

\$10,000 Programming Contest! See Page 38 For Details.

COMPUTER!'S

Apple

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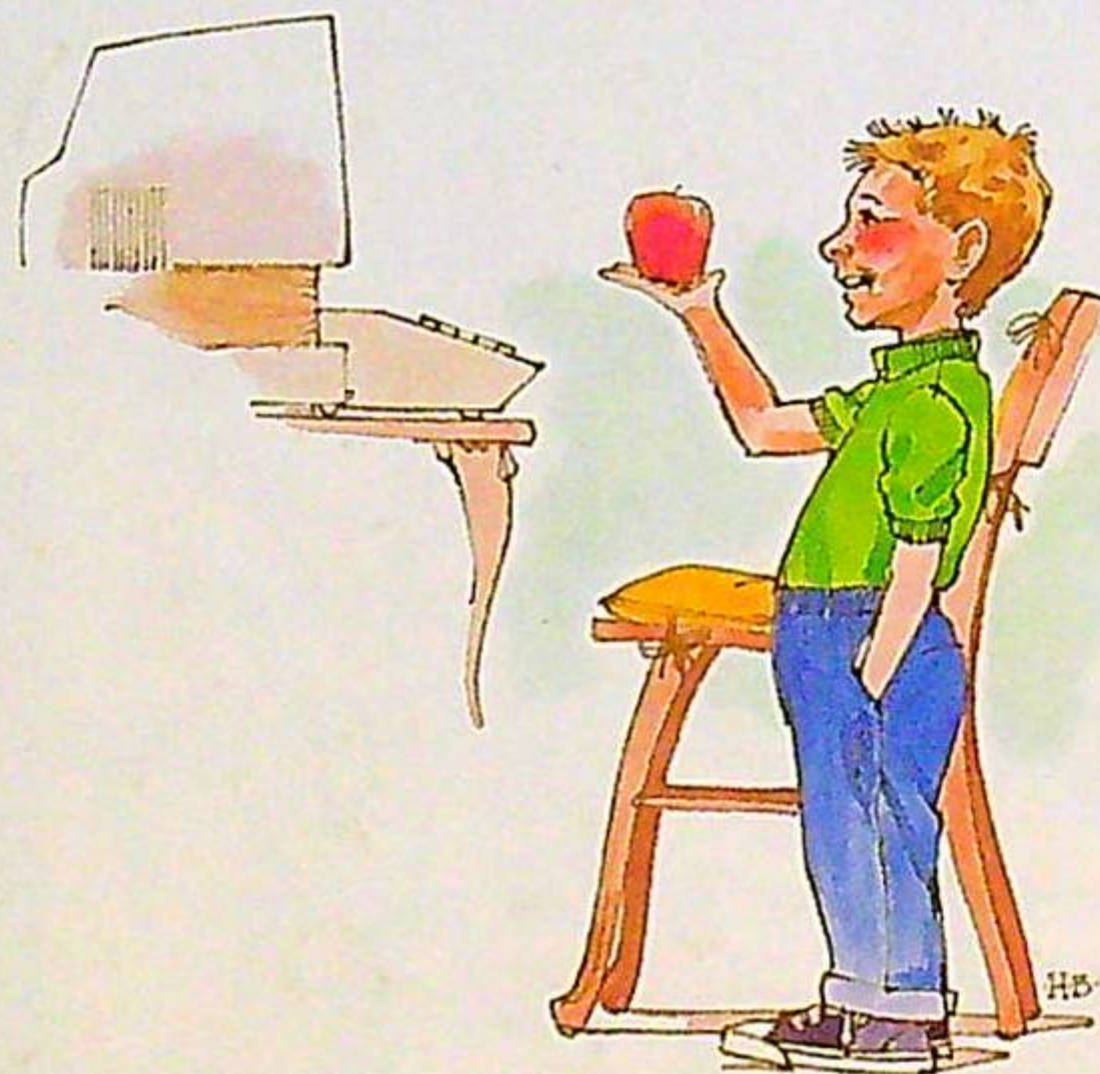
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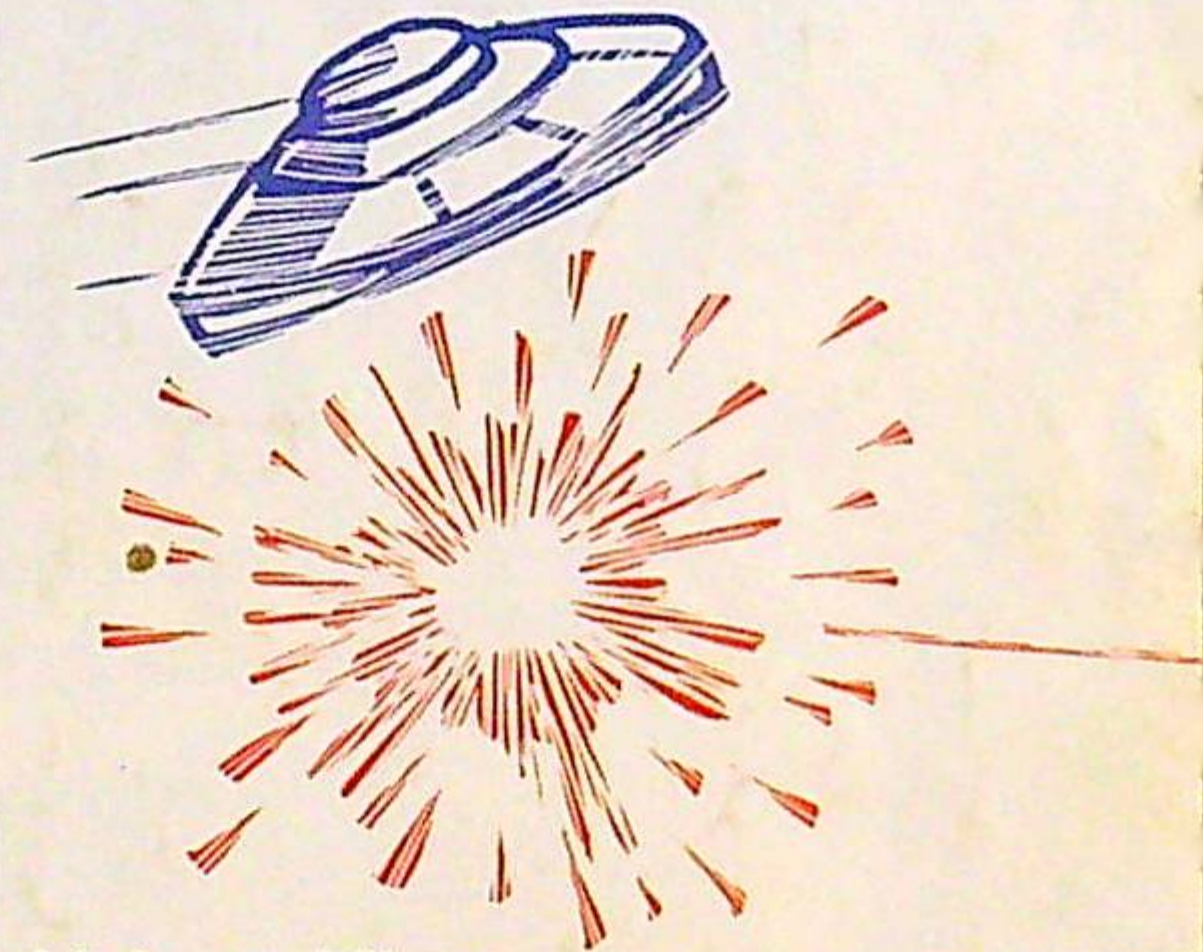
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Apple News And Notes
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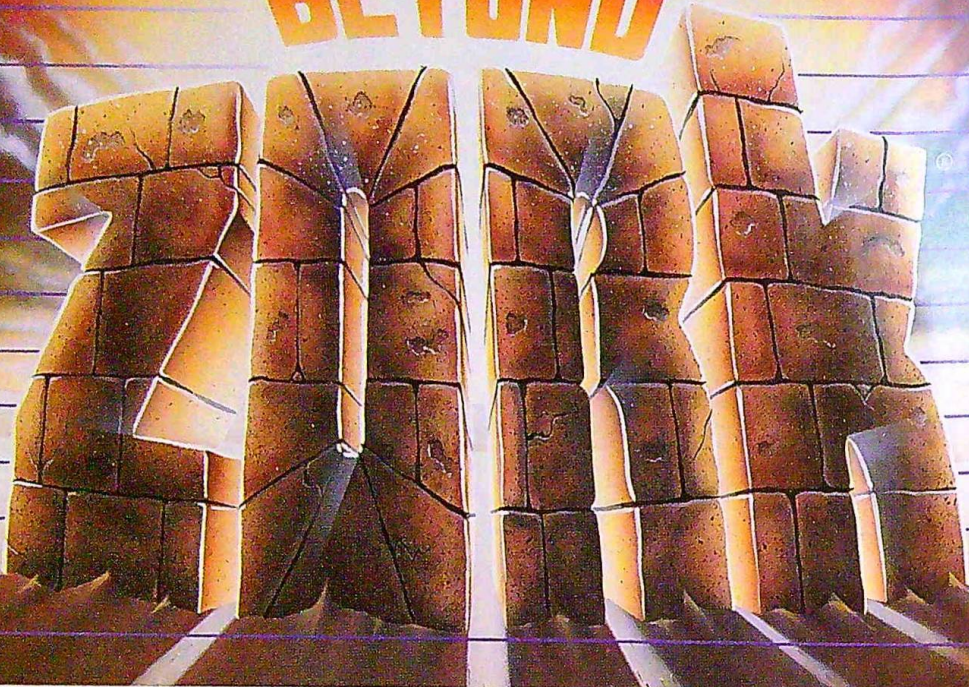
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Number
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Numbers



APPLE II DISK
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page 109

BEYOND



The *Zork Trilogy* has become a legend in its time, selling nearly one million copies! Now the legend continues with an extraordinary new Zorkian universe that breaks ground in computer gaming. For the first time, the character-building and combat of role-playing games joins the masterly prose and puzzles of Infocom's interactive fiction.

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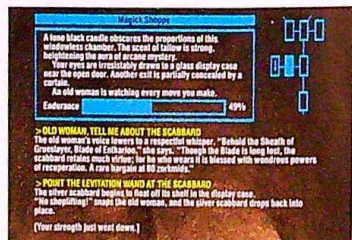
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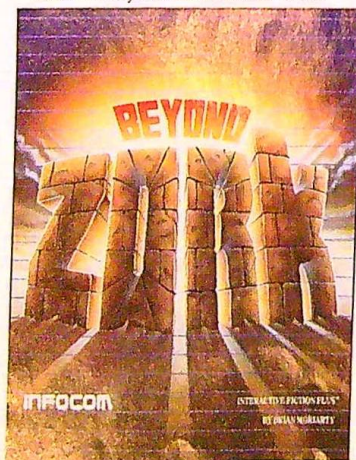
Beyond Zork is available at your local dealer for the Apple II series, Macintosh, Commodore 128, Amiga, IBM PC and 100% compatibles, and Atari ST. To order direct, call 1-800-262-6868. Coming soon: Apple IIGS.

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One glance at *Beyond Zork* will show you that it's unlike any interactive story you've seen before. On-screen mapping. Window displays. A character that grows in strength and power. You get all the excitement of role-playing games, skillfully blended with the fabulous puzzles and award-winning prose of Infocom's interactive fiction.

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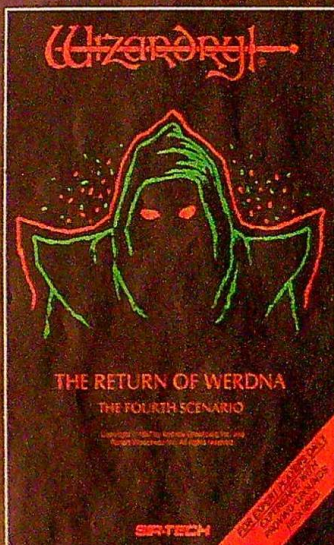
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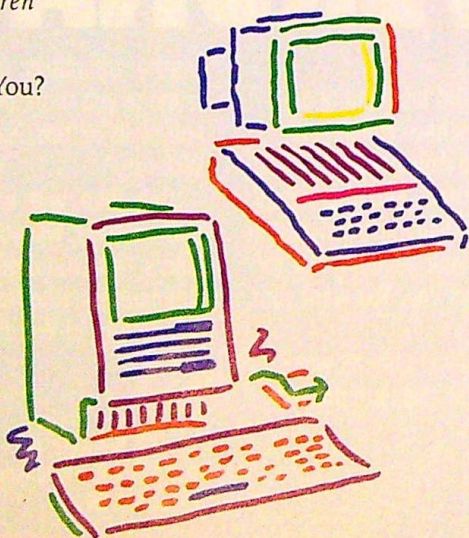
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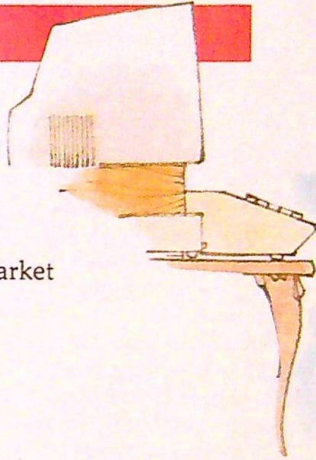
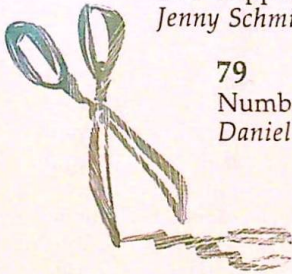
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Editor's Notes

Welcome to the new COMPUTE's Apple Applications.

This is the first bimonthly issue of Apple Applications. Previously a newsstand-only magazine that appeared twice a year, Apple Applications has proven so successful at delivering the information and programs Apple users want and need, we're now turning it out six times a year and offering subscriptions for the very first time.

In all modesty, we think this is a unique publication—one that mixes Apple II and Macintosh coverage, combines features with the highest quality ready-to-type-in software, and offers informative applications tutorials and accurate hardware and software product reviews. By all indications—more than a quarter million people have bought the magazine—you like the flavorful blend that's made Apple Applications what it is. We're only going to make it better.

Apple Applications is expanding as we turn it into a bimonthly. Regular columns like "Apple News and Notes," "Reader's Feedback," "Tips, Tricks, and Tidbits," and Dan Gutman's game column, "Just for Fun," debut in this issue.

We're also continuing to offer impressive Apple II programs. Each of the seven programs in this issue is a winner. Try the

fast-paced arcade game "Vulcan Mines," an all-machine language game that lets you create the game boards. "ProDesk" is a superb program launcher and file maintenance program. "The Clipper" is a sophisticated graphics system that makes it possible to create custom clip art from any hi-res picture and lets you paste clippings together to make new computer art.

We publish applications for the home, school, and even the office. And we publish more full-featured programs than any other magazine. Among our past efforts have been a fast and easy-to-use 80-column word processor, animation packages, a disk editor, programming utilities, and educational games and programs. We'll continue to publish the best Apple type-in software in every issue.

That's why Apple Applications is sponsoring a \$10,000 programming contest (see page 38 for details). With six possible prize winners, ranging from a First Prize of \$5,000 to three Honorable Mentions of \$500 each, it's the largest programming contest ever sponsored by an Apple magazine. Even if you don't win a prize in the contest, your program could be bought for publication, with generous payments headed your way. If you program, or you know someone else who does, get in touch with us.

All the Apple II programs in this issue are available on our companion Apple Applications Special Disk. This 5 1/4-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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AppleWorks, Where Are You?

The Apple IIGS is an innovative computer that runs most of the existing Apple IIe and IIc software. But most people who buy an Apple IIGS (and the numbers are increasing) usually don't want to run IIe/c software—they want to run IIGS-specific programs that make use of the machine's terrific sound and graphics.

But the fact remains that *AppleWorks* is the best selling Apple program ever. It's the reason thousands of people bought Apple IIc and IIe computers.

A IIGS version of *AppleWorks*, or an integrated package like *AppleWorks*, could galvanize the machine's sales. The IIGS's speed, one of its strong points, and its easy-to-add memory make it a perfect computer for large and sophisticated applications.

Yet many developers have taken the IIGS's Macintosh-like appearance too much to heart. Frequently, the result is programs which, though colorful and complete with pull-down menus and zooming windows, suffer from slow speeds. Graphics manipulation, whether in a drawing program or in a graphics-extensive environment like a Mac-style desktop or window, needs high processing speeds. Without such quickness, redrawing screens slows to a crawl and typing fails to keep up with the typist.

As if to compensate, the IIGS

Coming Attractions

Coming in the February 1988 issue of *COMPUTE!'s* Apple Applications: **AppleFest**. Our firsthand report from the biggest Apple II fair of the year.

Laser Chess™. This machine language, double hi-res strategy program is a powerfully original, futuristic strategy game.

Computers, Cameras, and Composition. Apple computers, video cameras, audio equipment, and desktop publishing combine to create multimedia classrooms.

Rat Race. A fast-paced arcade game where speed and dexterity is of the essence. Run your rats and avoid the traps.

Mastering MacDraw. Hands-on information about the most popular drawing program for the Macintosh.

NewsWriter. A printing and formatting utility that turns the plainest Apple II text files into multicolumn newsletters.

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

has a lot of memory—more than twice what's found in a IIe or IIc. Adding memory to the IIGS is both easy and inexpensive. And large amounts of memory means the machine can run large programs.

The Apple IIGS needs a program like *Microsoft Works* for the Macintosh—an integrated package of word processor, spreadsheet, database, telecommunications, and graphics. This hypothetical *GSWorks* doesn't need color; writing, calculating, filing, charting, and communicating don't require color. *GSWorks* should be fast—scrolling through a word processing document or across a huge spreadsheet should be at least as fast as in *AppleWorks*.

Multiple windows must be sup-

ported; you should be able to open at least four at any one time. Pull-down menus and mouse support are needed, but the interface should not be bogged down with countless fonts or unnecessary graphics. In all, *GSWorks* should look clean and run fast.

GSWorks could be the program that opens the doors to acceptability and a significant installed base. Without *GSWorks* (or something like it), the IIGS may well languish. That would be a shame.

Gregg Keizer

Gregg Keizer
Editor

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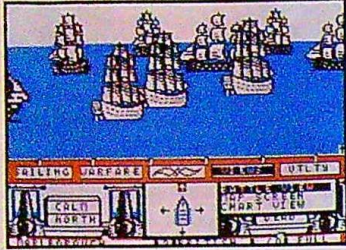
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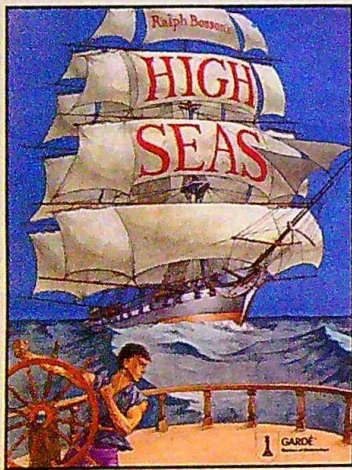
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Apple News & Notes



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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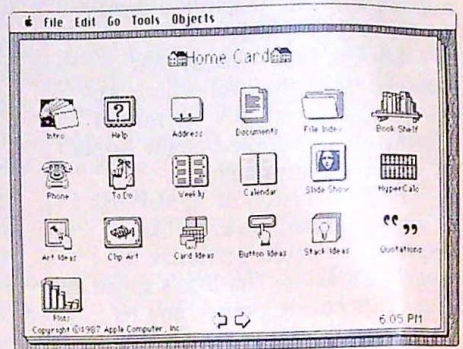
Information On A Card

HyperCard, announced in August and shipped with every new Macintosh as of September, may make Macintosh the personal computer of choice.

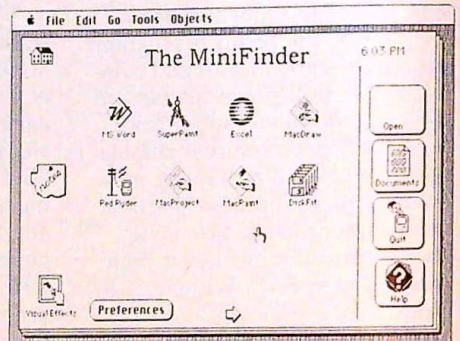
Not really system software, not really an application, *HyperCard* is touted as a personal toolkit for developing the ways to create and use information. Its name derives from the way it treats information and accesses that information. Much like the touted hypertext concept, *HyperCard* lets people locate information in a nonlinear fashion, by dynamically linking one idea with another. And its index-card look is something most people can get comfortable with in a matter of moments.

Here's how *HyperCard* works. Information is stored on *cards*, screens which can include such things as graphics, buttons to send the user to other cards, and fields for entering and editing text. While working within an address-filer application of *HyperCard*, for instance, you can enter and delete names, addresses, and phone numbers. You can search for any name, sort the cards, even turn to another kind of card—a list of things to do, perhaps.

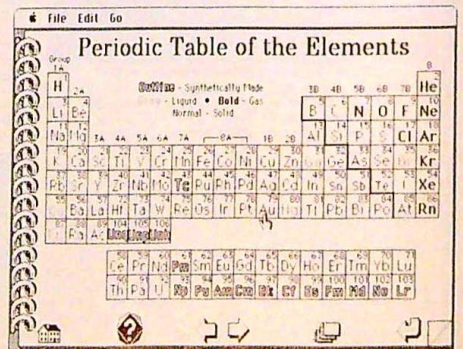
The *HyperCard* package includes four 800K disks, about three megabytes of files altogether. Sample *stacks*, the term given to the collections of cards *HyperCard* uses, include such things as address files, to-do lists, and phone lists. Announced stacks from developers range from one that's a partial adaptation of *The Whole Earth Catalog* to one that offers thousands of facts for international travelers—such as currency exchange rates, schedules, and climate.



HyperCard's applications are called by clicking on the appropriate button on the Home card.



One of the first HyperCard applications to appear on commercial databases like GENIE and CompuServe was this MiniFinder.



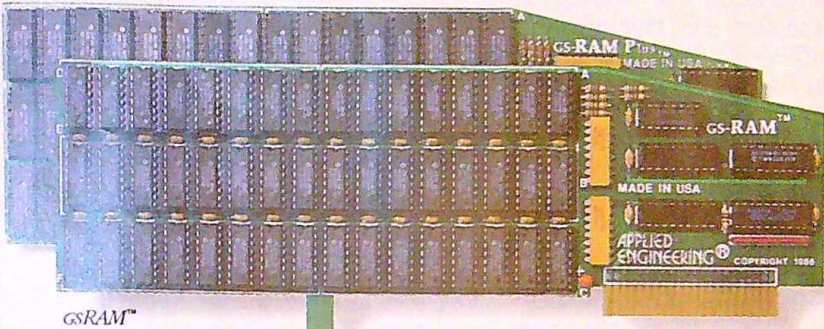
Another early HyperCard entry was this dynamic chart of the elements. Click on the element and additional information appears.

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GSRAM™

Remember the 16K cards for the II+ and the 64K cards for the IIe? At the time, that much memory seemed like a lot. But when the owners of these memory cards came to us for more memory, many had to throw away their smaller Apple memory cards or try to sell them. Most of our customers told us that had they known about Applied Engineering's larger memory cards when they bought their Apple, they would have purchased them at the same time.

GSRAM and GSRAM Plus are available now, allowing up to 8 MEG of memory expansion. That's 8 times the memory capacity of Apple's card and just look at the benefits that only GSRAM and GSRAM Plus have over Apple's card:

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- Has ROM expansion port
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- No soldered in RAM chips
- Expandable to 8 MEG
- Expands AppleWorks internal limits
- Built-in Hi-Res self-diagnostic software
- 5 year hassle free warranty (Apple has a 90 day warranty)
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GSRAM for More AppleWorks Power

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High Expectations

Apple is expecting great things from *HyperCard*. With its HyperTalk scripting language (essentially a programming language) it should be easy for users to create new stacks of their own. Customizing cards and entire stacks is also relatively easy, though it takes time. But as with most other computer applications, many *HyperCard* users will probably leave their purchased stacks alone and use them as is.

HyperCard is fun to play with, but at the moment, its usefulness is less than revolutionary. One reason is its memory requirements. *HyperCard* requires a full megabyte of memory. In itself, that's not shocking; all Macintosh computers now sold come with that much RAM. But many Macintosh owners are comfortable only when using more than one application at a time. *Switcher* and desk accessories are the two most common examples of that philosophy.

Yet *HyperCard* demands the full attention of a one-megabyte Macintosh. And since it's an application, users must first quit whatever program is active—for instance, a word processor—before running *HyperCard*. Look for *HyperCard* to reach its stride when Macintosh memory is at the two-megabyte point.

With the amount of information a stack can contain (the upper limit is 32K per card, which means that a stack could hold megabytes of data), *HyperCard* doesn't seem practical on a floppy disk-based Macintosh.

HyperCard has one glitch.

What the program calls the Home card (a central stack that lets you call other stacks and cards) is a necessary part of *HyperCard*. Without it, stacks can't be accessed. In fact, *HyperCard* won't run without the Home card. But a new Home card cannot be created without *HyperCard*. Corrupt the Home card, and you're stuck.

ROM And CD-ROM

The talk is that at some point *HyperCard* may become part of the Macintosh's ROM. That would certainly solve the memory problem. And it would make *Hyper-*

Card's ultimate application, CD-ROM, a reality. CD-ROM links a compact disc player, much like the popular audio players, to a computer. Huge quantities of information can be stored on just one small compact disc.

HyperCard seems tailor-made for accessing enormous amounts of information. First of all, the card-style interface can be immediately understood by almost anyone, from school children to power users. More importantly, the ability to link information and then let the user access that information in a nonsequential fashion is perfect for CD-ROM, which allows for relatively fast random access. And by allowing for graphics, video, and audio, *HyperCard* is properly positioned to act as an interface for these aspects of future CD-ROM.

One piece of announced *stackware*—the phrase being coined for *HyperCard* applications—provides such an interface, not for CD-ROM, but for a laser videodisc. *The National Gallery of Art Laserguide* will work with *The National Gallery of Art* videodisc and let users design their own tour of the museum's works. Sort for all Renoirs, for instance, set the speed of the tour, and sit back and watch the masterpieces slide by. Or select any painting or sculpture and read detailed notes about its artist, subject, or school.

And What Do They Think?

Some developers are bound to be less than enthusiastic about *HyperCard*. It will obviously cut into the market of such products as hypertext applications like *Guide* as well as simple file managers traditionally used for the kinds of information processing that *HyperCard* is good at.

Others, though, can only be ecstatic. With the proper basic information, the smallest programming shop should be able to turn out *stackware*. Expect a number of the early efforts to show up as shareware or freeware on bulletin boards or commercial database services like CompuServe, Delphi, and GENie. Both GENie and CompuServe had *HyperCard*-dedicated areas in their

Macintosh forums within days of the product's announcement. *Stackware* available for downloading in late August ranged from note-taking cards to program launchers to one showing every chemical element.

Look for even more sophisticated stacks in the months to come, both from shareware and commercial programmers.



II On II

Software publishers aren't climbing over each other to release hot new products for the Apple IIGS. Many publishers have canceled or postponed their plans for Apple IIGS software and instead are cautiously introducing programs for the Apple IIc and IIe. It's even more revealing that many of the products for the Apple IIGS are simply versions of software which first appeared on the Apple IIe and IIc—versions that incorporate color and use the mouse interface.

Not that the Apple IIGS isn't an exciting computer or that it's not selling. The fact remains that there is software for the Apple IIGS which accomplishes tasks never before possible with an Apple II computer. But the Apple IIGS is in a strange position, something software publishers feel in their pocketbooks. Its technology is far beyond the other Apple II computers, but because of limitations in resolution and speed, it's not quite a Macintosh.

Businesses are cautious enough about unproven products that the slightly more expensive Macintosh Plus is more attractive than the Apple IIGS (the Mac Plus can now be found for several hundred dollars more than an Apple IIGS). On the other hand, thousands of business, educational, and home users are perfectly happy with their IIe and IIc computers. They have a computer with an unmatched track record at an affordable price. (One user traded in his Macintosh for an Apple IIc because he realized that he *wasn't* doing desktop publishing, he *wasn't* creating artistic graphics, and he *wasn't* linking his

computer to three synthesizers and a MIDI controller box. He was doing simple database and spreadsheet work for sales and occasionally typed out a letter or report.)

There are lots of computer applications, such as *AppleWorks* and memory expansion, that don't require anything but an Apple IIe or IIc and existing products. So effective is the basic Apple II software that the hottest product on the Apple IIGS is *AppleWorks*. No mouse interface, no pull-down menus, no color, no graphics. Just *AppleWorks* from the IIe and IIc world.

The *AppleWorks* Umbrella

When you look at the *AppleWorks* add-on industry, you find all the competition and excitement that was supposed to be part of the IIGS. *AppleWorks* has become a frontier for software developers. That's exciting for Apple users.

Take Beagle Bros. Here's a company that gained a following of hackers and programmers because of its utility tools for the old Apple II and Apple II+ computers. Now, seven years later, the company is introducing a line of products which enhance *AppleWorks*, but demand no reduction in speed, control, or ease of use. Beagle is making big waves, as evidenced by the attention they attracted at AppleFest in San Francisco.

Their products are based on the theory that it's better to stay inside *AppleWorks* than to leave it. There are nearly one million *AppleWorks* users who might agree. Beagle Bros.' new Time Out line enhances *AppleWorks* itself, giving you graphing, spelling correction, desktop accessories, and other tools. These new powers appear within the application, as if *AppleWorks* always had them. Their *Power Fonts* program prints files with Macintosh-like fonts on the ImageWriter (and over 50 other printers), without leaving *AppleWorks*. The results are as good or better than a Mac.

To get this kind of *AppleWorks* compatibility, Beagle had to play with the *AppleWorks* program code and change it—a

process known as *patching*. Apple makes this kind of information available to developers.

Nondevelopers can get the information from the *AppleWorks* programmer himself, Bob Lissner. Lissner started a bulletin board service that users can call and download *AppleWorks* programming data. With all this patching going on, *AppleWorks* has become much like an umbrella, under which other software is written. Soon, the best software on the Apple II computer line will require *AppleWorks*.

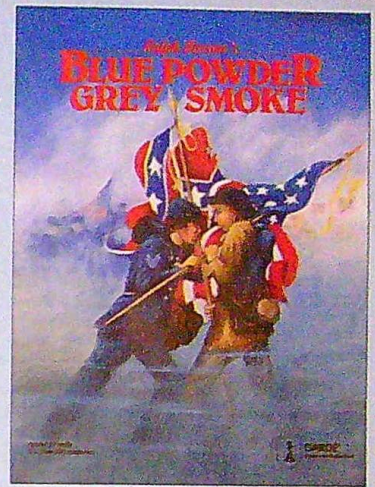
Passport, Please

Apple introduced a product, originally called *Passport*, which converts data to and from *MacWrite* format and (you guessed it) *AppleWorks*. Not only does the program let the Macintosh read a ProDOS-formatted disk (amazing in itself), but it also translates *AppleWorks* files to the Macintosh—and Macintosh text files to *AppleWorks*. Another breath of life into the Apple II. Now businesses that already use the Macintosh for desktop publishing and other Mac-specific applications can use an inexpensive Apple II for their second, third, and fourth computer.

Passport was originally available through the Apple Programmers and Developers Association (APDA—contact the A.P.P.L.E. Co-op at 290 SW 43rd St., Renton, WA 98055 for membership information), but will be shipped with every Macintosh in the future. Apple is *not* shipping *Passport* with Apple II computers. That's strange, for the program is most valuable as a translator from the Macintosh to *AppleWorks*—not the other way around.

Other Apple II developments: Look for someone to introduce a LaserWriter interface for the Apple II soon.

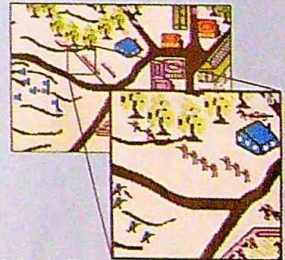
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In national reviews, Jay Selover in *Computer Gaming World* stated "This effort matches the cutting edge market level...A Player's game"

Neil Shapiro in *Nibble* said "Blue Powder Grey Smoke is the definitive way to fight Civil War battles today...Graphically the game is beautiful...A piece de resistance"

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The Sky's The Limit

Apple has dollars in its pockets. Over \$600 million, to be exact, according to the company's just-released third-quarter report.

That money comes from an increase in both sales and income over the same quarter last year. With jumps over last year of 42 and 65 percent, respectively, net sales rose to \$637 million, resulting in a net income of \$53 million.

According to the report, close to half of that sales amount came from new products—those introduced in the last 12 months. (Three new computers have been released in that time—the Apple IIGS, the Macintosh SE, and the Macintosh II; the Mac II could not have had a major impact on sales, however, due to its low level of production in the third quarter.) International sales accounted for 32 percent of all revenues, ascribed to brisk Macintosh overseas sales.

Apple is cash-rich, according to the report, which lists cash and temporary investments at nearly \$624 million. But that's down \$78 million from last quarter because of a continued policy of repurchasing Apple common stock and a large increase in inventories to \$191 million. The huge inventories (up 55 percent over last quarter and up 90 percent over the same quarter last year) indicate that Apple believes it will sell more computers this fall and into the Christmas season, traditionally the strongest selling season.

What's Apple doing with all this cash? Perhaps nothing. The company has built up this enormous cash reserve over several years, and hasn't devoted large chunks of it to any one project or purchase. On the other hand, with that much money, almost anything's possible. Some of it could be used to buy software companies and their products for Claris, the new software arm of Apple. Already, Apple's strategic investment group has invested in four firms, ranging from Sybase, maker of a relational database product, to Forethought, developer of *PowerPoint*, the desktop presentation package.

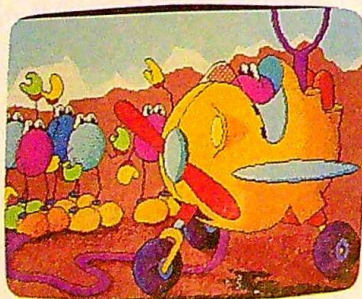
Another way to spend this money may be research and development, where \$48 million was spent last quarter; R & D's funds could be increased dramatically to search for and create Apple products for the 1990s and beyond.

Online Art

CompuServe's forums contain hundreds of Apple II and Macintosh programs for its subscribers to download. One particular dazzling program for the Apple IIGS, a program that's just part of an ambitious graphics project CompuServe has embarked upon, is *SuperHiRes Converter*.

Want to view an Amiga-created *Deluxe Paint II* picture—on your IIGS? Or take a look at an Atari ST graphic made with *DEGAS Elite*? What about sneaking a peek at the hundreds of digitized pictures Macintosh owners have been making for years with *Thunderscan* and *MacPaint*?

CompuServe's GIF (Graphics Interchange Format) project—a proprietary picture format and accompanying conversion utilities for computers ranging from the IBM and Macintosh II to the Atari ST, Amiga, and Apple IIGS—is partially complete. With the



Originally drawn on an Atari ST with *DEGAS*, "Bubble Bumpers" was electronically transferred to an Apple IIGS and converted with *SuperHiRes Converter*, the GIF-specific utility found on *CompuServe*.

proper utility programs, all available on CompuServe in the PICS forum, you can view a large number of computer works of art created on a wide variety of computer systems.

The Apple IIGS program can be found in Data Library 1 of the PICS forum as *SHRCNV.BNY*. Download and convert the file from its Binary II format (look for a file called *BLU.EXE* in *DL10* of the Apple II area of *MAUG*, the Apple/Macintosh-specific forum of CompuServe; *BLU* is necessary to convert *SuperHiRes Converter*) into a runnable application.

Pictures can be found in PICS and in some of the machine-specific forums on CompuServe. Look for any files marked with the *.GIF* extension.

SuperHiRes Converter works in native mode, that is, as a IIGS program complete with menus, resizable windows, and mouse support. Documentation is virtually unnecessary, as most people can figure out how things work with just a little experimentation.

SuperHiRes Converter works wonderfully, and, in short tests here, it successfully converted pictures originally created on an Atari ST with *DEGAS* and on a Commodore 64 with *FlexiDraw*. The results were stunning. Colors and shading seemed true to the original; in one case, in fact, the picture seemed brighter on the IIGS than on the original computer.

At this writing, *SuperHiRes Converter* only displays pictures; its Save feature, required before Apple IIGS artists can upload their own artistic endeavors, was not working. But by the time you read this, the GIF project should be complete, and Apple IIGS owners will be able to add their work to the growing gallery of online art.

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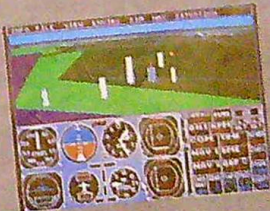
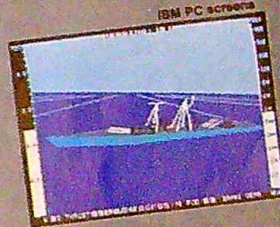
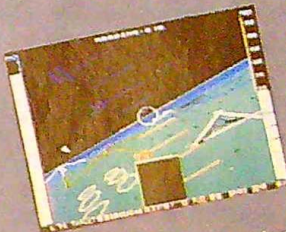
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Making



Music

Rick Parfitt

The Apple IIGS holds the promise of sophisticated sound and music capabilities. Has that promise been kept? The author, a designer of music software, says the answer is a resounding "yes."

Your computer sits in front of you. As you type a letter, your fingers begin tapping out a beat, a rhythm for a song. The computer has helped you process words for years—but why stop there?

If only there were a way to capture those taps and transform them into a rhythm for a song you've been wanting to write. The computer could play back the captured rhythm, or even become a musical instrument itself.

Enter the Apple IIGS, a unique computer, capable of playing 32 different instruments simultaneously. In addition, the IIGS offers 16-color graphics and a mouse for input. With the right software, this machine can com-

pose, record, and play music.

The sound capabilities of the IIGS are impressive and extensive. In fact, the IIGS contains a computer within the computer. Inside every IIGS is a special processor for turning digital information into sound. This processor, or *special purpose sound computer*, can control up to 32 different oscillators. Each oscillator can play a different note or sound like a different instrument. Apple licensed the processor from Ensoniq, a popular manufacturer of music synthesizers. Ensoniq's Mirage electric keyboard has internal hardware similar to the IIGS, but sells for \$1,700.

Sound created by the IIGS is normally heard on the internal speaker, but for better sound quality, an audio output jack is provided. The sound quality is enhanced when the audio output is connected to a home stereo system. An add-on card is even available from MDIdeas to give the IIGS stereo output. The stereo card can be used to individually direct the output of each sound oscillator to either the left or right stereo channel.

There are several ways to write your own music software for

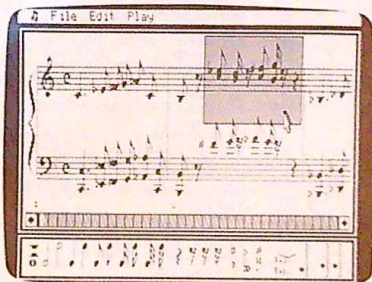
the IIGS. Unfortunately, the current version of Applesoft BASIC doesn't address the computer's *firmware* (the instructions written permanently into its ROM) for using the sound hardware. Still, there's hope. Rumors are circulating about a new ProDOS-16 BASIC—a BASIC able to access such things as the sound hardware. Until then, you'll have to write music programs in C, Pascal, or machine language, or any other language which permits direct ROM access.

The IIGS comes with a sophisticated set of software called the *Toolbox*. Inside the Toolbox is Tool25, the note synthesizer. With this tool, and any IIGS standard sound file, you can write an elementary program to play notes. Simple subroutine calls are made to the NoteOn and NoteOff routines. The note synthesizer interface simulates a typical MIDI synthesizer (MIDI is a universal interface for linking computers and musical instruments—see sidebar for a more complete description of MIDI). The *Apple IIGS Technical Reference Manual* contains a full description on how to load and call the note synthesizer.

Music Software For The Computer

Today, there's a wide range of music software available for personal computers. You can edit and compose music using standard musical notation, record a live performance directly into the computer using the MIDI interface, and design and create your own sounds.

With one category of software, **note editors**, the computer becomes a composition tool, helping people write musical scores. Many of these composition programs can even play the composition and print the results. *Music Construction Set*, from Electronic Arts, and *The Music Studio*, from Activision, are music composition programs available for the Apple IIGS.



Music Construction Set, from Electronic Arts, is an example of a note editor. On the IIGS, notes can be picked up, dragged, and set down on the staff. Notice the shaded box of selected notes.

Another category of music software, **sequencers**, turn the computer into a sophisticated tape recorder that includes editing capabilities. An electronic keyboard is attached to the computer through a MIDI interface. The keyboard is then played and the notes are recorded by the computer. Recorded sections of the music are called *sequences*, which can either be spliced together or individually edited. Examples of this type of software are *Master Tracks* and *MIDI 8 Plus*, both from Passport Designs. These packages, previously available for the eight-bit Apple II line (Apple IIe, IIc), have been upgraded to work with the Apple IIGS.

MIDI

MIDI (Musical Instrument Digital Interface) was adopted as an international standard in 1984 by several electronic musical instrument makers. The MIDI standard allows different instruments, computers, and device controllers to communicate with one another over a common interface. Using MIDI, a computer can record input from a MIDI instrument and send output to a MIDI instrument. With the right software, an Apple IIGS, and a MIDI interface, you could write a symphony and play it back via synthesizers.

A MIDI keyboard connects to your computer just like a printer or other peripheral. Hook a MIDI keyboard to your computer, and suddenly all the precision and data-handling ability of the computer is at your disposal. The power of MIDI comes from both its simplicity and universal acceptance.

Any MIDI adapter box compatible with the Macintosh, such as Passport's MIDI interface, can be used on the Apple IIGS. A MIDI keyboard, an adapter box, and two inexpensive cables are the only hardware required to use MIDI on your new Apple.

Sending information over MIDI is like sending information to a printer. Like the letters of the alphabet, piano keys of a MIDI keyboard are mapped to a set of numbers. Any key on the keyboard can be turned on or off from software by a simple sequence of three bytes. The first byte is the *key on* command; the second byte is the *key number* (60 for middle C, 61 for C-sharp, and so on); and the third byte is the *volume* at which to play the note. Sending a zero volume turns a note off. With a computer and MIDI, complicated (even humanly impossible) music is now often surprisingly easy for anyone to create.

One advantage of using a computer to record MIDI data is that the playback speed can be different than the recording speed without affecting the pitch of the notes. It's simple to record a piece slowly and then increase the speed on playback. A great variety of other modifications to a piece are also quite easy with sequencers: inversions, various kinds of transposition, merging, automatic variations, selective or randomized permutations, and many other transformations. Composers are now able to easily test their ideas using a variety of instrumentations and alternative arrangements.

Sound editors/librarian software manipulates and stores information about different synthesized or digitized instrument sounds. Sounds generated by the Apple IIGS can be captured, or digitized, using a hardware product from MDIdeas called the *Supersonic Digitizer*. The *Music Studio* software also allows the user to edit the already digitized

sounds available on the Apple IIGS.

When a MIDI interface is connected, the computer can load, store, and edit sounds stored in keyboards from such companies as Ensoniq, Yamaha, Casio, and others. Librarian programs solve the data management problem of tracking large sound libraries. For example, there are over 3,000 different instrument sounds available for the Yamaha DX7 keyboard, yet it can internally store only 64 at one time.

At this writing, however, there are no sound editors/librarians available for the Apple IIGS. (Several are available for Apple II and Macintosh computers.) Undoubtedly, similar software will be available in the future for the Apple IIGS.

Here And Now

More software is appearing all the time for the Apple IIGS, software that turns the computer into a musical instrument. One such pro-

Programs, Peripherals,

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Thezard (*IIGS*) 32.
The Black Cauldron 25.
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Simon & Schuster
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Star Trek (*The Promethean Prophecy*) 26.
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Knight of Diamonds (each) 25.
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Gato (*IIGS*) 25.
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Battle For Normandy, BroadSides, Colonial Conquest, Gemstone Warrior, Geopolitics 1990, Imperium Galactum, NAM, North Atlantic '86, Phantasia II, Phantasia III, Rails West, Ring's of Ziffin, Roadwar 2000, Shard of Spring, The Eternal Dagger, or Wizard's Crown (each) 26.
Battle Cruiser, Battle Group, Kampfgruppe, Mech Brigade, U.S.A.A.F., Warship, or War in the South Pacific (each) 38.
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Apple Pascal V13 199.
Beagle Brothers
Beagle Basic, Beagle Screens, Big U, Double Take, MacroWorks, or Pro-Byter (each) 19.
Beagle Compiler 42.
Beagle G.P.L.E. or Super MacroWorks D-Code, Extra K, Power Print or Triple Dump (each) 21.
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Print Shop Paper Refill 12.95

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Deluxe Paint II (*IIGS*) 75.
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Communications

Checkmate Technology
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Commworks (*Ile & Ie*) 65.

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United Software Industries
ASCII: Express Pro: Prodos or Dos 3.3 75.
ASCII: Express Mousetailk 59.

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Activision Writer's Choice Elite (*IIGS*) 62.
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Apple Writer II 2.0 ProDos (*Ile, Ie*) 119.
BPI Systems
(Accounting Systems for the *Ile, Ie & IIGS*)
BPI General Accounting ProDos 149.
BPI AR/AP or Inventory ProDos (ea.) 149.
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Sensible Speller-Dos or ProDos w/ 3.5 & 5.25" 58.
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Homework Plus (128K) w/ Speller 45.
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Webster's Spelling Checker (ProDos) 38.
Sir-Tech Software, Inc.
The Clan Practical Accountant Software Publishing 55.
All Programs for *Ile* with 128K or *Ile* PFS: Workmates (File/Report/Plan/Write) 129.
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PFS: File/Report Bundle 65.
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Softword GS File 99.
StyleWare, Inc.
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Picture Manager or Desk Accessories 27.
Multiscribe Spell Checker 27.
Multiscribe Fontpaks 1-5 (each) 15.
VIP Software VIP Professional (*Apple Ie* or Enhanced *Ie*) 159.
VIP Professional (*IIGS* Version) 179.
Word Perfect Corporation
WordPerfect V1.1 w/ Speller (*Ile & Ie*) 85.
WordPerfect (*Apple IIGS*) 85.

