C$ < > " " THEN GOSUB 520:V(F) =
     J + 16 * (D = 1) * V(F):D = D + 1
5F 490 IF D > 0 AND C$ = " " OR D = 2 THEN
     D = 0:F = F + 1
0B 500 NEXT : IF D = 0 THEN F = F - 1
17 510 RETURN
B5 520 J = ASC (C$):J = J - 48 - 7 * (J >
    64): RETURN
AB 530 A = 0: INPUT A$:A$ = LEFT$ (A$,4):
    IF LEN (A$) = 0 THEN RETURN
6F 540 FOR P = 1 TO LEN (A$):C$ = MID$ (A$
    ,P,1): IF C$ < "0" OR C$ > "9" AND
    C$ < "A" OR C$ > "Z" THEN A = 0: RE
    TURN
2D 550 GOSUB 520:A = A * 16 + J: NEXT : RE
    TURN
28 560 C = INT (B / 256):C = B - 254 * C -
     255 * (C > 127):C = C - 255 * (C >
     255)
20 570 FOR F = 1 TO 8:C = C * 2 - 255 * (C
     > 127) + V(F):C = C - 255 * (C > 2
    55): NEXT : RETURN
DA 580 I = FRE (0):A$ = "": FOR I = 1 TO L
    :T = INT (A / 16):A$ = MID$ ("01234
    56789ABCDEF",A - 16 * T + 1,1) + A$
    :A = T: NEXT : RETURN
1F 590 PRINT "FROM ADDRESS ";: GOSUB 530:
    IF S > A OR E < A OR A = 0 THEN B =
     0: RETURN
0D 600 B = S + 8 * INT ((A - S) / 8): RETU
    RN
B6 610 PRINT "DISK ERROR": GOTO 150
```

Apple Automatic Proofreader

Tim Victor, Editorial Programmer

It's easier than ever to enjoy programs for Apple II–series computers. "Apple Automatic Proofreader," an error-checking program for the Apple II, II+, IIe, and IIc, with either DOS 3.3 or ProDOS, alerts you to almost every typing mistake you might make.

"Apple Automatic Proofreader" will help you type in program listings without typing mistakes. It's a short error-checking program that hides itself in memory and attaches to your Apple's operating system. Each time you press Return to enter a program line, this routine displays a two-digit checksum at the top of your screen. If you've typed the line correctly, the checksum on your screen matches the one in the printed listing—it's that simple. You don't have to use the Proofreader to enter listings, but doing so greatly reduces your chance of making a typo.

Getting Started

First, type in the Apple Automatic Proofreader program following this article. The Proofreader can't check itself before it's done, so you'll have to be extra careful to avoid mistakes.

The Proofreader checks which operating system you're running before it hooks up the checksum routine, so you can type it in with either DOS 3.3 or ProDOS. If you want to use the Proofreader with both operating systems, you won't have to retype it. All you need is a utility to copy a file between disks with different formats, such as the one provided on the ProDOS *User's* or *System Utilities* disk.

As soon as you finish typing the Proofreader, save at least two copies. This is very important, because the Proofreader erases the BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Now, type RUN and hit Return. The Proofreader clears the screen, loads the machine language routine, displays the message PROOFREADER ACTIVATED, erases the BASIC portion of itself, and ends. If you type LIST and press Return, you'll see that no BASIC program is in memory. The computer is ready for you to type in a new BASIC program.

Entering Programs

Once the Proofreader is activated, you can begin typing in a BASIC program as usual. Every time you finish typing a line and press Return, the Proofreader displays a two-digit checksum number in the upper-left corner of the screen. Compare this checksum with the two-digit checksum printed next to the corresponding line in the program listing. If the numbers match, you can be pretty certain the line was typed correctly. Otherwise, check for your mistake and type the line again.

A common mistake when entering BASIC programs on the Apple occurs when you accidentally press a key while holding down the Control key. This adds an invisible control character to the line you are typing. If you don't find it before you run the program, this stray character may cause a SYNTAX ERROR or other mysterious behavior. Fortunately, the Proofreader detects the presence of these invisible control characters and displays a checksum that doesn't match the one in the listing. So it's always a good idea to retype a line if the checksums don't match, even though you might not see any difference in the lines themselves.

The Proofreader ignores space characters, so you can omit spaces between keywords and still see a matching checksum. Spaces are important only between the quotation marks of PRINT statements or string assignments. The only mistake the Proofreader won't catch is if you accidentally type too many spaces or leave some out. For this reason, be extra careful when you're entering text within quotes.

Before running another BASIC program, it's a good idea to turn off the Proofreader by holding down the Control key while pressing the Reset button. The machine language part of the Proofreader is kept in memory starting at address 768 ($300 hexadecimal). This location is out of BASIC's way, but a lot of other programs use this same place for their machine language subroutines. Disable the Proofreader to avoid conflicts.

How It Works

When the Applesoft BASIC interpreter needs to get a line of input from the keyboard, it calls a machine language routine in the Apple's read-only memory (ROM) called GETLN. GETLN, in turn, calls the operating system to get a single keypress, which it stores in an input buffer. If the Return key was pressed, GETLN ends, leaving one new line for the BASIC interpreter in the input buffer. Otherwise, it repeats the process, asking for another keypress.

The operating system normally gets individual keystrokes from a ROM routine called KEYIN, but the Proofreader changes this. When the Proofreader is installed, the operating system calls the checksum routine instead, and the checksum routine asks KEYIN for a character. If any key other than Return was pressed, the checksum routine just passes it on to the operating system, which gives it to GETLN. But if Return *was* pressed, the checksum routine examines the contents of GETLN's input buffer, which now contains an entire line of input, to calculate the checksum that it displays at the top of the screen.

A common typing mistake is transposition—typing two successive characters in the wrong order, like *PIRNT* instead of *PRINT*. A checksum program that merely adds the codes of the characters in a line can detect only the presence or absence of a character, not transposition errors. Because the Apple Proofreader uses a sophisticated formula to compute checksums, it alerts you to transposed keystrokes.

The Apple Automatic Proofreader detects almost every possible typing mistake, including transpositions, missing or extra characters, accidental control characters, and incorrect line numbers. Typing *COMPUTE!'s Apple Applications Special* programs into your Apple computer has never been easier.

Apple Automatic Proofreader