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The Body Transparent	29	Snoopy Writer	20
DLM Create With Garfield! Deluxe Edition	28	Simon & Schuster	39
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MathTalk, Kidtalk, First Shapes, Speller	34	Spinnaker Kindercomp Gold	28
Be, or Smoothtalker (IGS) (each)	34	Homework Helpers Writing or Math (IGS)	32
MathTalk Fractions or First Letters & Words (IGS)	34	Typing Made Easy	26
Great Wave Kidstime II (IGS)	24	Facemaker: Golden Edition	32
Harcourt, Brace, Jovanovich Computer SAT	26	Kidwriter	25
Hesvra Pro Electronic Station	24	Kindercomp, Kids on Keys or Alphabet Zoo	19
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Math Rabbit or Writer Rabbit	22		
Mopstown Hotel, Parade, or Number Stumper	25		
Robot Odyssey I or Rocky's Boots	32		

Modems

Anchor Automation Signalman Express 1200	179	Prometheus Pro Modem 1200 (External)	239
Signalman Lightning 2400	299	ProModem 1200G (Non Expandable)	169
Applied Engineering DataLink Modem	179	Pro Modem 2400 (External)	309
(300/1200 baud Internal II, Ile, IIGS)	179	Pro Modem 2400G (Non Expandable)	229
Hayes Hayes Micromodem IIe (Internal)	159	Pro Modem 1200A (Single Card)	199
Hayes Smartmodem 1200A (Internal)	275	Pro Modem 300c	89
Hayes 300 Baud Smartmodem	189	Communications Buffer (2K Exp. to 512K)	105
Ile w/Smartcom I	159	Alphanumeric Display	69
Hayes 300 Baud Smartmodem	299	U.S. Robotics U.S. Robotics Courier 1200	199
Hayes 1200 Baud Smartmodem	299	U.S. Robotics Courier 2400	249
Hayes 2400 Baud Smartmodem	449	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	49	MultiRam Ile (320K)	149
Apple Computer		MultiRam Ile (576K)	179
Apple IIe Enhanced 80 Col. Card	89	MultiRam Ile (832K)	199
Apple IIe Enhancement Kit	49	MultiRam RGB (320K)	179
Applied Engineering		MultiRam RGB (576K)	215
RamWorks III (64K to 3 MB)	Call	MultiRam RGB (832K)	239
RamWorks Expander 512K or 2M Ver.	Call	MultiRam RGB (1024K)	269
2 Meg Plus RamWorks Expander (1 or 2M)	Call	Zee-80A	55
RamFactor (256K to 1MB)	Call	MDIleas, Inc.	
Z-RAM Ultra 1 (256K or 512K)	Call	OctoRam 256k (8MB RamCard w/256k Installed)	129
Z-RAM Ultra 2 or 3 (256K to 1Meg)	Call	OctoRam 1 Meg (8MB RamCard w/1 MB Installed)	279
GS-RAM (1MB to 6MB)	Call	OctoRam 2 Meg (8MB RamCard w/2 MB Installed)	479
Phasor (II, Ile, and IIGS)	139	OctoRam SIMM Module Upgrade (256k SIMMs)	65
TransWarp Accelerator (II+ and Ile)	219	OctoRam ESP 128K (Extended Static Ram w/256k)	149
ViewMaster 80 (II+)	119	OctoRam ESP 512K (Extended Static Ram w/512k)	299
Z-80 Plus (II, Ile, IIGS)	119	OctoRam ESP Upgrade 64k (64k Static Ram)	32
AST Research		Micro Sei Micro Sci 80/64e	45
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MultiRam CX (512K)	175		
MultiRam CX+ Piggyback (512K)	199		
MultiRam Plus (256K)	209		
MultiRam Plus (512K)	259		
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Printer Interface Cards

Apple		Buffered Grappler+	99
Apple Super Serial Card	115	Grappler Ile	79
Applied Engineering		Grappler C/Mac/GS	65
Serial Pro (II+, Ile, IIGS)	135	Hot Link	49
Apricorn Apricorn IIc	54	Thirdware	
Super Serial Card	75	Choice of Parallel, Serial, ImageWriter I (Serial), or ImageWriter II (Serial)	89
Orange Micro		Finger Print Plus II, Ile, Iic	89
Pro Grappler (Apple Ile or IIGS)	75	Finger Print G+ (IIGS)	55
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Applied Engineering		SMT No Slot Clock (II+ & Ile)	42
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Juice Box (IIGS Switched Surge Suppressor w/Fan)	62	Hayes Mach II Joystick (Beige or Platinum)	29
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Curtis Emerald	36	Kraft Universal 3 Button Joystick (II+, Ile, Iic)	32
Curtis Ruby	57	Koala Pad Plus w/Graphics Exhibitor	79
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ThunderScan Apple (IIGS, Ile, and Iic)	179	ImageWriter Ribbon-Black	4.50
AST-VisionPlus Digitizer (IIGS)	269	ImageWriter Ribbon-Color	5
		ImageWriter II - 4 Color Ribbon	12
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BASF 5.25" SS, DD (box of 10)	8	Sony 3.5" DS/DD (box of 10)	19
Verbatim 5.25" SS, DD (box of 10)	10	Fuji 3.5" DS/DD (box of 10)	20
Sony 5.25" SS, DD (box of 10)	9	Maxell 3.5" DS/DD (box of 10)	20
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M-1409 (180cps Dot Matrix NLQ) 10"	349	Microline 293P (240cps Dot Matrix 15")	639
M-1509 (180cps Dot Matrix NLQ) 15"	389	Panasonic	
HR-20 (20cps) Daisywheel	349	KXP-1080AP (100 cps)	199
HR-40 (35cps) Daisywheel	599	ImageWriter Compatible	
TwinWriter 5	779	KXP-1080i (120 cps) NLQ Mode	179
Epson LX-86 LX-800	249	KXP-1091i (160 cps) NLQ Mode	199
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LQ-2500	Prices	KXP-3151 (23 cps) Daisywheel	409
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Microline 192Plus (200cps Dot Matrix 10")	339	NX-15 (120cps Dot Matrix/NLQ 15")	339
Microline 193Plus (200cps Dot Matrix 15")	489	NP-10 (100cps Dot Matrix/NLQ 10")	189

Disk Drives/Hard Disks

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AS Slimline Ile	139	Half Height 5 1/4" Drive for Apple Ile or Iic (Platinum)	149
AS Slimline Iic	139	Half Height 5 1/4" Drive Platinum for IIGS	169
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First Class Peripherals		ProAPP 20 MB Hard Disk System (II+, Ile, & Iic)	799
Slider 10MB Hard Drive	449	Video Technology Computers, Inc.	
Slider II 20MB Hard Drive	569	Laser FD 100c (Apple Iic)	139
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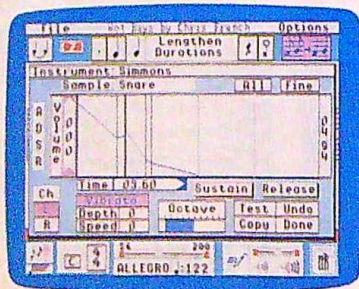
gram, *Instant Music*, from Electronic Arts (see sidebar "Jamming with *Instant Music*"), lets you play along as the computer plays a song.

With the large library of educational software available for the Apple II, it's not surprising that programs already exist to teach the rudiments of note composition and music theory. Since the Apple IIGS can run almost all Apple II programs without modification, it has an instant collection of usable software. Some of the better programs will certainly migrate to the IIGS system over time.

Anatomy Of A Music Program

The Music Studio, a program produced by the author, is an example of what can be accomplished when the Apple IIGS is used as a music processor.

The program automatically loads from a 3½-inch disk. Typical of the menu-driven software that's appearing for the IIGS, there's little need for the instruction manual once the program is loaded.



Activision's *The Music Studio* can show an instrument's ADSR (Attack-Decay-Sustain-Release) envelope as a graphic on the screen.

Music Studio begins with a grand staff in the middle of the screen (a grand staff is the term for the horizontal bars on which notes are placed in musical scripts). Moving the mouse moves a note around the screen; every time the mouse button is pressed, a note is pasted to the staff. Writing a song is as simple as pointing and pressing. (Of course, writing a good song, as always, requires not

Jamming With *Instant Music*

Music composition software is impressive, especially for the Apple IIGS, but there are those of us who have never been near a keyboard, fret, or mouthpiece in our entire lives. Placing notes on a staff (the notation is enough to scare us off, isn't it?) may be an effective and efficient way of, as Rick Parfitt says, *music processing*, but it doesn't make us composers. What's needed to get the rest of us started is something simpler, more intuitive, and most important, fun right out of the box.

Instant Music from Electronic Arts is the program musical morons like us have been waiting for. It's laughably easy, lots of fun, and ready to rock-'n-roll as soon as you have the shrink-wrap off the package.

Mousejamming may be the new word for your Apple IIGS lexicon. It refers to the what you use to jam with the best computerized musicians since Electric Light Orchestra. The process almost takes longer to describe than to try out.

Since *Instant Music* is menu- and mouse-driven, all you have to do is load a background song (actually more like a musical template, since it includes everything from the notes to the instruments), click in the tiny mouse icon, start the music, click on one of the four instruments at the bottom of the screen and begin to cook.

Press the mouse button and move the mouse up and down. Slow. Then fast. As the mouse moves, so does a cursor on the screen. That, in turn, produces notes. The higher the cursor, the higher the pitch. Bring the cursor down and the pitch falls. You can play with, above, or around the base tune; switch instruments with a click of the mouse button; and change volume or tempo.

The sound from the IIGS is fair—plug a pair of headphones into the port at the back of the computer and the sound improves tremendously. *Instant Music* works with MDIdea's Supersonic Stereo Card to produce stereo sound that can be sent to a home stereo system or headphones. It's not phonographic quality, but it's close. But then, you can't jam with the tunes on your favorite album, can you?

G.K.



Apple IIGS mouse and any surface (even an inflatable guitar) combine to create improvised music with *Instant Music* from Electronic Arts.

only the computer and software, but also *talent*.)

The top and bottom of the screen contain two menu bars for selecting a variety of features. Choosing the note box at the top of the screen causes a submenu to pop out. Different note values, from a 30-second to a dotted whole note, may be selected. Notes can be added and deleted, from anywhere in the song, with the mouse.

Everything is graphically displayed. With 15 colors to work with, notes can be shaded to represent different instruments. A

quartet can easily be written by combining four different instruments which may all be played back simultaneously for the grand effect.

Twenty-four columns of music may be edited on the screen at one time. A graphic slider is used to randomly move to any location in the song.

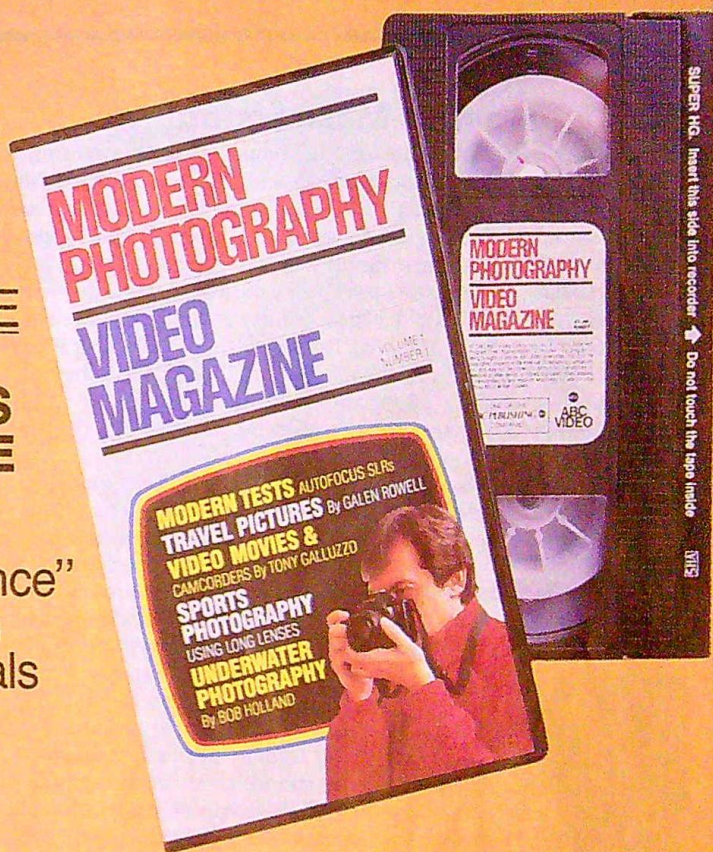
Notes may be dotted, tied, triplet, accidental, or accented. The tempo and volume of a song may be set to a number of different values which are displayed in traditional Italian music notation.

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How Computers Make Sound

How is it possible for a IIGS, or any computer for that matter, to make sound? The mechanical end of the process is pretty simple. Many personal computers, including all of the Apple II series, have a small speaker mounted just inside the computer. The Apple IIe, for example, makes sound by sending a simple series of on and off signals to its internal speaker. Or you can sometimes connect a computer to a home stereo system. A series of electrical waves is sent from the computer to the stereo. The stereo amplifies the signal before sending it to a loud-speaker. When the electrical signals reach the speaker, they drive a magnet which make a paper cone in the speaker vibrate. In turn, this causes the air to vibrate—we perceive the sound when the air vibrates on our eardrum.

There are two basic ways to create the electrical signals that produce sound from a computer—*digitizing* and *synthesizing*. The IIGS is designed to play digitized sounds, but it can also play synthesized sounds.

Ordinarily *digitized* sounds are recorded (sampled) at the factory and stored as a set of numbers in a machine's ROM memory. When the sound is played back, the numbers are converted back into electrical pulses which closely match the original sound. Anything can be recorded and played back—from the sound of a Steinway piano to the bark of a dog. The realism of digitized sounds can be amazing. In theory if a sound is carefully digitized it's impossible to tell the difference between the original and digitized sounds. In practice, however, it's extremely difficult to digitize all the sounds of an instrument exactly. Although it's been done, sampling all the complex waveforms produced by a grand piano is not an easy task. Many other instruments, drums and flutes for example, are very easy to digitize.

But to capture the nuances of complicated acoustic instruments like pianos and violins (not to mention the human voice), a great amount of computer memory is required. To accurately reproduce the sound of a violin the data must be recorded at 40,000 samples a second. One second of violin sound could, therefore, consume 40,000 bytes. The problem is compounded because violin notes must be sampled over a range of octaves to capture the different qualities of the instrument at various pitches. Because of the memory-intensive nature of digitized sounds, it's easy to understand why the sound chip on the IIGS has its own built-in 64K-memory buffer.

Synthesized sounds, on the other hand, create sounds from a collection of artificial sonic building blocks. One starting point for a synthesized sound is a *sine wave*, a simple pattern of gentle, repeating waves. A sine wave sounds like a flute. However, by changing the shape of this wave you can generate all other sounds. The wave is generated through a set of rules (sometimes called *parameters*) which can be thought of as a mathematical formula. Yet some sounds are so complex that it's hard to find a set of rules to generate the sound. An added complexity is that the wave pattern of some instruments changes as a note is held.

Since synthesized sounds are controlled by parameters, they typically require much less memory than digitized sounds, but far more sophisticated software.

Sections of a song may be highlighted for block editing. Some of the block-edit functions are copy, move, delete, transpose, and change duration. At any time the song may be automatically transposed into any one of 15 ma-

jor key signatures. Measure bars and time signatures may also be selected.

When the song is complete, or anytime during editing, the computer can play back the composition. When a MIDI adapter is

installed, output can be directed to the MIDI interface. A special MIDI dialogue box is an option available for controlling MIDI channel numbers and MIDI instrument selections.

Instruments are not limited to the 15 that load when the program begins. Another option is the ability to design your own instrument by changing the parameters of an existing digitized sound.

The computer, much like a word processor, is turned into a music processor. A composition, once it's been entered, may be edited to perfection. The finished results may be played or sent to the printer for a copy of the musical manuscript.

Computers have only recently started helping make music. A new musical world remains to be explored.

Rick Parfitt has spent the last five years designing music-related software. He is founder and President of Audio Light, Inc., a company which designs and develops such programs as The Music Studio (Apple IIGS) and Paintworks (Atari ST). He plays various instruments, including guitar, keyboard, and accordion.

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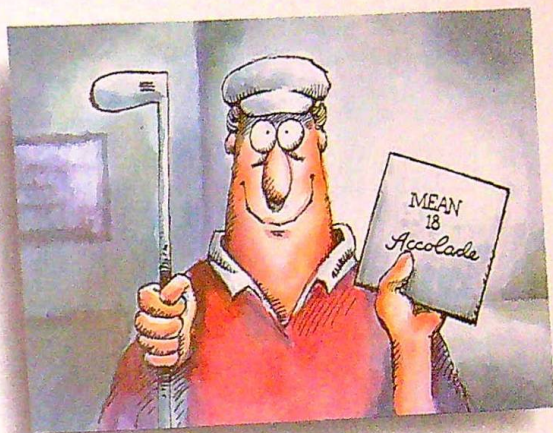
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San Mateo, CA 94404

Music Studio (\$79.95)
Music Studio '87 (Tentative title,
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Activision
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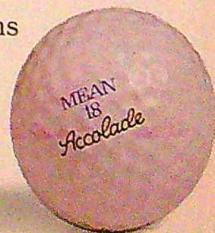


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The Substitute Teacher

David Stanton

Study German. Learn to type. Improve your chess game. Figure out those gadgets on your new 35mm camera. Whatever you want to learn, chances are your Apple can help. Here's a look at just some of the impressive self-teaching software you can find for Apple II and Macintosh personal computers.

Teachers don't need to worry about their jobs. Computers aren't likely to replace them in the classroom. Until recently, some people were predicting schools where computers taught and technicians replaced educators. This theory has vanished. In its place is a more realistic view of computers and their appropriate role in education.

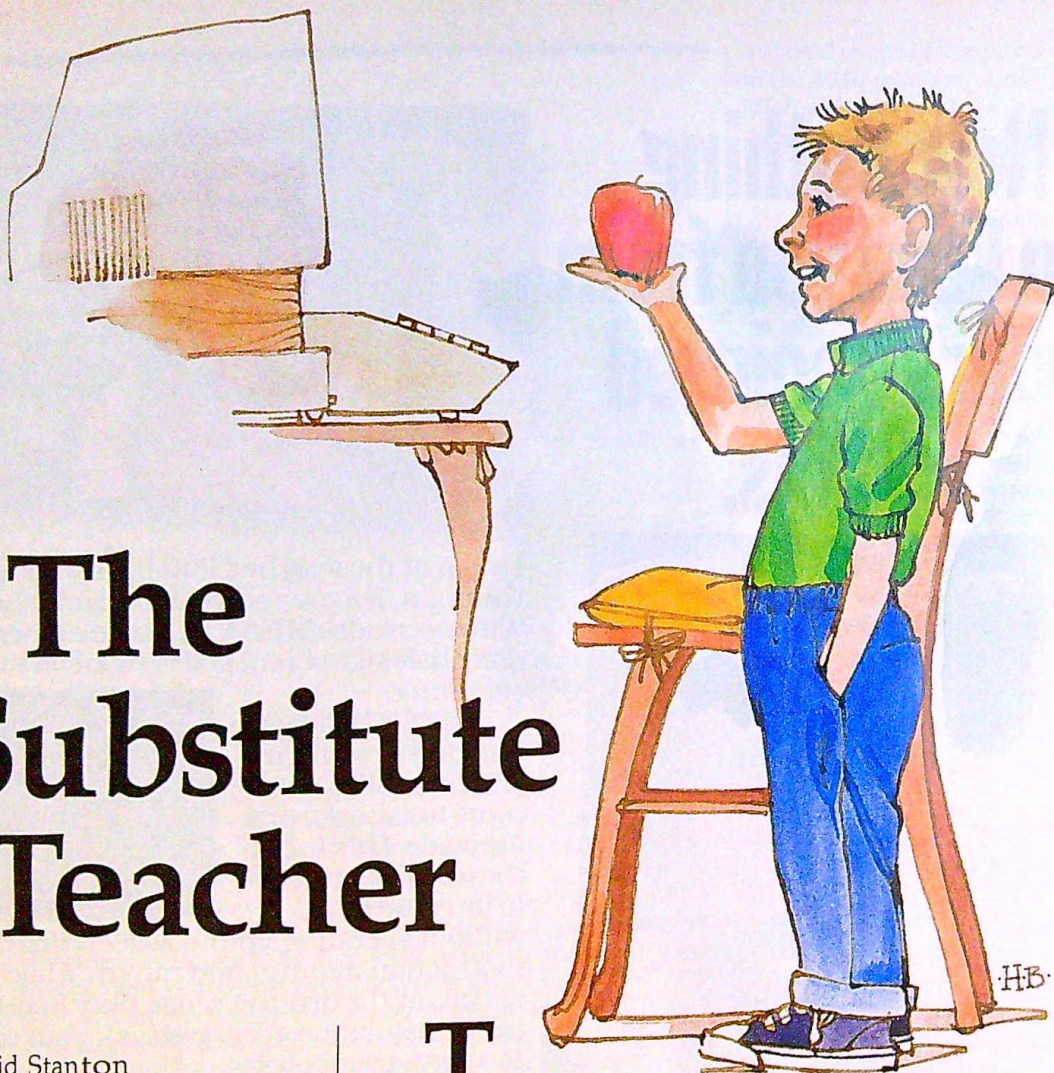
Enthusiasm has replaced fear. Computers have become allies, not adversaries. Perhaps more than any other trend, the increasing acceptance of tutorial software in the schools demonstrates this new alliance.

Less obvious, though, are the many opportunities for using tutorial software at home. While some families still wonder what you really can *do* with a computer, others supplement their children's school work with motivating educational games and tutorials.

When schedules or school budgets prevent students from taking the extra courses they'd like, home-study software can fill the gap. Students who seek a greater challenge may find it just a keypress away, ready at any time to help them explore new interests, develop new hobbies, or learn new skills. Adults can study accounting or Braille or computer science or French without the pressures associated with structured college or adult-education courses.

Best of all, learning by computer is fun.

So when the fall doldrums and winter blues set in, when the kids renew their cries of *What's there to do?*, or when reruns dominate the television schedule, why not consider the benefits of a little self-improvement? One of the following programs may be just what you need.



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Teach Yourself Chess

Learning to play a game as sophisticated as chess can be a humbling experience. Repeated defeats at the hands of a helpful but proud friend can devastate the most healthy ego and make the game seem hopelessly complex.

Fortunately, there's a more humane way to learn. A few hours with *Paul Whitehead Teaches Chess* (Apple II series) will introduce you to the basics and turn you into an experienced intermediate-level player while leaving your dignity intact. That's one of the greatest benefits of computer tutorials—the computer never scoffs, chides, insults, or tells tales afterward.

And you get to study with the best. Paul Whitehead is an acknowledged chess master and American chess champion. He knows the game and presents its rules and strategies in a simple and organized manner. You control what you learn and how fast you progress through the carefully sequenced screens.



Paul Whitehead Teaches Chess introduces you to the basics of the game and can turn you into an experienced intermediate-level player.

Included with the program is *The Coffeehouse Chess Monster*, a powerful computer-based chess game. In fact, the Monster sounds worse than it is. It lets you change your moves at any time, and even warns you about its intentions so you can foresee the traps it sets. When you feel hopelessly lost, the monster will gladly switch sides. If that's not enough, just hit one key and it'll play dumb by reverting to Level 1, a beginner-level of play.

The Monster is a cooperative opponent. When you feel comfortable with it, you'll be ready to challenge a friend who is likely to

play far more monstrously.

Jeremy Silman's Guide to Chess Openings (Apple II series) takes up where Mr. Whitehead leaves off. This program provides advanced instruction for the truly addicted chess fan. It teaches how to initiate and counter strong opening gambits.

Study Philidor's Defense, the Latvian Gambit, or the Pirc Defense. Whether you're playing white or black, Mr. Silman's tutorial uses popular attacks to highlight common defensive mistakes. Then he suggests better moves that could prevent the embarrassment of losing within a few opening minutes.

This program also comes with the Monster, so you can test your new knowledge against one of the most powerful computer-chess games available. Best of all, if you lose, who will know?

Celebrate The Constitution's Bicentennial

Mindscape's *Understanding the U.S. Constitution* program (Apple II series) represents the best of the traditional tutorial genre. Although the program uses no graphics, its mix of challenge and reward is just right to lure users from one lesson to the next as they learn and enjoy.

What is a writ of habeas corpus? Which government entity has the power to impeach a President? How old must a candidate be to run for the Senate? This tutorial answers those questions and many more.

Ten self-paced lessons cover duties of the legislative, executive, and judicial branches of government as well as the contents of the constitutional amendments.

Each question set may be studied in either Learning Mode or Testing Mode. The former poses questions and provides help as needed. A memory aid appears onscreen to reinforce an answer after the question has been missed three times.

When you're up to it, you can test your knowledge with Test Mode. A software-controlled clock times each session, so you can race against yourself or challenge a friend. Final results can be printed out for future reference.

Whether at school or at home, this tutorial makes learning rewarding and entertaining. The fact that 1987 marks the 200th anniversary of the writing of our Constitution adds special significance to this package.

Learn To Type

The pervasiveness of computers at school, work, and home has divided us into two distinct groups—people who can type and people who *wish* they could. Keyboard skills have become a near-necessity for anyone who wants to access databases, create spreadsheets, or produce written material of any kind. Those without proper skills often find themselves hard-pressed to compete.

MasterType (Apple II series/Macintosh), originally released by Scarborough Systems but now distributed by Mindscape, will make you eager to learn what you thought would be so difficult.

Designed for ages 7 to adult, it begins with an explanation of the home row and proper fingering of all keys. A unique keyboard display demonstrates proper hand positioning, and as you press each key, the onscreen fingers mimic the movements your own fingers should be making.

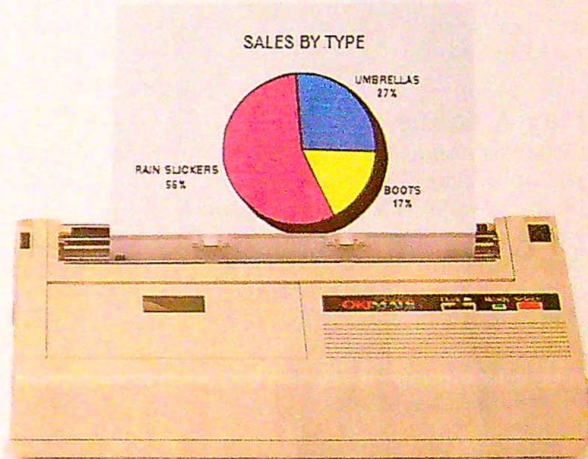
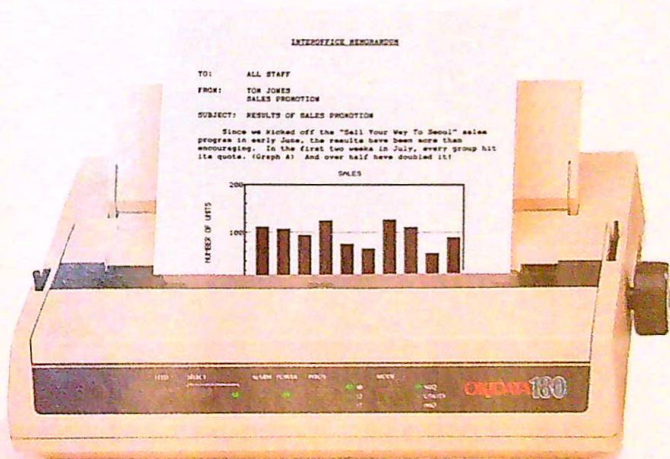


MasterType on the Apple II offers enough variety and features to teach typing to even the most keyboard-shy individual.

The accompanying manual adds a touch of classroom realism as it nags about the importance of home-row positioning and of avoiding the temptation to watch the keyboard. In actual practice, the interactive screen display subtly draws your attention to the monitor and away from the keyboard.

If you like a bit of competition

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in your learning, you'll appreciate the regular feedback offered in all the program's modes. *MasterType* calculates words per minute and maintains high scores for pinball enthusiasts who insist on setting ever-rising game scores.

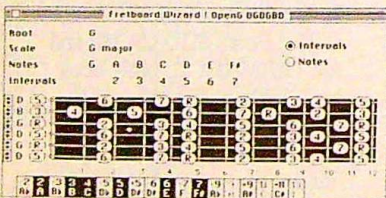
Even advanced typists will benefit from practicing with *MasterType*. The versatile space game lets you control keys to be tested, length of words, and the speed of presentation. A maximum possible speed of 760 words per minute assures a challenge for most. Practice may not make perfect, but when it's this much fun, it sure can't hurt.

Play A Guitar

Guitarists and aspiring guitarists will appreciate Baudville's *Guitar Wizard* (Apple II/Mac). It plays no games and makes no music. Nor does it teach in the expected sense. Instead, it serves as a powerful reference tool to assist anyone who plays stringed instruments.

Four different sections provide information that's hard to find anywhere else.

What's the proper fingering for the D-flat chord? "Chord Wizard" displays it in normal position or any other location up to the twelfth fret. A-minor, C-sharp, D-minor 9—simply select the chord, and the program immediately shows how to play it. If you want, you can print the screen display for future reference.



The Macintosh version of *Guitar Wizard* displays almost any chord for you to study.

"Scale Wizard" shows how to play the scales in any key. Whether it's major scales for beginners or minor, pentatonic, or blues scales for experienced players, all are easily available.

Need to know all fret positions of G-sharp? "Fretboard Wizard" displays any scale or any chord in all of its available locations at once.

"Fretboard Wizard" even supports other popular stringed instruments. Retune to match your banjo or bass guitar, and scale and chord information adjust to that instrument. You can save your tuning configuration for future use or load built-in data for specially tuned guitars or similar instruments.

Over all, *Guitar Wizard* provides just the help musicians are likely to need. The program functions well and supports printouts for its displays. You'll need to start with a basic understanding of music, but as a handy tutorial and reference tool on chords, scales, and harmony, it delivers the right stuff.

Take Good Photographs

Anyone who has ever purchased a full-featured, 35mm camera knows how intimidating its odd collection of buttons, knobs, dials, and levers can be. For those who don't know an f-stop from an ISO, *Camera Simulator* (Apple II series) offers some helpful guidance.

This step-by-step tutorial explains everything from focusing to troubleshooting. A series of seven short, interactive lessons guides you through the maze of technical jargon to a clear understanding of how to produce good photos. Lessons covered include An Introduction, The Rangefinder, The Shutter, The Aperture, Exposure and Film Speeds, The Light Meter, and Troubleshooting.

The program turns an Apple II computer into a camera simulator that "develops" each shot, good or bad, and analyzes the result. Practice as long as necessary. This teacher never gets impatient or critical, and poor shots cost nothing.

As a supplement to your camera's manual or as an introduction to the principles of photography, *Camera Simulator* has much to offer.

Become Mr. Science

Brøderbund's award-winning *Science Tool Kit* series (Apple II series) can spark the imagination of even the most reluctant scientist, young or old. To date, the series includes three packages, each of which contains a program disk, a *User's Man-*

ual & Experiment Guide, and devices of various sorts.

The Master Module is required for all the other modules. It includes an interface box for connecting scientific probes to the computer, as well as a thermister for measuring temperatures from 10 to 140 degrees Fahrenheit and a photocell which measures light intensity.

The program disk controls both probes and adds two other useful computer-based measuring devices: a highly accurate stopwatch and a strip chart for tracking changes in temperature or light intensity over a period of time.



The Speed and Motion module turns an Apple II into a speedometer (shown here) and a tachometer.

All of this, plus a thoughtfully written manual full of intriguing experiments, makes the package a sure winner for both school and home users alike. The school version even includes a teacher's guide to assist in preparing lesson plans for each experiment.

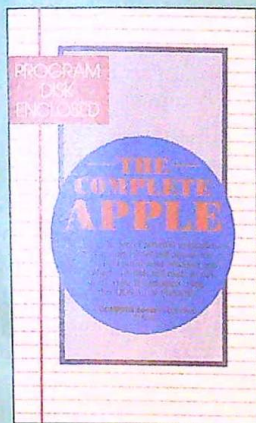
Two supplements to the Master Module offer hours of additional learning fun. *Module 1: Speed and Motion* comes with an additional photocell and software that converts an Apple II into a speedometer and a tachometer. It also contains a balloon-powered car which, believe it or not, can be converted into a pendulum device. Several experiments help students investigate the principles of jet propulsion, while others consider pendulum motions.

Module 2: Earthquake Lab adds a simple seismoscope to your computer-based science lab. Its manual explains the origin of earthquakes and suggests three experiments to demonstrate the principles behind them. For instance, one experiment explains

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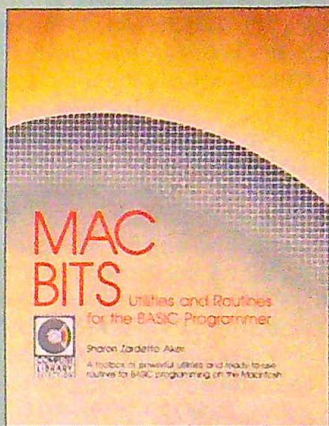


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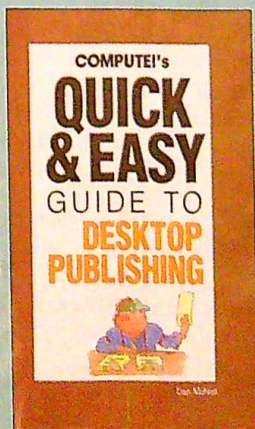
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Dan McNeill
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The Complete Apple

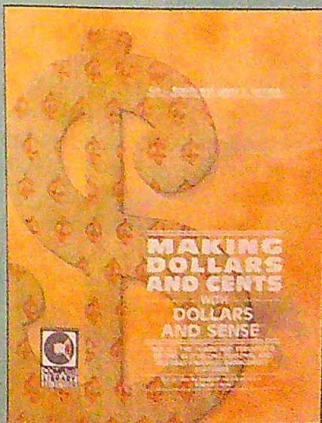
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Score High On The SAT

Every college-bound high-school student knows the importance of doing well on the Scholastic Aptitude Test (SAT). Fair or not, many colleges rely heavily on SAT scores as a measure of an applicant's potential success. And some scholarships are based partly on the results.

Fortunately for everyone who wants to do well on the SAT, several recent studies have shown that students can dramatically improve their scores by studying for the test. The *Hayden Score Improvement System for the SAT* (Apple II series / Macintosh) offers just the help necessary to improve scores and gain an important edge in the competition.

The Macintosh version includes a 47-page *User's Guide* and three disks: A Program disk, a Practice Tests / Verbal disk, and a Math disk. Unlike some other SAT preparation programs, this one doesn't depend upon workbooks and other noncomputer support. In fact, reading the *User's Guide* is optional for anyone already familiar with the Macintosh. Boot the Program disk and select Overview for all the instructions you'll need.

A two-hour pretest, composed of questions similar to those on the SAT, diagnoses areas of weakness and suggests additional work. Five skill-specific modules provide tutorials and practice in vocabulary, reading comprehension, algebra, geometry, quantitative comparisons, and word problems. Two additional practice tests provide a means of measuring your results. Scores are reported on an SAT-type scale of 200-800 points.

The *Score Improvement System* provides a pleasant and effective means of preparing for the SAT. Who knows? A few minutes of

study could make a big difference in your future.

Master A Foreign Language

Computer tutorials cover a wide range of interests and intensities. Only the most dedicated and serious student should consider such comprehensive, computer-based, self-study courses as *Apfeldeutsch* (Apple II series). Don't expect arcade games and entertainment here, but if you need to learn German, this course published by Wida Software in London and distributed by Gessler can teach you.

The package includes seven disks, six audio tapes, three paperback manuals, and an instruction guide. Followed judiciously, this 30-lesson home-study course provides the rough equivalent of one year of high-school German.

Each lesson begins with an audiotape of two native speakers introducing conversational segments. Next, you listen to the tape a second time while reading the passage from the accompanying textbook. During a third time through, you listen and read aloud. Through listening, reading, and speaking, you can more easily learn and remember the language.

Workbook exercises provide practice with writing skills, and a disk-based, self-assessment test completes each lesson. The teaching approach uses proven educational techniques, and the system works effectively in a home-study environment. Encouraging results are apparent after the first lesson.

Although the included software sometimes seems a bit unfriendly by today's standards (it's copyrighted 1980), the package as a whole is well-planned and reliable. Foreign language teachers recognize Gessler as one of the best producers of foreign-language products. Wida Software even guarantees its disks against any damage, including intentional misuse. What greater assurances could a hopeful student of the German language want?

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.

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Apple Vs. IBM:

The Struggle For The Educational Market

Keith Ferrell, Features Editor

Apple Computer has built an enviable level of leadership in educational computers. So enviable that IBM, Tandy, and many other MS-DOS compatible manufacturers are mounting campaigns aimed at taking over the educational market. Is Apple up to the challenge? Or will IBM and MS-DOS become the coins of the educational realm?

Apple and classrooms—it's been a perfect match since the company's earliest days, which were also, not coincidentally, the early days of educational microcomputing. Lately, though, some observers have seen signs of deterioration in the relationship. Is Apple's share of the educational computer marketplace slipping? Is the company in danger of losing its long-established dominance of the important kindergarten through twelfth grade market?

Some surveys indicate that it is, showing Apple's share of the K-12 market as having declined by several percentage points over the last couple of years. At the same time, the market share held by IBM compatibles—and especially Tandy—has increased dramatically.

Among the compatibles manufacturers, Tandy has been the most aggressive. In 1986, according to a leading computer industry trade publication, Tandy held 19 percent of the K-12 grade market; Apple was reported to hold 47 percent of the market, with IBM at 8 percent.

Whatever the figures, it's clear that Apple no longer has the educational market to itself. IBM's

introduction of its Model 25, aimed squarely at schools, has contributed more fuel to arguments that the heyday of Apples in schools may be ending.

What does this say about Apple's future? What does it reveal about the market that Apple had so decisively made its own?

Educational Computing: Created By Apple

First, it demonstrates how much of an effect Apple exerts on the educational market. Apple influences *every* aspect of our increasingly computerized society, of course, but perhaps nowhere so dramatically as in primary and secondary school classrooms. Many children's first micro-computer experience came on the friendly Apple II computer tucked in a corner of their kindergarten or first grade classroom. Odds were that the first time educators encountered a representative of a computer company, that company was Apple.

The company's openness to outside developers insured plenty of educational software. Part of Apple's genius has been its understanding from the earliest days that there was much good to be reaped from placing computers in schools.

Of course there are huge market benefits to be reaped as well. Education has been among Apple's top markets since the company's inception. And if education was number one for Apple, there was little question that Apple was number one for education.

As David Seuss, president of Spinnaker, a publisher of educational, entertainment, and

productivity software, says, "Apple dominates the schools because they've done it right—not from a technical or hardware perspective, necessarily, but by being consistent from year to year, by emphasizing software development and having every software developer in the world writing Apple educational software, by catering to the needs of schools, by publicly supporting computing in schools, and by being first, they've maintained their position in schools."

Getting Down To Business

No healthy business exists in a vacuum, though, and nothing breeds competition like success. Apple's domination of educational computing has lately come under dynamic assault from the MS-DOS front, the IBM clones and compatibles that have made IBM and its relatives the overwhelming choice of the business community and increasingly the choice of the home computer enthusiast.

With an estimated \$1.6 billion annual hardware and software educational market, it was only a matter of time before IBM and the clone manufacturers launched an assault on buyers for the educational market.

IBM, in fact, made one early attempt with its ill-fated PCjr; then it retreated from the educational hardware market. Despite the failure of the PCjr, IBM maintained an educational presence through its Write to Read program.

IBM Goes Home

While the IBM school market languished, the company and the

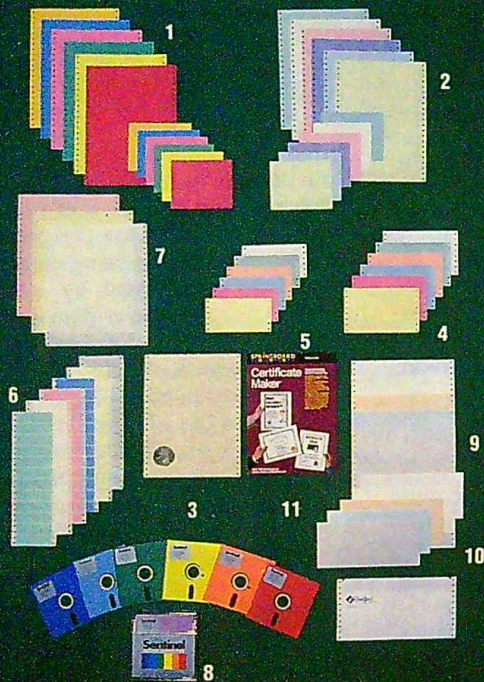
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compatibles manufacturers went after the home market in a big way. "In the home, people are highly motivated to do productivity applications," Seuss says. For word processing, databases, financial management, and other applications, DOS compatibles offered both a wide range of software and prices that dropped dramatically while capabilities climbed.

Additionally, many people used IBMs and compatibles in the office and workplace. "People have a strong tendency to want to buy the same machine at home that they use in the office." Another market fell to MS-DOS.

"This leaves the schools somewhat alienated from the mainstream of life. IBM dominates the marketplace, and, because of that, IBM dominates the home market."

The all-business, all-productivity image of IBM and the compatibles is helping those companies in the educational market. One frequently heard argument maintains that children need to be exposed in school to the same computing environment they'll encounter in the "real" world.

The Cost Of Going To School

Price can't be underestimated as a factor in successful marketing to schools. "One of the nice things IBM did for Apple," Seuss says, "was its pricing strategy, which protected the Apple franchise in the schools." As long as IBM-type machines were upper-end business purchases, there was little or no motivation for software developers to port their educational products to the DOS environment.

The arrival of large numbers of affordable clones changed all of that. Once there was a PC in the house, consumer demand for MS-DOS educational software began to climb.

That climb is lately becoming precipitous.

Jan Davidson, president of Davidson & Associates, a leading publisher of educational software, notes that the demand for MS-DOS educational programs is accelerating. "Our MS-DOS sales have increased dramatically this last year," she says. "They aren't quite even with Apple, but they're very close."

Davidson launched her company in 1983. "We were one of the first [educational software publishers] to embrace IBM machines." The large home market helped shape that decision. "Because we sell a lot of our software into the home as well as schools, it was valuable to support IBM from the beginning."

For now, price sensitivity is likely to work in Apple's favor. As Cathy Carlston, vice president of educational market planning for Brøderbund, a publisher of educational, entertainment, and productivity software, says, "Apple has an extremely well-established share of the market. The school market is price sensitive, and doesn't replace hardware quickly. Apple's market share represents quite an investment for the schools, one that schools will hold on to."

You've Got To Have Software

One of Apple's great educational strengths has been the sheer size of the educational software library that

runs on Apple machines. But the number of IBM-compatible educational programs is by now nearly equal to that of Apple and is reflected in industry sales figures.

Seuss cites figures from the Software Publishers Association (SPA), saying, "Industry-wide statistics comparing the [annual wholesale dollar] growth rate of MS-DOS educational software and Apple educational software show that between 1984 and 1986 MS-DOS educational software grew 100 percent. During the same two-year period, Apple educational software grew only 15 percent."

He adds that the figures are not cut-and-dried: "In fairness, Apple grew 15 percent, to \$31 million, and MS-DOS grew 100 percent, to \$8 million." He says it's easier to accumulate very high rates of growth that translate into dramatic figures when your installed base is smaller. "At the end of 1986," he says, "Apple was still 80 percent of the sales. Apple is still the dominant machine in the education channel. But IBM is growing very fast, and, if the growth rate persists, it will challenge that dominance."

High School: The Class Of MS-DOS?

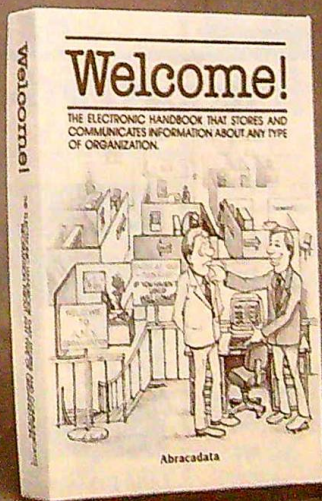
So far, the majority of educational MS-DOS machines are in high schools, with many of those computers in vocational education labs. Many educators cling to the rationale that preparing students for the business environment requires teaching them how to use the dominant computers in that

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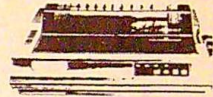


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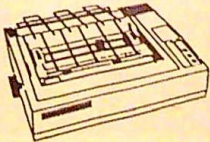
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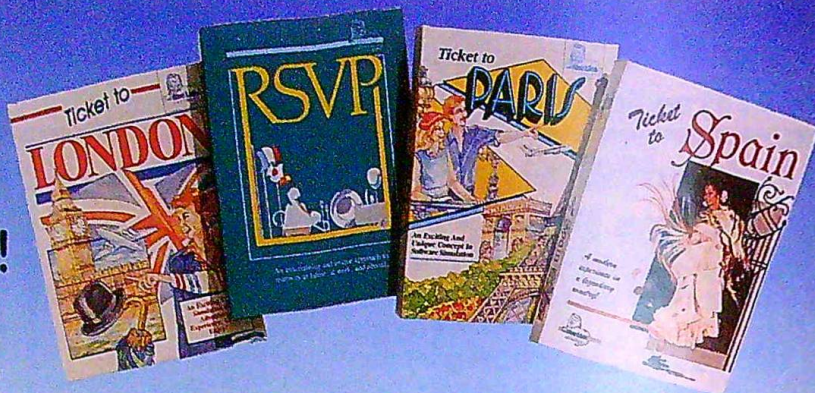
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environment—MS-DOS machines.

Another upper-grade application in which computers are playing a larger and larger part is the teaching of foreign languages. Seth Levin, president of Gessler Educational Software, points out that in this applications area Apple has a clear lead that won't soon be eroded.

"The vast preponderance of language labs are Apple-based," he says. "The labs are already installed with Apple hardware, and schools aren't going to abandon that investment too quickly."

Language instruction also offers Apple a market opportunity. As Levin explains, computer instruction of foreign languages will take a great leap forward once digitized sound, able to reproduce accurately accented speech, becomes available. "At some point the Apple IIGS will have an advantage in this area. It's not there yet, technically, but, when it does become viable to put sound in a program, the IIGS will play an important part."

There are other reasons Levin sees Apple's educational dominance continuing. "For developers, one of the reasons we keep looking at Apple is the excellent support they give. Apple's technical and other support is far better than the other companies', although Tandy is improving. But Apple is still the leader in support."

Is One Machine Better?

Although productivity applications are increasingly being stressed even in the lower grades, pre-vocational levels do have needs other than high-level productivity. Does this offer Apple a marketing advantage? Is one machine better than another for younger children?

Jan Davidson notes that the machines have somewhat different personalities for which some adjustments must be made as programs are developed. "We try to give IBM users the same things we give Apple users," she says. "We're certainly limited in colors, especially on the older machines. The new IBM System/2 takes care of that. Otherwise, for each system, we try to make the most of the capabilities we have."

Seuss, on the other hand, sees neither Apple nor IBM as particularly effective for young children. "I don't see what the differences are, from the perspective of a child. Apple does have a somewhat larger color palette than IBM, but it doesn't have nearly the color capabilities of the Commodore 64. Neither IBM nor Apple are particularly good at animation—they don't support sprites, for example. Both have limited sound capabilities. A program you can do on one you, can do on another. I can't personally make a meaningful distinction between Apple and IBM the way I can between either of them and the Commodore 64."

Both Apple and IBM have lately improved their graphics and sound capabilities—Apple with the IIGS, IBM with its System/2 line and particularly its education-oriented Model 25. It is clear that both companies understand increasingly well the demands that educators at all levels are making, and equally clear that a battle for dominance of the educational market is currently shaping up.

Apple's Future In Schools

Who will win this battle? Apple, with its established leadership in education, or IBM and the compatibles, with their overwhelming numbers?

At the moment, the answer appears to be a toss-up. Apple's support remains unparalleled in education, and is further bolstered by both the trust and the money schools have invested in their computers. With the introduction of the IIGS, questions about graphics and sound limitations were rendered moot. For business and vocational classes, the Macintosh is making larger inroads, especially as the Mac itself becomes more and more recognized as a workhorse business machine.

On the other side of the question is the obvious hunger of IBM and the clone manufacturers to cut a piece of the educational pie. Tandy is perhaps the hungriest of them all, bringing to the marketplace a real strength as a result of its nationwide chain of Radio Shack retail outlets.

Underlying the confrontation is the old argument of applications and the need for students to learn computing on the same machines they'll encounter in the workplace. For the next year or two, at least, this is likely to be the area around which most of the battles will be centered.


Ironically, Apple has won many of these battles by default. More and more MS-DOS software comes with Mac-like icons and pull-down menus. It's the rare compatible that hasn't sprouted a mouse port. Point-and-click is as common on MS-DOS programs as on Apple software now.

As a result, the whole operating system argument grows less relevant. The more transparent computers and software, the less it matters which operating system the computer uses.

"What really matters," says Carlston (of Brøderbund), "is that children are exposed to quality software on computers that work."

Apple, of course, more than meets that criterion. The company has followed a sensible upgrade path with its machines, providing schools with an affordable path to higher capabilities and more advanced functions.

And there's that huge installed base which schools are not quickly going to abandon. For one thing, there's the investment the Apples represent. Probably more far-reaching is the fact that those hundreds of thousands of Apple machines have served—and are still serving—schools well. In schools, Apple has earned a reputation for excellence of product and support. IBM and the clone manufacturers still have to prove that they can meet the demands schools, school budgets, and students place upon them.

Apple has already proven that it is not only up to that particular challenge, but it is also enthusiastic about challenges in general. Its market leadership may be under assault, but in such a confrontation, as IBM and the others may discover, experience is more than half the battle. For some time to come, the bright Apple logo is likely to continue to be the symbol most frequently seen on computers in our schools. 

AppleWorks For Everyone

Christopher Van Buren

In the first of a two-part series, Christopher Van Buren, noted AppleWorks expert, shows how templates—ready-made databases and spreadsheets—can make AppleWorks a dynamic program for the home.

AppleWorks, the premier integrated software for the Apple II, is one of the most versatile programs around. It combines a word processor, database, and spreadsheet into one system, resulting in power far and beyond what you'd find in any single application. Rather than fitting *your work* to the program, AppleWorks lets you make the *software* fit the way you work.

Although AppleWorks is found in thousands of businesses and schools, it's just as valuable in the home.

What Is A Template?

Chances are that somebody has already used AppleWorks to do exactly what you want it to do. If that person gave you a file on disk containing their setup, it would be called a *template*. Templates are simply predesigned

word processing, database, or spreadsheet files.

You'll find two kinds of AppleWorks templates: public domain and commercial. Public domain templates are offered by user groups and other organizations at little or no cost, since the

template authors have released the rights to the software. As you might guess, there are hundreds of these public domain templates. The quality ranges from outstanding to nearly useless. Commercial templates are created by experienced programmers and authors

Figure 1: Simple Budget

File: Budget		REVIEW/ADD/CHANGE			Escape: Main Menu
		January	February	March	
11					
21					
31	Utilities	65	65	45	
41	Phone	130	130	130	
51	Car Pymnt	250	250	250	
61	House Pymnt	700	700	700	
71	Master Card	55	35	35	
81	Visa	100	50	30	
91	Food	250	250	250	
101					
111		1550	1480	1440	
121					
131					
141					
151					
161					
171					
181					

D15					
Type entry or use ⌘ commands					
⌘-? for Help					

Spreadsheet budgets for the home don't have to be complicated.

and are usually of better quality. But since they're written with the intent of turning a profit, they cost more than public domain templates—expect to pay from \$9 to \$99 (or more).

Budgets The Easy Way

Household finances can get involved. *AppleWorks*, however, is capable of handling almost every household financial matter—from simple budgets and taxes to

analysis of properties and investments. The spreadsheet module is best suited for financial applications, serving as a kind of bookkeeping ledger that calculates itself. Many *AppleWorks* users avoid the spreadsheet, fearing such grim terms as *formulas*, *functions*, and *cell references*. But using the spreadsheet can be quite simple, as the budget in Figure 1 demonstrates.

Most of the work in the Figure 1 spreadsheet template is done by entering the words and numbers into the appropriate columns. *AppleWorks* lets you adjust the width of the spreadsheet columns and the way numbers appear. The only hard part is adding up the figures to arrive at a total.

The spreadsheet, though, has built-in math capabilities that can do these calculations for you, even do them automatically. With automatic calculation, once you tell the spreadsheet how to calculate the figures, you can go back and change those numbers as often as you want. The new figures are immediately used in the new (and automatic) calculations. This feature is perfect for home budgeting because it lets you play "what-if?" games: You can easily enter various amounts into the columns to see how the bottom line is affected.

But because budgets are very personal things, it's often difficult to find a spreadsheet template that perfectly meets your requirements. It's not a problem with numbers—you can always enter different figures into a spreadsheet template—but is more a problem with the particular expense and income items you need to list. One template, however, appears to cover many of the common home expense categories. It's one of the many *AppleWorks* templates found in the public domain library of The *AppleWorks* User Group (TAWUG). Figure 2 shows this template's expense categories.

The template isn't very fancy (the formulas are simply additions of columns) but since the templates in the TAWUG library cost only \$3, you really can't go wrong. At the least, you can use this template to save some time in designing your own budget spreadsheet.

Figure 2: Public Domain Budget Template

File: AM.1 REVIEW/ADD/CHANGE Escape: Main Menu

151 Expenditures							
161 -----							
171 Federal Taxes..\$	⌘	⌘	⌘	⌘	⌘	⌘	⌘
181 State Taxes....	⌘	⌘	⌘	⌘	⌘	⌘	⌘
191 Soc. Sec.(FICA)..	⌘	⌘	⌘	⌘	⌘	⌘	⌘
201 Contributions...	⌘	⌘	⌘	⌘	⌘	⌘	⌘
211 Mortgage Payment	⌘	⌘	⌘	⌘	⌘	⌘	⌘
221 Food.....	⌘	⌘	⌘	⌘	⌘	⌘	⌘
231 Utilities.....	⌘	⌘	⌘	⌘	⌘	⌘	⌘
241 Home maint/rent.	⌘	⌘	⌘	⌘	⌘	⌘	⌘
251 Auto operation..	⌘	⌘	⌘	⌘	⌘	⌘	⌘
261 Auto insurance..	⌘	⌘	⌘	⌘	⌘	⌘	⌘
271 Medical ins.....	⌘	⌘	⌘	⌘	⌘	⌘	⌘
281 Medical expenses	⌘	⌘	⌘	⌘	⌘	⌘	⌘
291 Disability ins..	⌘	⌘	⌘	⌘	⌘	⌘	⌘
301 Home owner ins..	⌘	⌘	⌘	⌘	⌘	⌘	⌘
311 Vacations.....	⌘	⌘	⌘	⌘	⌘	⌘	⌘
321 Education.....	⌘	⌘	⌘	⌘	⌘	⌘	⌘

A20: (Label, Layout-L) Contribu

Type entry or use ⌘ commands ⌘-? for Help

This template from an *AppleWorks* User Group public domain disk provides a comprehensive list of expense categories.

Figure 3: Public Domain Check Reconciliation

File: RECONCILE.CHECK Page 1

OUTSTANDING CHECKS			BANK BAL.	CHECK BAL.
-	\$0.00		\$0.00	\$0.00
-	\$0.00	LESS OUTSTANDING CKS	\$0.00	
-	\$0.00	LESS BANK CHARGES		\$0.00
-	\$0.00	OTHER CHARGES		\$0.00
-	\$0.00	OTHER DEPOSITS		\$0.00
-	\$0.00	NET BALANCE	\$0.00	\$0.00
-	\$0.00			
-	\$0.00			
-	\$0.00			

			THESE SHOULD AGREE	
TOTAL	\$0.00		DIFFERENCE	\$0.00

CHARGES NOT DEDUCTED FROM CHECKBOOK				
-	\$0.00			
-	\$0.00			
-	\$0.00			
-	\$0.00			
TOTAL	\$0.00			

DEPOSITS NOT ADDED TO CHECKBOOK				
-	\$0.00			
-	\$0.00			
-	\$0.00			
-	\$0.00			
TOTAL	\$0.00			

Another template from an *AppleWorks* User Group public domain disk helps you balance your checkbook.

Figure 4: Personal Balance Sheet

File: PERS BAL SHEET

DATE----->JANUARY 1, 1986

ASSETS		LIABILITIES	
CURRENT		SHORT TERM	
----->CHECKING ACCOUNTS	\$2,000.00	----->TAXES DUE	\$350.00
SAVING ACCOUNTS	\$5,000.00	CURRENT MONTH BILLS	\$2,000.00
PREPAID TAXES	\$2,000.00		
-----		-----	
TOTAL	\$9,000.00	TOTAL	\$2,350.00
LONG TERM		LONG TERM	
----->HOUSE	\$135,000.00	----->MORTGAGE	\$108,000.00
FORD AUTO MTK VALUE	\$1,400.00	FORD LOAN	\$11,000.00
BUICK AUTO MTK VALUE	\$3,000.00	SAVING & LOAN	\$4,536.00
HOUSE HOLD INVENTORY	\$52,000.00		
-----		-----	
TOTAL	\$191,400.00	TOTAL	\$123,536.00
TOTAL ASSETS	\$200,400.00	TOTAL LIABILITIES	\$125,886.00
*****		*****	
TOTAL NET WORTH----->	\$74,514.00		
*****		*****	

This personal balance sheet is just one of the templates included on a disk from Personal Computer Applications.

Figure 5: Loan Calculation Template

USE DA-K THRICE			
LOAN CALCULATIONS			
To 1st Principal	Calc		2.681
Payment	Calc		2.801
Interest (APR)	Enter	Decimal	4.25%
Interest (1st) Pay	Calc		.121
Payments per Year	Enter		3651
Number of Years	Enter		1.001
Loan	Enter		1000.001
Balloon	Enter		0.001
Current Period	Enter		3651
Principal Paid	Calc		1000.001
Balance	Calc		-.001
Accum Interest	Calc		18.661

The Q-mar group offers a disk which includes, among other templates, this loan calculator.

AppleWorks Checks And Loans

Besides playing what if with a budget, you can use *AppleWorks* to reconcile your checking accounts. The database is a good choice for this application—although it can also be done with the spreadsheet. After entering your checks into the database, you can sort them into various categories for tax preparation. You can also total the checks in any or all categories. For example, you could find the total of all checks written to Wilshire Hospital, locate all checks written for medical pur-

poses that are over \$200, or identify all checks written to Wilshire Hospital or Doctor Jacobson. The searching, selecting, and sorting capabilities in *AppleWorks'* database are as powerful as most large business databases—and they're definitely easier to use.

Loan calculations, on the other hand, are commonly made on spreadsheets. You can use the spreadsheet to figure the payment schedule on a loan, the remaining balances during any term of the loan, the number of payments, the amount of interest, and so on. This can be handy for checking the accuracy of a lender's interest calculations. Some of the more elaborate spreadsheets can calculate your earnings on stocks and bonds, compare loan rates, figure an amortization table on a loan, and more.

There are several premade templates, both public domain and commercial, that handle check registers, loan calculators, and other personal financial tasks. The TAWUG public domain library has a template (Figure 3) which acts as a worksheet for balancing your checkbook. (It doesn't actually hold the check register; it simply helps you balance it.) This worksheet is on TAWUG's disk 46; another can be found on disk 33.

TAWUG's disk 5 contains a bond portfolio that tracks the issue dates, terms, and amounts of bonds held. And disk 6 has a template that analyzes income property to show if you've lost or made money, and how the expenses break down.

A commercial check register can be found on the collection of personal financial tools from Practical Computer Applications. The disk, which contains several templates, costs \$24.95. Other templates on the disk include a worksheet for bills, a loan payment analyzer, a worksheet for examining present and future values of saving accounts, a personal balance sheet (Figure 4), and more. This disk covers the entire range of personal financial matters and can be a great aid in your own template efforts.

The Q-mar group publishes a commercial checkbook template,

Figure 6: Educational Database

File: Countries

INSERT NEW RECORDS

Escape: Review/Add/Change

Record 1 of 1

Name: -	Longitude: -
Population: -	Latitude: -
Primary Religions: -	Capital: -
Government Type: -	Climate: -
Products Produced: -	
Foods Produced: -	
Indigenous Animals: -	

Type entry or use \odot commands

739K Avail.

Database creation—locating information from a variety of sources, collating it, and organizing it—can be an educational experience for junior-high and high school students.

along with a collection of other templates, for \$12.95. Q-mar's checkbook template includes both the register and the reconciliator. Other files on the disk include a loan calculation tool (Figure 5), a worksheet for determining sales commissions, and other nonfinancial tools.

Works Access publishes a personal finance template disk called *Home Money Works*. It contains a checkbook manager, budgeting, financial planning, home inventory, and a billing reminder template—all for \$25.

Death And Taxes

Tax planning and preparation can be one of the most challenging spreadsheet applications. Luckily, some people have already done the work for you. Some tax templates actually print your tax forms right from *AppleWorks*. After you enter the raw data into such a spreadsheet template, it calculates amounts, looks up information in tables, and creates forms. *1040Works* from Personal

Presidents, Planets, And Trees

Home education covers a lot of territory, and the *AppleWorks* database can help with much of it. Anything that requires drawing conclusions from large amounts of data is ideal for the database. Even the simple act of entering information into the database can be educational.

Let's say your child is using *AppleWorks* to create a database on various countries and their characteristics (Figure 6). The student will have to go to several sources to find the necessary information. In many ways, it's a process of answering questions. When the information is finally entered for several countries, the student can arrange the data in many ways—finding all countries in the Southern Hemisphere, or all countries that produce oil, or the countries with the largest populations. Arranging information in various ways lets the student draw new conclusions.

As with many of *AppleWorks* applications, you can find cus-

Sources For *AppleWorks* Templates

The AppleWorks User Group
Box 24789
Denver, CO 80224

Maintains a library of public domain *AppleWorks* templates. Each disk contains several templates and costs \$3. Ask for a catalog of disks. Public domain templates can be good starting points for your own customized templates.

ImagiMedia Software
16640 Roscoe Pl.
Sepulveda, CA 91343

Produces *FactWorks*, a three-volume set of encyclopedia disks for the *AppleWorks* database. Will provide lists of files on each disk at request.

Practical Computer Applications
2323 Tucker Ct.
Santa Rosa, CA 95401

Produces two commercial template packages, including personal financial tools and professional financial tools. These template disks are well packaged and are professionally made.

Personal Financial Services
Box 1401
Melville, NY 11747

Publishes *1040Works*, one of the best tax templates for *AppleWorks*. This template does most of the federal tax schedules and prints the forms.

The Q-mar group
5677 Oberlin Dr.
San Diego, CA 92121

Has a catalog full of commercially made templates for *AppleWorks*, including some for home finance and education. Most come with manuals. Also publishes an *AppleWorks* newsletter.

Works Access
2636 Churn Creek Rd.
Redding, CA 96002

Publishes templates for various

\$10,000.00 Programming Contest!

COMPUTE!'s Apple Applications

First Prize \$5,000.00 Second Prize \$2,500.00 Third Prize \$1,000.00
Three Honorable Mentions \$500.00 each

COMPUTE! Publications, Inc., a longtime leader in personal computer publishing, is turning its popular semiannual COMPUTE!'s Apple Applications into a bimonthly magazine starting this fall. Each issue will include high-quality programs for the Apple II+, IIe, IIc, and IIGS computers, ready for readers to type in and run. Along with the best in Apple software, readers will find feature articles, tutorials, reviews, and other Apple information in the new, expanded COMPUTE!'s Apple Applications. We're also offering a companion disk containing each issue's programs, as well as a magazine/disk subscription.

To find the very best original software for Apple II-series personal computers, we're sponsoring a programming contest with \$10,000.00 in prize money for the top six winners. In addition, the winners will receive standard purchase fees for publication of their programs in our magazine and royalties if they're republished in COMPUTE! books.

Even if your contest entry doesn't win a prize, you'll still earn purchase fees if we accept your program for publication.

Interested? If so, here are the rules:

1. Entries must be your original work, previously unpublished in any form. All those whose programs are accepted will be required to affirm this in writing.

2. You can submit as many entries as you want, but we cannot consider programs which currently are entered in other contests or are submitted for publication elsewhere.

3. The contest deadline is December 31, 1987. All entries must be received at our offices by this date. Programs submitted after this date will still be considered for publication, but will not be entered in the contest. If we purchase an entry for publication before the deadline, the entry is still eligible to win.

4. Entries are allowed (and encouraged) in virtually all software categories: home and business applications, education, recreation, telecommunications, graphics, sound and music, and utilities.

5. Entries may be written in either Applesoft BASIC, machine language, or a combination of the two. All possible efforts should be made to insure that an entry runs under both DOS 3.3 and ProDOS. Programs must be of a publishable length—BASIC and machine language program listings are printed in *COMPUTE!'s Apple Applications*. Although this length is quite flexible, it's unlikely we would publish a BASIC program of more than 12K or a machine language program of more than 6K. Exceptional software which exceeds these sizes will certainly be considered.

6. Entries must be submitted on 5¼-inch floppy disks. If your program is written in machine language, you must submit both the object code and all of the source code required to compile the program.

7. Entries must be accompanied by an article which explains how to use the program and what it does. If your program employs any new or unusual techniques that you think will be of interest to other programmers, you can also describe how the program works. (If you feel that writing is not your strong point, please do not hesitate to enter; this is a programming contest and the entries will be judged solely on the basis of the programs submitted.)

8. Submissions which do not win a prize and are not accepted for publication will be returned only if accompanied by a self-addressed, stamped mailer.

9. Members of the staff of COMPUTE! Publications, Inc., will judge the contest, and all decisions regarding contest entries and acceptances will be made solely at the discretion of COMPUTE! Publications, Inc. All decisions are final. This includes decisions regarding creativity, similarity among entries, and general suitability.

10. Winners will be announced by COMPUTE! Publications, Inc., in the spring of 1988.

11. This contest is void where prohibited by law. Full-time, part-time, and previous employees of COMPUTE! Publications, Inc., and Capital Cities/ABC are ineligible for the contest, but may still submit work for publication at standard rates.

Every contest entry must include this signed form.

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APPLICATIONS

A bimonthly magazine for every Apple II and Macintosh owner. Includes informative features and top-quality programs ready to type in and run.

Millions of Apple personal computers—from the venerable II+ and IIe to the compact IIc and the powerful IIGS—are in homes, schools, and offices across the country. And Apple's Macintosh computers are showing up in more businesses, more universities, and now more homes than ever before. Apple computers are being used for almost everything—entertaining and educating people of all ages, managing home finances, running businesses, writing, painting, composing. Name something computers can do, and Apple computers do it.

That's why COMPUTE! Publications created COMPUTE!'s Apple Applications magazine as a semiannual nearly three years ago. Its informative features, product reviews, tutorials, and type-in programs have made the magazine extremely successful on the newsstands. So successful, in fact, that we're making COMPUTE!'s Apple Applications a bimonthly magazine and offering subscriptions for the very first time.

Whether you use an Apple computer at school to teach or to learn, at home to help organize your household, or at work to keep your business profitable, you'll find valuable applications, information, and news in every issue of COMPUTE!'s Apple Applications:

■ **Fascinating features.** Thoroughly researched, well-written feature articles on such wide-ranging topics as desktop publishing, computer-generated arts and crafts, and new frontiers in educational computing.

■ **Top-quality programs.** Sophisticated applications such as *SpeedScript 80*, an 80-column word processor for all Apple II computers. Exciting arcade-style games such as "Heat Seeker." Colorful graphics programs such as "Picture Maker." Utilities. Educational software. Home and business productivity applications. Every program is ready to type in and run. And with COMPUTE!'s program-entry software—"Apple Automatic Proofreader" and "Apple MLX"—typing is a snap. Or, if you prefer, a companion 5¼-inch disk containing all of the programs is available singly or by subscription.

■ **Hands-on tutorials.** Tips and techniques for all kinds of computer applications—from power programs like *Microsoft Word* to popular software like *AppleWorks*.

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■ **Balanced reviews.** Honest and up-front evaluations of the most interesting software and hardware for the Apple II and Macintosh.

■ **Buyer's guides.** Detailed reference guides to new Apple II and Macintosh software and hardware.

■ **And more.** Interviews with Apple newsmakers. Comprehensive lists of Apple user groups. Forecasts of the future of computing with Apple computers. Reports from the latest industry trade shows. And in 1988, COMPUTE!'s Apple Applications will begin publishing the winning programs from our \$10,000 Apple programming contest!



Look for the December 1987 issue of the new bimonthly COMPUTE!'s Apple Applications available November 1 at your favorite newsstand. Or you can have it delivered to your mailbox six times a year for only \$13.95. Each issue's companion disk can be purchased separately for \$12.95, or you can take a year's subscription to the disk for just \$49.95—you save 35 percent over the single-disk purchase price.

As a special bonus, if you order a prepaid subscription before November 1, you'll get the first issue absolutely free! That's seven issues for \$11.95!

To order a subscription to the magazine and/or disk, call TOLL FREE, 1-800-727-6937. Or send a check or money order to:

COMPUTE!'s Apple Applications
P.O. Box 10767
Des Moines, IA 50340

To order a single copy of the magazine, or to order an individual disk for \$14.95 (includes \$2.00 shipping and handling), please call 1-800-346-6767. (In New York, 212-887-8525.)

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Which Apple For You?

Gregg Keizer, Editor

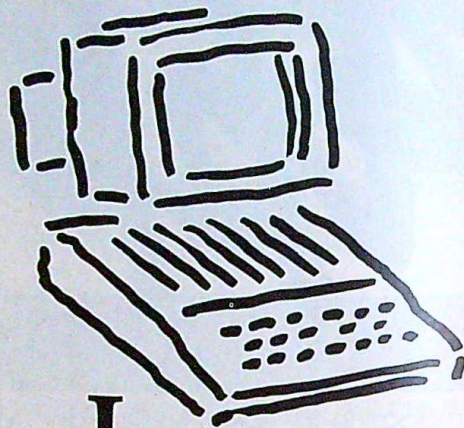
There are more choices than ever. A portable IIc or an expandable IIe? Apple IIgs or Macintosh Plus? Entry-level Macintosh Plus or speedier Macintosh SE? Deciding which Apple computer is right for you depends on several things ranging from what you'll do with it to who uses it.

It's not easy buying a computer. Not as tough as buying a new car (you know, after all, what the computer should cost when you walk into the dealership), but not something you rush into, either. This is just as true with your first computer as it is if with your fourth.

At least you know one thing. You're getting an Apple. You know that much. But which one?

Each of the three Apple II-series machines and the two Macintosh models discussed here offers something different. It might be its price, or its raw computing power, or its software library. But which computer you put on your desk, whether at home or at work, depends on what you want, what you have to have, and what you're willing to spend.

The Apple IIc: Compact Computing



Inexpensive and portable are two of the better ways to describe the Apple IIc. Even with its monochrome monitor, the IIc is the smallest and lightest model in Apple's line.

The IIc's 5¼-inch built-in disk drive, separate power supply, and handle combine to make a transportable computer that can be carried with ease from room to room, from class to class, or from home to work. If you're moving the computer regularly, you can even buy a carrying case.

For most people, though, the IIc's small size and light weight are secondary to its price. The suggested retail price for the IIc and a matching monochrome monitor is \$995, but it's not hard to find the machine substantially discounted. Check with local dealers and watch for special promotions and sales, and you might be able to pick up a complete system—IIc computer, monochrome monitor, and monitor stand—for less than \$700.

Of course, the IIc runs all the popular Apple II software, including such stalwarts as *AppleWorks*, *Where in the World is Carmen Sandiego?*, *MasterType*, and *The Print Shop*, to name just a few of the more than 10,000 Apple II programs. You can also connect a mouse to the computer to use the few mouse- and menu-driven software packages available.

But the IIc's low price and portability mean some sacrifices on your part. First and foremost, the machine is virtually unexpandable. Because the IIc is in a small case, you can't call on the same selection of add-on cards (modem cards, memory cards, accelerator cards) that an Apple IIe

owner can. There's just not enough room in the IIc for these cards; the same holds true for the IIGS upgrade that only IIe owners can take advantage of.

You *can* add a memory card to the IIc, though it means cracking open the IIc case and pulling some chips. Three different sources—Apple itself, Applied Engineering, and Checkmate Technology—offer IIc memory-expansion cards.

AppleWorks is the primary reason why you'd want to increase your IIc's memory, although you can set up the additional memory as a ramdisk for use with other programs or operations.

Because it's so compact, the IIc doesn't include a numeric keypad. If you work extensively with numbers, you might want to consider another Apple.

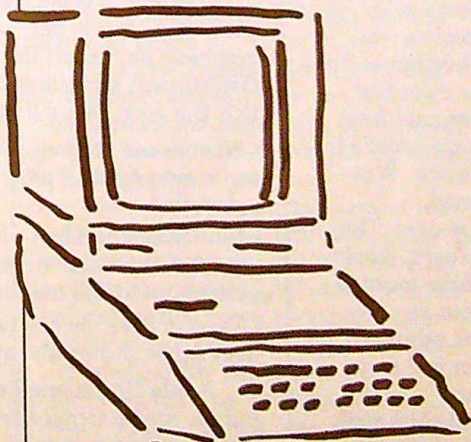
The Apple IIc is the low end of the Apple II line, and for many people, their first computer. It makes a perfect choice if you

- Want to run Apple II software, but don't want to spend a lot of money
- Need to move the computer regularly, or
- Don't expect to need more than 128K of memory.

Apple IIc strengths. *It's compact and inexpensive, and it can be toted from place to place without difficulty. It includes a built-in disk drive.*

Apple IIc weaknesses. *It's difficult to expand. The keyboard is small and is without a numeric keypad.*

The Apple IIe: Ten Years And Going Strong



Ask most people familiar with computers to describe an Apple II and they'll tell you about the Apple IIe. This workhorse of the Apple II line has changed only slightly since its introduction four years ago. It still offers solid

computing power in a system that's eminently expandable.

Slots is the key word to remember when you're considering an Apple IIe. The seven slots inside the computer can hold a variety of add-on boards, each filled with its own special chips and carrying out its own special task. Because of these slots, you can customize your IIe to your heart's content. You can add memory, a modem, a speech synthesizer, a video digitizer, and more. In most cases, all you have to do is open the case and plug in the board.

The IIe is slightly less expensive than the IIc, with a suggested retail price of \$829. However, the IIe, unlike its smaller sibling the IIc, doesn't come with a built-in disk drive. It also needs cards to use a printer, modem, or even a disk drive—things the IIc can do without expansion. Thus an Apple IIe with one drive and the necessary add-on cards costs more than a similarly equipped IIc.

Why then, should you consider the IIe? Simple—the future.

What you need your computer for now, what you use it for at the moment, is probably not what you'll do with the computer in two years, or even one. In that time, software may have advanced to the point where the memory inside your machine is insufficient. Or you discover that your business must send files to another computer, and so you need a modem. Or you're working with a sight-impaired child, and you could use a speech synthesizer.

The flexibility of the Apple IIe is almost without parallel (the IBM PC is the only comparably expandable personal computer). It's one reason why the Apple II line has lived to see its tenth anniversary. Of course, with the capability of adding boards to the Apple IIe comes the responsibility of knowing what you're doing. The IIe is not, and isn't meant to be, a plug-in-and-turn-on kind of computer. To fully utilize the IIe's power, you have to learn something about the computer and how its software works.

Yet the Apple IIe is an excellent first computer. Better still, an Apple IIe will probably be used longer than a *closed* computer (one that can't be easily opened and customized) like the IIc. Choose the IIe if you:

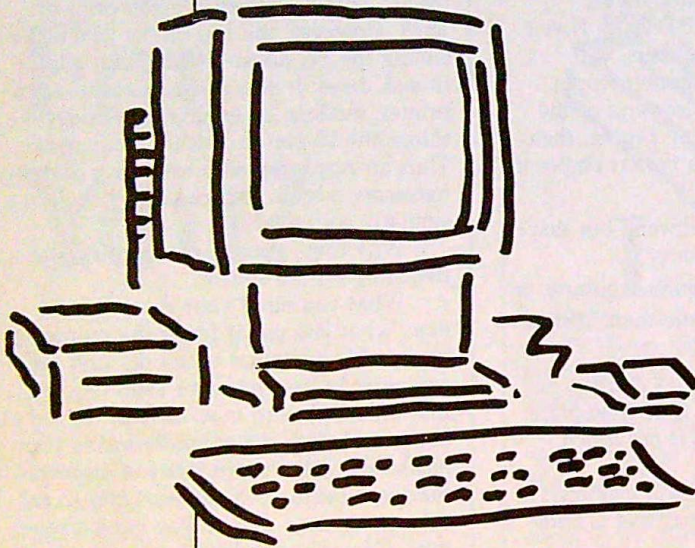
- Think you'll use the computer for more than one or two tasks
- Know a number of people will use the computer, as in a school or business (the machine just *feels* sturdier than a IIc), or
- Have special computing needs, such as speech/music synthesizing, video digitiz-

ing, or large amounts of file storage (in other words, you want to use a hard disk drive).

Apple IIe strengths. Slots make it an extremely versatile machine. It can be expanded and customized to your exact needs.

Apple IIe weaknesses. It has a higher cost relative to other computers. Add-on boards are necessary even for basic operations like printing.

The Apple IIGS: Top Of The Line



Introduced last fall, the Apple IIGS got a lot of attention before fading temporarily from sight. Problems in delivering the computers to dealers—attributed to everything from a shortage of the machine's sound chip to the simple fact that Apple announced the computer long before its inventory was built up—made it seem that you could never get one. Waiting lists for the computer formed.

Now, however, the wait is over. The Apple IIGS is back in the limelight. Apple advertised heavily in educational journals in early summer, and rolled out an impressive, though brief, print campaign in Apple-specific magazines in late summer and early fall. Sales are up.

The Apple IIGS is a hybrid. Although it can run most Apple II-series software (and all the popular programs), it can also run IIGS-specific programs that in most instances bear a striking resemblance to those seen on the Macintosh. This duality makes for an interesting computer. You can play it safe and use the same software that runs on IIc and IIe computers, or you

can tackle the more impressive IIGS programs. Or you can do both.

The special features and advantages of the IIGS are evident only with IIGS software; pre-GS programs look and feel as if they're on an Apple IIe, though the IIGS's standard RGB monitor has a crisper picture than most Apple users are accustomed to. But with the right software, the IIGS's claim to fame—*Graphics* and *Sound*—are quickly apparent. At the moment, graphics quality dominates. Few developers have yet gotten a handle on the machine's sound (for the exceptions, see Rick Parfitt's "Making IIGS Music" in this issue). Paint programs, draw programs, and even word processors let you create in color, using the simple-to-learn pull-down menu and mouse-driven system popularized by the Macintosh. The available music programs are just as impressive, offering stereo sound, MIDI capabilities, and more. Educational programs that use the IIGS's built-in speech synthesis are only just appearing—the feature seems perfect for scores of programs aimed at school-aged children.

A complete Apple IIGS system—computer, RGB color monitor, and two disk drives—retails for \$2,196. If you look hard, you should be able to find the system for less than that, but since the computer is the newest in the line, don't expect as much of a discount as with the other Apple II machines.

Another thing to keep in mind is the size of the existing IIGS software base—at this writing, it's small. That's changing, though, as new products are released each month.

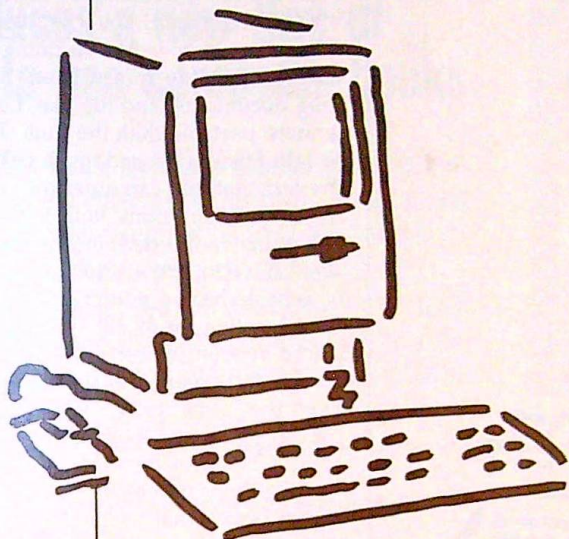
The IIGS is being marketed as *the* Apple II computer to buy, with heavy emphasis on the fact that it's the newest, fastest, most sophisticated II around. The IIGS is a good choice if you:

- Want to use Macintosh-style software and classic Apple II programs on the same computer
- Have young children—for whom great graphics and sound are especially important—who will use the computer, or
- Need to have the best (and most expensive) Apple II computer available.

Apple IIGS strengths. It's the newest and the most powerful Apple II computer ever. It offers superb graphics and sound.

Apple IIGS weaknesses. This is the most expensive Apple II computer. There is not a great deal of IIGS-specific software yet.

The Macintosh Plus: Enter Power Computing



With the recent elimination of the Macintosh 512K from Apple's line of personal computers, the Plus became the entry-level Macintosh. But the Plus is a far cry from the original Macintosh introduced almost four years ago. Outwardly, there has been little change (other than a change in case color from beige to off-white), but inside things are different. Instead of the first Mac's meager 128K of memory, the Macintosh Plus sports a full megabyte; its single disk drive is double-sided, able to cram a full 800K of files on one 3½-inch disk; and its SCSI (Small Computer System Interface) port allows for speedy access to peripherals such as hard disk drives.

Put these together, add a generous sprinkling of software that can be both easy to learn and impressive in its power, and you have a system that fits the needs of a wide range of people.

The vaunted Macintosh ease-of-use derives from the almost intuitive graphics interface—the mouse-driven method of pointing and clicking, pull-down menus, and clear dialog boxes presenting information and allowing choices. The interface is religiously adhered to by Macintosh software developers. That means it takes far less time to learn the basics of any Macintosh program when compared to the startup time necessary with software on most other computers.

The value of this surface similarity among Macintosh programs has always been underestimated. Not only does it cut down on training time whenever you turn to new software, but it also breeds a

familiarity with the computer and its way of doing things. You almost always know how to operate a Macintosh program straight out of the box, and that knowledge makes most people more comfortable with the computer and its programs. And the more at ease anyone is with the computer, the more he or she is likely to use the machine and use it more productively.

General advantages of the Macintosh line aside, this particular model is attractive to anyone who wants the power of the Macintosh at a relatively low price. Although its retail price is \$2,199, it's at the bottom end of the three-machine Mac line, so you can expect to find it for considerably less. Dealers often sell the machine for under \$1,400, considerably below the going price for an Apple IIGS.

On the other hand, if you'll need color *and* need a Macintosh, look into the Macintosh II (a high-end machine that's beyond the scope of this article). The Plus is strictly a black-and-white machine. Sound, another vital part of many programs, is excellent in the Macintosh, but it's not used to its fullest capacity by many packages. Animation is generally less than acceptable in entertainment software. The Plus can run the limited number of Macintosh fast-action games, but without a joystick, the traditional game controller, such games pale in comparison to those on the Apple II series.

The Macintosh Plus is, like the IIc, a closed system: You cannot easily expand it. Though you can add such exotic things as large screen displays, accelerator cards (to speed it up), and more memory, this is a chore best handled by a technician. Unlike the Apple IIe or IIGS, you can't just open the case and slip in a board.

The Plus is the computer that took the Macintosh from a hobbyist's upscale machine to the choice of hundreds of thousands of businesses. The Plus is right if you

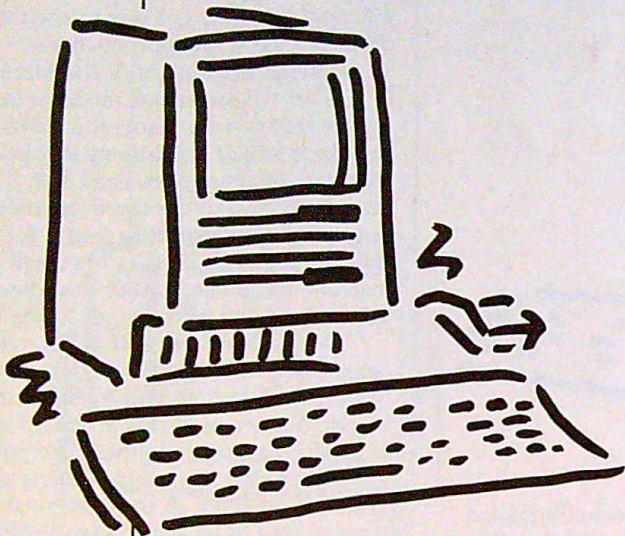
- Plan to use the computer for such things as word processing, database management, spreadsheet manipulation, and other traditional business applications
- Want to use almost any Macintosh software, but don't mind sacrificing some speed, or
- Go to college (Apple heavily discounts the Macintosh in higher education).

Macintosh Plus strengths. *This is the most inexpensive Macintosh. It runs almost every Macintosh software package (generally, the only exceptions are those specific to the Macintosh II).*

Macintosh Plus weaknesses. *It's slightly slower than the next model up, the*

SE. You cannot easily expand the Mac Plus yourself.

The Macintosh SE: One Slot Means A Lot



The Macintosh SE is a beefed-up version of the Mac Plus. It includes more ROM, an internal fan, the option of two internal 3½-inch drives or one 3½-inch drive with a 20-megabyte hard disk drive, and about a 20-percent increase in speed over the Mac Plus.

But the most important difference can't be seen or heard. Once the case is opened (again, a job best left to technicians), you'll find an internal connector that mates with a variety of cards and boards. These can range from more memory and accelerated microprocessors to network connections. In other words, the SE is expandable. It has, in effect, one "slot."

The SE runs the same software as the Plus. Although the SE is reportedly selling as well as or slightly better than the Plus, no software developer or publisher wants to exclude either potential audience.

Other than the obvious benefits to owning a Macintosh SE—already outlined when we explored the Mac Plus above—there are several reasons for considering this more expensive model. First and most important is the SE's expandability. The computer was designed with the internal connector in mind, so installing an add-on board or card is much simpler. That means more card and board manufacturers should enter the market, giving you a wider selection. Connecting SEs to a non-Apple network should be especially

easy when compared to the Plus.

The SE also runs a bit faster than the Plus. It's not a tremendous increase, but it's still significant. You'll probably notice the pickup in speed when doing things like recalculating spreadsheets, formatting long documents, and the like. Last, the SE is more portable than the Plus. The weight hasn't changed much either, but the fact that you can order the computer in two configurations, both with two drives inside the case, means that you don't have to tote anything else around (except perhaps a printer).

Retailing for \$2,898 in its lowest-priced version (with two 3½-inch drives), the SE costs more than a Macintosh Plus. Even the "street price," what you can expect to pay if you look and ask around, is about \$2,300 for the same two-drive SE.

Do the extra enhancements offset the higher price? That's something you'll have to decide. It depends on what you're planning to use the computer for. Writing is usually limited by the speed of the writer, not the computer, for example. But automatic spelling checks *are* a part of writing these days, and they *do* benefit from more speed. Rapid calculations can also be vital for such applications as graphics, desktop publishing, and CAD/CAM.

The SE is becoming the Apple machine of choice for businesses, large and small. You should look at the Macintosh SE if you:

- Need the fastest computing power offered in a traditional Macintosh (not a Mac II)
- Think you'll want to add power and capabilities to the computer in the next year, or
- Move the computer frequently and need two disk drives.

Macintosh SE strengths. *It provides faster operation than the Plus and some expandability. Two disk drives fit inside the computer's case.*

Macintosh SE weaknesses. *It's more costly. The internal connector is not accessible to the average user.*

You have choices when you're looking at the Apple II and Macintosh lines of personal computers from Apple. Apple's different computers can do different things in different ways.

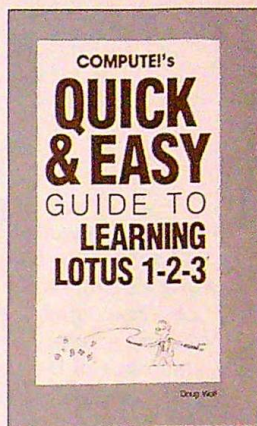
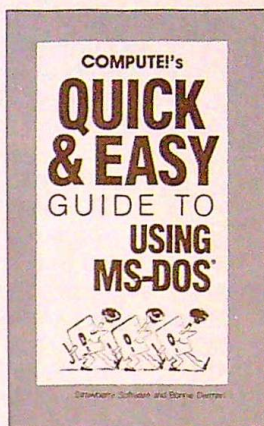
And each computer has particular strengths and weaknesses. All you have to do is match up your reason for buying, and what you want the computer to do for you, with the right system.

It may not always be easy, but it's sure fun.



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COMPUTE!'s Quick and Easy Guide to Using MS-DOS

Bonnie Derman and Strawberry Software
ISBN 0-87455-105-6 \$12.95

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COMPUTE!'s Quick and Easy Guide to Learning Lotus 1-2-3

Doug Wolf
ISBN 0-87455-106-4 \$12.95

The perfect guide for the novice user of the popular and powerful *Lotus 1-2-3*, this book assumes no previous computer experience whatsoever. *COMPUTE!'s Quick and Easy Guide to Learning Lotus 1-2-3* covers everything from building a spreadsheet model, setting up a database, and using 1-2-3 for word processing, to creating graphs and powerful macros. Also included are discussions on how to start 1-2-3 and available add-on software that can be used with *Lotus 1-2-3*.

COMPUTE!'s Quick and Easy Guide to AppleWorks

Tom and Ellen Dougher
ISBN 0-87455-109-9 \$10.95

AppleWorks, the unchallenged leader in personal productivity software on the Apple II series, is an integrated package combining a word processor, database, and spreadsheet. It's a complete program that lets you do everything from writing letters and reports to keeping extensive files and projecting financial earnings. With *COMPUTE!'s Quick and Easy Guide to AppleWorks*, you'll see how to get started with *AppleWorks*, and how to use each of the three major applications. A Command Summary, Keyboard Template, and Quick-Reference Chart provide information in one-stop locations. Numerous ideas offer practical examples on new ways to use *AppleWorks*. And there's even all the latest information on *AppleWorks'* add-ons and enhancements. Clearly defined sections apply to novices and power users alike.

COMPUTE!'s Quick and Easy Guide to dBase III Plus

Chuck Deberry
ISBN 0-87455-107-2 \$10.95

For the beginning or experienced user of this popular database management program, Ashton-Tate has sold more than a million copies of *dBase*, and *COMPUTE!'s Quick and Easy Guide to dBase III Plus* is the guide and reference to help you tap all the power and flexibility that *dBase III Plus* has

to offer. This is not a manual for *dBase*; rather, it's a guide that makes getting started with *dBase* easy and finding specific information quick. For all users of *dBase III Plus* on the IBM PC, PC XT, PC AT, or compatible computer.

COMPUTE!'s Quick and Easy Guide to WordPerfect

Patricia Farrell
ISBN 0-87455-011-4 \$10.95

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COMPUTE!'s Quick and Easy Guide to Desktop Publishing

Dan McNeill
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COMPUTE!'s Quick and Easy Guide to Dow Jones News/Retrieval

Donald B. Trivette
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Going To Work

Gordon McComb

There's been a bumper crop of business software this year for both the Apple II and Macintosh lines. Gordon McComb sorts it all out for us.

A funny thing happened to the Apple II and Macintosh on their way out of America's computer stores—people started using them for business. Though the Apple is touted as the perfect computer for education, and the Macintosh finds many of its users in the home front, increased memory and graphics capabilities make both machines natural for business applications, too.

It's been a great year for business in the Apple II and Macintosh lines. Here is what has happened in the past year in the business software community, and what you have to look forward to in the near future.

The Call For Business Solutions

Programs for business succeed when they solve a problem. There must be a tangible need for the program—a way to make things easier, faster, or more accurate—or the software isn't used. Word processors and spreadsheet programs precisely fit the profile of problem-solving software. It's no wonder they head the best-seller lists.

AppleWorks, which came out a few years back, is the premier spreadsheet and word processing program for the Apple II. This integrated package remains high on everyone's buying list partly because of the numerous *AppleWorks* add-on packages that are available. With an add-on, you can make *AppleWorks* an almost totally different program—from mailing list manager to time scheduler to tax preparer. A number of companies, including Pinpoint, Megahaus, Q-mar group, and Software Touch, are devoted almost exclusively to creating *AppleWorks* add-on software.

Competing software includes stand-alone spreadsheet programs like Applied Engineering's *VIP*

Professional (a Lotus 1-2-3 work-alike with a Macintosh-style interface) and Microsoft's *Multiplan*.

An *AppleWorks*-like program for the Macintosh is Microsoft *Works*. Like *AppleWorks*, it combines spreadsheet, word processing, and data management functions under one roof, but it adds telecommunications and graphics for a larger set of features. Similar applications exist for the Macintosh line: Lotus *Jazz* (to be replaced by Lotus *Galaxy* by early next year), Microsoft *Excel*, and Data Tailor's *Trapeze*. Most any business application can be tackled with one of these packages.

The demands placed on word processing software by most businesses require special formatting features and elaborate printer support. The entry- and intermediate-level word processors, such as *HomeWord* for the Apple II, can't be effectively used in most offices. Both the Apple II and Macintosh now have several powerful word processors to

WordPerfect

Apple II Word Power

The most popular word processor for the IBM PC is fast becoming the most popular word processor for the Apple II line. *WordPerfect*, version 1.1, combines all the word processing features you'd expect from a top-notch program, with many extras, including a spelling dictionary, macro language, and mail merging.

WordPerfect works on the Apple IIe, IIc, and IIGS (the IIGS version runs under ProDos-16). You interact with the program by pressing function keys and entering codes. Standard page formatting is automatic—you just start typing. You can change margins, page size, line spacing, line alignment, and other variables by pressing the proper keys and entering embedded codes. *WordPerfect* provides a menu of choices for advanced features.

The spelling dictionary in *WordPerfect* contains 50,000 words (the dictionary for the IIGS version contains 115,000 words). You can easily check a document or a portion of the document, and you may add your own words to the list. The macros feature works a lot like a tape recorder—it records keystrokes. Turn the macro recorder on, and *WordPerfect* memorizes everything you do on the keyboard. Save the macro, play it back, and your actions are repeated in a flash. The powerful macros features, not available on most other word processors (for any computer), lets you instantly change the formatting of documents or enter long passages of text.