```
10 C = 0: FOR I = 768 TO 768 + 68: REA
   D A:C = C + A: POKE I,A: NEXT
20 IF C < > 7258 THEN PRINT "ERROR IN
   PROOFREADER DATA STATEMENTS": END
30 IF PEEK (190 * 256) < > 76 THEN POK
   E 56,0: POKE 57,3: CALL 1002: GOTO
   50
40 PRINT CHR$ (4);"IN#A$300"
50 POKE 34,0: HOME : POKE 34,1: VTAB 2
   : PRINT "PROOFREADER INSTALLED"
60 NEW
100 DATA 216,32,27,253,201,141
110 DATA 208,60,138,72,169,0
120 DATA 72,189,255,1,201,160
130 DATA 240,8,104,10,125,255
140 DATA 1,105,0,72,202,208
150 DATA 238,104,170,41,15,9
160 DATA 48,201,58,144,2,233
170 DATA 57,141,1,4,138,74
180 DATA 74,74,74,41,15,9
190 DATA 48,201,58,144,2,233
200 DATA 57,141,0,4,104,170
210 DATA 169,141,96
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1. Please let us know. Do you

	Own:	Plan to buy:
Apple II+	☐ 270	☐ 271
Apple IIc	☐ 272	☐ 273
Apple IIe	☐ 274	☐ 275
Apple IIGS	☐ 276	☐ 277
Apple III	☐ 278	☐ 279
Macintosh 512	☐ 280	☐ 281
Macintosh Plus	☐ 282	☐ 283
Macintosh SE	☐ 284	☐ 285
Other ______ (please specify)	☐ 286	☐ 287

2. Where do you usually use your Apple computer?
At home/home office ☐ 214
At a business office ☐ 215
Both office and home ☐ 216
In the classroom ☐ 217
Other ______ 218

3. Do you plan to purchase a personal computer in the next 12 months?
Yes ☐ 219
No ☐ 220
Don't know ☐ 221

4. Do you plan to purchase software in the next 12 months?
Yes ☐ 222
No ☐ 223
Don't know ☐ 224

5. Which of the following peripherals do you own or use? (check all that apply)
Disk Drive ☐ 225
Joystick (or game peripheral) ☐ 226
Modem ☐ 227
Monitor ☐ 228
Printer ☐ 229
Other (please specify) ______ 230

6. Which of the following peripherals do you plan to purchase in the next 12 months? (check all that apply)
Disk Drive ☐ 231
Joystick (or game peripheral) ☐ 232
Modem ☐ 233
Monitor ☐ 234
Printer ☐ 235
Other (please specify) ______ 236