Mail merging is useful when you're sending out form letters to customers. You prepare the form letter that everyone receives; then you type the names and addresses of each individual. *WordPerfect* combines the two and prints each personalized letter, or stores that form for later editing.

With *WordPerfect*, you can go considerably beyond standard manuscript-style documents. For example, automatic line numbering can be used by lawyers to prepare legal briefs. And footnotes are available to make it easier for students and professors to prepare academic papers. Other advanced features include superscripts, subscripts, headers, footers, automatic page numbering (in a variety of formats), advanced printer control, and automatic hyphenation.

choose from—all are suitable for even the most demanding tasks.

Perhaps the most flexible and capable word processing package for the Apple II is *WordPerfect* (version 1.1). *WordPerfect* is, by far, the most popular word processing package for the IBM PC—almost all of the features found in that version are also included in the Apple II release. These include a built-in spelling checker (115,000-word dictionary for the IIGS), keyboard macros, headers, footers, and footnotes; and complete control over special printing, such as underlining, boldfacing, italicizing, super- and subscripting, and more.

Other word processing choices for the Apple II line (mostly for the Apple IIGS), include StyleWare's *MultiscribeGS*, DataPak's *GraphicWriter*, and *Sensible Writer*, from Sensible Software.

For several years, the Macintosh enjoyed only two general-purpose word processors, *MacWrite* and Microsoft *Word*. *MacWrite* was strictly for beginners, even though many businesses tried to make effective use of it. Microsoft added plenty of business-oriented features to *Word*, but hid them in hard-to-use commands.

Now there are no fewer than six first-rate word processors for the Macintosh (see McNeill's "Macintosh: the Word Explosion" for a detailed roundup of five Macintosh word processors), and more are coming. Two strong contenders are *WordPerfect*, which has just been released, and Microsoft *Word* 3.01. Both can be used to create documents with just about any type of formatting imaginable. Spelling checkers are built-in and both have keyboard-shortcut features to make using the program more efficient.

Businesses are fond of information, and of keeping that information within finger's grasp. When a filing cabinet won't do, the computer's memory and disk drives can be used to store data for almost-instant retrieval. In the past, both the Apple II and Macintosh have suffered from inadequate system memory, preventing them from being used for anything but simple data management applications. Now that you can quickly expand an Apple IIGS to 512K RAM and beyond, and Apple no longer sells a Macintosh with less than one megabyte of memory, the doors are wide open to extremely sophisticated data management packages.

Two new and unique data management applications for the Macintosh include Apple's *HyperCard* and ACIUS's *4th Dimension*. Both take a visual approach to storing and retrieving data, and they let you assign relationships by context and association.

HyperCard, written by Macintosh-guru Bill Atkinson (who designed *MacPaint*) is modeled after the 3 × 5 inch index card. You can enter any information you want—including text, numbers, and pictures—onto a card. How the information on the cards, and the cards themselves, relate is totally up to you. One noteworthy feature of *HyperCard* is that it can store an almost limitless pool of data, restricted only by the amount of available memory. The program is designed to work with video discs and CD-ROM drives, for a total maximum capacity of 4,096 megabytes of memory.

HyperCard also provides a programming language, called HyperTalk. With it, you can create your own information management applications, such as appointment books, phone dialers, inventory recordkeeper, and more.

Webster's New World Spelling Checker

114,000 Right Words

Even the best prose is marred by incorrect spelling. A document isn't finished anymore until it's been examined by a spelling checker. *Webster's New World Spelling Checker*, from publisher Simon & Schuster, is ideal if your word processor doesn't have its own spelling checker, or if you're not satisfied with the performance of the spelling checker you already own.

Webster's New World Spelling Checker contains 114,000 common and not-so-common words—that's several times the vocabulary of a college professor. If the dictionary doesn't have a word you regularly use, you can store it in a user dictionary so that it's not flagged in each of your documents.

The program runs outside your word processor. It can be used with most word processors for the Apple II line, including *AppleWriter*, *AppleWorks*, *Bank Street Writer*, *HomeWord*, *Magic Slate*, *Magic Window*, *Master Slate*, *MouseWrite*, *PIE Writer*, *Screenwriter*, *Word Juggler*, and standard ASCII text. If you own a word processor that isn't directly supported, you can train *Webster's* to work with it.

During spell checking, *Webster's* flags all suspect words, and also provides up to ten alternatives—proper spellings of the words it thinks you want to use. The suggestion system is elaborate and helps you find phonetic misspellings (*phone* instead of *fone*), transpositions, repeated words, and missing spaces.

If you don't see the word you want in the list, you can type it in. Should the word be spelled correctly, you may skip it (and all other occurrences if you wish), or add it to the user dictionary. Once the document is checked, *Webster's* saves the file under a new name, but it keeps the old one (in case you want to use it later).

Graphics Take Center Stage

Computer pundits have long criticized computers for not thinking the way humans do. According to experts, the brain thinks in pictures, not words; yet nearly all computers are text-oriented. Both the Apple II and Macintosh are graphics-oriented, which has helped establish them as masters of graphics applications. The first drawing programs came out for the Apple II+, though the colors and resolution were limited, so businesses shied away from using the computer to create charts, graphs, and meeting presentations.

The Apple IIGS sports more colors and higher resolution graphics. Its color palette contains 4,096 hues and you can view your pictures in two high-resolution views—640 × 200 pixels or 320 × 200 pixels. The higher resolution means business applications, such as technical drawing, computer-aided design, and presentation graphics, are now within reach with the IIGS. (As a point of comparison, the 320 × 200 pixel standard resolution screen of the IIGS is the same as the

Color/Graphics Adapter on the IBM PC. Though the PC now has higher resolution graphics boards available for it, most graphics software for that machine still use the 320 × 200 pixel standard.)

Among the Apple IIGS software enjoying the benefits of the increased resolution are PBI Software's *Visualizer* and DataPak's *GraphicWriter*. *Visualizer* is a presentation graphics program that makes it easy to transform rows of numbers into easy-to-understand line, bar, column, dot, and pie charts. You have full control over the color and texture of the graph elements, and if you're using a color output device (like the Imagewriter II), your charts are printed in color.

GraphicWriter is a unique blend of word processor and drawing program. On the same page, you can freely mix text and graphics and manipulate the two until you get just the right effect. The program includes drawing tools for making simple boxes, circles, triangles, and lines, or you can paint on a pixel-by-pixel basis for fine detail work.

The introduction of the Macintosh II brought color to the Mac line. As yet, only a few drawing applications exist for the Macintosh II, though a number of companies, including MicroCAD/CAM, Silicon Beach, and Cricket Software have announced their plans to market high-end, color business software, specifically computer-aided design and high-resolution presentation graphics packages. Some colorized applications already exist for the Macintosh II, including Microsoft *Excel* and Living Videotext's *More*.

While the screen on the earlier Macintoshes, including the SE, are black and white, the crystal-clear images are ideal for applications such as desktop publishing. There are no fewer than a half-dozen professional page layout programs available for the Macintosh. These include Aldus *PageMaker 2.0*, *ReadySetGo 4.0* from Letraset, *Orange Micro's Ragtime*, and *Xpress*, from Quark. All support the Apple Laserwriter for high 300 dot-per-inch resolution output.

The Macintosh has found a comfortable niche with desktop publishing. A steady stream of hardware and software is now available that supports the desktop publishing boom. Programs that were previously used only in home or educational environments are also being applied to desktop publishing applications. These include Silicon Beach's *SuperPaint*, which combines the powers of *MacDraw* and *MacPaint*, and *FullPaint*, an enhanced version of *MacPaint*.

SuperPaint supports 300 dot-per-inch drawing, making it ideal for documents that are printed on the Laserwriter. If you own a desktop scanner, such as those sold by Microtek Lab, Princeton, Datacopy, and DEST, you can edit the high-resolution images

GraphicWriter

Blend Words And Pictures

GraphicWriter, from DataPak Software, is an unusual mix of word processing and color graphics. In this one program, you can write text, draw illustrations, add graphics elements such as boxes, rules, and lines, and arrange the layout into a finished document. With most other software for the Apple II, these functions are found in stand-alone programs. You must cut graphics created in a drawing program and paste them into the word processor.

GraphicWriter is written for the Apple IIGS, and though it can be used with a black-and-white monitor, you get the most flexibility by using a color monitor. The drawing tools included with *GraphicWriter* let you create graphics in color—you're limited to four solid colors on the screen, but additional hues can be created using the Ditherize mixing option. Graphics can be intermixed with text at any point in the document. In fact, you can overlay graphics on top of text, or vice versa.

GraphicWriter actually has two graphics modes: Object and Canvas. You switch between the two graphics modes depending on your requirements. Object-mode graphics are object-oriented, allowing later editing of the individual shapes. You use the object mode to make boxes, circles, and other simple shapes. You might use the object drawing tools, for example, to frame a block of text with a colored box. Canvas-mode graphics are bitmaps which can be edited on a pixel-by-pixel basis.

You can't overlay object and canvas art, but you can mix the two in the same document. *GraphicWriter* lets you set up regions where you can define special formatting such as multiple columns and the drawing mode. In a two-region page, for example, one region might contain object art; the other, canvas art.

GraphicWriter looks a lot like traditional Macintosh software. Its menu bar contains nine menus, which you pull down with the mouse to choose a command. The text and graphics appear within a window, which you can resize and scroll to see different portions of the document. Drawing palettes flank the bottom of the window, and you click on an icon with the mouse to select a drawing tool.

Cricket Draw

Second Generation Drawing

MacDraw was one of the first programs for the Macintosh, and though it remains a best seller, the current version hasn't changed in over two years. That's prompted a number of companies, including Cricket Software, to offer competing object-oriented graphics software.

Cricket Draw, from Cricket Software, lets you combine rectangles, ovals, lines, and other simple shapes to produce any type of drawing imaginable. The program can be used to create blueprints, architectural drawings, page layouts, forms, schematic diagrams, and more.

The *Cricket Draw* tools include those to write text and to draw lines, square-corner boxes, rounded-corner boxes, circles, lines, polygons, and free-forms. It also includes special tools for making fountains, star bursts, and grates. These extra tools provide for remarkable special effects. Fountains, for example, are objects filled with graded tint patterns—from 0 to 100 percent. They can be used as a background for text or in an architectural rendering.

Objects can be rotated within *Cricket Draw* at one degree increments, giving you extra flexibility in creating such things as dramatic page layouts and isometric drawings. Full *PostScript* support is provided when using a printer such as the LaserWriter.

Cricket Draw lets you generate a *PostScript* text program that you can edit in a separate window. The *PostScript* program, and your drawings, can be mixed. If you know *PostScript* (or want to learn it), you can easily transform your graphics into *PostScript* code, which you can modify to obtain additional effects not offered in *Cricket Draw*.

(usually made at 300 dots-per-inch) then plug them into the page layout program. Most layout programs and scanners support the TIFF graphics file format, so cutting and pasting graphics between applications doesn't require conversion nor does it result in frustration.

Hard-Core Business Applications

Sometimes general-purpose programs like word processors, spreadsheets, and databases aren't enough for a business. Standard accounting practices often require a strict adherence to company and governmental regulations—and that takes a specialized accounting program.

Software like Monogram's *Dollars and Sense* (available for the Apple II and Macintosh) is intended for personal use, but if your business is small, it can also be used to keep track of the company's cash flow. When you need more, there are plenty of alternatives to choose from.

On the Apple II is *The Clan*, from Sir-Tech, BPI's *Entry Series*, DAC *Easy Accounting*, and Peachtree's *Back to Basics* accounting series. The publishers of *The Clan*, for instance, claim that the program is easy enough to use at home, but powerful enough for business. You can set up your own chart of accounts, or use one of the nine already made. You can ask for financial reports—up to the full fiscal year—at any time.

The Peachtree *Back to Basics* modules include general ledger, accounts receivable, and accounts payable. A full audit trail is provided for each transaction, and the modules are linked to reduce repetitive data entry. The chart of accounts is user-definable, and you can track up to three checking accounts.

Xpress

The Fast Layout

Desktop publishing is all the rage these days, and there are no fewer than half a dozen professional page layout packages for the Macintosh. A relative newcomer is *Xpress*, from Quark. The program combines features common to word processors with a sophisticated page layout system—together you have just about all the tools you need to produce elaborate documents of any size and shape.

Xpress works with *boxes*, either text or graphic. Graphics boxes hold a picture, either digitized art from a desktop scanner or drawn art from a graphics program like *MacPaint* or *MacDraw*. Text boxes hold the text of the document. You can control the size and position of both kinds of boxes on the page, and you can layer one box over another. *Xpress* automatically wraps text around graphics. There's no need to manually calculate the length of text lines to fit them around an illustration.

You can type text directly into *Xpress*—it has a number of common word processing features, such as a built-in spelling checker, search and replace, and full editing. You may also import text from *MacWrite* and *Microsoft Word*. Imported text automatically flows into columns and pages.

More demanding page layout projects require features such as kerning and tracking—*Xpress* offers both. *Kerning* tightens the space between certain characters to make them more readable, and *tracking* uniformly expands or contracts spaces between characters. This avoids the large gaps that sometimes appear between words when the text is justified. *Xpress* supports the *ImageWriter*, *ImageWriter II* (it can even do color separations using a colored ribbon), *LaserWriter*, and other *PostScript*-compatible devices, such as the *Linotronic* high-resolution imsetter.

4th Dimension

A New Era In Database Management

Acius Software's new *4th Dimension* database management program sows fresh ground. With it, you can keep track of information such as customers, inventory, and cash flow. But it's more than just a workable database, for you can also create your own applications using programming commands and functions. The record-keeping you do with *4th Dimension* is visual. By linking together information with simple lines and arrows, you define how things relate to one another.

As a database manager, you can define a file structure with up to 99 files, with an unlimited number of records. Each file can contain as many as 511 fields per record, and fields may contain as many as 32,767 characters of text (that's about equal to the number of words in seven pages of this magazine).

In addition to text, *4th Dimension* lets you store numbers, dates, and even pictures. For example, with a desktop scanner, you could digitize photographs of all the employees in your company and then place the digitized pictures in an employee database. (You'd need a hard disk drive to store all the data.)

Once the database is established and the data is entered, *4th Dimension* offers the usual database management functions, including adding new records, deleting old ones, and finding records that meet certain criteria. The program lets you define and print columnar reports of the information you've found. If you already have information entered into another database management program, don't worry—*4th Dimension* accepts information in SYLK, DIF, or ASCII text format.

4th Dimension is also a programmer's tool. It understands 200 of its own standard commands and functions, and it can accept external routines written in Pascal, C, assembly, and many other languages. You can also add custom menus and commands, turning a simple database template into a stand-alone application.

Back to Basics is also available on the Macintosh, joined by a number of capable accounting programs including *Chang Labs' Rags to Riches* (general ledger, accounts receivable, accounts payable, inventory control, and professional billing modules), *Satori's Legal Billing* and *Project Billing*, and *State of the Art's Electronic Checkbook*.

Satori's Project Billing, for example, keeps track of projects for your company or your business. You set up the categories, project numbers, number of employees on the project, and the hourly fee. As long as you feed the Macintosh information on how you and your employees are spending time, the *Project Billing* program keeps tabs on the cumulative costs.

The Future Of Business Applications

One of the biggest fears facing any business computer user is the amount of time it takes to learn and master a program. Thanks to the Macintosh's user interface, the learning curve for most programs is greatly reduced. All commands are almost universally found in the pull-down menus, and on-line help is a standard feature in most mainstream business programs. The mouse-based interface of the Macintosh is finding its way into Apple II products with increasing frequency. A good portion of the newly announced IIGS software uses pull-down menus and onscreen palettes, and it fully supports the mouse.

Powerful business applications depend on hardware support. High-resolution graphics has already spawned a new category of sophisticated programs for the Apple IIGS. And the increased memory capacity of the IIGS (not to mention the faster speed) means there's no end to the kinds

Microsoft Word

Integrated Word Processing

Microsoft Word 3.01 for the Macintosh is many programs in one: a word processor, a spelling checker, an indexer, and an outliner. The extra spelling, indexing, and outlining features are commands in Word's menus, so you don't need to quit the program and start another to completely write, rewrite, check, and print your documents.

Word 3.01 is a greatly modified version of Microsoft's earlier word processor, Word 1.0. This version, which came out several years ago, had many strong features, but lacked polish and sophistication. The new version has two modes of operation, a short version that offers minimal features and a full version, where all of the program's functions and capabilities are available. The short version is modeled after MacWrite.

One of Word's best features is not a command or a menu option, but performance. Microsoft was able to increase the speed of Word with version 3.01 so that operations such as saving and pagination take only a few moments. Word 3.01 only partially endorses the WYSIWYG (What-You-See-Is-What-You-Get) style of computing—you see text on the screen in the font, size, and style that will appear on paper, but the onscreen display is not an exact replication of the finished page. While writing, you see only the body text, not other elements such as page numbers and footnotes. Before printing, you can switch to a Page Preview mode, where the entire page is displayed in miniature.

The spelling checker, with its 80,000-word main dictionary, lets you search any file for misspelled words. The indexer compiles an index (or a table of contents) from words you have identified. When the document is printed, Word compiles the index and automatically inserts the page numbers. The outliner allows you to first construct an outline, then change the levels and locations of the items as desired.

One of Word's most powerful features is style sheets. A style sheet is a collection of character and paragraph formats stored with each document. You can access the style—and the formats contained in it—by choosing from a menu or typing on the keyboard. Elaborate formatting changes take only a second or two.

Visualizer

Graphics Numbers

The brain thinks best in pictures, not numbers. Presentation graphics programs, like Visualizer from PBI Software, turn numbers into colorful charts. The graphics in the chart—whether in bars, columns, lines, or pie slices—represent numbers. The size of each graphic conveys value and relationship. You can easily grasp the meaning behind the numbers.

Visualizer, designed for the Apple IIGS, transforms numbers into pie, bar, column, line, or scatter (X-Y) charts. You enter the numbers into a worksheet area, then tell the program the type and style of chart you want. Data can also be retrieved from AppleWorks spreadsheet files. You can use AppleWorks to handle statistical analysis, or you can perform the necessary math in Visualizer. The program can perform averaging, linear regression, and standard deviation, as well as other common statistical functions.

Graphics can be standard two-dimensional, three-dimensional, or overlapped. You have full control over the pattern and color of the elements. When used with an Imagewriter II, charts can be printed in color. Legends, titles, annotations, and other text can be placed anywhere. You use the mouse to position text within the graph area. You also use the mouse to choose commands from the pull-down menus.

A unique feature to Visualizer is its ability to combine charts with super-high-resolution pictures. The picture can be placed under the chart as background art. The program lacks graphics editing tools, but you import the image from a drawing program. Both chart and picture are displayed on the IIGS screen in super-high-resolution mode.

of business programs that can be written for the machine. Expect to see mainframe computer applications, like HyperCard or 4th Dimension, available soon for the IIGS.

Introduced in early 1984, the Macintosh has slowly warmed the hearts of corporate America. Given a choice, many office workers now opt for the Macintosh. It's easier to use than the IBM PC, and it does many things, like desktop publishing, better and more efficiently.

Nearly every Macintosh program supports the Apple LaserWriter, allowing you to invest in just one printer for several workers. Add-on memory boards, available for the SE and Macintosh II, allow easy installation of up to four megabytes of RAM. That ought to be enough for most any business application, including information-intensive data management software.

Though both the Apple II and Macintosh can be used for just about any business application you can imagine, it's important to remember that the computers are inherently fun to use, thanks to the blend of graphics, sound, and elegant user interface. Business doesn't have to be boring after all.

To give you an idea of the kinds of business software released in 1987, the accompanying thumbnail sketches of eight business programs for your Apple II or Macintosh personal computer were selected because of their usefulness, sophistication, and power, they are representative of many of the impressive packages now finding homes in businesses large and small.

Gordon McComb, well-known computer author, has just completed Mastering MacDraw (COMPUTE! Books). His writing regularly appears in a number of computer and high technology publications.

Apple II And Macintosh Business Software Sampler

Program	Description	Computer	Requirements	Price	Publisher
The Clan	Bookkeeping and accounting	Any Apple II	64K	\$79.95	Sir-Tech Software, Inc., P.O. Box 245, Ogdensburg, NY 13669-1517, (315) 393-6633
Cricket Draw	Object-oriented structured drawing program	Macintosh	512K	\$295	Cricket Software, Inc., 30 Valley Stream Pkwy., Great Valley Corporate Center, Malvern, PA 19355, (215) 251-9890
DeluxePaint II	Color free-hand painting program	IIcs	768K RAM, color monitor, mouse, ProDOS-16	\$99.95	Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, (415) 571-7171
Draw Plus	Object-oriented, structured drawing program	IIcs	128K RAM, ProDOS-16	\$79.95	Activision, Inc., 2350 Bayshore Pkwy., Mountain View, CA 94043, (415) 960-0410
Easy Working Series	<i>Easy Working Writer</i> is an entry-level, menu-driven word processor; <i>Planner</i> and <i>Filer</i> are basic, no-frills spreadsheet and database management programs, respectively.	IIc, IIe, IIcs	128K, ProDOS	\$9.95 each	Spinnaker Software Corp., 1 Kendall Square, Cambridge, MA 02139, (617) 494-1200
Filer's Choice	Personal and small-business oriented electronic database management program	Any Apple II	64K	\$49.95 (\$119.95 with <i>Planner's Choice</i> and <i>Writer's Choice</i>)	Activision/Personal Choice Software, P.O. Box 7287, Mountain View, CA 94039, (415) 940-6044
FontWorks	Font enhancement utility for <i>AppleWorks</i>	IIe, IIc, IIcs	<i>AppleWorks</i>	\$49.95	The Software Touch, 9842 Hilbert St., Ste. 192, San Diego, CA 92131, (800) 541-0900, (619) 549-3091
FormDesign	Form-making utility	Macintosh	128K	\$199 (template form disks \$49)	Clearview Software, P.O. Box 3294, Providence, RI 02906, (800) 541-FORM, (401) 351-1930
4th Dimension	Relational database management program	Macintosh	1 megabyte RAM	\$695	Acius, 20300 Stevens Creek Blvd., #495, Cupertino, CA 95014, (408) 252-4444
FullPaint	Enhanced free-hand painting program	Macintosh	512K	\$99.95	Ann Arbor Softworks, Inc., 2393 Teller Rd., #106, Newbury Park, CA 91320, (805) 375-1467
GraphicWorks (v1.1)	Combination painting and desktop publishing page layout program	Macintosh	512K	\$99.95	Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062, (312) 480-7667
GraphicWriter	Test-graphics document processor	IIcs	512K, ProDOS-16	\$149.95	DataPak Software, Inc., 14011 Ventura Blvd., #507, Sherman Oaks, CA 91423, (818) 905-6419
Great Plains Accounting Series	Accounting packages including modules for accounts payable, accounts receivable, payroll, general ledger, inventory, and order entry	Macintosh	512K, hard disk recommended	\$695 per module	Great Plains Software, Inc., 1701 S.W. 38th St., Fargo, ND 58103, (800) 345-3276, (701) 281-0550
FactWorks	<i>AppleWorks</i> database template; each volume contains encyclopedia-like data	IIc, IIe or IIcs	128K RAM, <i>AppleWorks</i> , ProDOS	\$32.95 per volume	ImagiMedia Software, 16640 Roscoe Pl., Sepulveda, CA 91343, (818) 891-3707
MacCalc	Electronic spreadsheet program	Macintosh	512K	\$139	Bravo Technologies, Inc. c/o DPAS, P.O. Box T, Gilroy, CA 95021
MacInTax	Income tax preparation software	Macintosh	512K	\$99; yearly updates about \$30 (depending on extent of revision)	Softview, Inc., 4820 Adohr Ln., Ste. F, Camarillo, CA 93010, (805) 388-2626
MegaWorks	Combination spell checker and mail merge for <i>AppleWorks</i> . Additional <i>AppleWorks</i> add-ons are <i>ReportWorks</i> (report writer) and <i>ThinkWorks</i> (outline processor).	IIe, IIc, IIcs	<i>AppleWorks</i>	\$99 (retail); \$49 direct-mail	Megahaus Corp., 5703 Oberlin Dr., San Diego, CA 92121
Microsoft Word (v3.01)	Word processor, with spelling checker, outline processor, and indexer	Macintosh	512K	\$395	Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, (800) 426-9400, (206) 882-8080

Program	Description	Computer	Requirements	Price	Publisher
Microsoft Works	Integrated software	Macintosh	512K	\$295	Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, (800) 426-9400, (206) 882-8080
MultiScribe GS	Menu-driven word processor	IIcs	512K	\$99.95	Styleware, Inc., 5250 Gulfton, Ste. 2E, Houston, TX 77081, (713) 668-1360
PageMaker Portfolios	Finished page templates for use with <i>PageMaker</i>	Macintosh	512K, PageMaker	\$79	Aldus Corp., 411 First Ave. S. #200, Seattle, WA 98104, (206) 622-5500
Paintworks Plus	Free-hand color painting program	IIcs	512K, color monitor	\$79	Activision, P.O. Box 7287, Mountain View, CA 94039, (800) 227-9759, (415) 940-6044
Planner's Choice	Personal and small-business oriented electronic spreadsheet program	Any Apple II	64K	\$49.95 (\$119.95 with <i>Writer's Choice</i> and <i>Filer's Choice</i>)	Activision/Personal Choice Software, P.O. Box 7287, Mountain View, CA 94039, (415) 940-6044
Ragtime (v1.1)	Intermediate-level desktop publishing and page layout program	Macintosh	512K	\$395	Orange Micro, Inc., 1400 N. Lakeview Ave., Anaheim, CA 92807, (714) 779-2772
Real Estate Analyzer	Investment advisor program for purchasing or dealing with real estate	IIcs		\$295	HowardSoft, 8008 Girard Ave., Ste. 310, La Jolla, CA 92037, (619) 454-0121
Sensible Grammar	Grammar checking program for use with <i>Sensible Writer</i> , <i>AppleWriter</i> , <i>PFS Write</i> , and others	IIc, IIe	128K RAM	\$99.95	Sensible Software, Inc., 210 S. Woodward, Ste. 229, Birmingham, MI 48011, (313) 258-5566
Sensible Speller	Spelling checking program for use with <i>Sensible Writer</i> , <i>AppleWriter</i> , <i>PFS Write</i> , and others; standard, medical, technical, and law dictionaries separate	IIc, IIe	128K, mouse	\$125 main speller, \$39.95 each for supplementary dictionaries	Sensible Software, Inc., 210 S. Woodward, Ste. 229, Birmingham, MI 48011, (313) 258-5566
Sensible Writer	Menu-driven word processing program	IIc, IIe	128K, mouse	\$99.95	Sensible Software, Inc., 210 S. Woodward, Ste. 229, Birmingham, MI 48011, (313) 258-5566
Sideways (v2.01)	Printing utility for producing <i>AppleWorks</i> spreadsheets and other wide documents sideways on the printer. Supports a variety of dot-matrix printers.	IIc, IIe, IIcs	64K, <i>AppleWorks</i> , ProDOS or DOS 3.3	\$69.95	Funk Software, Inc., 222 Third St., Cambridge, MA 02142
Space-Edit	3-D CAD program with variable zoom and perspective features	Macintosh	512K	\$625	Abvent, 9903 Santa Monica Blvd., #268, Beverly Hills, CA 90212
SuperPaint	Combination free-hand painting and object-oriented drawing program	Macintosh	512K	\$99.95	Silicon Beach Software, 9580 Black Mountain Rd., P.O. Box 261430, San Diego, CA 92126, (619) 695-6956
Time-Trax II	Personal and professional time management and scheduling program	IIc, IIe, IIcs	128K, ProDOS-compatible clock or IIcs internal clock	\$69 (\$129 with ProDOS clock)	Creative Peripherals Unlimited, 22952 Alcalde Dr., Ste. 160, Laguna Hills, CA 92653, (714) 770-3334
TopDraw	Object-oriented structured color drawing program	IIcs	512K, color monitor, mouse	\$99.95	Styleware, Inc., 5250 Gulfton, Ste. 2E, Houston, TX 77081, (713) 668-1360
Trapeze (v2.0)	Visual spreadsheet, with graphics and word processing features	Macintosh	512K	\$295	Data Tailor, Inc., P.O. Box 11530, Fort Worth, TX 76109, (817) 8944
Visualizer	Business presentation graphics	IIcs	512K, mouse	\$99.95	PBI Software, 1111 Triton Dr., Ste. 201, Foster City, CA 94404, (415) 349-8765
Webster's New World Spelling Checker	Spelling checker utility for most popular Apple II word processors, including <i>AppleWriter</i> , <i>Bank Street Writer</i> , <i>AppleWorks</i> , and <i>Word Juggler</i> .	IIc, IIe, IIcs	5¼-inch drive	\$49.95 (DOS 3.3); \$59.95 (ProDOS)	Simon & Schuster Software, 1 Gulf & Western Plaza, New York, NY 10023, (212) 373-8882
WordPlus Spell	Spelling checker for use with <i>Microsoft Works</i>	Macintosh	512K	\$59.95	Lundeen & Associates, P.O. Box 30038, Oakland, CA 94604, (800) 233-6851, (800) 922-PLUS
WordPerfect (v1.1)	Word processing program with integrated spell checker and mail merge	IIcs	512K	\$179	WordPerfect Corp., 288 W. Center St., Orem, UT 84057, (801) 227-4000
Writer's Choice	Personal and small-business oriented electronic word processor	Any Apple II	64K	\$49.95 (\$119.95 with <i>Planner's Choice</i> and <i>Filer's Choice</i>)	Activision/Personal Choice Software, P.O. Box 7287, Mountain View, CA 94039, (415) 940-6044
Xpress	Page layout and desktop publishing program	Macintosh	512K	\$695	Quark, Inc., 2525 W. Evans, Ste. 220, Denver, CO 80219, (303) 934-2211

Macintosh

The Word Explosion

Dan McNeill

This survey of five Macintosh word processors shows what's got what for writers of every talent and level.

You don't write like I do, and I don't write like you do. Why, then, did the Macintosh expect everyone to use the same writing tool?

Writing is the most individual of computer tasks, yet for over a year, there was only *MacWrite*. It was the word processor. It took Microsoft's *Word* to break the monopoly.

Those days are gone. An assortment of fine word processing programs now grace the Macintosh line, and their variety is as impressive as their power.

Below you'll find surveys of five major Macintosh word processors. Each program has virtually every feature of *MacWrite*. In addition, unless otherwise noted, each has Revert to Save, word count, shortcut Save and Quit, alternate headers/footers on odd and even pages, split screens, and condensed and expanded text.



MacWrite 4.6

Once a bold pioneer, *MacWrite* now seems frozen in time. For a long while it came free with the Macintosh, a fact that discouraged third-party developers from marketing alternative

word-processing software. As if to compensate, its upgrades (the last was from 4.5 to 4.6 and involved relatively minor features) haven't been frequent or wide-ranging. Why buy it then? Well, it has two main virtues: prevalence and ease of learning.

Features *MacWrite* is the feeblest of the five. It lacks hyphenation, multiple columns, split screens, footnotes, indexing, tabling of contents, alternate headers/footers, and condensed and expanded text, among other things.

Ease of Learning However, *McWrite* is clearly the easiest to learn. If you know the Macintosh interface, you know *MacWrite*. On the other hand, you can pick up this program quickly, simply because there's less to it than other programs. It's like the difference between hearts and bridge: Hearts is easier to learn, but it isn't bridge.

Ease of Use Simple programs are not necessarily streamlined, and *MacWrite* lacks a number of handy features common to other word processors. It's missing Revert to Save, Select All, a word count feature, and shortcut Save and Quit, (perhaps the two most important shortcuts). *McWrite* is also rather slow. However, it has a fine Undo feature that replaces prose entered after a Return-delete—the others replace only overtyped text.

Summary *MacWrite* is the stripped-down, generic Macintosh word processor. Its whole forms the mere core of the other four

programs. However, it is a standard, and it works with such software as *PageMaker*—something that may be critical to you. It's also fairly inexpensive.

In fairness, *MacWrite* is far more than just a letter-writing program; I've written books with it myself. But it lags behind other word processors in power and responsiveness, and it's clearly unsuited for outlining, layout, and other advanced tasks.

Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014. \$125.



MindWrite™

M

indWrite is a combination outliner/word processor with many pleasant features and a few pesky bugs. For writers who like to organize their thoughts before expressing them, there's nothing quite like it.

Features The word processor is a pleasure in itself. Because of its outline capacity, *MindWrite* easily distills tables of contents and offers a truly comprehensive search-and-replace. It allows numerous windows, and will wrap words around either the window (so you can see the complete text) or around the ruler. It lets you select several disconnected paragraphs and move or alter them at once. It also sorts and will shuffle or randomize paragraphs so that,

as the manual says, you may perceive intriguing new associations.

However, *MindWrite's* outliner has exacted some sacrifices from the word processor, which lacks multiple columns, hyphenation, footnotes, indexing, alternate headers/footers, and condensed and expanded text.

Ease of Learning The outline processor is fairly complex and takes a little time to master, but the documentation is fine and the program quite straightforward.

Ease of Use *MindWrite* has several special features which enhance its ease of use. The Just Print command circumvents the Print dialogue box, and outputs immediately using the last specified variables—a handy approach. Copying does not erase its Clipboard, which can, therefore, hold several items at once. It converts to and from ASCII, *MacWrite*, and *ThinkTank* formats, and its Launch feature shifts you directly into another application.

Summary *MindWrite's* excellent outline processor fuses directly with the word processor, so you can expand your outline into prose with no interference. The program has other fine qualities—among them treating headings as adroitly as paragraphs, and letting you drag both around with the mouse. The pointer even turns into a hand tool for easy movement of headings. *MindWrite* has a multitude of text-selection powers, and it can print selected text, such as all of an outline below Level 3. It collapses and expands items like most outline processors, but it will also reduce a paragraph to just its first line.

Unfortunately, *MindWrite* is still a bit slow, and the scroll bar is sticky on small documents. Moreover, version 1.0 retains glitches which, in my case, caused erratic display—vanishing paragraphs, duplicated lines—and eventually destroyed a document.

This is a fine word processor even if you never outline, and it's the best bargain of all. But you might wait till *MindWork* zaps the bugs.

MindWork Software, P.O. Box 222280, Carmel, CA 93922.
408-624-0522, \$125.



Laser Author™

Laser Author is a word processor with layout features—a good choice for writers who need some design powers, but not total layout prowess. It has a host of charming attributes, but its focus makes it less intuitive if you're simply writing.

Features As a word processor per se, it has further virtues. It lets you open four documents at once and zoom them in and out; it offers guttering, soft hyphenation, and superscript to seven levels; and you can set font size anywhere between 4 and 127 points. It allows paragraph and header separation, by points; permits expanded and condensed text; offers a strikeout style so you can simulate crossing out deleted text; turns selected prose into ALL CAPS, lowercase, or Title format; and has the full range of pagination styles including numbers, large and small Roman numerals, and upper- and lowercase letters. It also does intelligent paste, attempting to add a space to the

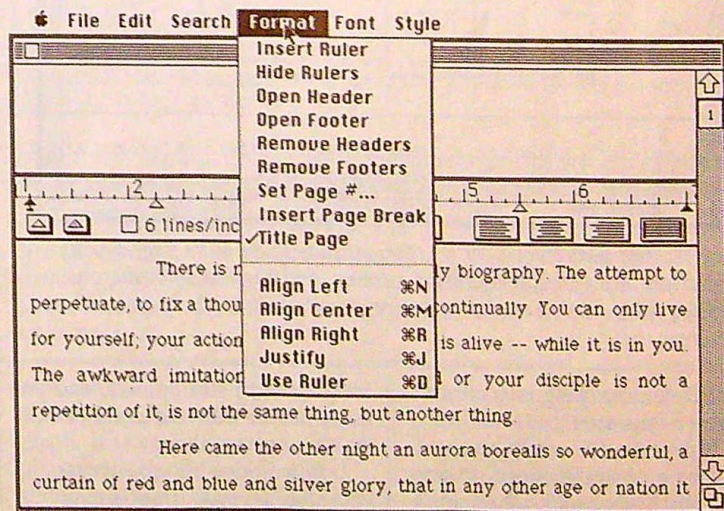
left or right of your insertion, whichever seems most appropriate.

Ease of Learning *Laser Author* is somewhat easier to learn than *MindWrite*, mainly because of its simpler features. The documentation is clear and easy to follow.

Ease of Use *Laser Author's* frames are a breeze, and they make layout simple. The program also displays far more document information than any rival, including such unusual data as time spent on the document, number of typing sessions, and time expended and words entered at the last session. The word count is always onscreen, another pleasing characteristic. *Laser Author* can also print pages in reverse order, and it can save automatically every few minutes.

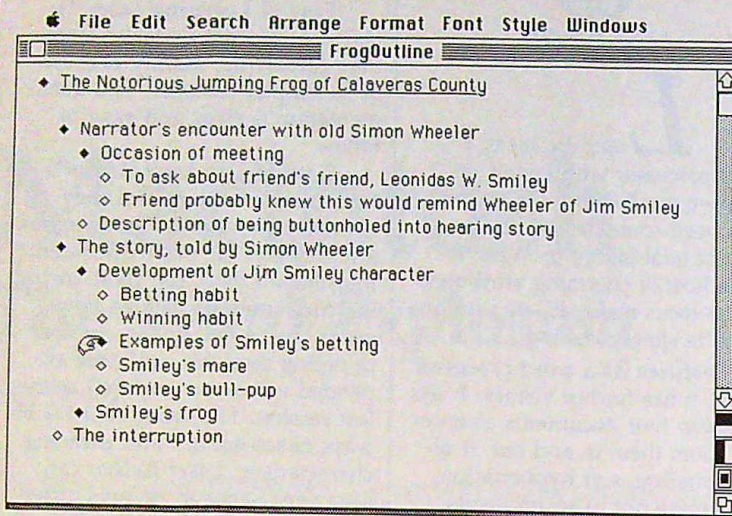
Summary Using *Laser Author* is somewhat like writing on a paste-up board. Like much layout software, the program is frame-oriented. You smoothly pull out frames and use them for columns, boxes of text, or pictures. You can easily resize the frame, and text jumps to fit it. Other powerful layout features include manual kerning and line separation, by points. Moreover, *Laser Author* simplifies creation of styles—text

Figure 1: *MacWrite*



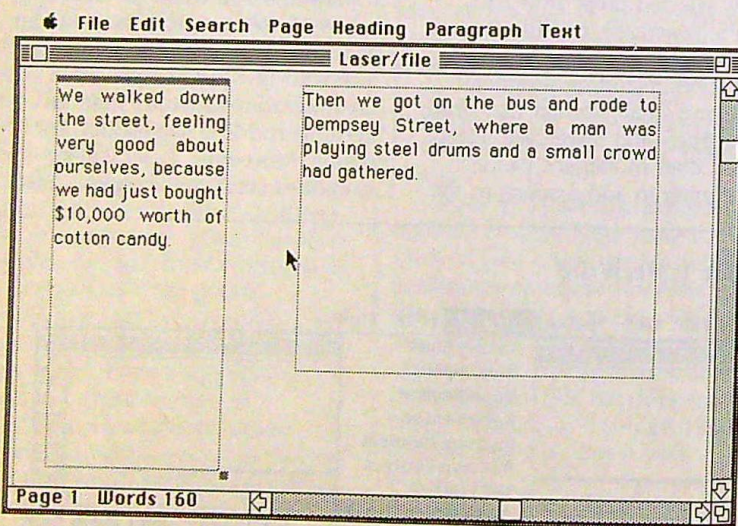
MacWrite is the first, and still the simplest, word processor for the Macintosh. Although the Format menu looks impressive, note that four of the bottom five actions can be accessed by clicking on the ever-present Ruler.

Figure 2: MindWrite



MindWrite's outlining capabilities are impressive. Revising an outline, including moving heads and subheads, is simple when the cursor turns into the hand shape. Once created, an outline can easily be expanded into a complete article, story, report, or other document.

Figure 3: Laser Author



Laser Author uses frames for its text, an indication of its page-layout orientation. You can quickly resize a frame, and the text immediately jumps to fill it. Note the always-active word count at the bottom left of the screen.

formats you can plug into either frame or document.

However, this word processor could be more streamlined. It lacks a shortcut Quit, and its shortcut Save is Option-Command-S rather than the simpler Command-S. It has no Select All, and its rulers cannot be placed above the prose. It converts from MacWrite, but not to it. Moreover, the menus lack

font and font size options, and you must detour into the world of Edit Styles to access them.

Edit Styles lets you create complete formats, then access them at any time from the menus. It's a good attribute for a layout-oriented program, since it lets you fill one frame with one kind of prose and an adjacent frame with another kind. However, to change

a single word in a sentence to a different font or size, you must also add a new entry to a menu, specifying both font and size. It's slow.

Laser Author is, nonetheless, a splendid program, and if you have modest layout needs, it may be just right for you.

Firebird Licensees, Inc. (FLI),
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\$199.95.



WriteNow

W

riteNow is the

Pegasus of Macintosh word processors—swift, easy to learn and use, and packed with power. It lacks the omnipotence of Word, but its speed and graceful design make it a writer's delight.

Features WriteNow's powers are significant. It allows four columns per page and endless windows. It offers any point size between 4 and 127, and permits global changes to fonts, font sizes, and styles. It performs automatic footnoting, soft hyphenation, multileveled superscript and subscript, and guttering.

Ease of Learning WriteNow is easier to learn than any other program listed here except for MacWrite.

Ease of Use This program's speed makes it highly responsive and gives you a sense of floating on a thin cushion of air. It also has numerous other sleek functions, including Select All and a compact Save. It can keep a selected block, like a table, all on the same page, and, under certain conditions, even do print spooling. However, WriteNow lacks word count. Translator, its auxiliary conversion program, moves documents from MacWrite and Word 1.05 into WriteNow, but not back. This awkward method of importing other processor's documents is WriteNow's main detractor, and it's inexcusable given the abilities of most other word processors.

Summary WriteNow is primarily a straightforward word processor with some layout capac-

ity. It comes with a 50,000-word spelling checker that suggests corrections.

If you can live with these limitations, you may find this accommodating software quite useful.

T/Maker, 1973 Landings Dr., Mountain View, CA 94043. 415-962-0195. \$175.



Microsoft Word 3.01

Microsoft Word 3.0

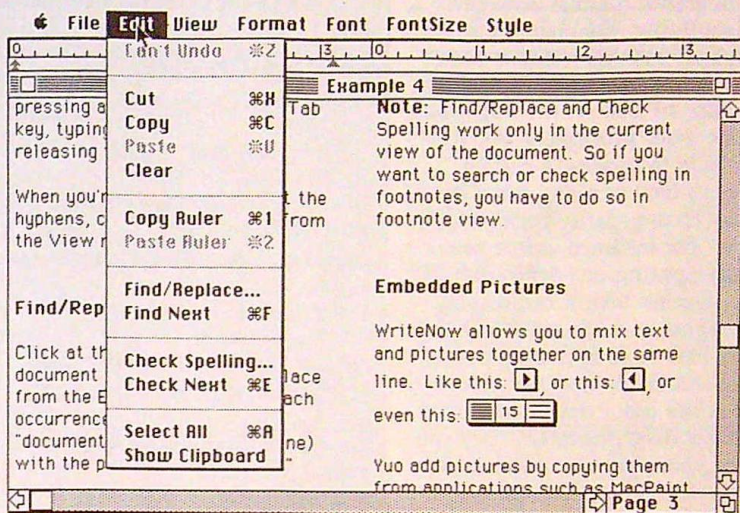
strode into the Macintosh word-processing world to hearty nodding acclaim—acclaim that was angrily retracted when 3.0 was found to be riddled with bugs. The newest update, 3.01, largely corrects those bugs and shows exactly what this software can do. Despite a certain awkwardness, it will likely become the major Macintosh word processor.

Features For sheer strength, *Word* has no competition on the Macintosh. Indeed, it has far too many features to list here. It makes you feel like you're in a great hotel in which the room anticipates your every need. You may not require all the extras, but it's nice to have them on call.

Word 3.01 allows as many columns per page as you want, and it lets you format them as tables, independent side-by-side entities, or newspaper-like columns with prose flowing from one column to the next. It footnotes with automatic numbers, daggers, or asterisks. It does indexing (including subentries) and guttering, as well as tables of contents. It will also automatically hyphenate all appropriate words in a document, which is a very likable feature.

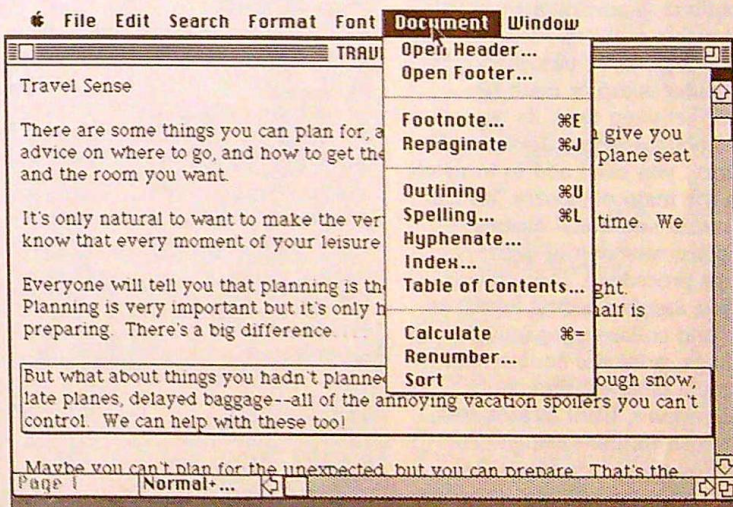
Word performs a variety of formatting and stylistic tricks. It paginates by Arabic numbers, large or small Roman numerals, and upper- or lowercase letters. It can box or bar paragraphs with single line, thick, double line, and shadow options. It offers double underline, dotted underline, strikethrough, small caps, and all caps. It can prevent a page break

Figure 4: WriteNow



WriteNow displays multiple columns on the screen, lets you place graphics beside text, and provides a 50,000-word dictionary for its spelling checker.

Figure 5: Microsoft Word



Microsoft Word 3.01 includes a wealth of features that make it the strongest word processor currently available. Its capabilities include outlining, spell checking, hyphenation, drawing simple objects such as boxes and lines, and sorting. Unfortunately, not all are easy to use or even intuitive.

between two adjacent paragraphs or between parts of a single paragraph. It lets you automatically set spacing for the lines before and after paragraphs, and it has widow control—preventing single lines from becoming separated from the rest of the paragraph.

In addition, the program boasts a wide range of keyboard powers. By using the Command

key, you can Select All, delete the previous word, repeat the prior command, move the insertion point to its previous location, jump to the start or end of the document, and do much more.

Ease of Learning *Word* has online help and a Short Menu option, which reduces the choices in the menus for those doing simple tasks. However, these features do

not make up for its documentation, which is terrible—a loose-leaf reference manual arranged alphabetically. The manual is complete, but this territory needs a guidebook, not an encyclopedia.

Ease of Use As the Superman of Mac word processors, you'd expect *Word* to possess a certain grace. In fact, in many ways *Word* is easy to use, partly because of its power. For instance, it lets you change spacing or justification of only selected text; it can display documents as wide as 22 inches; it offers Fast Save and an option to make a backup save; and it lets you delete other documents from within a *Word* document. You can create your own menu items for common commands or glossary entries; *Word* converts to and from ASCII, *MacWrite*, *Word* 1.0, *Word* MS-DOS, and RTF; and it works with a variety of printers.

Summary *Word* 3.01 is really an integrated word-processing package. It has a spelling checker, an outliner, a sort capacity, and print-merge facilities. Its glossary can store prose or pictures, and it can render complex math formulas. Yet even here, its occasional obliqueness is apparent. For instance, you can't add to or delete from the main dictionary. Instead, you create additional dictionaries and place new entries there—a strange procedure. The outliner lets you assign heading levels, expand and collapse text, number headings, print the outline, and prepare a table of contents.

However, *Word* lacks a real Macintosh follow-through. This limitation shows up in several ways, and none of them enhance ease of use. First, it does not supply full WYSIWYG (What You See Is What You Get). It presumes you should write the prose first and format it later, and, as a result, it doesn't display headers or footers, footnote position, multiple columns, or side-by-side paragraphs. In addition, it does not automatically update page breaks, so you must select Repaginate each time you want to see how much more you've written.

In compensation, *Word* offers Page Preview, which lets you peek at two adjacent pages to see how they'll look when printed. Page Preview magnifies parts of

More Macintosh Writing Tools

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Liberty Spell Checker \$59.95.
DataPak
14011 Ventura Blvd.
Sherman Oaks, CA 91423
This program's dictionary is somewhat small, but fast.

MacGAS \$99
EnterSet
2380 Ellsworth
Berkeley, CA 94720
MacGAS also comes with thesaurus, antonyms, and glossary.

MacLightning 2.0 \$99.95
Target Software
14206 SW 136th St.
Miami, FL 33186
MacLightning is a desk accessory, and offers such options as thesaurus and legal/medical dictionary.

MacProof \$195 (\$2,500 for network version)
Automated Language Processing Systems
190 W. 800 North
Provo, UT 84604
MacProof also has grammar and style checker.

Macspell+ \$99
Creighton Development
16 Hughes St.
Irvine, CA 92718
MacSpell+ installs as a desk accessory and requires 512K+.

Spelling Champion 2.2 \$39.95.
Champion Software
5201 South Hill Dr.
Madison, WI 53705
This program works with *MacWrite* 4.5 and *Microsoft Word*.

Spellswell 1.3 \$74.95
Working Software, Inc.
321 Alvarado, Ste. H
Monterey, CA 93940
Spellswell has a capacious dictionary, and offers such extras as homonym checking.

Thunder! \$49.95
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
Thunder! has a 50,000-word dictionary and a statistics feature.

Outline Processors

Acta \$59.95
Symmetry
761 E. University Dr.
Mesa, AZ 85203
Acta installs as a desk accessory, yet boasts most of the features of a stand-alone program.

Calliope \$99
Innovation
P.O. Box 1317
Los Altos, CA 94023
Calliope uses a novel approach in which you place text in "light bulbs," then move it around.

MORE 1.1 \$295
Living Videotext
117 Easy St.
Mountain View, CA 94043
This acclaimed program not only outlines, but does math and charts and lets you use fonts and styles.

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Mainstay
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Agoura Hills, CA 91301
This desk-accessory based outliner puts topics in a tree-style diagram.

ThinkTank 512 \$195
Living Videotext
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Mountain View, CA
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Voilà! \$99.95
Target Software
14206 SW 136th St.
Miami, FL 33186
Voilà! is another desk accessory with abundant power.

Glossaries

Quickword \$49.95
EnterSet
2380 Ellsworth
Berkeley, CA 94720
Quickword gives *MacWrite* 4.5 a glossary capacity.

Proofing

Document Compare \$99
Legalware
33 Young St.
Toronto, Canada M5E 1S9
Document Compare matches up two *MacWrite*, ASCII, or MDS documents, and highlights the differences.

Others

Doug Clapp's Word Tools \$79.95
Aegis Development, Inc.
2210 Wilshire Blvd.
Santa Monica, CA 90403
Word Tools offers several writing tools, such as word count, sorting, and analyzing text.

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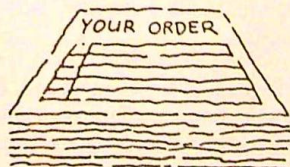
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the page so that you can read the text; it also lets you add the page number and adjust the page number position, adjust page breaks, change margins, adjust position of headers and footers, and print out a page or range of pages. It's a slick feature, and the lofty overview adds a helpful perspective, but it shouldn't be required. A true WYSIWYG would have been better.

Moreover, certain parts of *Word* retain a command orientation. You must type in specific instructions to carry out mail

merge, math formulas, table of contents, and indexing. Mail merge actually involves a mini-BASIC language with commands like DATA, IF, and ELSE. The others use letter codes.

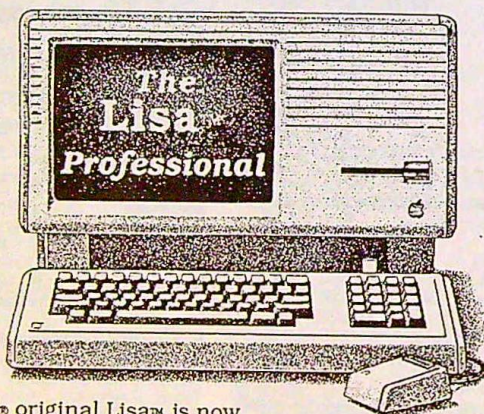
Finally, *Word* has a few important omissions, odd in such an omnibus. It does character count, but not word count; it has no Revert to Save; and it doesn't remember the Show Ruler command.

Despite these lapses, *Word* is marvelous. It's like a Mozart or an Edison, whose occasional gauche-

rie we excuse because of his great gifts. One may carp about the command orientation of the mail merge, but at least *Word* has this feature—and a great deal more.

Microsoft Corp., 16011 NE 36th Way, Redmond, WA 98073-9717. \$395.

Big Screen Small Price



Apple's® original Lisa™ is now The Lisa Professional. Run Macintosh™ software on the Lisa Pro as never before! A larger 12" screen, 800K floppy, a newly developed 20Mb internal hard disk is now available as well as HFS™. Run the most popular Mac business programs on the market for less, hundreds less! Built with all the quality you would expect and a national service center supporting you...just a phone call away.

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You now have only five writing choices for your Macintosh, but that number continues to grow. Although not yet available in finished form, at this writing (August), two other major packages are anticipated.

WordPerfect for the Macintosh, created by the same people who have made *WordPerfect* a standard in the MS-DOS world, is now scheduled for an early fall release. The MS-DOS version is a powerhouse program that includes almost everything. How the Macintosh version differs, or is similar, has yet to be seen. One thing to expect, however, is the ability to transfer MS-DOS *WordPerfect* format document files to the Macintosh without losing any formatting. That alone may make *WordPerfect* attractive to people working with both PCs and Macs.

Another word processor, *FullWrite Professional* from Ann Arbor Softworks, is also delayed, but expected soon. Heavily imbued with desktop-publishing capabilities, *FullWrite* will offer true WYSIWYG and an object-oriented drawing environment. Other stand-out features should include posted notes, outlining, full Undo, spelling checker, and thesaurus.

As long as the Macintosh is the alternate business machine, or as long as it remains a favorite for thousands of professional writers, new word processors will keep appearing.

The word explosion may become deafening.

Dan McNeill is a freelance writer who specializes in computers. His work regularly appears in a variety of Macintosh and Apple-specific publications. Dan's most recent book is *COMPUTE!'s Quick & Easy Guide to Desktop Publishing* (COMPUTE! Books). **aa**

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.

[Editor's Note: For this first "Reader's Feedback" in COMPUTE!'s Apple Applications, we have answered questions that might be raised by a wide range of Apple computer users. In future issues, we'll publish actual letters from readers.]

Apple Does Flips

I've heard that you can make Apple II hi-res graphics look smoother by using page flipping. How does this work and how can I use it in my programs?

When a program draws on an Apple's hi-res screen, there's a partially drawn or partially erased image on the screen for a certain amount of time. If the program frequently changes the image, the screen is unfinished most of the time. The hi-res display is very unsteady, appearing to pulse or flicker.

But all Apple IIs are equipped with two separate hi-res display areas, or pages. Either 8K section of RAM can hold the data for the high-resolution display. Whenever the Apple is in hi-res mode, one of these pages is displayed and the other is hidden. If a program does all its drawing and erasing on the hidden screen, the displayed screen can continuously show a complete image. Then, when the program finishes a new image, it can flip the pages, showing the previously hidden page and hiding the one that was displayed. This eliminates the flicker problem by only displaying whole pictures.

Here's a way to see the difference that page flipping can make. It's a BASIC example, but a page-flipping machine language program would perform exactly the same. First, type in and run this short program (it moves a medium-sized box across the hi-res screen). It

does all its drawing and erasing on the same page, and it has a severe problem with flicker.

```
10 HGR : HGR2 : E = 0 : P = 1
20 Y = 80 : FOR I = 20 TO 240 ST
  EP 4
30 X = I : HCOLOR= 7 : GOSUB 1000
  : HCOLOR= 0 : GOSUB 1000
50 NEXT
60 TEXT : END
1000 HPLLOT X,Y TO X + 21,Y TO X
  + 21,Y + 21 TO X,Y + 21 T
  O X,Y
1010 HPLLOT X + 1,Y + 1 TO X + 1
  ,Y + 20 TO X + 20,Y + 20 T
  O X + 20,Y + 1 TO X + 1,Y
  + 1
1020 RETURN
```

Notice how it works: The subroutine at line 1000 draws a two-pixel-wide box at a location determined by the variables X and Y. The built-in variable HCOLOR controls whether the subroutine draws (color 7) or erases (color 0). To move the box across the screen, lines 20-50 create a FOR-NEXT loop that draws, erases, and redraws the box from left to right across the screen.

Keep the previous program in memory, but type in these three lines:

```
30 POKE 230,P : 32: HCOLOR= 0 : X
  = I - 8 : IF E THEN GOSUB 10
  00
35 X = I : HCOLOR= 7 : GOSUB 1000
  : POKE 49235 + P,0
40 P = 3 - P : IF P = 1 THEN E =
  1
```

The program does basically the same thing, but without flicker. The variable P indicates which page to draw on. It's initially 1, indicating that drawing is done on the first page—page 2 is displayed first, since the HGR2 command in line 10 comes after the HGR command. To tell Applesoft which page to draw on, line 30 POKES either 32 or 64 in location 230, depending on the value in P.

The E variable is a flag indicating whether there's an image to erase. If there is (after drawing twice), line 30 calls the draw/erase subroutine, with X set two steps back from the current position. Then, in line 35, the program draws the new image and POKES the softswitch at either 49236 or 49237 to display the new image. Line 40 toggles the value in P and makes sure that images get erased.

It's Not Fair

Why can't I upgrade my Apple IIc to an Apple IIGS? After all, owners of the IIc can upgrade.

It's not a matter of Apple intentionally ignoring Apple IIc owners, but more a matter of physics.

There's just not room in the IIc's case for the IIGS circuit board. The upgrade from the IIc to the IIGS involves swapping the circuit board (also called the motherboard). The IIc's motherboard is pulled out and a IIGS motherboard put in. The back panel of the computer is also changed to a IIGS-style row of connectors. These include two 8-pin mini-DIN serial ports (identical to the connector on the ImageWriter II and Apple Personal Modem), a game/joystick port, a disk drive port, an analog RGB port (for the AppleColor RGB monitor), and the Apple DeskTop Bus port (normally used to connect the IIGS keyboard).

Even if the IIGS motherboard could be fit inside the IIc, there's the matter of slots. Much of the power, and all the flexibility, of the IIc and IIGS comes from the computer's slots. In effect, you can create your own custom computer by adding memory boards, internal modems, video cards, and more. The width of the normal card is larger than the thickness of the Apple IIc's case. You just couldn't get the case closed with boards inside.

If you have an Apple IIc, don't despair. You haven't been left with an orphan. Thousands of pieces of software run on your computer, and more is written everyday. The IIGS hasn't begun to dominate the Apple II line. And your computer's greatest advantage—its portability—still remains. Try lugging around a IIGS's system box, keyboard, mouse, and disk drive, and you'll be thankful for your IIc.

ProDOS Mystery Files

When I CATALOG one of my ProDOS disks, I see a couple of strange-looking files. In the column that normally lists things like BAS, BIN, or TXT, it says \$B3 instead. What are they? Can I do anything with them?

The \$B3 file type indicates a SYS16 file, a new creation of Apple's. This is a 16-bit system program for the IIGs computer and its ProDOS 16 operating system, the equivalent of an 8-bit system program like BASIC.SYSTEM (type SYS). When ProDOS 16 shows a disk's catalog, it lists this type as S16. Since ProDOS 16 only runs on IIGs, and SYS16 files only run under ProDOS 16, there's not much you can do with one of these files on a IIe or IIc.

The eight-bit ProDOS operating system was written long before the IIGs showed up, so it doesn't recognize this new file type. Rather than display a name—like BAS or DIR—it just shows a number.

All ProDOS file types are stored internally as numbers between 0 and 255. You might recognize this range of values as the limits of a number with eight binary digits or bits; that's precisely the amount of space a file type occupies in a disk directory. When you CATALOG a disk, ProDOS usually understands the file-type numbers of all the files and shows their three-letter abbreviations. If it doesn't, it displays a base-16 (hexadecimal) number. The leading dollar sign is a symbol for hex notation, and the number itself takes two digits, in the range 0-9 or A-F.

Here's a list of the 8- and 16-bit file-type values, along with their three-letter abbreviations and a short description.

For more information about file types, ProDOS 8, and ProDOS 16, pick up a copy of COMPUTE!'s Apple IIGs Machine Language for Beginners (19.95), written by Roger Wagner. The accompanying table, and much more, can be found there.

But What About The Gs?

When I write programs, I like to share them with friends and upload them to bulletin boards. Now that IIGs computers are around, I'm concerned that my programs might not be compatible with them. Since I'm not ready to buy one for myself yet, how can I tell if my programs will run?

If you're programming in BASIC, you have very little to worry about. The Applesoft language is completely unchanged and practically all pure BASIC programs run without any trouble. One significant difference between machines is that text page 2 (which is the same as lo-res page 2) isn't supported on the IIGs in emulation mode. Programs that use this page won't run correctly.

Even most machine language (ML) programs are compatible. The memory map—including zero page, language cards, and the auxiliary memory bank—is exactly the same. One kind of problem occurs with programs which use I/O addresses which were labeled reserved. Some of these are now used for new

hardware and could cause problems. Also, programs which directly access serial-port and mouse-port registers probably won't work right, since this hardware is different on the IIGs.

ML code which calls routines in the Applesoft ROM won't give any trouble; this range of ROM (\$E000-\$F7FF) is totally unchanged, byte-for-byte, so anything goes. There are some major changes in the monitor ROM (\$F800-\$FFFF), so if your program calls undocumented routines, or calls a documented routine at an address other than its published entry point, you might have trouble.

This seems to be the rule: If the list of entry points in Apple's Reference Manuals (II+, IIe, and IIc) includes the name and address of a routine, it's still starts at the same place in the IIGs—but the rest of the routine might be located anywhere.

Knowing When To Quit

Is there any way to quit the ProDOS version of Apple SpeedScript, besides turning off the computer (or pressing Open Apple-Control-Reset, which is the same thing)? It would be nice if I could leave the program without clearing my ramdisk, resetting ProDOS's current date, and so on.

Here's a BASIC program which patches the ProDOS version of Apple SpeedScript (and only the ProDOS version) so that it can call the standard ProDOS Quit function. It will work on both the 40- and 80-column versions of SpeedScript. When you type it in, change the first filename in line 100—it's SS.SYSTEM now—to match the filename of your copy of SpeedScript.

```

100 LO# = "SS.SYSTEM":SA# = "SS
QUIT.SYSTEM"
110 PRINT CHR# (4) "BLOAD "LO#",
A#2000,TSYS"
120 POKE 8866,141: POKE 8871,36
:C = 0
130 FOR I = 15551 TO I + 56: RE
AD A:C = C + A: POKE I,A: N
EXT
140 IF C < > 6329 THEN PRINT "C
HECK DATA STATEMENTS FOR ER
RORS": END
150 PRINT CHR# (4) "CREATE "SA#"
,TSYS"
160 PRINT CHR# (4) "BSAVE "SA#",
A#2000,L#1CF8,TSYS"
170 DATA 32,130,10,32,166,10
180 DATA 169,182,160,36,32,213
190 DATA 9,32,233,9,201,217
200 DATA 240,3,76,160,10,32
210 DATA 132,254,32,0,191,101
220 DATA 173,36,4,0,0,0
230 DATA 0,0,0,0,0,209
240 DATA 213,201,212,160,206,20
7
250 DATA 215,160,219,217,175,20
6
260 DATA 221,191,0

```

To try the new version, use the ProDOS smart run command: -SSQUIT

File Type	Name	Description
\$00		Uncategorized file
\$01	BAD	Bad block file
\$04	TXT	ASCII text file
\$06	BIN	General binary file
\$08	FOT	Graphics screen file
\$0F	DIR	Directory file
\$19	ADB	AppleWorks database file
\$1A	AWP	AppleWorks word processor file
\$1B	ASP	AppleWorks spreadsheet file
\$1C-\$AF		Reserved
\$B0	SRC	APW source file
\$B1	OBJ	APW object file
\$B2	LIB	APW library file
\$B3	S16	ProDOS 16 application program file
\$B4	RTL	APW runtime library file
\$B5	EXE	ProDOS 16 shell application file
\$B6		ProDOS 16 permanent initialization file
\$B7		ProDOS 16 temporary initialization file
\$B8	NDA	New desk accessory
\$B9	CDA	Classic desk accessory
\$BA		Tool set file
\$BB-\$BE		Reserved for ProDOS 16 load files
\$BF		ProDOS 16 document file
\$C0-\$EE		Reserved
\$EF	PAS	Pascal area on a partitioned disk
\$F0	CMD	ProDOS 8 CI added command file
\$F1-\$F8		ProDOS 8 user-defined files 1-8
\$F9		ProDOS 8 reserved
\$FA	INT	Integer BASIC program file
\$FB	IVR	Integer BASIC variable file
\$FC	BAS	Applesoft BASIC program file
\$FD	VAR	Applesoft BASIC variables file
\$FE	REL	Relocatable code file (Merlin)
\$FF	SYS	ProDOS 8 system program file

.SYSTEM. When you're ready to leave, press Control-Reset. The message on the command line will read, QUIT NOW [Y/N]? Pressing Y takes you to the ProDOS prompt for the next application. Any other key returns you to Speed-Script with your document intact.

When you see the ProDOS prompt, enter the volume name of the disk (inserting a new disk in the drive if necessary) and the name of a system program you want to run (usually BASIC.SYSTEM). Entering /MYDISK /BASIC.SYSTEM, for instance, runs the program BASIC.SYSTEM on the disk MYDISK.

User Group For Me?

What's a user group? Should I join one, and if so, where can I find one?

A user group is simply a collection of computer users who share a common interest. That interest may be a particular computer, such as the Apple II, or an application for computers in general, such as desktop publishing.

You'll find both beginning and experienced computer users in almost every group, so there's a wide range of abilities and knowledge. That's one reason to join—no matter what your problem, whether it's getting your printer to work with a stubborn piece of software or finding just the right programming technique, it's likely someone in the group has the answer.

Because of the lead time for publications (this issue, for instance, is being put together in August), you'll find Apple product news circulating in user groups long before you read about it in a magazine. User groups make it easy for you to keep up with what new software or hardware is available, and how people use it. That, in turn, may make your hardware- and software-buying decisions easier.

Another reason to join a user group is access to a huge collection of programs. User groups are an excellent source of public domain (free) and shareware (small fee if you use it) software. If you don't have a modem or aren't able to use one of the commercial database services like CompuServe, GENie, Delphi, and others, user groups are your only real way to find this kind of software. User group members, on the average, write more programs of their own than average Apple users, so that's another source of software.

You can look for a local user group in one of several ways. Visit a local Apple dealer and ask if they'd recommend a user group. Members may have posted notices in the dealer's store, or the dealer may be a member. Another way to locate user groups is through magazines like this. COMPUTE!'s Apple

Applications has published complete lists of all registered Apple user groups several times and will continue to do so in the future. A third way is to contact Apple directly. Ellen Leanse, Chief Apple User Group Evangelist, can steer you toward the closest user group. Contact Apple Computer, 20525 Mariani Ave., Mail Stop 36J, Cupertino, CA 95014.

Less Than Zero

I know that typing CALL -151 on an Apple II runs the monitor program, but what is it really doing? How can a machine language program start at a negative memory address?

Like any other computer, all the Apple II's memory addresses are positive integers. In the Apple's case, these addresses span the full 16-bit range, from 0 to 65535. Apple equipped its first machines with Integer BASIC, a language that couldn't understand numbers larger than 32767. In PEEK, POKE, and CALL commands, address values between 32768 and 65535 had to be expressed as negative numbers between -32768 and -1. Computer scientists use the name twos complement arithmetic for this method of representing negative numbers. If you add the negative address to 65536, you'll find the equivalent positive number.

Integer BASIC was rather short-lived. Apple soon introduced the current BASIC, Applesoft, which understands real numbers and has a much larger range. But Applesoft permits either positive or negative numbers for addresses, mostly for the convenience of programmers accustomed to Integer BASIC. There's an added bonus to this feature: some memory addresses—like the monitor's entry address of 65385—are much easier to remember as negative numbers. If you use the monitor much at all, you'll have no trouble remembering -151, but recalling the true address, 65385 (65536 + -151), takes a bit more thought.

Disk Drive Dilemma

I am going to purchase an Apple IIGS computer. I noticed in an advertisement that the computer was shown with the 3½-inch drive. Does that mean I should get one of those and copy all my 5¼-inch disks onto 3½-inch disks? Since I have over 100 floppies, and many are originals that don't copy easily, I am inclined to think that is not what I should do. Is there software on 3½-inch disks? I am quite worried that either one I get will be the wrong choice.

Apple's ads for its IIGS show only 3½-inch disk drives because that's the format Apple has chosen for the computer's sys-

tem software. The disks which come with the computer, a tutorial disk and the Systems disk, are of the 3½-inch variety.

All the IIGS-specific software so far released—from games like Mean 18 to applications like Top Draw—are on 3½-inch disks. Few IIGS software publishers are offering a 5¼-inch disk as an alternative. Obviously, both Apple and the IIGS software developer's community expect all Apple IIGS owners to have at least one 3½-inch drive.

Your dilemma, however, is that you want to use your existing software library. Like many Apple computer owners, you've got a considerable investment in that library. One of the advantages of the Apple IIGS is that it can run almost all Apple II programs. The only thing you need is a 5¼-inch drive.

If your current Apple computer has an external 5¼-inch drive, you can use that with your new IIGS. Remove the disk controller card from your Apple II+ or IIe, plug it into slot 6, and connect the drive. (You'll have to enter the IIGS's Control Panel and set slot 6 to read Your Card.) Connect your 3½-inch drive(s) to the disk drive port at the back of the computer and you're ready.

If you plan on selling your entire Apple system (or you have an Apple IIc, which means you don't have a usable external 5¼-inch drive), you should buy one 5¼-inch drive when you purchase your IIGS system.

Either way, you can continue to use your 5¼-inch disks with your new computer. However, you might want to transfer data and programs which you've written yourself to 3½-inch disks, simply because you can store so much more on a single disk.

(Note: Some commercial software licenses don't allow you to make backup copies to a different format—in other words, from 5¼-inch to 3½-inch format. Other licenses aren't specific about backup formats. If that's the case, and the software is not copy-protected, you can back up the program to a 3½-inch disk.)

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The Fall And Rise Of Computer Games

Dan Gutman

And I thought computer games were dead!

"You used to be the editor of *Computer Games Magazine*, didn't you?" I was asked recently by Gregg Keizer, who happens to be the editor of this thing. "How about writing a column on entertainment software?"

Sure, I started *Computer Games*. But that was before the computer games industry crashed and burned like a bad night of *Flight Simulator*—with my magazine on the runway. I remember it like it was yesterday. . . .

On January 18, 1982, *Time Magazine's* cover story shouted, "Video Games Are Blitzing the World." It was one of those funny, faddy times. America was going *Pac-Man* crazy. There were hit songs, books, and movies about video games. They were installing arcade machines in laundromats and hairdressing salons. There were the inevitable experts saying that video games were turning the nation's youth into brain-dead zombies, which made the kids want to play video games all the more.

Time said that Americans were spending more money on video games than on baseball, football, and basketball combined. More than on movies and records put together. More than twice the take of all the casinos in the country. Everybody was talking about the new national craze. It was the gold rush of the early 80's.

At the time, I didn't know a joystick from a track ball. I was the editor-in-chief of *Stag Magazine*. Yes, a *girlie* magazine. But after spending one night with a friend playing *Space Invaders* until four in the morning, I was hooked.

I marched into my publisher's

office with a suggestion—let's put out a magazine about video games—with *me* as the editor. It was perfect—I wanted to break out of *girlie* mags and he wanted to break into the legitimate publishing world. He gave me the OK to work on the project in my spare time.

We started *Video Games Player* in March of 1982, and the first issue came out that September. I was the only employee of the magazine, but we put a bunch of names inside so it would look impressive.

These were simpler times. Words like *Macintosh*, *ST*, and *ILGS* meant nothing in those days. State of the art was the Commodore VIC-20, sporting a full 5K of memory.

Rock-'n'-Roll Computing

I remember when a little company named Amiga came out with this goofy thing called the Joyboard. It was a controller that you'd stand on and rock back and forth to manipulate the screen. I fell off it and almost had a concussion playing *Centipede* one night. The company had a little more success with a computer they were working on at the time.

The first issue of *Video Games Player* featured a centerfold of *Zaxxon*. To give you an idea of what was happening, the big controversy in those days was whether the Atari 2600 or Mattel's Intellivision featured the best graphics. There were eight software companies at the time. One (Activision) is still making software today. In the next issue, there were 37 software companies. Video games were booming, the magazine sold well, and I was gone from *girlie* magazines forever.

A rash of video game titles were flooding the market:

Eggomania, *I Want My Mommy*, *Demolition Herby*, *Revenge of the Beefsteak Tomatoes* and the immortal *Communist Mutants from Space*. Everybody wanted to get a piece of the action. Some of the games were fun; most were really stupid. At the end of the year we gave our Golden Joystick Award for the best game of the year to *Shamus* by Synapse Software.

Suddenly, I was an authority on gaming. That's what happens when you put out a magazine—everybody figures you're an expert in the subject. Reporters from the *Wall Street Journal* would call me up to get my opinion and quotations about industry trends.

As the first wave of the personal computer boom started, the video games market began to taper off. People began to say to themselves, "Why should I buy a video game system when I can buy a computer that will play games and do so much more?" On October 17, 1983, the *New York Times* announced, "Video Games Industry Comes Down to Earth."

That January, *Time* put the personal computer on its cover and called it Machine of the Year. Video games were officially dead and computers were hot. In our October 1983 issue, we announced a change in the name of the magazine from *Video Games Player* to *Computer Games*. The Golden Joystick Awards came to be called The Golden Floppies. I noticed that the word *games* became a dirty word in the press. We started replacing it with *simulations* as often as possible.

My publisher finally gave me permission to hire a managing editor, and I picked a guy named Shay Addams. With complete freedom to do what we wanted, he and I got a little crazy. In the June 1984 issue, we poked fun at Coleco and IBM with a fake full-

page ad for the new Cabbage Patch Jr.—basically an Adam computer with a Cabbage Patch doll exploding out of it (“comes with letter-quality adoption papers”).

Boring Computing

I always thought computer magazines were dull, and in our February 1984 issue, we did a parody of all of them—*Boring Computing: The Computer Magazine for Computer Fans Who Love Their Computers and Want to Read About Computers 24 Hours a Day*.

Boring Computing had articles like:

- Software Piracy: Who Cares?
- Electronic Cottage Cheese
- I Axe-Murdered My Users Group
- Mystic Modem (the first product to make it possible to telecommunicate with the dead)
- Bankruptcy Street Writer (the word processor for software companies on the rocks)
- Exclusive Photos of People Standing Next to their Computers
- How to Turn Your Bathroom into a Mainframe
- We Rate the Styrofoam from Computer Boxes

Ah, those were the days. Sometimes I would have to pinch myself. There I was, earning a pretty decent living sitting in a fancy office and playing games all day. Thousands would kill for a job like that.

Unfortunately, utopia didn't last. Shakeout! The computer slump began and all those industry analysts who had predicted a computer in every home had changed their minds. Suddenly, everybody was saying that the home computer was a fad, just another hula hoop.

Computer companies were dropping like flies. It became harder and harder for the magazine to attract advertisers—there simply weren't many left. The magazine started getting thinner with each issue. My publisher began jacking up the price to make up for lost revenue.

One by one our competition bit the dust. *Videogaming*, *Electronic Games*, *Video Games*, *Vidiot*, and *Electronic Fun* all went out of business. It was fun watching

them fall by the wayside, but we knew the end was near for us, too. I was told to use black-and-white pages in the magazine to save money.

On January 1, 1984, Coleco gave up on their Adam computer. In March, IBM gave up on the PCjr. In June, the *New York Times* proclaimed, “Computer Makers in a Severe Slump.”

In September, I got the word to move out of my office. My publisher was losing \$25,000 on each issue and had decided to pull the plug on *Computer Games*. Shay and I had just written and turned in a book on computer games to Simon & Schuster, but the deal fell through when the magazine folded. According to the press, computer games, if not the home computer itself, were dead.

Do What With A Computer?

I never really believed that. The computer is simply too powerful a tool to disappear so easily. While all the newspapers were saying that the home computer had failed because there was nothing useful the average person could do with it, I saw *hundreds* of uses. I wrote a book called *I Didn't Know You Could Do THAT with a Computer!* (COMPUTE! Books) and waited for the shakeout to play itself out.

And that's exactly what happened. Personal computers started getting more powerful and became easier to use. The companies that were putting out bad games went out of business, and the companies that were putting out good games started putting out even better ones. More and more people began using computers in their offices, in school, and at home.

If you read the papers now, they say the home computer, and computer games, have come back from the dead. Apple is selling Macs and Apple IIs like frozen daiquiris on a hot day at the beach. Commodore has stopped losing money. Atari is riding high under the Tramiels. Nintendo sold a million of their Nintendo Entertainment Systems last Christmas, and Sega and Atari have hot-selling game systems as well.

Brøderbund is talking about making a public stock offering. Electronic Arts and Mindscape are swallowing up every small company in sight. *Toy and Hobby World Magazine* reports that entertainment software sales went from \$100 million in 1985 to \$300 million in 1986, and they say it could hit \$800 million this year. Computer games are finally being seen as a legitimate form of entertainment and education. Magazines are starting up entertainment software columns—like this one.

I guess the home computer isn't just another Pet Rock after all.

Inside Looks, Outside Trends

You'll be seeing this column in future issues of COMPUTE!'s Apple Applications. It's not going to be another column of game reviews. You can find reviews of all the latest games in an excellent newsletter called *Computer Entertainer* (5916 Lemona Ave., Van Nuys CA 91411; \$35 for 12 issues).

What I hope to do with this column is to try and probe into the phenomenon of entertainment on a computer. I hope to investigate the coming wave of games on CD-ROM and other new laser technologies. We'll look at all-text games and at adventure games, and we'll interview some of the hot new game designers. I hope to give you sneak peeks at what the major software companies are working on, and I'll try to step back and see the latest trends in computer gaming. If you have any suggestions, I'd love to hear them. You can contact me directly via electronic mail through CompuServe (76174,760), GEnie (D.GUTMAN), or QuantumLink (DanGut).

It's nice to think that once again I can make a living by sitting around an office playing games.

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, and Tidbits serves up a wealth of inside information on programming 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 the debut of Tips, Tricks, and Tidbits, we asked Vincent O'Connor, a collector of Apple programming and application software bugs, to share some of his tidbits. He offers four notable bugs—one each in BASIC, DOS 3.3, ProDOS, and AppleWorks—and their elegant solutions, below.]

BASIC And Decimals

Since the introduction of the Apple IIe, Applesoft BASIC has been built into the ROM of every Apple II computer. This, along with the wealth of programs written in Applesoft BASIC and books on how to write programs in it, makes Applesoft BASIC a popular programming language. Originally written by Microsoft in 1978, Applesoft has not been changed, despite the upgrades to the Apple II line, including the IIGS. Even though the IIc and IIGS ROMs were upgraded (the tape cassette commands were eliminated and the space reused), the bugs were left intact. While this has the obvious advantage of maintaining compatibility—allowing an Applesoft BASIC program written on a II+ to run on a IIGS—it also means that the bugs went unfixed.

And since Applesoft BASIC is within ROM—the computer's

permanent memory, which isn't modifiable—you can't load it into RAM and then change or patch it.

There are other ways to deal with BASIC bugs on the Apple, but for the most part they're too technical. What's left is finding ways to either bypass the bugs or fix them in ways that use only Applesoft BASIC commands. That's what we've done with the following bug.

Like most versions of BASIC available for personal computers, Applesoft doesn't always handle decimals correctly. Let's look at some examples of where this can happen, and how to avoid the problems that occur.

FOR-NEXT. To begin with, FOR-NEXT loops simply don't execute correctly with decimals in them. Type in and run the following program.

```
10 FOR I = 1 TO 2 STEP .1
20 PRINT I
30 NEXT I
```

If the program ran correctly, it would print 1, 1.1, 1.2, and so on, up to 2. But it actually prints 1, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9. There is no 2. Why? Because the numbers are actually slightly larger than they appear. PRINT rounds them off to five significant digits to produce what you see on the screen. This means that when I should equal 2, it actually equals slightly more than 2. Thus, the FOR-NEXT loop doesn't execute, since it's not supposed to go past 2 (FOR I=1 TO 2, remember?).

If at all possible, use only whole numbers in your FOR-NEXT loops. If this isn't possible, use whole numbers in the loop and convert them to decimals when you need to. Using this method, the program above would be written like this:

```
10 FOR I = 10 TO 20
20 PRINT I / 10
30 NEXT I
```

If you type this program in, you'll see that it executes correctly.

Subtracting. You also get errors in subtraction, although these occur only when you're subtracting numbers where several initial digits are the same and at least one of the numbers is a decimal. For example, the expression $(987654.1-987654)*100$

should evaluate to $.1*100$, or 10. Applesoft BASIC evaluates it to 10.0097656.

To avoid this problem, you'll have to multiply both numbers within the parentheses by a factor which eliminates the decimal, perform the calculations, then divide by the factor by which you multiplied. Here's what you would have to do to make sure the example above is evaluated correctly:

```
 $(987654.1*10)-(987654*10))*100/10$ 
```

This gives the correct answer (10).

IF-THEN. If you have decimals in an IF-THEN statement, and the result depends on two numbers being identical, you'll find that BASIC's decimal handling, again, creates problems. Type in and run the following program.

```
10 A = 8.001 - 8 : B = .001
20 IF A = B THEN PRINT "A and B
   are the same.": END
30 PRINT "A and B are different
   .": END
```

The program should print *A and B are the same.*, but it doesn't. Instead, it prints *A and B are different.*

It executes incorrectly because Applesoft evaluates $8.001 - 8$ as $9.99998301E-04$ instead of .001 (remember the subtraction problem). A similar problem occurs if you change A and B so that $A=1*1.0000001$ and $B=1.0000001$. Applesoft incorrectly evaluates

1*1.0000001 as 1.00000005.

If you're using decimals in an IF-THEN statement requiring exact equivalence, you should change line 20 to read

```
20 IF ABS (A - B) < = .00001 *  
ABS (B)
```

If you make this change, the program prints the correct response. How does this line work? The absolute value function (ABS) avoids any problems with using negative numbers in the statement. The <= .00001 tells the program to compare just the first five significant digits, since all problems occur in the sixth significant digit and beyond.

See DOS Run, Don't See DOS Run

DOS 3.3 is the older of the two currently-used Apple disk-operating systems. Although Apple no longer supports DOS 3.3, thousands of programs, commercial and amateur alike, still run under it. Like BASIC, DOS 3.3 has its share of bugs, but unlike Applesoft, it's disk-based. That makes it easier to fix bugs, since DOS can be patched, then saved back to disk.

One DOS 3.3 bug involves its MON and NOMON commands. MON displays some kinds of information sent to and from your disk drive, on the screen. The information includes commands a program sends to DOS 3.3, anything that's transferred from a disk to memory using either the READ or EXEC commands, and data transferred from a program to disk using the WRITE command. NOMON simply turns off the MON command.

These two commands are useful in finding and fixing problems in programs that access the disk. The problem is that every time you do a Control-Reset on an Apple IIe, IIc, or IIGS, or use FP or INT on any Apple II, the computer thinks you've just executed a NOMON command. Since hitting Control-Reset is quite common when debugging a program, it's very frustrating to constantly reissue the MON command. To fix this bug, type in Program 1 and save it as MON/NOMON FIX.

Program 1: Fix it MON

```
5 REM FIX MON/NOMON BUG IN DOS  
3.3  
10 TEXT : HOME : CLEAR  
15 IF PEEK (48896) = 76 THEN VT  
AB 12: PRINT "SORRY, THIS WI  
LL NOT WORK UNDER PRODOS": E  
ND  
20 FOR I = 40407 TO 40409: POKE  
I,234: NEXT I  
25 VTAB 12: PRINT "MON/NOMON PA  
TCH INSTALLED": END
```

Load and run it by entering

RUN MON/NOMON FIX

When you run the program, the bug is fixed. Now, when you issue a MON command, it won't be turned off unless you enter a NOMON command.

This only fixes the copy of DOS 3.3 in memory, so you must run it every time you boot a DOS 3.3 disk. You can do this by naming the program HELLO, which then automatically runs every time you boot the disk.

You can also use the program to make sure the fix is on any new DOS 3.3 disks you initialize. To do this, run the program, insert a blank unformatted disk into the drive, and type

```
NEW <Return>  
10 HOME <Return> (or load your  
favorite HELLO program from an-  
other disk)  
INIT HELLO
```

The newly formatted disk now carries DOS 3.3, minus the bug.

ProDOS Trashes Track 0

ProDOS is Apple's newest disk operating system, and is much more powerful than DOS 3.3. It beefs up many of the DOS 3.3 file-handling commands and adds some new ones, as well. It is several times faster when accessing disk drives; it supports files up to 16 megabytes in size; and it does string garbage collection at lightning speed. ProDOS also comes as two files, one labeled PRODOS and the other labeled BASIC.SYSTEM. Unlike DOS 3.3, which puts an image of itself on a disk every time you format one with the INIT command, ProDOS has no command to format a disk. This means you have to manually copy the two files to a disk after the disk has been formatted. The easiest way to copy PRODOS and

BASIC.SYSTEM to the newly-formatted disk is with FILER (which comes on the ProDOS User's Disk) or the Copy Files option on the IIc or IIGS Systems Utility Disk.

Like its predecessor, ProDOS has its share of bugs. To make matters worse, it's frequently updated. There are several versions, all containing slightly different bugs.

One of the worst can be found in versions 1.1.1 and 1.2 (the latter is also known as ProDOS 8, labeled P8 on the System disk which comes with the IIGS, and is dated 06-SEP-86).

These versions of ProDOS have a tendency to destroy track 0 on standard 5½-inch disks. That's disastrous because track 0 contains the directory. If track 0 is destroyed, the disk is useless (unless you can reformat only that track and then rebuild the directory—not a job for the faint-hearted). Worse, this is the version of ProDOS that's distributed with AppleWorks 1.2 through 2.0. The source of the bug (discovered by Stephen Thomas of Maclagan, Wright, and Associates, of Australia) lies in the way the floppy driver (the section of code which turns on the drives) reads and writes to the disks. Thomas suggests two small changes to correct the problem; the following listing is a short program that makes these suggested changes. Type in Program 2 and save it to disk as PRODOS.PATCH.

Program 2: Patching ProDOS

```
5 TEXT : HOME : CLEAR :D$ = CHR  
$(4): DIM P(2)  
6 IF PEEK (48896) < > 76 THEN V  
TAB 12: PRINT "PROGRAM MUST B  
E RUN UNDER PRODOS": END  
10 IF PEEK (116) < 96 THEN VTAB  
12: PRINT "INSUFFICIENT MEM  
ORY TO LOAD PRODOS": END  
15 VTAB 5: HTAB 15: PRINT "PROD  
OS FIX"  
20 VTAB 7: HTAB 9: PRINT "1. PR  
ODOS 1.1.1": VTAB 9: HTAB 9:  
PRINT "2. PRODOS 1.2 (PRODO  
S 8)": VTAB 12: HTAB 14: PRI  
NT "CHOICE=>";  
25 GET A$: IF A$ < > "1" AND A$  
< > "2" THEN 25  
30 Q = 20484: X = 22211: M = 2222  
0: IF A$ = "2" THEN Q = 2099  
6: X = 22723: M = 22732  
35 FOR I = 0 TO 2: READ P(I): N  
EXT I  
40 HOME : VTAB 12: PRINT "PLACE  
DISK WITH PRODOS IN DRIVE 1  
, THEN": PRINT "PRESS <RETUR  
N>";
```

```

45 WAIT - 16384,128:A = PEEK (
- 16384): POKE - 16368,0: IF
A < > 141 THEN 45
50 PRINT D$"BLOAD PRODOS,A$2000
,TSYS"
55 FOR I = X TO M STEP 3
60 IF PEEK (I) = 189 THEN HOME
: VTAB 12: PRINT "Prodos alr
eady corrected": END
65 IF PEEK (I) < > 157 THEN HOM
E : VTAB 12: PRINT "THIS IS
NOT VERSION 1.1.1 OR 1.2.":
END
70 POKE I,189: NEXT I
71 FOR I = 0 TO 2
72 IF PEEK (I + Q) = 189 THEN H
OME : VTAB 12: PRINT "Prodos
already corrected": END
75 IF PEEK (I + Q) < > 234 THEN
HOME : VTAB 12: PRINT "This
is not version 1.1.1 or 1.2
.": END
80 POKE I + Q,P(I): NEXT I
85 PRINT D$"UNLOCK PRODOS": PRI
NT D$"BSAVE PRODOS,A$2000,TS
YS": PRINT "LOCK PRODOS": HO
ME : VTAB 12: PRINT "PRODOS
PATCH INSTALLED": END
90 DATA 189,142,192

```

To use the program, type
RUN PRODOS.PATCH
and follow the screen prompts.
*Note: Never use an original
copy of your disk, especially if
you're patching ProDOS on an
AppleWorks disk. Always use a
backup copy.*

Choose the version of ProDOS you're patching. The program does the rest, including checking for sufficient memory to load the ProDOS system file, and insuring that you are patching the right version of ProDOS.

AppleWorks Spreadsheets Won't Load

AppleWorks, Apple's integrated word processor/spreadsheet/database software, has sold more copies than any other Apple program. For a short time, it sold more copies per month than Lotus 1-2-3, the perennial best-seller of the IBM world.

Despite its limitations, it is extremely popular not only because of what it can do, but also because of the wealth of add-on programs available.

Although it is not generally known and is not documented in the manual, there's a limit to the number of data bytes that can be in a single spreadsheet row. Worse, in AppleWorks 1.1-1.3, the number of bytes that can be

entered and saved is larger than the number of bytes that can be loaded. This can result in a situation in which you create a spreadsheet that can't be loaded.

The only sure way to prevent this problem is to avoid placing anything in columns CS-DW (DW is the last available column). There are situations in which you can use these columns, but they're dependent on the total number of bytes that exist in the other columns, and they lack any way to accurately determine that number of bytes—it's not worth the risk.

If you're working in a large spreadsheet and get the message *Some cells were lost from row X*, with X being the row you were working in, use Open Apple-B to blank all cells in that row from CS to DW, and place the information elsewhere in your spreadsheet. This should make it possible to safely save the file. To be sure, save it on a different disk—that way you won't have lost everything if you're unable to reload the file.

aa

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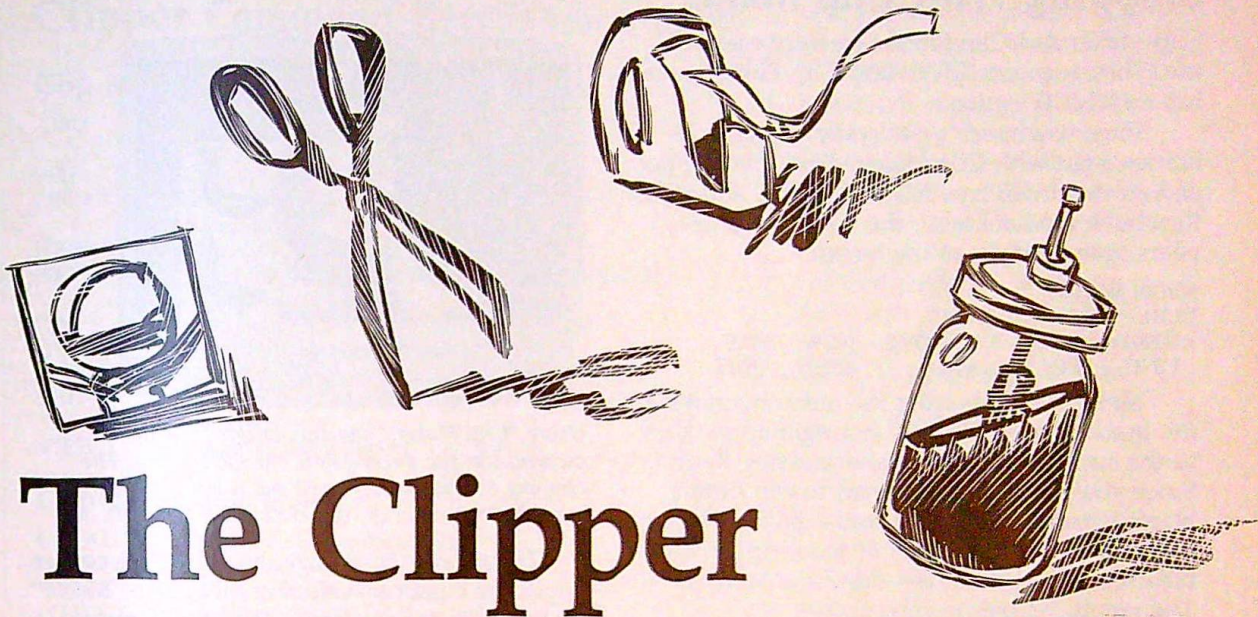
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The Clipper

Jenny Schmidt



Cut images from any high-resolution screen, save them as clip-art files, and paste them down again to make new and unusual pictures with "The Clipper," an impressive software package for all Apple II computers. This menu-driven program runs under either DOS 3.3 or ProDOS.