7. Approximately how much do you plan to spend on your computer or computer-rela items in the next 12 months?
Under $100 ☐ 237
100–499 ☐ 238
500–999 ☐ 239
1000–1999 ☐ 240
2000 or over ☐ 241
Don't know ☐ 242

8. Please put an X in the box which indicates your age group.
Under 18 ☐ 243
18–29 ☐ 244
30–44 ☐ 245
45–65 ☐ 246
Over 65 ☐ 247

9. What is the highest level you completed in school?
Some high school or less ☐ 248
High school graduate ☐ 249
Attended college 1-3 years ☐ 250
College graduate ☐ 251
Post-graduate study without degree ☐ 252
Master's degree ☐ 253
Doctoral degree ☐ 254

10. Would you describe your present occup as
Student ☐ 255
Manufacturing/service ☐ 256
Clerical/technical ☐ 257
Sales ☐ 258
Educator ☐ 259
Professional ☐ 260
Other ☐ 261

11. What is the total combined annual income before taxes for all members of your household?
Less than $10,000 ☐ 262
10,000 to 14,999 ☐ 263
15,000 to 19,999 ☐ 264
20,000 to 24,999 ☐ 265
25,000 to 34,999 ☐ 266
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	Epson MX/FX/RX 80/85	
Brown	Epson MX/FX/RX 100	
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Purple	Okidata 182/192/193	
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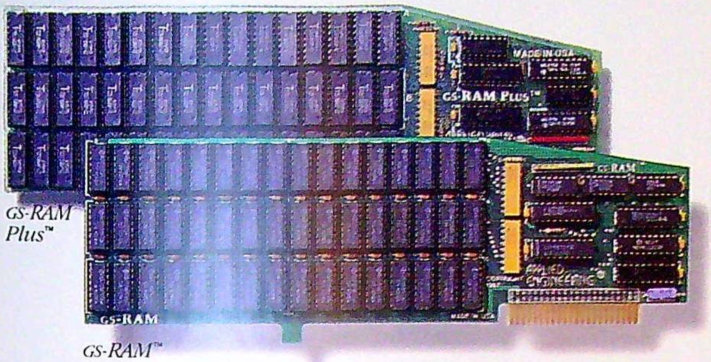

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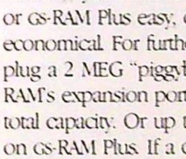
With our RamKeeper™ back-up option, your GS-RAM or GS-RAM Plus will retain both programs and data while your IIGS is turned off! Now when you turn your IIGS back on, your favorite software is on your screen in under 4 seconds! With RamKeeper you can divide your IIGS memory into part "electronic hard disk," and part extended RAM. Even change the memory boundaries at any time—and in any way—you want. Because Applied Engineering has the most experience in the industry with battery-backed memory for the Apple, you are assured of the most reliable memory back-up system available. And in the world of battery-backed memory, *Reliability* is everything. That's why Applied Engineering uses state-of-the-art "GEL-CELL's" instead of Ni-Cad batteries (if Ni-Cads aren't discharged periodically, they lose much of their capacity). RamKeeper has about 6 hours of "total power failure" back-up time. That's 6 times the amount of other systems. But with power from your wall outlet, RamKeeper will back-up GS-RAM, GS-RAM Plus, or most other IIGS memory cards indefinitely. Should you ever have a "total power failure," RamKeeper switches to its 6-hour battery. When power returns, RamKeeper will automatically recharge the battery to full power. RamKeeper incorporates a dual-rate charger, status L.E.D.'s, and advanced power reducing circuitry. RamKeeper comes *complete* with battery, software, and documentation.



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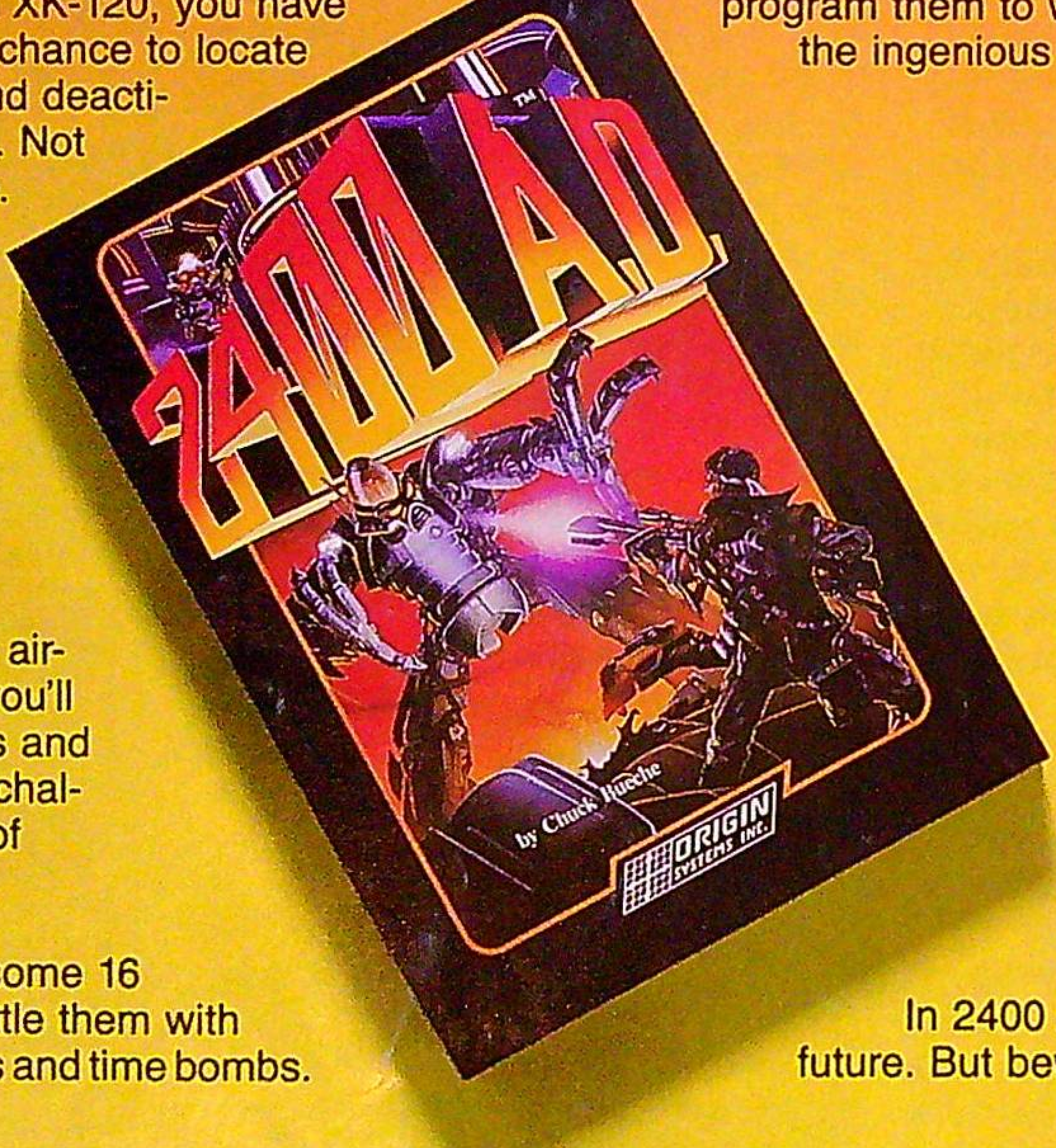

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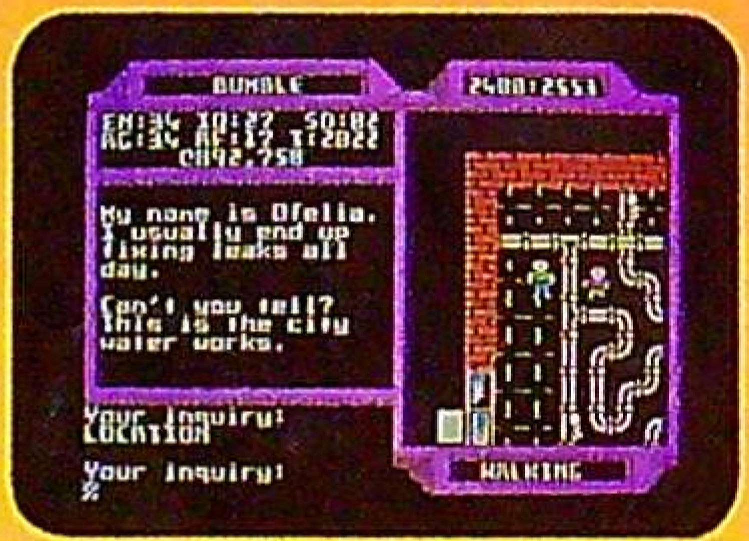

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