Scissors in hand, you cut pictures out of an old magazine or catalog. The glue is next, as you paste those pictures to paper. You've just created a work of art. Call it a *collage* if you're over five years old, or *refrigerator art* if you're not.

You can do the same thing with your Apple II computer now that you have "The Clipper," a sophisticated software package that comes in two parts. The first part, "Clip Maker," cuts images from different hi-res pictures, combines them in libraries, and saves them to disk as clip art. The second, "Clip Plotter," electronically pastes together those images to make new screens.

And though it's not strictly a drawing program, the Clipper system offers features for modifying your works of art. It's easy to change colors in a clipping or to paste down dozens of versions of the same image.

It doesn't even matter how the art was originally created, or with what drawing program. Clipper can combine art drawn by any program that saves work as standard Apple hi-res screens. Whether you're using *MousePaint* on the Apple IIc, *816/Paint* on the IIGS, or *COMPUTE!'s* own "Picture Maker"

(Spring/Summer, 1987) on the IIe, you can peel off images and put them back together again.

Software System

Clipper is actually two separate BASIC applications and one machine language program. You'll need to type in and save all three listings to use the entire Clipper system.

Type in Program 1, Clip Maker, using "Apple Automatic Proofreader," the error-checking utility included in this issue. Once you've entered it, save it to a disk (one that has been formatted with either DOS 3.3 or ProDOS) as *MAKER*.

Next, type in Program 2, Clip Plotter. Save the completed program to the same disk that Clip Maker is on, but call it *PLOTTER*.

The last listing, Program 3, is a machine language routine that Clipper needs. Program 3 is listed in *COMPUTE!'s* Apple Applications' MLX format for easy entry, so you need a copy of "Apple MLX" on disk before you begin typing it in. Load and run MLX, and then answer the two prompts as follows:

```
STARTING ADDRESS? 9300
ENDING ADDRESS? 95EF
```

Press E at the options menu to enter the program, then type the starting address. If this is your first session at entering Program 3 with MLX, type 9300. Type in Program 3, and, when you're through, save it to the same disk as the other two programs. *Make sure you name it CLIPPER, the filename both Program 1 and Program 2 expect to find on the disk.*

Snipping With Clip Maker

Clip Maker and Clip Plotter are very easy to use. They're menu driven and Clip Plotter even has an UNDO option.

Since you haven't made any clippings libraries, start with Clip Maker. Place the Clipper disk in the drive, type **RUN MAKER**, and press Return. A moment later, the main menu appears at the bottom of the screen.

MAIN MENU:

CLIP:

```
<NEXT>  SHOW  REMOVE  NEW  FILE
FIND    PIN   ADD     VIEW  QUIT
```

Make selections from the menu by moving the brackets with the left- and right-arrow keys to the appropriate feature and pressing Return. Since you probably don't want to clip from a blank screen, you need to load a picture. Insert a disk which contains one or more Apple hi-res picture files in either disk drive and select **FILE**. The menu changes to show:

FILE MENU:

```
<LOAD>  SAVE      MERGE  DELETE
DRIVE   CATALOG  PICTURE  MAIN
```

If you put the hi-res picture disk in drive 2, change the drive number by choosing **DRIVE** and entering the correct drive number.

Select **PICTURE** to load a picture. Type in the picture's filename (you can type ? and press Return to view the disk's catalog). You'll have to confirm that you want to erase the current picture by loading a new one. Press **Y** for Yes. *Note: You are not erasing anything from disk—only from the Apple's memory.*

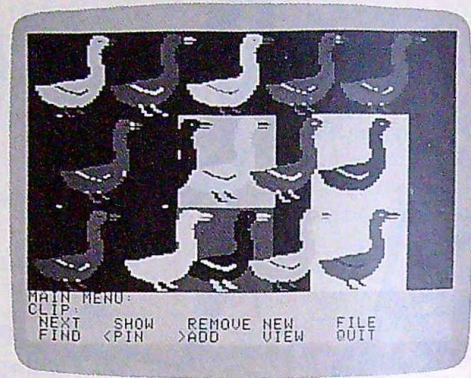
Once the picture loads and appears on the screen, go back to the main menu by picking **MAIN**. You're ready to start clipping. Move the cursor (you may have trouble seeing it in a complex picture—it's a tiny crosshair in the middle of the screen) with the **I**, **J**, **K**, and **M** keys.

You can move the cursor in small or large increments by pressing keys **1-9**. The cursor moves the same number of plotting points as the number key last pressed. Press **6**, for instance, and the cursor jumps in increments of six plotting points.

Clipping Libraries

Use the cursor to box the image you want to clip. Move the cursor to the upper left corner of the image and choose **PIN** in the menu at the bottom of the screen. Press Return and that corner is fixed. Now move the cursor to the lower right corner of the image to define the box—all four corners are visible as guides. *Don't press Return until you've moved the menu brackets off PIN.*

Figure 1: The Clipping Box



Using "Clip Maker," you snip images from hi-res pictures like the ducks-galore one shown here. The clipping box has been pinned and is being stretched around the duck in the center row at the far left.

If you want to change the upper left corner, unpin the cursor by selecting **PIN** again. Move the freed cursor to a new position and pin it again. **PIN** acts as a toggle between pinning and unpinning the cursor.

Once you've boxed the clipping, choose **ADD** in the menu at the bottom of the screen. **ADD** adds the image inside the box to the library you're creating.

Type in the name you want to give the clipping. The name can be any length, but those longer than 12 characters are truncated. Commas and colons are not allowed. After you name the clipping, it's added to the library—note that the clipping's name is shown on the menu after **CLIP**:. This *clipping window* indicates which clipping the program is currently pointing to.

You can add more clippings by following the same procedure. (You have to choose **PIN** to free the cursor, if you haven't done so already.) To see the part of the screen obscured by the menu, select **VIEW**. Press Return when you want to see the menu again. If you want to make clippings from another picture, go to the File menu and load a new one by selecting **PICTURE**.

The number of clippings you can place in a library depends on the size of those clippings. The larger each clipping, the fewer you can put in a library. (Total library size is limited to 13,044 bytes—for your technical reference, each clipping takes up 16 bytes plus a number of bytes equal to the number of dots in the image divided by 4.)

Eventually, you'll want to edit and review the clippings library you're creating. To see the clipping in the clipping window, choose **SHOW**. The current clipping appears in the upper left corner of the screen for a couple of seconds and

Clipper Command Reference Guide

Clip Maker Main Menu

ADD	Adds the image within the clipping box to the current library.
FILE	Calls the File Menu.
FIND	Brings a specific clipping to the clipping window (user enters name).
NEW	Deletes the current clipping library.
NEXT	Brings the next clipping in the current library to the clipping window.
PIN	Sets the upper left corner of the clipping box.
QUIT	Exits Clip Maker and returns to BASIC.
REMOVE	Deletes clipping currently in the clipping window.
SHOW	Briefly displays current clipping in the upper left corner of the screen.
VIEW	Erases the menu display.

Clip Maker File Menu

CATALOG	Lists the current disk's catalog.
DELETE	Deletes specified library file.
DRIVE	Changes current disk drive.
LOAD	Loads specified library file from disk.
MAIN	Calls the Main Menu.
MERGE	Merges one library with another.
PICTURE	Loads a standard Apple hi-res graphics file from disk.
SAVE	Saves current clipping library file to disk with CLIP. prefix.

Clip Plotter Main Menu

CHANGE	Exchanges one color for another in the clipping on subsequent DRAWS.
CLEAR	Erases the screen.
DRAW	Draws the current clipping at the clipping box position.
FILE	Calls the File Menu.
FIND	Brings a specific clipping to the clipping window (user enters name).
IGNORE	Prevents selected color(s) from being plotted on subsequent DRAWS.
NEXT	Brings the next clipping in the current library to the clipping window.
QUIT	Exits Clip Plotter and returns to BASIC.
UNDO	Restores the screen under a DRAWn clipping to its original state.
VIEW	Erases the menu display.

Clip Plotter File Menu

CATALOG	Lists the current disk's catalog.
CLIPS	Loads a new clipping file from disk.
DRIVE	Changes current disk drive.
LOAD	Loads specified standard Apple hi-res screen from disk.
MAIN	Calls the Main Menu.
SAVE	Saves standard Apple hi-res screen to disk.

then disappears. Change the contents of the clipping window (in other words, change the clipping the program is pointing to) with the NEXT and FIND commands. NEXT brings the next clipping in the library to the clipping window. You can thumb through the entire library of clippings by

repeatedly selecting NEXT. Selecting NEXT when the last clipping is in the window moves the first clipping back into the window.

Use FIND to bring a specific clipping into the window. Enter the clipping name, and the program finds it and moves it into the window. The con-

tents of the window remains unchanged if the desired clipping is not found in the library.

REMOVE lets you remove unwanted clippings from the library. Bring the unwanted clipping into the window by using NEXT or FIND. You may want to select SHOW to verify that this is the clipping you want to delete. Now choose REMOVE. As a precaution, you must confirm the deletion before the clipping is erased.

The only way to restore a removed clipping is to box the original image and ADD it to the library again. The REMOVE option should always be used with caution.

Two main menu options remain—QUIT and NEW. QUIT is self-explanatory. NEW, however, is not. It deletes the entire library. Use it only when you want to start a new library. As always, you must confirm your selection before the current library in memory is wiped out.

Fortunately, all is not lost if you accidentally erase a library. Quit Clipper and enter the following BASIC commands:

```
CALL FE,EP  
BSAVE CLIP.NAME,AS$6000,LET+1-SP
```

This changes pointers used by the program and saves the former library to disk. Change NAME to the filename you want.

And Saving Libraries

Of course, it's easier to use the program's File menu to save your work. Move to the File menu (choose FILE from the main menu). Then, to save your library, simply select SAVE. Enter a filename and the library is saved to disk. The program automatically adds CLIP. prefix to the filename. The prefix is used only to make it easy to tell which disk files are clipping libraries. *Note: Don't add the CLIP. prefix yourself; the program handles that for you.*

Pick LOAD when you want to load a library. Type in the filename (again, you can view the catalog by typing ? and hitting Return). Don't include the CLIP. prefix, since the program adds it automatically.

It's sometimes convenient to create a library by merging two smaller clipping libraries. MERGE does this. Load a library into memory or create one. Select MERGE and enter the filename of the library to be merged with the one in memory. The two libraries are treated as one by Clipper.

The other options in the File menu provide disk maintenance functions. CATALOG catalogs the disk, and DELETE removes unwanted files (not libraries in memory, remember, but disk files).

Drawing With Clip Plotter

Clip Maker makes it possible to quickly and easily create extensive libraries of images. But once you've created and saved libraries of clip art, you'll want to *do* something with them.

Clip Plotter, with an interface similar to Maker's, puts those libraries to use. Exit Clip Maker and type RUN PLOTTER. The menu appears at the bottom of the screen.

MAIN MENU:

CLIP:

<NEXT> CHANGE DRAW VIEW FILE
FIND IGNORE UNDO CLEAR QUIT

Make selections from this menu just as you did in Clip Maker.

First you need a clipping library to work with. Select FILE to enter the file menu.

FILE MENU:

<LOAD> SAVE CLIPS
DRIVE CATALOG MAIN

Now choose CLIPS, then enter the name of the appropriate library.

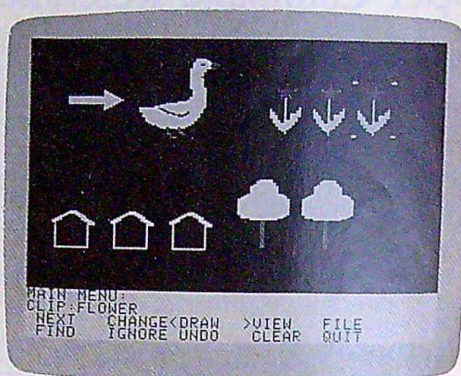
Do not type in the CLIP. prefix. Clip Plotter will terminate if you type in a filename beginning with CLIP. Once the library loads, return to the main menu (select MAIN).

Paste Down

The name which shows in the clipping window indicates the clipping currently in use. Change the clipping with the NEXT and FIND options—both work as in Clip Maker.

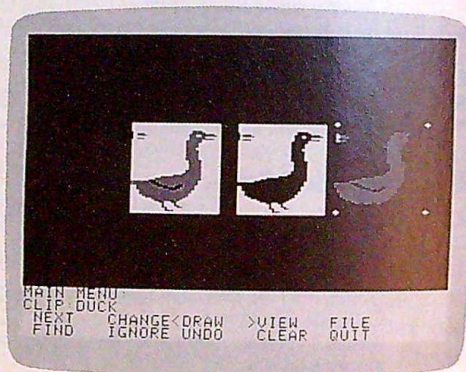
Instead of a single cursor on the screen, you'll see a box formed with four cursors at its corners. This outlines the dimensions of the clipping currently in memory. Move the box with the I, J, K, and M keys; change the movement increment with the 1-9 keys. The box's size changes when the clipping in the window changes.

Figure 2: Glued Down



With "Clip Plotter," you can paste down clippings to create new artwork. It's especially easy to lay down several identical images.

Figure 3: Ignoring Colors



By using the IGNORE option in "Clip Plotter," you can alter an image. In this example, first the duck and then its background were ignored.

Move the box to the screen position where you want the clipping to appear and select DRAW, and the clipping will appear. You can move the box again and paste down more clippings.

If, after selecting DRAW, you decide you don't like the clipping in that spot, choose UNDO—the screen area under the clipping will be restored to its original contents.

If you move the box or change the contents of the clippings window after a DRAW, UNDO won't work. UNDO should be used immediately after a DRAW, if it's to be used at all.

Color Changes

Changing and ignoring colors in a clipping is one of Clip Plotter's greatest strengths. One clipping can generate almost limitless variations.

The IGNORE option prevents selected colors from being plotted when the clipping is drawn. Select IGNORE, and you'll see this menu:

Short Description of Program 1, Clip Maker

Lines	Function
10-330	Main Menu
340-360	NEXT option
370-380	SHOW option
390-420	REMOVE option
430-440	NEW option
450-460	FIND option
470-480	PIN option
490-510	ADD option
520-530	VIEW option
540-550	QUIT option
550-680	Move box/cursor routine
690-830	File menu
840-900	PICTURE option
910-940	SAVE option
950-970	CATALOG option
980-990	DRIVE option
1000-1060	LOAD option
1070-1120	MERGE option
1130-1160	DELETE option
1170-1210	Error-handling routine
1220	Get clip name routine

Short Description of Program 2, Clip Plotter

Line	Function
10-360	Main menu
370-390	NEXT option
400-500	CHANGE option
510-520	DRAW option
530-540	VIEW option
550-570	FIND option
580-690	IGNORE option
700-710	UNDO option
720-730	CLEAR option
740-750	QUIT option
760-890	Move box routine
900-1040	File menu
1050-1090	LOAD option
1100-1110	SAVE option
1120-1140	CATALOG option
1150-1160	DRIVE option
1170-1210	CLIPS option
1220-1260	Error-handling routine
1270	Get clip name routine
1280-1310	Get CATALOG routine

IGNORE: (PRESS <ESC> FOR MAIN MENU)
<BK1>GRN VIO WT1 BK2 RED BLU WT2

The colors and their abbreviations are as follows:

Abbreviation	Color
BK1	Black 1
GRN	Green
VIO	Violet
WT1	White 1
BK2	Black 2
RED	Red or Orange
BLU	Blue
WT2	White 2

Move the brackets to the color you want to ignore, and press Return. The YES label appears beneath each color you choose to ignore. Re-instate a color by moving the brackets to the

color and pressing Return again. YES disappears to show that the color is no longer ignored. You can ignore as many colors as you want.

Press the Escape key to return to the main menu. From this point on, when you DRAW a clipping, the ignored colors are not painted. *None of the previously drawn clippings change in any way, however.* Experiment by ignoring foreground colors to paste down only the background, or ignore the background colors to lose the rectangular appearance of the clippings.

CHANGE exchanges one color for another in the clipping. You can, for instance, change all the violet to green. Choose CHANGE, and this menu appears:

CHANGE: (PRESS <ESC> FOR MAIN MENU)
BK1 GRN VIO WT1 BK2 RED BLU WT2
<BK1> GRN VIO WT1 BK2 RED BLU WT2

The top row displays the original colors, while the bottom row contains the replacement colors. The brackets only move on the bottom row. To change violet to red, for example, move the brackets until they appear under the top-row VIO. (The color within the brackets is what DRAW uses wherever violet appears in the original clipping. Since you haven't changed violet to another color yet, VIO appears inside the brackets.)

Press Return, and the color within the brackets changes. Cycle through the colors by repeatedly pressing Return until RED appears. You can change other colors in the same way, and you can restore the original colors by pressing Return until the color in the top and bottom rows match.

Go back to the main menu by pressing the Escape key—from this point on, DRAW uses the new, replacement colors. *None of the previously drawn clippings are changed in any way.*

Possible Confusion

You may become confused when you use IGNORE and CHANGE together. For example, suppose you chose to ignore BLACK1 in the IGNORE menu, and you changed BLACK1 to GREEN and changed VIOLET to BLACK1 in the change menu. What happens when you draw a clipping? Is the BLACK1 ignored, or is it plotted as GREEN? Is VIOLET drawn as BLACK1, or is it ignored since BLACK1 is supposed to be ignored? The answer is that BLACK1 is ignored: It is not drawn as GREEN. But VIOLET is not ignored and is drawn as BLACK1.

Here's what happens when you select DRAW: The program goes dot by dot, plotting the colors in the clipping following the rules set up by IGNORE and CHANGE. For each dot,

the program reads the original color given in the clipping. Then it checks that color with the IGNORE list. If the color is to be ignored, the dot is skipped entirely, *without* checking whether it should be changed to another color. If the color is *not* to be ignored, however, then it's changed to the color in the CHANGE list. Only then is the dot plotted.

In other words, ignores are done first, changes second. A dot of an ignored color is skipped entirely. Only colors that are not ignored are changed.

Other Plotter Options

VIEW shows the portion of the screen obscured by the menu. Press Return when you want to see the menu again.

CLEAR erases the screen. QUIT exits the program and returns to BASIC. LOAD and SAVE respectively load and save high-resolution screens. DRIVE lets you change the current disk drive. CATALOG catalogs the disk, and CLIPS loads a new clipping library (*do not enter a filename with the prefix CLIP; the program does this automatically for you*).

Program 1: Clip Maker

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```

A3 10 REM COPYRIGHT 1987 COMPUTE! PUBLICAT
    IONS, INC. ALL RIGHTS RESERVED
47 20 TEXT : HOME : VTAB 8: HTAB 14: PRINT
    "COPYRIGHT 1987": HTAB 8: PRINT "CO
    MPUTE! PUBLICATIONS, INC."
1D 30 HTAB 10: PRINT "ALL RIGHTS RESERVED.
    ": FOR I = 1 TO 1000: NEXT I
9F 40 ONERR GOTO 1170
AA 50 HIMEM: 7168
B7 60 SZ = 5: DD = 1: MC = 37632: DC = 37905:
    DE = 38072: FE = 37871: FC = 38162: UN
    = 38057: PD$ = "      ": REM 12
    SPACES
10 70 DATA 1,0,4,0,62,96,21,5,0,104,168,10
    4,166,223,154,72,152,72,96
C9 80 FOR I = 768 TO 786: READ J: POKE I,J
    : NEXT I: POKE 232,0: POKE 233,3
43 90 FOR I = 0 TO 7: POKE 816 + I,0: NEXT
    I: FOR I = 0 TO 7: POKE 824 + I,I:
    NEXT I
54 100 PRINT CHR$ (4);"BLOAD CLIPPER"
12 110 BL = 1: POKE EP + 11,0
2E 120 TEXT : HGR
B3 130 ROT= 0: SCALE= 1: JX = 140: JY = 86: S
    P = 24576: EP = 24576: CP = SP: XDRAW
    1 AT JX,JY
4A 140 CX = 1: CY = 23
C1 150 HOME : VTAB 21: PRINT "MAIN MENU:":
    PRINT "CLIP:": HTAB 2: PRINT "NEXT
    ": HTAB 9: PRINT "SHOW": HTAB 16:
    PRINT "REMOVE": HTAB 23: PRINT "N
    EW": HTAB 30: PRINT "FILE":
B4 160 VTAB 24: HTAB 2: PRINT "FIND": HTA
    B 9: PRINT "PIN": HTAB 16: PRINT "
    ADD": HTAB 23: PRINT "VIEW": HTAB
    30: PRINT "QUIT":
22 170 IF EP < > SP THEN GOSUB 1220: VTAB
    22: HTAB 6: PRINT CP$:
4D 180 POKE 49168,0
DC 190 HTAB CX: VTAB CY: PRINT "<": HTAB
    CX + 7: PRINT ">":
D7 200 IF PEEK (49152) < 128 THEN 200
B4 210 KY = PEEK (49152): POKE 49168,0
CB 220 IF KY < > 149 THEN 260
A1 230 IF VW THEN 190
C8 240 HTAB CX: VTAB CY: PRINT " ": HTAB
    CX + 7: PRINT " ": CX = CX + 7: IF
    CX > 30 THEN CX = 1: CY = CY + 1: IF
    CY = 25 THEN CY = 23
9E 250 GOTO 190
A9 260 IF KY < > 136 THEN 300
A9 270 IF VW THEN 190
10 280 HTAB CX: VTAB CY: PRINT " ": HTAB
    CX + 7: PRINT " ": CX = CX - 7: IF
    CX < 1 THEN CX = 29: CY = CY - 1: I
    F CY = 22 THEN CY = 24
A6 290 GOTO 190
91 300 IF KY = 141 THEN ON (CX - 1) / 7 +
    1 + 5 * (CY - 23) GOTO 340,370,390,
    430,690,450,470,490,520,540
3A 310 IF KY > 200 AND KY < 206 AND KY < >
    204 THEN GOSUB 560: GOTO 190
D2 320 IF KY > 176 AND KY < 186 THEN SZ =
    KY - 176: GOTO 190
A2 330 PRINT CHR$ (7): GOTO 190
59 340 IF SP = EP THEN 190
D7 350 CP = CP + PEEK (CP + 12) + PEEK (CP
    + 13) * 256: IF CP = EP THEN CP =
    SP
24 360 GOSUB 1220: VTAB 22: HTAB 6: PRINT
    CP$: GOTO 190
5F 370 IF SP = EP THEN 190
D7 380 CALL DC,0,0, PEEK (CP + 14), PEEK (
    CP + 15),CP: FOR I = 1 TO 1000: NEX
    T I: CALL UN,0,0, PEEK (CP + 14), P
    EEK (CP + 15): GOTO 190
C2 390 HOME : VTAB 21: PRINT "REMOVE ": CP$
    : INPUT A$: IF LEFT$ (A$,1) < > "Y"
    AND LEFT$ (A$,1) < > CHR$ ( ASC ( "
    Y") + 32) THEN 150
D6 400 CALL DE,CP,EP,EP: IF CP = EP THEN C
    P = SP
89 410 POKE EP + 11,0
96 420 GOTO 150
92 430 HOME : VTAB 21: INPUT "ARE YOU SURE
    ?": A$: IF LEFT$ (A$,1) = "Y" OR LEF
    T$ (A$,1) = CHR$ ( ASC ("Y") + 32)
    THEN EP = SP: CP = SP
9A 440 GOTO 150
8B 450 HOME : VTAB 21: INPUT "ENTER CLIP N
    AME:": A$: A$ = A$ + PD$: TP = CP: CAL
    L FC,A$,CP: IF CP = EP THEN CP = TP
9E 460 GOTO 150
24 470 IF PN THEN GOSUB 660: JX = HX: JY = H
    Y: GOSUB 680: PN = 0: GOTO 190
B5 480 PN = 1: HX = JX: HY = JY: GOTO 190
8A 490 IF NOT PN THEN GOTO 190
8F 500 IF EP + (JX - HX) / 4 * (JY - HY) +
    16 > MC THEN HOME : VTAB 21: PRINT
    "NO ROOM": INPUT "PRESS RETURN": A$
    : GOTO 150
F4 510 HOME : VTAB 21: PRINT "CLIP NAME: ":
    INPUT " ": A$: A$ = A$ + PD$: CP = EP:
    GOSUB 660: CALL MC,EP,A$,HX / 2,HY
    ,JX / 2,JY,EP: GOSUB 660: POKE EP +
    11,0: GOTO 150
9C 520 IF NOT VW THEN VW = 1: POKE 49234,0
    : GOTO 190
4F 530 VW = 0: POKE 49235,0: GOTO 190
29 540 HOME : VTAB 21: INPUT "QUIT?": A$: I
    F LEFT$ (A$,1) = "Y" OR LEFT$ (A$,1
    ) = CHR$ ( ASC ("Y") + 32) THEN HOM
    E : TEXT : END

```

```

90 550 GOTO 150
17 560 XDRAW 1 AT JX,JY: IF NOT PN THEN 59
0
99 570 IF JX < > HX THEN XDRAW 1 AT HX,JY
28 580 IF JY < > HY THEN XDRAW 1 AT JX,HY:
IF JX < > HX THEN XDRAW 1 AT HX,HY
70 590 IF KY = 201 THEN JY = JY - SZ: IF J
Y < 0 THEN JY = 0: GOTO 630
0E 600 IF KY = 205 THEN JY = JY + SZ: IF J
Y > 191 THEN JY = 191: GOTO 630
58 610 IF KY = 202 THEN JX = JX - SZ: IF J
X < 0 THEN JX = 0: GOTO 630
E5 620 IF KY = 203 THEN JX = JX + SZ: IF J
X > 279 THEN JX = 279
CC 630 IF NOT PN THEN 680
A7 640 IF JX < HX THEN JX = HX
78 650 IF JY < HY THEN JY = HY
98 660 IF JX < > HX THEN XDRAW 1 AT HX,JY
2A 670 IF JY < > HY THEN XDRAW 1 AT JX,HY:
IF JX < > HX THEN XDRAW 1 AT HX,HY
DF 680 XDRAW 1 AT JX,JY: RETURN
59 690 CX = 1:CY = 23
16 700 HOME : VTAB 21: PRINT "FILE MENU:";
: VTAB 23: HTAB 2: PRINT "LOAD";: H
TAB 10: PRINT "SAVE";: HTAB 18: PRI
NT "MERGE";: HTAB 26: PRINT "DELETE
";
A2 710 VTAB 24: HTAB 2: PRINT "DRIVE";: HT
AB 10: PRINT "CATALOG";: HTAB 18: P
RINT "PICTURE";: HTAB 26: PRINT "MA
IN";
47 720 POKE 49168,0
DA 730 HTAB CX: VTAB CY: PRINT "<";: HTAB
CX + 8: PRINT ">";
F1 740 IF PEEK (49152) < 128 THEN 740
C1 750 KY = PEEK (49152): POKE 49168,0
E0 760 IF KY < > 149 THEN 790
E3 770 HTAB CX: VTAB CY: PRINT " ";: HTAB
CX + 8: PRINT " ";:CX = CX + 8: IF
CX > 25 THEN CX = 1:CY = CY + 1: IF
CY = 25 THEN CY = 23
A6 780 GOTO 730
BD 790 IF KY < > 136 THEN 820
F7 800 HTAB CX: VTAB CY: PRINT " ";: HTAB
CX + 8: PRINT " ";:CX = CX - 8: IF
CX < 1 THEN CX = 25:CY = CY - 1: I
F CY < 23 THEN CY = 24
99 810 GOTO 730
23 820 IF KY = 141 THEN ON (CX - 1) / 8 +
1 + 4 * (CY - 23) GOTO 1000,910,107
0,1130,980,950,840,140
E6 830 PRINT CHR$ (7);: GOTO 730
B4 840 HOME : VTAB 21: PRINT "ENTER FILE N
AME-- '?' FOR CATALOG": PRINT "<RET
> TO CANCEL:": INPUT "";A$
90 850 IF A$ = "" THEN 700
9C 860 IF A$ = "?" OR A$ = "/" THEN 950
49 870 HOME : VTAB 22: INPUT "ERASES CURRE
NT PICTURE. CONTINUE?";B$: IF LEFT$
(B$,1) < > "Y" AND LEFT$ (B$,1) <
> CHR$ ( ASC ("Y")) + 32) THEN 700
C1 880 PRINT CHR$ (4);"BLOAD";A$;"",A$2000,
D";DD
5C 890 GOSUB 630
95 900 GOTO 700
AF 910 HOME : VTAB 21: PRINT "ENTER FILE N
AME-- '?' FOR CATALOG": PRINT "<RET
> TO CANCEL:": INPUT "";A$
0B 920 IF A$ = "" THEN 700
97 930 IF A$ = "?" OR A$ = "/" THEN 950
C6 940 PRINT CHR$ (4);"BSAVECLIP.";A$;"",A$
6000,L";EP + 1 - SP;"",D";DD: GOTO 7
00
FB 950 HOME : TEXT : PRINT : IF PEEK (4889
6) = 76 THEN PRINT CHR$ (4);"CAT,D"
;DD: GOTO 970
00 960 PRINT CHR$ (4);"CATALOG,D";DD
90 970 INPUT "PRESS RETURN TO CONTINUE";A$
: POKE 49232,0: GOTO 700
FE 980 HOME : VTAB 22: INPUT "ENTER DRIVE
NUMBER:";A$:DD = VAL (A$): IF DD <
1 OR DD > 2 THEN PRINT CHR$ (7): GO
TO 980
A7 990 GOTO 700
FA 1000 HOME : VTAB 21: PRINT "ENTER FILE
NAME-- '?' FOR CATALOG": PRINT "<R
ET> TO CANCEL:": INPUT "";A$
02 1010 IF A$ = "" THEN 700
CA 1020 IF A$ = "?" OR A$ = "/" THEN 950
A0 1030 HOME : VTAB 22: INPUT "REPLACES CU
RRENT CLIP LIBRARY. CONTINUE?";B$:
IF LEFT$ (B$,1) < > "Y" AND LEFT$
(B$,1) < > CHR$ ( ASC ("Y")) + 32)
THEN 700
71 1040 PRINT CHR$ (4);"BLOADCLIP.";A$;"",A
$6000,D";DD:CP = SP: CALL FE,EP
CC 1050 POKE EP + 11,0
E2 1060 GOTO 700
35 1070 HOME : VTAB 21: PRINT "ENTER FILE
TO BE MERGED-- '?' FOR": PRINT "CA
TALOG <RET> TO CANCEL:": INPUT ""
;A$
CE 1080 IF A$ = "" THEN 700
E6 1090 IF A$ = "?" OR A$ = "/" THEN 950
F7 1100 PRINT CHR$ (4);"BSAVETEMP,A$6000,L
";EP + 1 - SP;"",D";DD:TP = EP: PRI
NT CHR$ (4);"BLOADCLIP.";A$;"",A$60
00,D";DD: CALL FE,EP
D7 1110 IF TP + EP - 2 * SP > 13044 THEN P
RINT "NO ROOM.": INPUT "PRESS RETU
RN:";A$: PRINT CHR$ (4);"BLOAD TEM
P,D";DD:EP = TP: POKE EP + 11,0: G
OTO 700
DD 1120 PRINT CHR$ (4);"BLOADTEMP,A";EP;"",
D";DD: CALL FE,EP:CP = SP: POKE EP
+ 11,0: GOTO 700
CC 1130 HOME : VTAB 21: PRINT "ENTER FILE
TO BE DELETED-- '?' FOR": PRINT "C
ATALOG <RET> TO CANCEL:": INPUT "
";A$
C0 1140 IF A$ = "" THEN 700
D8 1150 IF A$ = "?" OR A$ = "/" THEN 950
CF 1160 PRINT CHR$ (4);"DELETE";A$;"",D";DD
: GOTO 700
31 1170 IF NOT BL THEN PRINT "NO CLIPPER.
INSERT DISK AND <RET>. <SPC>TO END
.": GET A$: IF A$ = " " THEN END
14 1180 IF NOT BL THEN PRINT A$: CALL 777:
RESUME
E5 1190 IF PEEK (222) = 0 OR PEEK (222) >
15 THEN PRINT "ERROR #"; PEEK (222
);" IN LINE "; PEEK (218) + PEEK (
219) * 256: END
CF 1200 PRINT "DISK ERROR": INPUT "PRESS R
ETURN";A$
8C 1210 CALL 777: GOTO 700
00 1220 CP$ = "": FOR I = 0 TO 11:CP$ = CP
$ + CHR$ ( PEEK (CP + I)): NEXT I:
RETURN

```

Program 2: Clip Plotter

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```

A3 10 REM COPYRIGHT 1987 COMPUTE! PUBLICAT
IONS, INC. ALL RIGHTS RESERVED
47 20 TEXT : HOME : VTAB 8: HTAB 14: PRINT
"COPYRIGHT 1987": HTAB 8: PRINT "CO
MPUTE! PUBLICATIONS, INC."

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10 30 HTAB 10: PRINT "ALL RIGHTS RESERVED.
   ": FOR I = 1 TO 1000: NEXT I
0F 40 ONERR GOTO 1220
AA 50 HIMEM: 7168
57 60 PRINT CHR$(4); "BLOOD CLIPPER"
14 70 DIM CL$(7)
FA 80 DATA "BK1", "GRN", "VIO", "WT1", "BK2", "
   RED", "BLU", "WT2"
FA 90 FOR I = 0 TO 7: READ CL$(I): NEXT I
15 100 SZ = 5: DD = 1: MC = 37632: DC = 37905
   : DE = 38072: FE = 37871: FC = 38162: U
   N = 38057: PD$ = " " " : REM
   12 SPACES
05 110 DATA 1, 0, 4, 0, 62, 96, 21, 5, 0, 104, 168, 1
   04, 166, 223, 154, 72, 152, 72, 96
39 120 FOR I = 768 TO 786: READ J: POKE I,
   J: NEXT I: POKE 232, 0: POKE 233, 3
20 130 FOR I = 0 TO 7: POKE 816 + I, 0: NEX
   T I: FOR I = 0 TO 7: POKE 824 + I, I
   : NEXT I
E4 140 BL = 1
34 150 TEXT = HGR
82 160 ROT = 0: SCALE = 1: JX = 140: JY = 86: H
   X = JX: HY = JY: SP = 24576: EP = 2457
   6: CP = SP: XDRAW 1 AT JX, JY
50 170 CX = 1: CY = 23
80 180 HOME : VTAB 21: PRINT "MAIN MENU: "
   PRINT "CLIP:": HTAB 2: PRINT "NEXT
   " : HTAB 9: PRINT "CHANGE": HTAB 1
   6: PRINT "DRAW": HTAB 23: PRINT "V
   IEW": HTAB 30: PRINT "FILE":
14 190 VTAB 24: HTAB 2: PRINT "FIND": HTA
   B 9: PRINT "IGNORE": HTAB 16: PRIN
   T "UNDO": HTAB 23: PRINT "CLEAR":
   HTAB 30: PRINT "QUIT":
56 200 IF EP < > SP THEN GOSUB 1270: VTAB
   22: HTAB 6: PRINT CP$:
40 210 POKE 49168, 0
0F 220 HTAB CX: VTAB CY: PRINT "<": HTAB
   CX + 7: PRINT ">":
E3 230 IF PEEK (49152) < 128 THEN 230
8A 240 KY = PEEK (49152): POKE 49168, 0
04 250 IF KY < > 149 THEN 290
3F 260 IF VW THEN 220
06 270 HTAB CX: VTAB CY: PRINT " " : HTAB
   CX + 7: PRINT " " : CX = CX + 7: IF
   CX > 30 THEN CX = 1: CY = CY + 1: IF
   CY = 25 THEN CY = 23
1E 280 GOTO 220
85 290 IF KY < > 136 THEN 330
34 300 IF VW THEN 220
03 310 HTAB CX: VTAB CY: PRINT " " : HTAB
   CX + 7: PRINT " " : CX = CX - 7: IF
   CX < 1 THEN CX = 29: CY = CY - 1: I
   F CY = 22 THEN CY = 24
13 320 GOTO 220
70 330 IF KY = 141 THEN ON (CX - 1) / 7 +
   1 + 5 * (CY - 23) GOTO 370, 400, 510,
   530, 900, 550, 580, 700, 720, 740
8A 340 IF KY > 200 AND KY < 206 AND KY < >
   204 THEN GOSUB 760: GOTO 220
95 350 IF KY > 176 AND KY < 186 THEN SZ =
   KY - 176: GOTO 220
07 360 PRINT CHR$(7): GOTO 220
10 370 IF SP = EP THEN 220
00 380 CP = CP + PEEK (CP + 12) + PEEK (CP
   + 13) * 256: IF CP = EP THEN CP =
   SP
A9 390 GOSUB 870: JX = HX + PEEK (CP + 14)
   * 2: JY = HY + PEEK (CP + 15): GOSUB
   830: GOTO 200
86 400 HOME : VTAB 21: PRINT "CHANGE: ( <E
   SC> MAIN MENU)": FOR I = 0 TO 7: PR
   INT " " : CL$(I): NEXT I
97 410 IX = 1: FOR I = 0 TO 7: VTAB 23: HT
   AB 2 + I * 4: PRINT CL$( PEEK (824
   + I)): VTAB 22: HTAB 2 + I * 4: PR
   INT CL$(I): NEXT I
54 420 VTAB 23: HTAB IX: PRINT "<": HTAB
   IX + 4: PRINT ">":
E7 430 IF PEEK (49152) < 128 THEN 430
8C 440 KY = PEEK (49152): POKE 49168, 0
F2 450 IF KY = 155 THEN 180
0F 460 IF KY = 149 THEN HTAB IX: PRINT " "
   : HTAB IX + 4: PRINT " " : IX = IX
   + 4: IF IX > 29 THEN IX = 1
1A 470 IF KY = 136 THEN HTAB IX: PRINT " "
   : HTAB IX + 4: PRINT " " : IX = IX
   - 4: IF IX < 1 THEN IX = 29
90 480 IF KY < > 141 THEN 420
68 490 I = PEEK (824 + (IX - 1) / 4): I = I
   + 1: IF I = 8 THEN I = 0
AD 500 POKE 824 + (IX - 1) / 4, I: HTAB IX
   + 1: PRINT CL$(I): GOTO 420
5E 510 IF EP = SP THEN 220
87 520 GOSUB 870: CALL DC, HX / 2, HY, JX / 2
   , JY, CP: GOSUB 870: X1 = HX: Y1 = HY: P
   1 = CP: GOTO 220
36 530 IF NOT VW THEN VW = 1: POKE 49234, 0
   : GOTO 220
44 540 VW = 0: POKE 49235, 0: GOTO 220
66 550 IF EP = SP THEN 220
30 560 HOME : VTAB 21: INPUT "CLIP NAME:":
   A$: A$ = A$ + PD$: TP = CP: CALL FC, A
   $, CP: IF CP = EP THEN CP = TP
2F 570 GOSUB 870: JX = HX + PEEK (CP + 14)
   * 2: JY = HY + PEEK (CP + 15): GOSUB
   830: GOTO 180
85 580 HOME : VTAB 21: PRINT "IGNORE: ( <E
   SC> MAIN MENU)": FOR I = 0 TO 7: PR
   INT " " : CL$(I): NEXT I
27 590 IX = 1: VTAB 23: FOR I = 0 TO 7: IF
   PEEK (816 + I) > 127 THEN HTAB 2 +
   I * 4: PRINT "YES":
E2 600 NEXT I
AA 610 VTAB 22: HTAB IX: PRINT "<": HTAB
   IX + 4: PRINT ">":
E7 620 IF PEEK (49152) < 128 THEN 620
8C 630 KY = PEEK (49152): POKE 49168, 0
F2 640 IF KY = 155 THEN 180
0F 650 IF KY = 149 THEN HTAB IX: PRINT " "
   : HTAB IX + 4: PRINT " " : IX = IX
   + 4: IF IX > 29 THEN IX = 1
1A 660 IF KY = 136 THEN HTAB IX: PRINT " "
   : HTAB IX + 4: PRINT " " : IX = IX
   - 4: IF IX < 1 THEN IX = 29
90 670 IF KY < > 141 THEN 610
F0 680 IF PEEK (816 + (IX - 1) / 4) = 0 TH
   EN POKE 816 + (IX - 1) / 4, 128: VTA
   B 23: HTAB IX + 1: PRINT "YES": VT
   AB 22: GOTO 610
85 690 POKE 816 + (IX - 1) / 4, 0: VTAB 23:
   HTAB IX + 1: PRINT " " : VTAB 22
   : GOTO 610
82 700 IF X1 = HX AND Y1 = HY AND P1 = CP
   THEN GOSUB 870: CALL UN, HX / 2, HY, J
   X / 2, JY: GOSUB 870
15 710 GOTO 220
6F 720 HOME : VTAB 21: INPUT "SURE?": A$: I
   F LEFT$ (A$, 1) = "Y" OR LEFT$ (A$, 1
   ) = CHR$( ASC ("Y") + 32) THEN HGR
   : GOSUB 870
9E 730 GOTO 180
28 740 HOME : VTAB 21: INPUT "QUIT?": A$: I
   F LEFT$ (A$, 1) = "Y" OR LEFT$ (A$, 1
   ) = CHR$( ASC ("Y") + 32) THEN HOM
   E : TEXT = END
A2 750 GOTO 180
53 760 XDRAW 1 AT JX, JY
98 770 IF JX < > HX THEN XDRAW 1 AT HX, JY

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20 780 IF JY < > HY THEN XDRAW 1 AT JX,HY:
    IF JX < > HX THEN XDRAW 1 AT HX,HY
7F 790 IF KY = 201 THEN JY = JY - SZ:HY =
    HY - SZ
1E 800 IF KY = 205 THEN JY = JY + SZ:HY =
    HY + SZ
59 810 IF KY = 202 THEN JX = JX - SZ:HX =
    HX - SZ
FE 820 IF KY = 203 THEN JX = JX + SZ:HX =
    HX + SZ
81 830 IF HY < 0 THEN JY = JY - HY:HY = 0
95 840 IF JY > 191 THEN HY = HY - JY + 191
    :JY = 191
72 850 IF HX < 0 THEN JX = JX - HX:HX = 0
88 860 IF JX > 279 THEN HX = HX - JX + 279
    :JX = 279
9C 870 IF JX < > HX THEN XDRAW 1 AT HX,JY
2E 880 IF JY < > HY THEN XDRAW 1 AT JX,HY:
    IF JX < > HX THEN XDRAW 1 AT HX,HY
E3 890 XDRAW 1 AT JX,JY: RETURN
4A 900 CX = 1:CY = 23
A6 910 HOME : VTAB 21: PRINT "FILE MENU:";
    : VTAB 23: HTAB 2: PRINT "LOAD";: H
    TAB 10: PRINT "SAVE";: HTAB 18: PRI
    NT "CLIPS";
FE 920 VTAB 24: HTAB 2: PRINT "DRIVE";: HT
    AB 10: PRINT "CATALOG";: HTAB 18: P
    RINT "MAIN";
4B 930 POKE 49168,0
DE 940 HTAB CX: VTAB CY: PRINT "<";: HTAB
    CX + 8: PRINT ">";
F9 950 IF PEEK (49152) < 128 THEN 950
C5 960 KY = PEEK (49152): POKE 49168,0
52 970 IF KY < > 149 THEN 1000
ED 980 HTAB CX: VTAB CY: PRINT " ";: HTAB
    CX + 8: PRINT " ";:CX = CX + 8: IF
    CX > 17 THEN CX = 1:CY = CY + 1: IF
    CY = 25 THEN CY = 23
AC 990 GOTO 940
08 1000 IF KY < > 136 THEN 1030
C6 1010 HTAB CX: VTAB CY: PRINT " ";: HTAB
    CX + 8: PRINT " ";:CX = CX - 8: I
    F CX < 1 THEN CX = 17:CY = CY - 1:
    IF CY = 22 THEN CY = 24
DC 1020 GOTO 940
25 1030 IF KY = 141 THEN ON (CX - 1) / 8 +
    1 + 3 * (CY - 23) GOTO 1050,1100,
    1170,1150,1120,170
74 1040 PRINT CHR$ (7);: GOTO 940
87 1050 GOSUB 1280
0F 1060 HOME : VTAB 22: PRINT "ERASES CURR
    ENT PICTURE.": INPUT "CONTINUE?";B
    $: IF LEFT$ (B$,1) < > "Y" AND LEF
    T$ (B$,1) < > CHR$ ( ASC ("Y") + 3
    2) THEN 910
21 1070 PRINT CHR$ (4);"BLOAD";A$;","A$2000
    ,D";DD
6A 1080 GOSUB 870
F2 1090 GOTO 910
75 1100 GOSUB 1280
E2 1110 GOSUB 870: PRINT CHR$ (4);"BSAVE";
    A$;","A$2000,L$1FFF,D";DD: GOSUB 87
    0: GOTO 910
A5 1120 HOME : TEXT : PRINT : IF PEEK (488
    96) = 76 THEN PRINT CHR$ (4);"CAT,
    D";DD: GOTO 1140
AF 1130 PRINT CHR$ (4);"CATALOG,D";DD
66 1140 INPUT "<RET> TO CONTINUE";A$: POKE
    - 16304,0: GOTO 910
17 1150 HOME : VTAB 22: INPUT "ENTER DRIVE
    NUMBER:";A$:DD = VAL (A$): IF DD
    < 1 OR DD > 2 THEN PRINT CHR$ (7):
    GOTO 1150
E8 1160 GOTO 910
91 1170 GOSUB 1280

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C4 1180 HOME : VTAB 22: INPUT "REPLACES CU
    RRENT CLIP LIBRARY. CONTINUE?";B$:
    IF LEFT$ (B$,1) < > "Y" AND LEFT$
    (B$,1) < > CHR$ ( ASC ("Y") + 32)
    THEN 910
08 1190 PRINT CHR$ (4);"BLOADCLIP.":A$;","A
    $6000,D";DD:CP = SP: CALL FE,EP: G
    OSUB 870:JX = HX + PEEK (CP + 14)
    * 2:JY = HY + PEEK (CP + 15): GOSU
    B 830
8C 1200 POKE EP + 11,0
06 1210 GOTO 910
71 1220 IF NOT BL THEN PRINT "NO CLIPPER--
    INSERT DISK & PRESS <RET>. <SPC>
    TO QUIT." GET A$: IF A$ = " " THEN
    END
02 1230 IF NOT BL THEN PRINT A$: CALL 777:
    RESUME
03 1240 IF PEEK (222) = 0 OR PEEK (222) >
    15 THEN PRINT "ERROR #"; PEEK (222
    );" IN LINE "; PEEK (218) + PEEK (
    219) * 256: END
DD 1250 PRINT "DISK ERROR": INPUT "<RET> T
    O CONTINUE";A$
04 1260 CALL 777: GOTO 910
E4 1270 CP$ = "": FOR I = 0 TO 11:CP$ = CP
    $ + CHR$ ( PEEK (CP + I)): NEXT I:
    RETURN
61 1280 HOME : VTAB 21: PRINT "ENTER FILE
    NAME-- '?' FOR CATALOG.": INPUT "
    ";A$
67 1290 IF A$ = "" THEN POP : GOTO 910
63 1300 IF A$ = "?" OR A$ = "/" THEN POP :
    GOTO 1120
08 1310 RETURN

```

Program 3: CLIPPER

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

```

9300: 20 BE DE 20 7B DD 20 52 AA
9308: E7 A5 51 85 09 A5 50 85 14
9310: 08 20 BE DE 20 E3 DF A0 F9
9318: 01 B1 83 85 FE C8 B1 83 F6
9320: 85 FF A0 0B B1 FE 91 08 83
9328: 88 10 F9 20 4C E7 86 FD E5
9330: 86 CE 20 4C E7 86 FC 20 8A
9338: 4C E7 86 FB E0 4C E7 86 98
9340: FA A5 FB 38 E5 FD A0 0E C7
9348: 91 08 C8 A5 FA 38 E5 FC 2F
9350: 91 08 A5 09 85 FF A5 08 07
9358: 85 FE 18 69 10 85 08 90 D2
9360: 02 E6 09 A5 CE 0A AA A9 5B
9368: 00 2A A8 A5 FC 20 11 F4 09
9370: 20 61 95 A5 F9 0A 0A 0A 23
9378: A0 00 91 08 A5 CE C5 FB 92
9380: D0 08 E6 08 D0 2E E6 09 85
9388: D0 2A E6 CE A5 CE 0A 93
9390: A9 00 2A A8 A5 FC 20 11 CE
9398: F4 20 61 95 A0 00 A5 F9 12
93A0: 11 08 91 08 E6 08 D0 02 FF
93A8: E6 09 A5 CE C5 FB F0 04 2B
93B0: E6 CE D0 AF A5 FC C5 FA BB
93B8: F0 08 A5 FD 85 CE E6 FC 21
93C0: D0 A1 A0 0C A5 08 38 E5 31
93C8: FE 91 FE C8 A5 09 E5 FF 5D
93D0: 91 FE A9 00 A8 91 08 20 71
93D8: BE DE 20 E3 DF A5 09 A4 A5
93E0: 08 20 F2 E2 A4 84 A6 83 A8
93E8: 20 2B EB 20 B7 00 60 A9 92
93F0: 00 85 08 A9 60 85 09 A0 E0
93F8: 00 B1 08 F0 DA A0 0C B1 BF

```


9400: 08 18 65 08 AA C8 B1 08 44
 9408: 65 09 85 09 86 08 4C F7 4C
 9410: 93 20 93 95 20 BE DE 20 B0
 9418: 7B DD 20 52 E7 A5 50 18 2E
 9420: 69 10 85 06 A5 51 69 00 58
 9428: 85 07 A5 FC 85 CF A5 FD 0F
 9430: 85 CE A0 00 B1 06 85 F9 8E
 9438: 4A 4A 4A A8 B9 30 03 30 B1
 9440: 1A B9 38 03 AA A0 20 F0 F6 CA
 9448: A5 CE 0A AA A9 00 2A A8 2E
 9450: A5 CF 20 57 F4 20 8A F4 EB
 9458: 20 5A F4 E6 CE A5 FB C5 FF
 9460: CE B0 08 E6 06 D0 36 E6 53
 9468: 07 D0 32 A5 F9 29 07 A8 15
 9470: B9 30 03 30 1A B9 38 03 11
 9478: AA 20 F0 F6 A5 CE 0A AA B3
 9480: A9 00 2A A8 A5 CF 20 57 52
 9488: F4 20 8A F4 20 5A F4 E6 10
 9490: 06 D0 02 E6 07 E6 CE A5 B6
 9498: FB C5 CE B0 95 E6 CF A5 A3
 94A0: FA C5 CF B0 89 20 B7 00 F9
 94A8: 60 A9 40 85 E6 20 93 95 41
 94B0: A9 20 85 E6 20 B7 00 60 16
 94B8: 20 BE DE 20 7B DD 20 52 65
 94C0: E7 A5 50 85 FE 85 42 A5 E1
 94C8: 51 85 FF 85 43 A0 0C B1 BA
 94D0: FE 18 65 42 85 3C C8 B1 B0
 94D8: FE 65 43 85 3D 20 BE DE 62
 94E0: 20 7B DD 20 52 E7 A5 50 84
 94E8: 85 3E A5 51 85 3F A0 00 98
 94F0: 20 2C FE 20 BE DE 20 E3 AC

94F8: DF A4 42 88 C0 FF D0 02 B5
 9500: C6 43 A5 43 20 F2 E2 A4 7F
 9508: 84 A6 83 20 2B EB 20 B7 92
 9510: 00 60 20 BE DE 20 E3 DF 62
 9518: A0 01 B1 83 85 FE C8 B1 AD
 9520: 83 85 FF A9 00 85 06 A9 D4
 9528: 60 85 07 A0 08 B1 06 F0 EB
 9530: 07 D1 FE D0 18 88 10 F5 39
 9538: 20 BE DE 20 E3 DF A5 07 F1
 9540: A4 06 20 F2 E2 A4 84 A6 CB
 9548: 83 20 2B EB 60 A0 0C B1 B0
 9550: 06 18 65 06 AA C8 B1 06 73
 9558: 65 07 85 07 86 06 4C 2B 29
 9560: 95 A9 00 85 F9 B1 26 29 25
 9568: 7F 25 30 F0 04 A9 02 85 02
 9570: F9 B1 26 10 06 A9 04 05 AE
 9578: F9 85 F9 20 8A F4 B1 26 F4
 9580: 29 7F 25 30 F0 02 E6 F9 1F
 9588: B1 26 10 06 A9 04 05 F9 D9
 9590: 85 F9 60 20 4C E7 86 FD 18
 9598: 20 4C E7 86 FC 20 4C E7 35
 95A0: 86 FB 20 4C E7 86 FA A5 CB
 95A8: FC 85 CF A0 00 A5 FB 0A 50
 95B0: 90 02 A0 24 38 E9 07 C8 3B
 95B8: B0 FB 84 CE A5 FD 0A AA 9C
 95C0: A9 00 2A AB A5 CF 20 11 4E
 95C8: F4 B1 26 48 A5 27 49 60 E0
 95D0: 85 27 68 91 26 A5 27 49 0E
 95D8: 60 85 27 C4 CE C8 90 E9 6B
 95E0: 47 FA C5 CF E6 CF B0 D4 D0
 95E8: 60 45 39 33 30 39 33 39 F5

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Number Construction Kit

Daniel L. Stone

Original game design by Gerald W. Rightmer

You've got the tools, materials, and the final blueprint for this construction project. All you have to do is think hard and work fast. For children, it's an excellent math-skills game. For adults, it's a real brainteaser. Works on all Apple II-series computers in DOS 3.3 or ProDOS.

Your bid has been accepted for a new construction project—to build a three-digit number between 100 and 999. Fortunately, you have your "Number Construction Kit," which includes everything you need.

Your tools are the four basic arithmetic operators: +, -, *, and /. Your building materials are single-digit integers—three, four, or five of them, depending on the skill level you choose. And, as in all construction projects, there's a deadline. In this case, it's one, two, or three minutes.

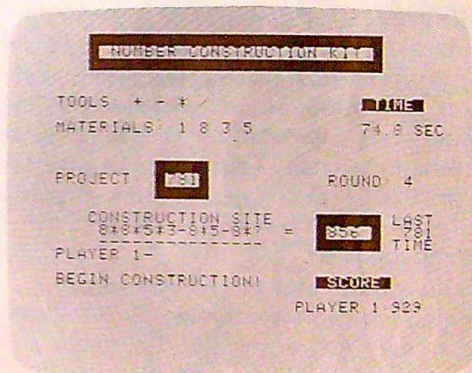
Putting The Kit Together

Number Construction Kit is written in BASIC and can be typed in using "Apple Automatic Proofreader," an error-checking utility published elsewhere in this issue.

Type in and save the game to disk, perhaps with a filename like *NUMBER*. If you're using an Apple IIGS, set the speed from the Control Panel to *Normal* before you begin the game. Number Construction Kit still works if the Control Panel is set to *Fast*, but your deadlines will come sooner than expected.

Now, type

```
RUN NUMBER
```



With just over 70 seconds left, this player has only one spot in the Construction Site open but is still 75 points from the goal.

press Return, and a simple title screen appears. Press any key, and you're in the Number Construction Kit.

If the game is to be used by young children, you may want the program to run automatically when you boot the disk. In this case, type this single-line program and save it as HELLO (DOS 3.3) or STARTUP (ProDOS) on the same disk as the Number Construction Kit program:

```
10 PRINT CHR$(4);"RUN NUMBER"
```

That's assuming, of course, you named the file as *NUMBER*. With this boot program, the child need only insert the disk in the drive and turn on the computer to start the game.

Use the up- and down-arrow keys (left-

and right-arrow keys on the Apple II+) or the appropriate number key to select the number of players. Press Return when the desired number is highlighted, then choose the skill level using either the arrow keys or the 1-3 keys.

The difference between levels is one of time and materials. The Beginner level gives you three minutes and five numbers to complete the project; the Intermediate level gives you two minutes and four numbers to work with; and the Advanced level offers only three numbers and a one-minute deadline. Scoring is based on your level, the time remaining when you finish a project, and how close you come to the project goal.

On The Clock

After selecting the number of players and the difficulty level, you're ready. Your project blueprint (the goal) and materials (the numbers you'll work with) are displayed, and you're asked to press any key to begin.

The timer begins counting down when you start the game. It's based on a counting loop which includes the game action. That means the clock runs fast if you just watch it. Normal play makes it tick off the seconds in close to realtime.

First, press a number key that matches one of the listed materials. Then, press one of the operators (tools). Don't press Return—in fact, press Return only when you've finished the construction project.

Build toward your project goal without hesitating. You can view the numbers and operators in the construction site. To change a previously entered number or operator, use the left- and right-arrow keys to move the question mark back and forth along the construction site. Once you've entered a number or operator, it can't be deleted, but you can replace it with one or the other numbers or operators. If you reach the goal before time runs out, press Return.

Each game consists of five rounds, each ending when you press Return or when time runs out. At game's end, you can play again if you like. Highlight your choice and press Return. You can change the number of players and the skill level as you start a new game. The previous project's goal will show as LAST TIME on the right. This gives you a chance to see how you did before you start the next round.

Staying In Bounds

Like any construction project, there are constraints. Notice that there are only fifteen work spaces at the CONSTRUCTION SITE. This means you can use a maximum of only eight numbers and seven operators to complete the

project. A running total is displayed to the right of the CONSTRUCTION SITE so you can watch your progress. The goal is always positive and over 100. No negative project totals are allowed; nor can you create numbers larger than 9,999.

The program randomly generates numbers for the project goal and the materials. Zero and duplicates are excluded. The only keys that work are the designated number keys (materials), the four operators (tools), the arrow keys, and Return.

Number Construction Kit is a challenge at any age, and it can be an entertaining way to reinforce basic arithmetic skills. Because of the game's immediate feedback, children can learn much by trial and error.

If you're just out to win the game, a few strategy tips may be helpful. The first step is to study the project number and materials *before* pressing a key to begin. For larger, more difficult numbers, it's usually easiest to get close to the project as fast as possible, and then fine tune your answer with the remaining spaces and time. Remember that the materials can be used as often as needed—you have an unlimited supply.

Number Construction Kit

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```

E5 10 REM COPYRIGHT 1987 COMPUTE! PUBLICATIONS, INC. - ALL RIGHTS RESERVED
BC 20 GOSUB 1560: REM INITIALIZE
D1 30 GOSUB 1410: REM TITLE SCREEN & DIRECTIONS OPTION
B9 40 GOSUB 1240: REM OPENING SCREEN
28 50 GOSUB 1120: REM NUMBER OF PLAYERS
33 60 GOSUB 1010: REM LEVEL OF DIFFICULTY
4C 70 R = RND ( - ( PEEK (7B) + PEEK (79) * 256)): REM RANDOMIZE
EE 80 GOSUB 760: REM ROUND START-UP
BB 90 REM --- ROUND LOOP ---
D3 100 VTAB 16: HTAB 29: PRINT W$: FOR I = 1 TO 8: B(I) = T(I): NEXT :L = G
E8 110 FOR I = 1 TO 7: B(I + 1) = (O(I) = 43) * B(I + 1) + 1: NEXT :M% = 0: I = 0: F = 0
B7 120 I = I + 1: IF (O(I) = 42 OR O(I) = 47) AND I < L / 2 THEN 180
26 130 H = M%: IF H + B(I) > 9999 THEN E$ = " TOTAL TOO LARGE - PLEASE CORRECT! ": F = 1: GOTO 190
D5 140 IF H + B(I) < 0 THEN E$ = " NEGATIVE TOTAL - PLEASE CORRECT! ": F = 1: GOTO 190
E1 150 M% = M% + B(I): IF I < L / 2 THEN 120
5F 160 VTAB 16: HTAB 29: PRINT M%
3B 170 N% = M%: GOTO 220
44 180 B(I + 1) = - (B(I) * B(I + 1)) * (O(I) = 42) - (B(I) / B(I + 1)) * (O(I) = 47): GOTO 120
4E 190 VTAB 21: INVERSE : PRINT E$: NORMAL : POKE B,160:N = N - (N < 15): G = G - (N = G AND G < 15): O = - O
28 200 IF N = G + 1 AND F = 1 THEN VTAB 16 : HTAB 29: PRINT N%

```

```

17 210 IF N = G + 1 AND F = 1 THEN F = 0:
    WAIT W,128
9B 220 IF F = 0 THEN VTAB 20: PRINT : FOR
    II = 1 TO X + 4: PRINT 0$;: NEXT
7A 230 B = SC + N:A = PEEK (B): POKE B,A:
    IF NOT ((N = 15) AND (O < 0)) THEN
    O = - O
8D 240 LE = LE - .1: IF LE < .1 THEN LE =
    0
09 250 LE$ = STR$ (LE): IF LE = 0 THEN LE$
    = "000"
25 260 IF LE = > 100 THEN LE$ = LEFT$ (LE$,
    5)
23 270 IF LE < 100 AND LE > 10 THEN LE$ =
    0$ + LEFT$ (LE$,4)
E5 280 IF LE < 10 THEN LE$ = 0$ + 0$ + LEF
    T$ (LE$,3)
A3 290 VTAB 8: HTAB X - 1: PRINT LE$
EC 300 IF LE = 0 THEN FOR I = 1 TO 10: PRI
    NT 0$;: NEXT : GOTO 390
BF 310 IF PEEK (W) < 128 THEN VTAB 16: HTA
    B N + 7: PRINT "?";: GOTO 240
4F 320 C = PEEK (W) - 128: POKE KB,0: IF C
    = 13 THEN 390
82 330 S = (N + 1) / 2: IF (C = 42 OR C =
    45 OR C = 43 OR C = 47) AND O > 0 A
    ND N < 16 THEN O(S) = C: GOTO 380
EB 340 CC = C - 48: IF (CC = M(1) OR CC =
    M(2) OR CC = M(3) OR CC = M(4) OR C
    C = M(5)) AND O < 0 AND N < 16 THEN
    T(S) = CC: GOTO 380
73 350 IF F = 1 OR NOT ((C = 21 AND (N < G
    + 1) AND N < 15) OR (C = 8 AND N >
    1)) AND NOT ((C = 10 AND (N < G +
    1) AND N < 15) OR (C = 11 AND N > 1
    )) THEN 240
48 360 IF (C = 21 AND (N < G + 1) AND N <
    15 AND N = > 1) OR (C = 10 AND (N <
    G + 1) AND N < 15 AND N = > 1) THE
    N POKE B,A:N = N + 1: GOTO 230
C2 370 IF (C = 8 AND N > 1 AND N < 16) OR
    (C = 11 AND N > 1 AND N < 16) THEN
    POKE B,A:N = N - 1: GOTO 230
74 380 POKE B,C + 128:G = G + (N > G):N =
    N + (N < 15): GOTO 100
B1 390 POKE B,A:E = (V - ABS (V - MX)) / V
    :U = Z * E
FE 400 TR = LE / LF:U = INT (U + (U * (4 -
    LF / 60) * TR * 5))
78 410 L(P) = L(P) + U: VTAB 21 + P: HTAB
    35: PRINT W$
18 420 VTAB 21 + P: HTAB 35: PRINT L(P);:D
    = D + INT (P / T):P = 1 + (T = 2 A
    ND P = 1): IF D < 6 THEN LE = LF /
    60: GOSUB 760: GOTO 100
3F 430 GOSUB 950: VTAB 20: HTAB 9: FLASH :
    PRINT " GOOD GAME! ": VTAB 18: HTA
    B 1: INVERSE : PRINT " USE ARROWS T
    O MOVE <RETURN> TO SELECT ": NORMA
    L : VTAB 22: HTAB 6: PRINT "PLAY AG
    AIN?":HT = 19
28 440 VTAB 22: HTAB HT: INVERSE : PRINT "
    Y";: NORMAL : PRINT "/N":P = 1
48 450 POKE KB,0: WAIT W,128:A = PEEK (W)
    - 128: IF A = 13 THEN 510
18 460 IF A = 27 THEN 520: REM --- ESC ---
F1 470 IF A = 89 OR A = 121 THEN 440
36 480 IF A < > 8 AND A < > 21 AND A < > 1
    10 AND A < > 78 AND A < > 10 AND A
    < > 11 THEN 450
66 490 IF P = 1 OR A = 110 OR A = 78 THEN
    P = 0: VTAB 22: HTAB HT: PRINT "Y/"
    ;: INVERSE : PRINT "N": NORMAL : GO
    TO 450
78 500 IF NOT P THEN POKE KB,0: GOTO 440
44 510 IF P THEN CLEAR : GOTO 20
68 520 REM ---- THAT'S ALL! ----
83 530 SPEED= 200
FD 540 FOR II = 23 TO 4 STEP - 1
9F 550 VTAB II: HTAB 1
7A 560 IF II / 2 < > INT (II / 2) THEN FOR
    I = 1 TO 40: PRINT 0$;: NEXT : GOT
    O 580
2F 570 FOR I = 40 TO 1 STEP - 1: VTAB II:
    HTAB I: PRINT 0$;: NEXT
C1 580 NEXT : TEXT : INVERSE
5C 590 FOR II = 4 TO 22 STEP 2: VTAB II: F
    OR I = 1 TO 28: PRINT 0$;: NEXT : N
    EXT
7E 600 VTAB 23: HTAB 3: PRINT W$W$;: HTAB
    15: PRINT W$W$W$;: HTAB 30: PRINT W
    $W$;
EF 610 SPEED= 220: NORMAL
59 620 NN = 9:M$ = "NUMBER CONSTRUCTION KI
    T": FOR II = 1 TO LEN (M$): FOR I =
    2 TO 22: VTAB 3: HTAB NN: PRINT 0$
    : IF NN = 15 OR NN = 28 THEN 640
2A 630 VTAB I: HTAB NN: PRINT 0$: HTAB NN:
    PRINT MID$ (M$,NN - 8,1)
86 640 NEXT
2A 650 NN = NN + 1
8A 660 NEXT
C8 670 SPEED= 255
3F 680 VT = 2:M$ = " G A M E O V E R ":
    FLASH
AD 690 N$ = M$: FOR I = 1 TO LEN (M$)
C6 700 VT = VT + 1
78 710 M$ = MID$ (N$,I,1)
D5 720 GOSUB 1510
85 730 NEXT
D2 740 NORMAL
99 750 END
72 760 REM ROUND START UP
6C 770 LE = LE * 60:LF = LE
25 780 VTAB 8: HTAB 30: PRINT W$W$
7F 790 VTAB 8: HTAB X: PRINT LE" SEC.":N
    = 1:G = 0: FOR I = 1 TO 5:M(I) = 0:
    NEXT
FA 800 REM GET MATERIALS
C3 810 R = INT ( RND (1) * 9) + 1: IF R =
    M(1) OR R = M(2) OR R = M(3) OR R =
    M(4) OR R = M(5) THEN 810
C4 820 FOR I = N TO 5:M(I) = R: NEXT : IF
    N < K THEN N = N + 1: GOTO 810
CA 830 VTAB 8: HTAB 15: PRINT W$W$" ";
55 840 N = 1:O = 1:G = 0:T(1) = 0: VTAB 8:
    HTAB 15: FOR I = 1 TO K
C1 850 PRINT M(I)0$;: NEXT : REM DISPLAY M
    ATERIALS
F2 860 V = INT ( RND (1) * 900) + 100: VTA
    B 12: HTAB 14: PRINT V: REM GET & D
    ISPLAY PROJECT
89 870 VTAB 12: HTAB 36: PRINT D: REM ROUN
    D #
A5 880 VTAB 18: HTAB 4: PRINT "PLAYER "P"-
    ": PRINT TAB ( 4)"PRESS ANY KEY TO"
E5 890 PRINT TAB ( 4)"BEGIN CONSTRUCTION!":
    WAIT W,128: POKE KB,0
38 900 VTAB 16: HTAB 8: PRINT W$W$W$W$;: H
    TAB 29: PRINT W$;: HTAB 36: PRINT V
89 910 VTAB 19: HTAB 1: CALL - 868
20 920 VTAB 20: PRINT TAB ( 4)"BEGIN CONSTR
    UCTION!"
IF 930 RETURN
E3 940 REM ERASE R19-23//C1-25
5F 950 FOR I = 19 TO 23
3F 960 HTAB 1
A5 970 FOR II = 1 TO 25
6C 980 VTAB I: PRINT TAB ( II)0$;: NEXT : N
    EXT

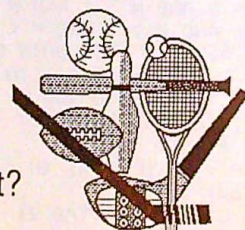
```

```

2B 990 RETURN
AA 1000 REM LEVEL OF DIFFICULTY
BE 1010 VTAB 19: HTAB 1: PRINT "1=BEGINNER
2=INTERMEDIATE 3=ADVANCED"
89 1020 VTAB 21: HTAB 2: PRINT "LEVEL OF P
LAY?":HT = 19
7D 1030 VTAB 21: HTAB HT: INVERSE : PRINT
"1";: NORMAL : PRINT "/2/3":D = 1
FC 1040 POKE KB,0: WAIT W,128:A = PEEK (W)
- 128: IF A = 13 THEN 1100
7B 1050 IF A = 21 OR A = 11 THEN HT = HT +
2:D = D + (HT = 21) + (HT = 23):
IF HT > 23 THEN HT = 19:D = 1: GOT
O 1090
C1 1060 IF A = 49 OR A = 50 OR A = 51 THEN
D = A - 48:HT = 19 + (D > 1) + (D
= > 2) + (D = 3) * 2: GOTO 1090
33 1070 IF A = 27 THEN 20
8B 1080 IF A = 8 OR A = 10 THEN HT = HT -
2:D = D - (HT = 19) - (HT = 21): I
F HT < 19 THEN HT = 23:D = 3
C7 1090 VTAB 21: HTAB 19: PRINT "1/2/3": V
TAB 21: HTAB HT: INVERSE : PRINT D
: NORMAL : GOTO 1040
84 1100 D$ = STR$(D): VTAB 18: HTAB 1: CA
LL - 868: VTAB 19: CALL - 868: GOS
UB 950:D = 1:L(1) = 0:L(2) = 0:LE
= 4 - VAL (D$):K = 5 - (D$ > "1")
- (D$ > "2"): POKE KB,0: RETURN
9B 1110 REM NUMBER OF PLAYERS
AF 1120 VTAB 18: HTAB 1: INVERSE : PRINT "
ARROWS TO MOVE <RETURN> SELECTS
": NORMAL :HT = 19
D3 1130 VTAB 20: HTAB 1: PRINT "NUMBER TO
PLAY?"
E5 1140 VTAB 20: HTAB HT: INVERSE : PRINT
"1";: NORMAL : PRINT "/2":T = 1
86 1150 POKE KB,0: WAIT W,128:A = PEEK (W)
- 128: IF A = 13 THEN 1210
58 1160 IF A = 27 THEN 20: REM ---ESC---
C3 1170 IF A < 8 OR A > 50 THEN 1150
95 1180 IF A = 49 THEN 1140
35 1190 IF T = 1 OR A = 50 THEN T = 2: VTA
B 20: HTAB HT: PRINT "1/";: INVERS
E : PRINT "2": NORMAL : GOTO 1150
AB 1200 IF T = 2 THEN POKE KB,0: GOTO 1140
82 1210 GOSUB 950: VTAB 22: HTAB 26: PRINT
"PLAYER 1:": IF T = 2 THEN VTAB 2
3: HTAB 26: PRINT "PLAYER 2:"
66 1220 POKE KB,0: RETURN
3B 1230 REM OPENING SCREEN
6C 1240 TEXT : HOME
D6 1250 VTAB 1: HTAB 7: INVERSE : FOR I =
1 TO 27: PRINT 0$;: NEXT
84 1260 VTAB 2: HTAB 7: PRINT 0$;: HTAB 33
: PRINT 0$
73 1270 VTAB 3: HTAB 7: FOR I = 1 TO 27: P
RINT 0$;: NEXT
AF 1280 NORMAL : VTAB 2: HTAB 9: PRINT "NU
MBER CONSTRUCTION KIT"
ED 1290 POKE 34,7
E8 1300 VTAB 6: HTAB 4: PRINT "TOOLS: + -
* /";: INVERSE : HTAB 32: PRINT "
TIME ": NORMAL
E4 1310 VTAB 8: HTAB 4: PRINT "MATERIALS:"
82 1320 VTAB 12: HTAB 4: PRINT "PROJECT: ";
: HTAB 29: PRINT "ROUND:"
78 1330 VTAB 11: HTAB 13: INVERSE : PRINT
W$0$: VTAB 12: HTAB 13: PRINT 0$;:
HTAB 17: PRINT 0$: VTAB 13: HTAB
13: PRINT W$0$: NORMAL
2D 1340 VTAB 15: HTAB 7: PRINT "CONSTRUCTI
ON SITE";: HTAB 35: PRINT "LAST"
98 1350 VTAB 17: FOR I = 8 TO 22: PRINT TA
B( I) "-";: NEXT : HTAB 35: PRINT "
TIME"
38 1360 VTAB 16: HTAB 25: PRINT "="
9A 1370 VTAB 15: HTAB 28: INVERSE : PRINT
W$0$0$: VTAB 16: HTAB 28: PRINT 0$
;: NORMAL : HTAB 33: INVERSE : PRI
NT 0$: VTAB 17: HTAB 28: PRINT W$0
$0$: NORMAL
52 1380 VTAB 20: HTAB 28: INVERSE : PRINT
" SCORE ": NORMAL
FB 1390 RETURN
58 1400 REM TITLE SCREEN & DIRECTIONS OPTI
ON
85 1410 TEXT : HOME : POKE 34,8
81 1420 VT = 4:M$ = "THE": GOSUB 1510
2B 1430 VT = 5:M$ = "NUMBER": GOSUB 1510
88 1440 VT = 6:M$ = "CONSTRUCTION": GOSUB
1510
35 1450 VT = 7:M$ = "KIT": GOSUB 1510
58 1460 VT = 12:M$ = "COPYRIGHT 1987 COMPU
TE! PUB., INC.": GOSUB 1510
85 1470 VT = 13:M$ = "ALL RIGHTS RESERVED"
: GOSUB 1510
71 1480 VT = 24:M$ = "PRESS ANY KEY": GOSU
B 1510
53 1490 POKE KB,0: WAIT W,128: RETURN
DB 1500 REM CENTERING ROUTINE
C3 1510 VTAB VT
2B 1520 HTAB 20 - LEN (M$) / 2
93 1530 PRINT M$;
EB 1540 RETURN
D6 1550 REM --- INITIALIZE ---
DB 1560 P = 1:X = 32:SC = 1966:W = - 16384
:KB = - 16368:0$ = CHR$ (32):W$ =
" "
28 1570 Z = 100:G$ = CHR$ (7)
FB 1580 RETURN

```

Who? Where?
What? When?



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Calendar Maker

William Coleman

Apple Version by Randy Thompson

Print custom calendars for any year from 1900 to 2050 with this surprisingly short, efficient program. Calendars can be printed on paper, to the screen, or saved to disk. For all Apple II computers, using either DOS 3.3 or ProDOS.

Create a calendar for each year from now until 2050. Or find out on which day of the week Christmas falls in the year 2000. Or locate the day of the week on which you were born.

You can do all this with "Calendar Maker" and your Apple II+, IIe, IIc, or IIGS computer. Calendar Maker prints out a nicely formatted 12-month calendar with a personalized message that you write.

Calendar Maker is a short program written entirely in BASIC. Type in Program 1 using "Apple Automatic Proofreader," the error-checking utility in this issue, and save it to disk as CALENDAR.MAKER. When you're ready to make a calendar, run the program by typing RUN CALENDAR.MAKER

Years

When you see the prompt WHAT YEAR WOULD YOU LIKE?, enter a number from 1900 to 2050. If you enter 0-99, Calendar Maker assumes you're asking for a year in the twentieth century and sticks on a prefix of 19 to your request. Typing 0, then, creates a calendar for the year 1900, not the year 2000.

The program next asks for a message to put at the top of the calendar. Type in a message (maximum is 254 characters), and Calendar Maker prints it over and over to form the numerals of the year. Press Return here if you'd rather have solid numerals printed with the asterisk (*).

This line then appears on the screen:
(S)creen, (P)rinter, or (D)isk?

If you choose S, the output will go to the screen. The display will be unreadable unless

you're in 80-column mode. You can enter 80-column mode (on your IIc, IIGS, or suitably equipped IIe) by pressing Escape-8, but you'll have to rerun Calendar Maker.

Press P to print the calendar to your printer. This is the option you'll be using most often. To center the calendar, move the paper about one-fourth inch down from the top of the page before printing.

```

TE'S      APPLICATIONS*C  DMFUTE'S APPLE  APPLICATIONS*CO
E'S A     APPLICATIONS*CO MFUTE'S APPLE A  APPLICATIONS*COM
'S AP     APPLICATIONS*COM PUTE'S APPLE AP  APPLICATIONS*COMPL
S APP     APPLICATIONS*COMPLICATIONS*COMPU
UTE'S APPL LICATIONS*COMPU LICATIONS*COMPU
TE'S APPLE ICATI    COMFU TE'S A     APPL ICATI    DMFUTE
E'S APPLE  CATIO    MFUTE  E'S A     APPLI CATIO    MFUTE
'S APPLE A ATION    FUTE'  S APP     PFLIC ATION    PUTE'
LE AP      TIONS*COMPUTE'S  APPLE APPLICATI IONS*COMPUTE'S
E APP      IONS*COMPUTE'S  APPLE APPLICATI IONS*COMPUTE'S A
APPL       DNS*COMPUTE'S A PPLE APPLICATIO NS*COMPUTE'S AP
APPLI      NS*COMPUTE'S AP PLE APPLICATIO S*COMPUTE'S APPL
PFLIC      S APP      LE AP      TIONS *COMP  APPL
PFLICA     APPL     E APP      IONS*  COMPU  APPL
LICAT      APPL     APPL     DNS+C  DMFUTE  PPLE
ICATI      PPLE     APPLI     NS*CO  MPUTE  FLE A
APPLICATIONS*CO MFUTE'S APPLE A PPLICATIONS*COM PUTE'S APPLE AP
PPLICATIONS*COM PUTE'S APPLE AP PPLICATIONS*COM PUTE'S APPLE APPL
PLICATIONS*COMPL UTE'S APPLE AP PPLICATIONS*COMPU TE'S APPLE APPL
PLICATIONS*COMPU TE'S APPLE APPL ICATIONS*COMPUT E'S APPLE APPLI
    
```

JANUARY							FEBRUARY							MARCH						
SU	TU	WE	TH	FR	SA		SU	TU	WE	TH	FR	SA		SU	TU	WE	TH	FR	SA	
				1	2			1	2	3	4	5	6			1	2	3	4	5
3	4	5	6	7	8	9	7	8	9	10	11	12	13	6	7	8	9	10	11	12
10	11	12	13	14	15	16	14	15	16	17	18	19	20	13	14	15	16	17	18	19
17	18	19	20	21	22	23	21	22	23	24	25	26	27	20	21	22	23	24	25	26
24	25	26	27	28	29	30	28	29						27	28	29	30	31		
31																				
APRIL							MAY							JUNE						
SU	TU	WE	TH	FR	SA		SU	TU	WE	TH	FR	SA		SU	TU	WE	TH	FR	SA	
				1	2			1	2	3	4	5	6			1	2	3	4	
3	4	5	6	7	8	9	8	9	10	11	12	13	14	5	6	7	8	9	10	11
10	11	12	13	14	15	16	15	16	17	18	19	20	21	12	13	14	15	16	17	18
17	18	19	20	21	22	23	22	23	24	25	26	27	28	19	20	21	22	23	24	25
24	25	26	27	28	29	30	29	30	31					26	27	28	29	30		
JULY							AUGUST							SEPTEMBER						
SU	TU	WE	TH	FR	SA		SU	TU	WE	TH	FR	SA		SU	TU	WE	TH	FR	SA	
				1	2			1	2	3	4	5	6			1	2	3	4	
3	4	5	6	7	8	9	7	8	9	10	11	12	13	4	5	6	7	8	9	10
10	11	12	13	14	15	16	14	15	16	17	18	19	20	11	12	13	14	15	16	17
17	18	19	20	21	22	23	21	22	23	24	25	26	27	18	19	20	21	22	23	24
24	25	26	27	28	29	30	28	29	30	31				25	26	27	28	29	30	
31																				
OCTOBER							NOVEMBER							DECEMBER						
SU	TU	WE	TH	FR	SA		SU	TU	WE	TH	FR	SA		SU	TU	WE	TH	FR	SA	
				1	2			1	2	3	4	5				1	2	3	4	
2	3	4	5	6	7	8	6	7	8	9	10	11	12	4	5	6	7	8	9	10
9	10	11	12	13	14	15	13	14	15	16	17	18	19	11	12	13	14	15	16	17
16	17	18	19	20	21	22	20	21	22	23	24	25	26	18	19	20	21	22	23	24
23	24	25	26	27	28	29	27	28	29	30				25	26	27	28	29	30	31
30	31																			

Note: Calendar Maker will not print properly through the Apple IIGS's printer port. You must have a serial card of some sort installed in slot 1 and the Control Panel set to Your card for that slot.

Calendars On A Disk

Choose D if you wish to save the calendar to disk. This is useful if you want to make several copies of the same calendar. Each calendar is saved to disk in text file format with the filename CALENDAR.YEAR, where YEAR is the number you entered earlier.

If you have a word processor that loads and prints standard text files (most do), you can use it to print the calendars saved to disk. If you don't have a word processor with this feature, type in and save Program 2, "Calendar Lister." It's a short text-file printing utility.

Run Calendar Lister and answer the prompt by entering the year of the calendar you want printed. If you type in a two-digit number, the Lister assumes you mean a year in the twentieth century and automatically precedes the number with a 19.

Turn on your printer and press Return. The calendar is quickly printed.

Program 1: Calendar Maker

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```

E5 10 REM COPYRIGHT 1987 COMPUTE! PUBLICATIONS, INC. - ALL RIGHTS RESERVED
D3 20 REM DRIVE#, SLOT# (FOR DRIVE), SLOT# (FOR PRINTER), SPACER
44 30 DR = 1:SL = 6:SP$ = "*"
63 40 SX$ = " " :S6$ = " "
29 50 POKE 768,169: POKE 770,41: POKE 772,133: POKE 773,16: POKE 774,96
F9 60 HOME : DIM M(12),Y$(4),Q$(6),H$(25),C$(6),M$(4)
94 70 FOR I = 1 TO 12: READ M(I): NEXT : READ D$:D$ = D$ + " " + D$ + " " + D$
1A 80 FOR I = 1 TO 4: READ A$,B$,C$:M$(I) = S6$ + A$ + LEFT$(SX$,15) + B$ + LEFT$(SX$,15) + C$: NEXT
59 90 Q$ = " ": FOR I = 1 TO 31:Q$ = Q$ + STR$(I) + LEFT$(SX$,1 + (I < 9)): NEXT : READ F$
67 100 REM --- PARSE YEAR ---
2D 110 HOME : PRINT " COPYRIGHT 1987 COMPUTE! PUB., INC."
5A 120 PRINT TAB(10)"ALL RIGHTS RESERVED"
67 130 PRINT : PRINT : PRINT TAB(13)"CALENDAR MAKER": PRINT TAB(13)"-----": PRINT : PRINT
A8 140 INPUT "WHAT YEAR WOULD YOU LIKE? "; Y$: IF LEN(Y$) = 2 THEN Y$ = "19" + Y$
BA 150 Y = VAL(Y$): IF Y < 1900 OR Y > 2050 THEN GOTO 110
A7 160 FOR J = 1 TO 4: FOR I = 0 TO 4:Y$(J) = Y$(J) + MID$(F$,I * 10 + VAL(MID$(Y$,J,1)) + 1,1)
CB 170 NEXT : NEXT
36 180 REM --- GET TEXT ---
81 190 PRINT : PRINT "ENTER TEXT (254 CHAR. MAX).": PRINT : PRINT ">> ";
CE 200 GET A$
86 210 IF A$ = CHR$(13) THEN GOTO 260
83 220 IF A$ = CHR$(8) AND N$ > "" THEN N$ = MID$(N$,1,LEN(N$) - 1): GOTO 240
E2 230 ON (A$ < " " OR A$ > CHR$(95) OR LEN(N$) = 254) GOTO 200:N$ = N$ + A$
24 240 PRINT A$;: GOTO 200
34 250 REM --- WHERE? ---
84 260 PRINT : PRINT "(S)CREEN, (P)RINTER, (D)ISK?"
AA 270 GET A$:OD = (A$ = "S") + 2 * (A$ = "P") + 3 * (A$ = "D")
94 280 ON OD GOTO 400,290,330: GOTO 270
EA 290 PRINT : PRINT "SET UP PRINTER AND HIT ANY KEY...": GET A$
C4 300 PRINT : PRINT "WORKING..."
81 310 PRINT : PRINT CHR$(4)"PR#1": PRINT CHR$(9)"80N"
14 320 GOTO 420
2F 330 PRINT : PRINT "WORKING...": ONERR GOTO 720
AD 340 PRINT CHR$(4)"OPEN CALENDAR."Y$,D"DR",S"SL
38 350 PRINT CHR$(4)"CLOSE CALENDAR."Y$
6B 360 PRINT CHR$(4)"DELETE CALENDAR."Y$
83 370 PRINT CHR$(4)"OPEN CALENDAR."Y$,D"DR",S"SL
4E 380 PRINT CHR$(4)"WRITE CALENDAR."Y$
95 390 POKE 216,0: GOTO 420
C5 400 PRINT : PRINT "WORKING..."
AC 410 REM --- PRINT HEADING ---
97 420 FOR I = 1 TO INT(255 / (LEN(N$) + 1)):AA$ = AA$ + N$ + SP$: NEXT
1F 430 FOR I = 1 TO 17 STEP 4:P = 0: FOR K = 1 TO 4:B = VAL(MID$(Y$(K),I / 4 + 1,1)): FOR L = 2 TO 0 STEP -1
5F 440 POKE 769,B: POKE 771,(2 ^ L): CALL 768: IF PEEK(16) = 0 THEN FOR J = I TO I + 3:H$(J) = H$(J) + CHR$(0) + " " + CHR$(0): NEXT : GOTO 460
74 450 FOR J = I TO I + 3:H$(J) = H$(J) + CHR$(0) + MID$(AA$,J + P * 5,5) + CHR$(0): NEXT
4A 460 P = P + 1: NEXT : NEXT : A$ = " " :L = 21: FOR I = 1 TO 20
63 470 N$ = LEFT$(H$(I),L) + A$ + MID$(H$(I),22,L) + A$ + MID$(H$(I),43,L) + A$ + RIGHT$(H$(I),L)
F6 480 PRINT " " :N$: NEXT : PRINT " " : PRINT " " :M = 1
3C 490 REM --- PRINT CALENDAR ---
41 500 Z = INT(365.25 * (Y - 1)) + INT(30.6 * (M + 13)) - 1
99 510 FOR I = 1 TO 10 STEP 3: FOR J = I TO I + 2:D = M(M) + (Y / 4 = INT(Y / 4)) * (M = 2)
5C 520 IF RIGHT$(Y$,2) = "00" THEN YC = VAL(LEFT$(Y$,2)):D = D - (YC / 4 < > INT(YC / 4)) * (M = 2)
17 530 Z = Z - INT(Z / 7) * 7:Q$(1) = MID$(MID$(SX$,1,3 * Z) + Q$,1,21):L = 7 - Z:K = 1:A = 0
8F 540 K = K + 1:B = A:A = (L + 7 + D - ABS(L + 7 - D)) / 2:Z = A - B
13 550 Q$(K) = LEFT$(MID$(Q$,3 * L + 1,3 * Z) + 9X$,21)
87 560 L = L + 7: ON (A < D) GOTO 540: IF K = 5 THEN Q$(6) = SX$
C9 570 FOR K = 1 TO 6:C$(K) = C$(K) + " "

```

+ Q\$(K):Q\$(K) = SX\$: NEXT :M = M + 1: NEXT

```

E1 580 PRINT S6*M$(J / 3): PRINT : PRINT S
    6*D$: FOR K = 1 TO 6
E2 590 PRINT "      "C$(K):C$(K) = "" : NEXT
    : PRINT : NEXT : FOR I = 1 TO 3: P
    RINT : NEXT
E3 600 ON OD GOTO 630,610,620
E4 610 PRINT : PRINT CHR$(4)"PR#0": GOTO
    630
E5 620 PRINT : PRINT CHR$(4)"CLOSE CALEND
    AR."Y$
E6 630 PRINT : PRINT "DONE...HIT ANY KEY T
    O CONTINUE"; GET A$
E7 640 PRINT : PRINT : PRINT "MAKE ANOTHER
    ? (Y/N)": GET A$: IF A$ = "Y" THEN
    RUN
E8 650 HOME : END
E9 660 REM --- DATA ---
E10 670 DATA 31,28,31,30,31,30,31,31,30,31,
    30,31
E11 680 DATA " SU MO TU WE TH FR SA "
E12 690 DATA " JANUARY", "FEBRUARY", " MAR
    CH", " APRIL ", " MAY ", " JUNE"
E13 700 DATA " JULY ", " AUGUST ", "SEPTEMB
    ER", " OCTOBER", "NOVEMBER", "DECEMBER
    "
E14 710 DATA "72775777775611544155527377717
    752411151517777177177"
E15 720 REM --- DISK ERROR ---
E16 730 PRINT : PRINT "*** DISK ERROR ***"
    CHR$(7)
E17 740 FOR I = 1 TO 1000: NEXT
E18 750 POKE 216,0
E19 760 RUN
  
```

Program 2: Calendar Lister

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```

E20 10 REM COPYRIGHT 1987 COMPUTE! PUBLICAT
    IONS, INC. ALL RIGHTS RESERVED.
E21 11 HOME : VTAB 8: HTAB 12: PRINT "COPYR
    IGH 1987": HTAB 6: PRINT "COMPUTE!
    PUBLICATIONS, INC.": HTAB 10: PRINT
    "ALL RIGHTS RESERVED."
E22 12 FOR I = 1 TO 1500: NEXT I
E23 20 HOME : INPUT "WHAT YEAR IS THE CALEN
    DAR FILE? ";Y$: IF LEN (Y$) = 2 THEN
    Y$ = "19" + Y$
E24 30 Y = VAL (Y$): IF Y < 1900 OR Y > 205
    0 THEN GOTO 20
E25 40 PRINT
E26 45 ONERR GOTO 160
E27 50 PRINT CHR$(4)"VERIFY CALENDAR."Y$
E28 55 PRINT CHR$(4)"PR#1": PRINT CHR$(9)
    "B0N"
E29 60 PRINT CHR$(4)"OPEN CALENDAR."Y$
E30 70 PRINT CHR$(4)"READ CALENDAR."Y$
E31 80 ONERR GOTO 120
E32 90 L$ = ""
E33 100 GET S$:L$ = L$ + S$: IF S$ < > CHR$(
    13) THEN 100
E34 110 PRINT L$;: GOTO 90
E35 120 PRINT
E36 130 PRINT CHR$(4)"PR#0"
E37 140 PRINT CHR$(4)"CLOSE CALENDAR."Y$
E38 150 PRINT "DONE. ": END
E39 160 HOME : PRINT "FILE DOES NOT EXIST.
    PRESS ANY KEY.": GET A$
E40 170 GOTO 20
  
```

aa

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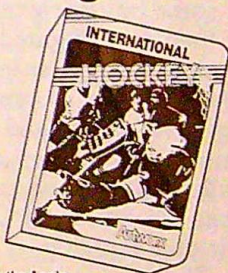
Company _____

Address _____

City, State, Zip _____

Phone _____

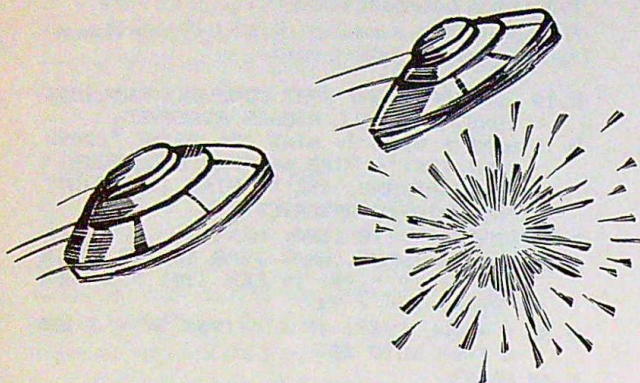
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Vulcan Mines

Brett A. Painter

A fast and challenging all-machine language game, "Vulcan Mines" features high-resolution graphics and exciting sound effects. It runs on all Apple II computers under either DOS 3.3 or ProDOS. Apple II and II+ computers require either a pair of paddles or a joystick. The joystick is optional on all other models.

The folks in accounting finally had to shut down the Special Projects Center. Sure, SPC did some brilliant work for TransGlobal Labs, but they never figured out what a budget or a schedule was. Their last masterpiece was the Vulcan security system, a networked array of Computer-Automated Manufacturing (CAM) stations. Each station can generate an almost limitless number of simple but effective mobile mines. Of course, SPC installed the prototype in their own building.

That's why a munitions expert like yourself is needed. Before leaving, a disgruntled engineer decommissioned the system's master computer with a lug wrench. Isolated from the rest of the network, each station has assumed the worst and is building mines as fast as it can. Before the legal department can move their offices into the building, someone has to neutralize the Vulcan system. That someone is you. So sit down at the control console of your robotic minesweeper. You've got some work to do.

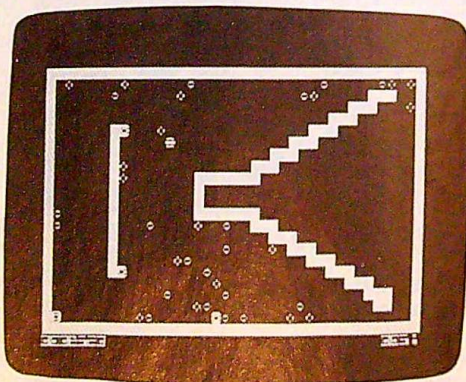
Typing In The Game

You'll need to type in several different files to get "Vulcan Mines" going. These include the master program and five files that define the predesigned game levels. Only the first listing is

really a machine language program—the rest are pure data, but they're all stored in the same type of file. You should use the "Apple MLX" machine language entry program, published elsewhere in this issue, to enter all of the files.

Start by typing in Program 1, the Vulcan Mines program. Load and run Apple MLX, then answer the starting and ending address prompts with:

```
STARTING ADDRESS? 4000  
ENDING ADDRESS? 495F
```



Your minesweeper is just left of center, near the top end of the leftmost wall. Mines surround you (one is to the sweeper's upper left) and four generators remain (the closest is to the left, against the wall).

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 to work on Vulcan Mines, type 4000, the first address in the listing.) Type in the data and save this file on the disk with the name *VULCAN*.

The Vulcan Mines program expects to find definitions for all the levels of the game on the disk. Programs 2-6, which define five game levels, must be typed in with Apple MLX and saved as separate files. For each file, give the corresponding starting and ending address from the following list. Then press E and type 5020 to enter data from the start of the listing. After you've typed in all the lines of a level file, be sure to save a copy. Put all the game level files on the same disk as the game file (Program 1). If you're using ProDOS, put all the files in the same subdirectory. Also, be sure to use the names shown below for the level files (LEV01, LEV02, and so on). If you don't, the game program won't be able to find its files. Continue until you've entered all five levels:

Program 2: LEV01

STARTING ADDRESS? 5020
ENDING ADDRESS? 50C7

Program 3: LEV02

STARTING ADDRESS? 5020
ENDING ADDRESS? 50D7

Program 4: LEV03

STARTING ADDRESS? 5020
ENDING ADDRESS? 50BF

Program 5: LEV04

STARTING ADDRESS? 5020
ENDING ADDRESS? 5117

Program 6: LEV05

STARTING ADDRESS? 5020
ENDING ADDRESS? 510F

Finally, you need to create a one-byte file containing the current total number of game levels. Make sure that the disk containing the other game files is still in the drive, then enter the following two lines at a BASIC] prompt, pressing Return after each line:

```
POKE 768,5  
BSAVE NUMLEV,A$300,L$1
```

Playing The Game

Type BRUN VULCAN to begin. The Caps Lock key should be down before you start playing. The computer will print the message, JOYSTICK OR KEYBOARD? Press J to use a joystick if you have one connected, or K to use the keyboard.

Note: If you're playing Vulcan Mines on an Apple IIGS, make sure the Control Panel's System Speed option has been set to Normal.

After a short pause to read the data for the first level from the disk, the first level begins. You'll see your score displayed at the lower left of the screen (initially 0000000) and your energy level (initially 0500) at the lower right. Your character on the screen will be invisible until you move. This gives you time to look at the board and establish a strategy. It also pro-

jects you from being hit before you've had a chance to react.

To move using the joystick, simply move the stick in the desired direction. From the keyboard, Vulcan Mines uses an inverted-T key arrangement, using the I, J, K, and L keys—I for up, J for left, K for down, and L for right. You may not move diagonally.

If you're playing a level for the first time, you probably won't know where you are on the screen before you move. You can find out by firing your laser a couple of times; the shots will appear on the screen, but you'll remain invisible. To shoot using the joystick, press joystick button 0, then move the stick in the direction you want to fire. From the keyboard, press Open Apple and the key for the desired direction. On Apple II's and II+'s, which don't have the Open Apple key, the paddle 0 button should be used instead.

You should shoot at the mines and their generators, both to disable them (once disabled, they're no longer shown onscreen) and to protect yourself. Refer to the screen photo—the small diamond-shaped objects are mines, the four-sided blocks represent generating stations, and the eight-pointed star shows the position of your minesweeper. There's no way to shoot diagonally or through walls, or to shoot anything that's right next to you—there has to be at least one empty space between you and whatever you're trying to shoot. This feature adds an extra challenge to the game, since you can get trapped in a swarm of mines if you're not alert.

Be careful not to run into mines. They can't shoot at you, but they will do some damage to your minesweeper if you run into them. Every time you touch a mine, your energy level drops by ten units. When you disable a mine or a generator, you can recover some energy from the scrap that's left. Each mine that you shoot adds one energy unit and scores 10 points; each generator adds five energy units and 500 points. If your energy level reaches zero, the game ends. Press Control-Reset if you want to stop playing or any other key to play again.

When you've deactivated all the mines and generators on a level, Vulcan Mines loads the next level from disk. After you've completed the highest level, the game continues by returning to the first screen, but with a higher difficulty factor.

Designing Extra Boards

Five different levels are included with Vulcan Mines, but the game may consist of as many boards as you want. Even better, you can de-

Start by entering the board editor listed as Program 7. You'll find it much easier if you use the "Apple Automatic Proofreader" program, found elsewhere in this issue, to help you check your typing. Save Program 7 on the same disk with the game and all the existing levels, giving it the filename *MAKE*. Check that the Caps Lock key is down and then type

RUN MAKE

The program clears the text screen and draws a border of asterisks (*). It also shows a cursor—a flashing plus sign—that you can move using the keyboard. Use the same keys you use to control the game from the keyboard. Here's a list of all the keys that the board-maker program recognizes:

Key	Action
I	Move up
J	Move left
K	Move down
L	Move right
X	Draw a wall
G	Draw a generator
Space	Erase a square
S	Set player's starting position
Return	Save the board to disk

Move the cursor around the screen and use the X and G keys to place walls and generators wherever you want. To erase a wall or generator that you don't want, press the space bar. Walls and generators appear in the same places on the editing screen as on the finished game screen, but the board-maker program uses text characters to represent them—asterisks for walls and uppercase Gs for generators. You should also press the S key once to set the player's starting position. (This won't be displayed on the screen.)

Make sure that the player can actually get to all the generators and can get a straight shot from more than one square away in at least one direction. Otherwise, that generator can never be destroyed and the round will never end. You should also remember that each level is limited to 32 generators at most.

When you're satisfied with the layout, press Return. The program will ask you for a randomness value, which sets the speed at which each generator in the level produces mines. Enter a value between 0 and 255. Higher numbers are faster speeds. Ten is a good value for beginners, while 255 is nearly impossible, since a new mine will appear each time you shoot one. Next, enter the number for this level. This number will become part of the filename for this level and will indicate the order of play for the different boards. (Use numbers greater than 5 unless you want to overwrite one of the

existing level files.) After a short period of processing, the program will write the data for the new level to the disk.

The NUMLEV file also gets updated when you create a new level. This binary file contains only one byte, indicating the number of levels on the disk. If the number you've assigned to the new level is greater than the old value in NUMLEV, the board editor will write the new number to NUMLEV. Otherwise, it will assume you're redefining an existing level and will leave NUMLEV alone. If you want to create a version of the game with fewer than five levels, you must create a new NUMLEVEL file. Follow the example given above, but replace the 5 in the POKE statement with the new total number of levels.

There can be as many as 99 levels, but there can't be any gaps in the sequence of level numbers; if you make a level 9, levels 1-8 have to exist as well. If there's a gap, the Vulcan Mines game will draw a semirandom (and usually impossible) board in its place.

Program 1: Vulcan Mines

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

```

4000: 20 76 48 20 2D 48 20 EC F0
4008: 47 20 B9 47 20 91 47 AD 63
4010: 50 C0 AD 52 C0 AD 57 C0 EF
4018: A0 7F A9 00 99 00 60 8B 14
4020: D0 FA A9 64 85 FE A9 50 0F
4028: 85 FF A9 00 85 FA 85 F9 BD
4030: 85 FD A9 08 85 FC A9 FF 1C
4038: 45 FD 85 FD A0 00 B1 FE D2
4040: F0 33 8D 61 49 A4 F9 A6 45
4048: FA BD C0 58 85 D0 BD 00 3E
4050: 58 85 CF A5 FD 91 CF E8 71
4058: E4 FC D0 ED C8 C0 28 D0 ED
4060: 0D E0 B8 F0 18 86 FA 8A 21
4068: 69 08 85 FC A0 00 CE 61 24
4070: 49 D0 D4 84 F9 E6 FE D0 E6
4078: BD E6 FF D0 B9 BD C0 58 3D
4080: 85 D0 BD 00 58 85 CF A0 C8
4088: 27 A9 00 91 CF 88 10 FB DC
4090: E8 E0 C0 D0 E8 AD 22 50 75
4098: 85 00 AD 23 50 85 01 AD 0C
40A0: 20 50 8D 73 49 8D 24 50 47
40A8: A9 00 8D 74 49 AD 21 50 8A
40B0: 18 6D 77 49 90 02 A9 FF FB
40B8: 8D 00 60 20 EE 45 20 56 31
40C0: 46 AE 24 50 86 06 BD 44 A5
40C8: 50 BC 24 50 B4 FD A0 00 87
40D0: 84 FE AA 18 69 08 85 FF A0
40D8: BD C0 58 85 D0 BD 00 58 A1
40E0: 85 CF A4 FE B9 37 49 A4 7E
40E8: FD 91 CF E6 FE E8 E4 FF 9A
40F0: D0 E6 C6 06 A6 06 D0 CE 8A
40F8: AD 10 C0 8D 7E 49 C9 A0 92
4100: D0 0A AD 10 C0 AD 00 C0 A1
4108: 10 FB 30 EC A2 02 20 29 EC
4110: 48 CA D0 FA AD 7D 49 F0 1A
4118: 29 AD 7E 49 65 08 E5 09 1F

```

4120:	85	09	ED	7E	49	85	08	AD	6B	4348:	BD	00	61	C5	FF	F0	05	CA	CE
4128:	7E	49	A2	04	C9	CC	F0	52	86	4350:	D0	ED	F0	2D	A9	00	9D	00	34
4130:	CA	C9	CA	F0	4D	CA	C9	CB	E7	4358:	60	20	D5	43	A9	01	8D	69	DB
4138:	F0	48	CA	C9	C9	F0	43	CA	9E	4360:	49	A9	00	8D	68	49	20	EE	66
4140:	F0	40	A2	01	20	1E	FB	98	B9	4368:	45	A9	01	20	35	46	CE	74	F2
4148:	65	09	85	09	E5	08	85	08	63	4370:	49	A2	00	AD	3A	C0	8A	AA	61
4150:	A2	02	C0	C8	B0	06	CA	C0	3D	4378:	20	29	48	CA	C0	F0	F4	F0	83
4158:	32	90	01	CA	86	FE	A2	03	5D	4380:	7F	A2	1F	BD	24	50	F0	0B	7E
4160:	A0	00	20	29	48	CA	D0	FA	D3	4388:	C5	FE	D0	07	BD	44	50	C5	A1
4168:	20	1E	FB	98	65	09	85	09	EE	4390:	FF	F0	05	CA	D0	ED	F0	68	29
4170:	E5	08	85	08	A5	FE	A2	03	8A	4398:	A9	00	9D	24	50	20	D5	43	DB
4178:	C0	32	90	06	E8	C0	C8	B0	E6	43A0:	A9	00	8D	69	49	A9	05	8D	CC
4180:	01	AA	8A	F0	0C	CA	F0	0C	08	43A8:	68	49	20	EE	45	A9	05	20	A3
4188:	CA	F0	28	CA	F0	47	CA	F0	89	43B0:	35	46	CE	73	49	A2	01	8A	D5
4190:	5E	4C	00	44	A6	01	CA	A4	0D	43B8:	18	69	46	85	FF	AD	30	C0	9E
4198:	00	20	4D	42	D0	F3	AD	61	04	43C0:	8A	A8	20	29	48	E8	E4	FF	FC
41A0:	C0	10	03	4C	5A	42	20	2F	F7	43C8:	D0	F3	8A	38	E9	1E	AA	C9	70
41A8:	42	A5	01	38	E9	08	85	01	D4	43D0:	D2	90	E4	B0	2B	A5	FF	AA	27
41B0:	4C	06	42	A5	01	18	69	08	C0	43D8:	18	69	08	85	FF	BD	C0	58	EF
41B8:	AA	A4	00	20	4D	42	D0	D1	A2	43E0:	85	D0	BD	00	58	85	CF	A4	33
41C0:	AD	61	C0	10	03	4C	98	42	48	43E8:	FE	A9	00	91	CF	E8	E4	FF	5E
41C8:	20	2F	42	A5	01	18	69	08	0D	43F0:	D0	EB	60	BD	C0	58	85	D0	06
41D0:	85	01	4C	06	42	A6	01	A4	93	43F8:	BD	00	58	85	CF	B1	CF	60	07
41D8:	00	88	20	4D	42	D0	B2	AD	BE	4400:	AE	24	50	86	F9	A5	09	2A	FD
41E0:	61	C0	10	03	4C	DC	42	20	F0	4408:	65	08	85	09	A6	F9	BC	44	61
41E8:	2F	42	C6	00	4C	06	42	A6	12	4410:	50	84	FE	BC	24	50	84	FF	F8
41F0:	01	A4	00	C8	20	4D	42	D0	35	4418:	F0	58	CD	00	60	B0	56	A5	C1
41F8:	98	AD	61	C0	10	03	4C	0C	9C	4420:	FE	38	E9	08	AA	A4	FF	20	FB
4200:	43	20	2F	42	E6	00	A5	01	BB	4428:	F3	43	D0	04	A9	01	D0	23	EB
4208:	AA	A0	00	84	FE	18	69	08	85	4430:	8A	18	69	10	AA	20	F3	43	33
4210:	85	FF	BD	C0	58	85	D0	BD	53	4438:	D0	04	A9	02	D0	15	A6	FE	A6
4218:	00	58	85	CF	A4	FE	B9	27	1C	4440:	88	20	F3	43	D0	04	A9	03	B4
4220:	49	A4	00	91	CF	E6	FE	E8	8C	4448:	D0	09	C8	C8	20	F3	43	D0	49
4228:	E4	FF	D0	E6	4C	00	44	A5	38	4450:	24	A9	04	86	07	85	FE	A2	2D
4230:	01	AA	18	69	08	85	44	FF	A4	4458:	80	CA	F0	19	BD	00	60	D0	03
4238:	00	BD	C0	58	85	D0	BD	00	B4	4460:	F8	98	9D	00	60	A5	FE	9D	74
4240:	58	85	CF	A9	00	91	CF	E8	B5	4468:	00	62	A5	07	9D	00	61	EE	4D
4248:	E4	FF	D0	ED	60	BD	C0	58	0C	4470:	74	49	20	C1	45	C6	F9	D0	AF
4250:	85	D0	BD	00	58	85	CF	B1	AD	4478:	8C	A2	7F	86	F9	A9	FF	8D	4C
4258:	CF	60	A6	01	A4	00	CA	BD	3A	4480:	62	49	A6	F9	BD	00	60	85	35
4260:	C0	58	85	D0	BD	00	58	85	3D	4488:	ED	F0	6D	BC	00	62	BD	00	C2
4268:	CF	B1	CF	D0	06	A9	88	91	C1	4490:	61	85	EC	88	D0	13	AA	CA	44
4270:	CF	D0	EB	20	B1	47	A6	01	08	4498:	A4	ED	20	89	45	B0	40	BD	B6
4278:	A4	00	CA	BD	C0	58	85	D0	C7	44A0:	00	61	E9	07	9D	00	61	B0	8F
4280:	BD	00	58	85	CF	B1	CF	C9	F5	44A8:	42	88	D0	15	18	69	08	AA	01
4288:	88	D0	06	A9	00	91	CF	F0	B7	44B0:	A4	ED	20	89	45	B0	28	BD	9E
4290:	E9	8A	29	F8	AA	4C	39	43	9D	44B8:	00	61	69	08	9D	00	61	90	87
4298:	A4	00	A5	01	18	69	08	AA	55	44C0:	2A	AA	88	D0	0D	A4	ED	88	86
42A0:	BD	C0	58	85	D0	BD	00	58	6D	44C8:	20	89	45	B0	12	DE	00	60	E3
42A8:	85	CF	B1	CF	D0	07	A9	88	95	44D0:	10	19	A4	ED	C8	20	89	45	3A
42B0:	91	CF	E8	D0	EB	20	B1	47	46	44D8:	B0	05	FE	00	60	10	0C	AD	E3
42B8:	A4	00	A5	01	18	69	08	AA	75	44E0:	7C	49	D0	6A	20	63	45	D0	A4
42C0:	BD	C0	58	85	D0	BD	00	58	8D	44E8:	A5	F0	0D	20	C1	45	AD	62	05
42C8:	85	CF	A4	00	B1	CF	C9	88	81	44F0:	49	30	05	A6	F9	9D	00	62	DD
42D0:	D0	07	A9	00	91	CF	E8	D0	23	44F8:	C6	F9	D0	81	AD	73	49	0D	70
42D8:	E7	4C	39	43	A6	01	BD	C3	38	4500:	74	49	F0	03	4C	F8	40	20	4C
42E0:	58	85	D0	BD	03	58	85	CF	3D	4508:	CF	46	AC	76	49	C8	C0	0A	02
42E8:	A4	00	88	B1	CF	D0	06	A9	63	4510:	D0	05	A0	00	EE	75	49	8C	C4
42F0:	7F	91	CF	D0	F5	20	B1	47	1B	4518:	76	49	AD	75	49	0A	8D	7A	45
42F8:	A4	00	88	B1	CF	C9	7F	D0	71	4520:	49	0A	0A	6D	7A	49	6D	76	34
4300:	06	A9	00	91	CF	F0	F3	A6	DD	4528:	49	ED	00	03	90	1D	AD	77	CE
4308:	01	4C	39	43	A6	01	BD	C3	F5	4530:	49	18	69	08	8D	77	49	90	80
4310:	58	85	D0	BD	03	58	85	CF	6E	4538:	05	A9	FF	8D	77	49	A9	00	BC
4318:	A4	00	C8	B1	CF	D0	06	A9	9C	4540:	8D	75	49	A9	01	8D	76	49	27
4320:	7F	91	CF	D0	F5	20	B1	47	4C	4548:	20	2B	47	4C	0C	40	20	65	62
4328:	A4	00	C8	B1	CF	C9	7F	D0	AA	4550:	47	20	FE	46	AD	10	C0	AD	A7
4330:	06	A9	00	91	CF	F0	F3	A6	0E	4558:	00	C0	10	FB	C9	A0	D0	F7	3F
4338:	01	86	FF	84	FE	A2	7F	BD	68	4560:	4C	09	40	A6	F9	AC	62	49	56
4340:	00	60	F0	0B	C5	FE	D0	07	80	4568:	10	11	A5	08	71	CF	85	08	52

4570: 29 03 A8 C8 BC 63 49 BC 03
 4578: 62 49 60 C8 C0 05 D0 02 DC
 4580: A0 01 8C 62 49 CC 63 49 E0
 4588: 60 BD C0 58 85 D0 BD 00 3B
 4590: 58 85 CF B1 CF F0 09 C9 DB
 4598: 08 D0 03 20 8B 46 38 60 04
 45A0: A6 EC A4 ED 8A 18 69 08 BC
 45A8: 85 FF BD C0 58 85 D0 BD F1
 45B0: 00 58 85 CF A9 00 91 CF 3F
 45B8: EB E4 FF D0 ED A6 F9 18 14
 45C0: 60 BD 00 61 BC 00 60 84 2C
 45C8: FD A0 00 84 FE AA 18 69 FE
 45D0: 08 85 FF BD C0 58 85 D0 DF
 45D8: BD 00 58 85 CF A4 FE B9 6E
 45E0: 2F 49 A4 FD 91 CF E6 FE 62
 45E8: F8 E4 FF D0 E6 60 18 A2 B9
 45F0: 06 BD 59 49 7D 64 49 C9 87
 45F8: 0A 90 02 E9 0A 9D 59 49 4E
 4600: A9 00 CA 10 EC A2 B9 86 A7
 4608: FE A9 00 85 FF BD C0 58 A7
 4610: 85 D0 BD 00 58 85 CF A0 64
 4618: 06 B9 59 49 0A 0A 0A 65 C7
 4620: FF AA BD C1 48 91 CF 88 DB
 4628: 10 EF E6 FF E6 FE A6 FE 15
 4630: E0 C0 D0 D9 60 A2 03 18 C0
 4638: 7D 6B 49 9D 6B 49 C9 0A 7F
 4640: 90 14 E9 0A 9D 6B 49 A9 CE
 4648: 00 CA 10 EC A9 09 A2 03 12
 4650: 9D 6B 49 CA A2 10 FA A2 B9 C7
 4658: 86 FE A9 00 85 FF 18 BD 37
 4660: 00 58 69 24 85 CF BD C0 1A
 4668: 58 69 00 85 D0 A0 03 B9 9C
 4670: 6B 49 0A 0A 0A 65 FF AA 77
 4678: BD C1 48 91 CF 88 10 EF 27
 4680: E6 FF E6 FE A6 FE E0 C0 01
 4688: D0 D4 60 A9 0A 85 FC A2 5C
 4690: 06 A0 00 AD 30 C0 20 29 11
 4698: 48 CA D0 F7 A2 06 20 29 2C
 46A0: 48 CA D0 FA C6 FC D0 E7 81
 46A8: A2 03 38 A9 F5 7D 6B 49 AE
 46B0: 9D 6B 49 B0 17 69 0A 9D 2B
 46B8: 6B 49 A9 FE CA 10 EE A2 89
 46C0: 03 A9 00 9D 6B 49 CA 10 39
 46C8: FA 8E 7C 49 4C 56 46 A9 8C
 46D0: 04 8D 73 49 A2 00 BD C0 17
 46D8: 58 85 D0 BD 00 58 85 CF 25
 46E0: A0 27 A9 FF 51 CF 91 CF 79
 46E8: 88 10 F7 AD 30 C0 8A AB D9
 46F0: 20 29 48 E8 E0 C0 D0 DE F9
 46F8: CE 73 49 D0 D7 60 A9 06 99
 4700: 8D 73 49 A2 C0 BD BF 58 5A
 4708: 85 D0 BD FF 57 85 CF A0 56
 4710: 27 A9 FF 51 CF 91 CF 88 9E
 4718: 10 F7 CA D0 E8 E8 C8 20 AF
 4720: 29 48 CA D0 FA CE 73 49 FE
 4728: D0 D9 60 A9 03 8D 7A 49 C8
 4730: A9 02 8D 7B 49 2C 30 C0 99
 4738: AC 7B 49 20 29 48 A0 50 23
 4740: 20 29 48 2C 30 C0 A9 FF CC
 4748: 38 ED 7B 49 A8 20 29 48 D2
 4750: A0 50 20 29 48 EE 7B 49 18
 4758: AD 7B 49 C9 FD D0 D6 CE 12
 4760: 7A 49 D0 CC 60 A9 F0 A2 93
 4768: 01 86 FC 2C 30 C0 A4 FC 46
 4770: 20 29 48 E6 FC C5 F4 D0 9A
 4778: F2 38 E9 0A C9 0F B0 E7 40
 4780: 60 A2 A0 AD 30 C0 8A A8 19
 4788: 20 29 48 E8 E0 C8 D0 F3 C8
 4790: 60 A0 00 B9 3F 49 F0 06 1A

4798: 20 63 48 C8 D0 F5 AD 75 D4
 47A0: 49 18 69 B0 20 63 48 AD DE
 47A8: 76 49 18 69 B0 20 63 48 73
 47B0: A9 8D 20 63 48 20 66 48 89
 47B8: 60 D8 A9 00 A0 07 99 59 90
 47C0: 49 99 64 49 88 10 F7 A0 90
 47C8: 04 99 6B 49 99 6F 49 88 67
 47D0: 10 F7 A9 05 8D 6C 49 C8 64
 47D8: 8C 7C 49 8C 73 49 8C 74 0D
 47E0: 49 8C 75 49 8C 77 49 C8 18
 47E8: 8C 76 49 60 A0 00 B9 4A 4D
 47F0: 49 F0 06 20 63 48 C8 D0 C1
 47F8: F5 20 66 48 20 58 FC A0 D8
 4800: 00 B9 11 49 F0 06 20 ED 83
 4808: FD C8 D0 F5 AD 10 C0 AD 20
 4810: 00 C0 10 FB A2 00 C9 CA 06
 4818: F0 06 A2 01 C9 C8 D0 EF 16
 4820: 8E 7D 49 A9 8D 20 ED FD E1
 4828: 60 88 D0 FD 60 AD 00 BF 7E
 4830: C9 4C F0 0B A9 ED 8D 7F 27
 4838: 49 A9 FD 8D 80 49 60 A9 04
 4840: 4F 8D 7F 49 A9 48 8D 80 6A
 4848: 49 A9 00 8D 81 49 60 C9 7C
 4850: 84 F0 22 8C 82 49 AC 81 80
 4858: 49 EE 81 49 99 00 02 AC 8B
 4860: 82 49 60 6C 7F 49 AD 00 D3
 4868: BF C9 4C D0 08 20 03 BE 67
 4870: A9 00 8D 81 49 60 A9 00 BE
 4878: 85 CF A9 20 85 D0 A0 00 A7
 4880: A5 D0 99 C0 58 A5 CF 99 E9
 4888: 00 58 20 93 48 C8 C0 00 14
 4890: D0 EE 60 18 A5 D0 69 04 1A
 4898: 85 D0 2C CD 48 F0 01 60 EA
 48A0: E9 1F 85 D0 A5 CF 69 7F 6A
 48A8: 85 CF B0 01 60 E6 D0 A5 FB
 48B0: D0 29 03 F0 01 60 A9 20 60
 48B8: 85 D0 A5 CF 69 27 85 CF B4
 48C0: 60 3F 21 21 2D 2D 21 3F 27
 48C8: 00 0C 0C 08 08 1C 1C 63
 48D0: 00 3F 20 20 3F 01 01 3F 76
 48D8: 00 1F 10 10 3F 30 30 3F 8E
 48E0: 00 03 03 33 33 3F 30 30 EC
 48E8: 00 3F 01 01 3F 20 20 3F 73
 48F0: 00 1F 19 01 3F 21 21 3F 7C
 48F8: 00 3F 23 10 08 0C 0C 53
 4900: 00 3E 32 32 3F 33 33 3F F7
 4908: 00 3F 21 21 3F 30 30 30 EB
 4910: 00 CA CF D9 D3 D4 C9 C3 36
 4918: CB A0 CF D2 A0 CB C5 D9 79
 4920: C2 CF C1 D2 C4 BF 00 08 9A
 4928: 36 22 5D 5D 22 36 08 80 5A
 4930: 08 14 22 22 14 08 80 3E 32
 4938: 6B 5D 63 63 5D 6B 3E 84 14
 4940: C2 CC CF C1 C4 A0 CC C5 85
 4948: D6 00 84 C2 CC CF C1 C4 F0
 4950: A0 CE D5 CD CC C5 D6 8D 37
 4958: 00 FF 00 00 FF FF 00 00 EA

Program 2: LEV01

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

5020: 06 08 13 58 0C 11 16 02 80
 5028: 11 16 25 00 00 00 00 00 7B
 5030: 00 00 00 00 00 00 00 00 D0
 5038: 00 00 00 00 00 00 00 00 D8
 5040: 00 00 00 00 00 80 80 A0 84
 5048: A0 A0 A0 00 00 00 00 00 75

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5050: 00 00 00 00 00 00 00 00 F0
5058: 00 00 00 00 00 00 00 00 F8
5060: 00 00 00 00 29 0E 01 0B 8C
5068: 01 0E 02 0E 01 0B 01 0E 66
5070: 02 0E 0A 0E 02 26 02 26 8A
5078: 02 26 02 0E 04 02 04 0E 03
5080: 02 0E 01 0B 01 0E 02 0E 98
5088: 01 0B 01 0E 02 0E 01 0B FE
5090: 01 0E 02 0E 01 0B 01 0E 8E
5098: 02 0E 01 0B 01 0E 02 0E B0
50A0: 01 0B 01 0E 02 0E 0A 0E 2F
50A8: 02 12 02 12 02 12 02 12 9E
50B0: 02 12 02 12 02 12 02 12 A6
50B8: 02 12 02 12 02 12 02 12 AE
50C0: 02 12 02 12 29 12 02 00 DD

```

Program 3: LEV02

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

```

5020: 06 08 12 58 06 01 12 08 ED
5028: 08 01 12 00 00 00 00 00 4F
5030: 00 00 00 00 00 00 00 00 D0
5038: 00 00 00 00 00 00 00 00 D8
5040: 00 00 00 00 00 08 08 2B 39
5048: 88 AB AB 00 00 00 00 00 6C
5050: 00 00 00 00 00 00 00 00 F0
5058: 00 00 00 00 00 00 00 00 F8
5060: 00 00 00 00 29 26 02 21 08
5068: 03 02 02 1F 03 04 02 1D 86
5070: 03 06 02 06 01 14 03 08 1B
5078: 02 06 01 12 03 0A 02 06 27
5080: 01 10 03 0C 02 06 01 0E FE
5088: 03 0E 02 06 01 08 07 10 15
5090: 02 06 01 08 01 16 02 06 BE
5098: 01 08 01 16 02 06 01 08 6F
50A0: 07 10 02 06 01 0E 03 0E BD
50A8: 02 06 01 10 03 0C 02 06 3F
50B0: 01 12 03 0A 02 06 01 14 95
50B8: 03 08 02 06 01 16 03 06 E9
50C0: 02 1F 03 04 02 21 03 02 67
50C8: 02 22 02 02 02 26 29 03 51
50D0: 01 FF 00 00 FF FF 00 00 F1

```

Program 4: LEV03

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

```

5020: 11 0B 23 A0 06 25 11 11 72
5028: 11 21 25 11 03 05 06 08 8F
5030: 25 21 07 07 07 07 00 00 51
5038: 00 00 00 00 00 00 00 00 D8
5040: 00 00 00 00 00 10 18 20 71
5048: 28 28 28 30 48 48 48 48 4B
5050: 48 60 68 70 78 80 00 00 07
5058: 00 00 00 00 00 00 00 00 F8
5060: 00 00 00 00 29 26 02 26 0D
5068: 02 0A 01 06 01 14 02 0A 73
5070: 01 06 01 14 02 0A 01 06 B4
5078: 01 14 02 0A 01 06 01 14 B5
5080: 02 0A 01 05 18 02 06 02 EB
5088: 01 1B 02 01 01 01 01 02 D0
5090: 01 01 01 01 01 1B 02 0A A4
5098: 01 14 06 01 02 0A 01 1B E4
50A0: 22 06 02 26 02 26 02 26 49
50A8: 02 26 02 06 22 1B 01 0A FD
50B0: 02 17 01 0E 02 17 01 0E 95
50B8: 02 1B 01 0A 29 12 02 06 7D

```

Program 5: LEV04

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

```

5020: 19 0D 03 A0 06 17 0F 14 B9
5028: 02 06 07 24 0E 10 12 14 57
5030: 16 18 1A 0B 1D 1E 21 0B 84
5038: 1D 03 14 26 17 1E 00 00 3E
5040: 00 00 00 00 00 08 10 20 41
5048: 30 58 58 58 60 60 60 60 4D
5050: 60 60 60 68 68 68 68 70 F1
5058: 70 78 80 80 88 A0 00 00 2E
5060: 00 00 00 00 29 26 02 26 0D
5068: 02 03 1C 07 02 03 01 22 FE
5070: 02 03 01 22 02 03 01 03 36
5078: 18 03 01 03 02 03 01 03 57
5080: 01 16 01 03 01 03 02 03 92
5088: 01 03 01 16 01 03 01 03 05
5090: 02 03 01 03 01 03 01 01 5A
5098: 01 01 01 01 01 01 01 01 39
50A0: 01 01 01 01 01 01 04 01 03 4F
50A8: 01 03 02 03 01 03 01 03 14
50B0: 01 12 01 03 01 03 02 03 C1
50B8: 01 03 01 03 01 12 01 03 40
50C0: 01 03 02 03 01 03 01 03 2C
50C8: 01 0E 01 02 02 03 01 03 CE
50D0: 02 03 01 03 01 03 01 12 AB
50D8: 01 03 01 03 02 03 01 03 2C
50E0: 01 03 01 0F 01 02 01 03 E8
50E8: 01 03 02 03 01 03 01 01 52
50F0: 16 03 01 03 02 03 01 1E E9
50F8: 01 03 02 03 01 1E 01 03 D0
5100: 02 01 03 1E 01 03 02 03 41
5108: 20 03 02 04 01 21 02 26 B2
5110: 29 00 FF 20 20 20 20 31 3C

```

Program 6: LEV05

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

```

5020: 15 10 24 A0 06 0B 0B 0B 5B
5028: 24 24 06 05 04 03 22 23 88
5030: 02 12 17 17 17 12 17 0A E3
5038: 11 17 00 00 00 00 00 00 27
5040: 00 00 00 00 00 10 18 20 71
5048: 28 48 50 58 60 68 68 68 7C
5050: 70 70 70 78 80 88 88 90 A2
5058: 90 90 00 00 00 00 00 00 65
5060: 00 00 00 00 29 26 02 0B F1
5068: 01 1A 02 0B 01 1A 02 0B 80
5070: 01 1A 02 0A 0F 08 02 03 98
5078: 02 19 01 06 01 02 01 02 F4
5080: 02 1A 01 05 01 02 01 02 2D
5088: 02 1B 01 04 01 02 01 02 65
5090: 02 06 0D 09 01 04 02 03 05
5098: 02 06 01 0C 01 09 01 08 D2
50A0: 02 05 01 0E 01 09 01 06 B8
50A8: 03 04 01 10 01 09 01 04 1F
50B0: 01 01 02 03 01 06 06 06 B4
50B8: 01 09 01 02 01 02 02 02 72
50C0: 01 06 01 06 01 06 01 09 0F
50C8: 02 03 02 08 01 08 01 05 1B
50D0: 02 09 01 03 02 08 01 08 3F
50D8: 01 05 01 01 01 09 01 02 9B
50E0: 02 09 01 06 01 06 01 02 69
50E8: 01 09 01 01 02 0A 06 07 C7
50F0: 01 03 01 09 03 16 01 05 FA

```

```

50F8: 01 09 02 15 01 07 01 08 1C
5100: 02 14 01 09 01 07 29 03 D2
5108: 20 03 02 04 01 21 02 26 B2

```

Program 7: Vulcan Mines Level Editor

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```

73 5 REM COPYRIGHT 1987 COMPUTE! PUBLICATI
ONS, INC. ALL RIGHTS RESERVED.
59 6 HOME : VTAB 10: HTAB 13: PRINT "Copyr
ight 1987": HTAB 7: PRINT "COMPUTE! P
ublications, Inc.": HTAB 11: PRINT "A
ll Rights Reserved.": FOR I = 1 TO 50
0: NEXT I
C3 10 LOMEM: 8192
4B 20 HOME
A6 30 DIM M(40,24)
BE 40 DIM GX(32),GY(32)
8D 50 FOR T = 1 TO 40
87 60 HTAB (T): VTAB 1: PRINT "*";
9D 70 HTAB (T): VTAB 23: PRINT "*";
6A 80 M(T,1) = 1:M(T,23) = 1
E1 90 NEXT T
E2 100 FOR T = 1 TO 23
DB 110 M(1,T) = 1:M(40,T) = 1
D9 120 HTAB 1: VTAB (T): PRINT "*";
BB 130 HTAB 40: VTAB (T): PRINT "*";
6B 140 NEXT T
1C 150 X = 20:Y = 13
9B 160 HTAB (X): VTAB (Y): PRINT "+";
3A 170 HTAB (X): VTAB (Y)
8F 180 N = M(X,Y)
8F 190 IF N = 1 THEN PRINT "*";
EA 200 IF N = 0 THEN PRINT " ";
75 210 IF N = 2 THEN PRINT "G";
1D 220 IF PEEK (- 16384) < 128 THEN 160
19 230 GET R$
9B 240 IF R$ = "S" THEN PRINT CHR$ (7):SX
= X:SY = Y
56 250 IF R$ = " " THEN M(X,Y) = 0
FF 260 IF R$ = "X" THEN M(X,Y) = 1
28 270 IF R$ = "G" THEN M(X,Y) = 2
87 280 IF R$ = "I" THEN Y = Y - 1
85 290 IF R$ = "K" THEN Y = Y + 1
77 300 IF R$ = "J" THEN X = X - 1
75 310 IF R$ = "L" THEN X = X + 1
B3 320 IF R$ = CHR$ (13) THEN 380
52 330 IF Y < 2 THEN Y = 2
24 340 IF X < 2 THEN X = 2
32 350 IF Y > 22 THEN Y = 22
83 360 IF X > 39 THEN X = 39
A8 370 GOTO 160
D7 380 IF SX = 0 THEN HTAB 1: VTAB 24: PRI
NT CHR$ (7)"NO START POSITION";: GE
T A$: HTAB 1: PRINT SPC( 17);: GOTO
160
C9 390 HOME : INPUT "RANDOMNESS -> ";RA
4F 400 GOSUB 580
6A 410 G = 5 * 4096 + 100
EC 420 X = 1:R = 0
E9 430 PRINT
34 440 PRINT "FORMING MAP:"
BE 450 FOR O = 1 TO 24
D1 460 FOR T = 1 TO 40
2B 470 IF M(T,O) = X THEN R = R + 1: GOTO
510
EB 480 X = M(T,O): POKE G,R
AF 490 R = 1:G = G + 1
92 500 GOTO 520
18 510 IF R = 256 THEN POKE G,255: POKE G
+ 1,0:G = G + 2:R = 1
6B 520 NEXT T
2B 530 PRINT ".": NEXT O
EC 540 PRINT
AF 550 LE = (G - ((5 * 4096) + 32)) + 2
D8 560 LE$ = STR$ (LE)
21 570 GOTO 810
F4 580 PRINT
AB 590 PRINT "COUNTING GENERATORS:"
23 600 J = 0
A8 610 FOR O = 1 TO 23
52 620 PRINT ".":
CD 630 FOR T = 1 TO 40
87 640 IF M(T,O) < > 2 THEN 690
C3 650 IF J = 33 THEN PRINT : PRINT "ONLY
FIRST 32 GENERATORS INCLUDED":T = 4
0:O = 23: GOTO 690
D4 660 GX(J) = T - 1:GY(J) = (O - 1) * 8
77 670 M(T,O) = 0
3A 680 J = J + 1
C6 690 NEXT T,O
9F 700 G = 5 * 4096 + 32
72 710 POKE G,J
44 720 G = 5 * 4096 + 37
45 730 FOR R = 0 TO 30
A4 740 POKE G + R,GX(R)
72 750 NEXT R
BC 760 G = 5 * 4096 + 69
4D 770 FOR R = 0 TO 30
BC 780 POKE G + R,GY(R)
7A 790 NEXT R
18 800 RETURN
C2 810 G = 5 * 4096 + 33
8C 820 POKE G,RA
89 830 G = G + 1
77 840 POKE G,SX - 1
8D 850 G = G + 1
E8 860 POKE G,(SY - 1) * 8
67 870 D$ = CHR$ (4)
C7 880 INPUT "LEVEL NUMBER -> ";L
6D 890 IF L < 1 OR L > 99 THEN 880
65 900 L$ = STR$ (L)
C3 910 IF L < 10 THEN L$ = "0" + L$
76 920 PRINT D$;"BSAVE LEV" + L$ + ",A$502
0,L" + L$
58 930 PRINT D$;"BLOAD NUMLEV"
E8 940 G = PEEK (768)
8C 950 IF G < L THEN G = L
4D 960 POKE G,68,G
22 970 PRINT D$;"BSAVE NUMLEV,A$0300,L$000
1"

```

BB

ProDesk

David Bailey

"ProDesk," a superb menu-driven program launcher, works with all Apple II computers using ProDOS. ProDesk makes it easy to find and run programs, no matter how many levels of subdirectories are involved. It also offers file maintenance features such as creating subdirectories and deleting, locking/unlocking, and renaming files. An 80-column card is required for Apple II+ and older IIe computers.

The Macintosh has its Finder. The Apple IIGS has its Desktop. Both are applications that let you locate files, execute programs, and conduct routine file maintenance chores like deleting and renaming files. But if you're using an Apple II+, IIe, or IIc computer and ProDOS, you've been pretty much out of luck. Until now—until "ProDesk."

ProDesk uses a folder metaphor to show you what files and directories are on any disk; then it lets you select and execute system, BASIC, and machine language files. ProDesk opens and closes directories and subdirectories with the touch of a key, letting you locate buried files with ease.

More than just a file locator and program launcher, ProDesk also offers some basic file maintenance features. Instead of typing in cumbersome commands like `DELETE filename` or `RENAME oldname,newname`, ProDesk deletes and renames files at your order.

Name It **STARTUP**

ProDesk is a BASIC program that should be entered using "Apple Automatic Proofreader," the error-checking utility found elsewhere in this issue. Type in the program and save it to a blank disk using the name *STARTUP*.

When a ProDOS disk boots, the computer reads the first track from the disk. That starts a process of loading the PRODOS and BASIC

.SYSTEM files. After that, the computer searches the disk for a file named *STARTUP*. If it finds one, the *STARTUP* program is executed. Saving ProDesk as *STARTUP*, then, causes the program to run automatically when the disk boots.

It's easiest if you copy ProDesk to each of your disks and make it the first file you place on any newly formatted disk. That way, you won't need to switch disks as often.

You can name ProDesk something other than *STARTUP*, but then you'll have to manually load and run it the usual way, such as

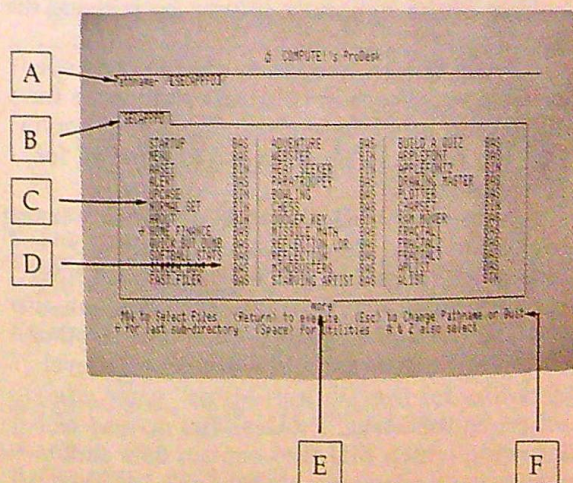
with the command

```
RUN PRODESK
```

File Folder Mentality

It takes only a moment for ProDesk to find all the files on the disk and display them on the screen. Figure 1 shows the ProDesk file folder as you'll see it on your computer's monitor.

Figure 1: The ProDesk Screen



A **Pathname** lists the complete directory path-name in the standard ProDOS format of */volume/directory/subdirectory/filename*. The boldfaced brackets indicate the current volume, directory, or subdirectory.

B The current volume, directory, or subdirectory name is also placed here.

C Filenames appear in the first column.

D File types (BAS, BIN, DIR, TXT, SYS) are listed in the second column. A vertical bar separates the two-column combinations.

E When there are more than 36 files on the disk, the word *more* appears. Selecting it displays the next group of 36 files.

F Command key summaries are listed at the bottom of the screen.

You can operate ProDesk with just the up- and down-arrow keys (or the A and Z keys for up and down, respectively), Return, Escape, the left-arrow key, and the spacebar. These six keys let you do everything from executing a machine language program to accessing ProDesk's file maintenance utilities.

Using ProDesk

ProDesk is simple to use. The up- and down-arrow keys (or A and Z, if you have an Apple II+ keyboard) select the file to execute (or the directory to open). Notice that the arrow appears next to the chosen file or directory. It "wraps" around as well, so that when it's at the top of the leftmost column, you can reach the bottom of the rightmost column by pressing the up-arrow key.

Press Return to execute the file or to open the selected directory. ProDesk changes to the 40-column mode before running a program, in case the executed program isn't formatted for 80-columns.

Note that ProDesk can be fooled into trying to execute some files that aren't really programs. Although binary (BIN) files often hold machine language programs, such files can also be used to store character shape data or other information. An example is the playing level data files for the "Vulcan Mines" game elsewhere in this issue. ProDesk has no way of knowing which BIN files contain data and which contain executable machine language. If

you try to execute a data file, you'll probably experience an immediate system crash. If this occurs, press Control-Reset to return to the familiar] prompt, then type **RUN STARTUP** (or whatever name you gave to ProDesk) to re-run the program.

When there are more than 36 files on the disk, the word *more* shows at the bottom of the file folder. It's normally in lowercase, but changes to uppercase (MORE) when it's selected. Pressing Return when MORE is visible puts the disk's next 36 files on the screen. (Notice that the back-arrow key is now labeled *for last group of files* instead of *for last subdirectory*.)

Use the Escape key to look at another disk's files. Put another disk in the drive and press Return to view the root directory, or type in the pathname if you want to view a directory on that new disk. Pressing the Escape key at this point exits ProDesk and puts the] prompt on the screen.

The left-arrow key closes the current directory and takes you back one level. If you're in a directory named DOX in the volume PRODESK, for instance, pressing the left-arrow key closes DOX and displays the main root directory of the volume PRODESK. Closing a disk's root directory puts the same options on the screen as when you press the Escape key.

When you use ProDesk to execute a program in a subdirectory, the path to that program will still be the default ProDOS path when the program ends. If you attempt to load a program (ProDesk, for example) not in the selected subdirectory, you'll get a *Path not found* error message. To avoid this, use the command PREFIX / to return to the volume directory before attempting to load another program.

Empty directories and non-existent pathnames are errors that ProDesk copes with. The program displays a short message and allows you to continue with the press of any key.

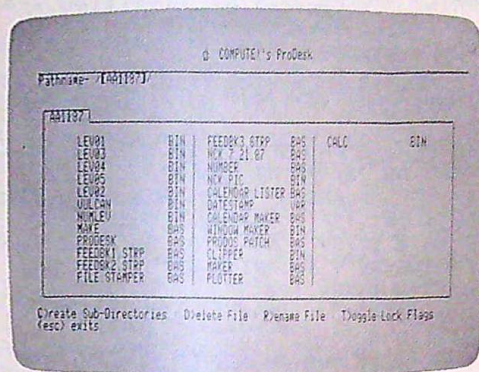
Using The Utilities

ProDesk also offers several file maintenance features that you can use without exiting the program. To reach the Utilities menu, press the spacebar. Selecting the proper utility takes just one keypress.

Note: Make sure the Caps Lock key is down.

Create Subdirectory puts a short note on the screen. Read the note, hit any key, and type in the name of the new subdirectory. Although you can create a subdirectory within a directory here (by separating the two with a slash (/) and by keeping the total character count under 15), it's best if you first open the appropriate directory, and then create the new subdirectory.

Figure 2: ProDesk's Utilities



ProDesk's Utility menu appears when you press the spacebar. Each of the four features is called with a single keypress.

Delete File does just that. Press the D key, move the arrow to select the file, and press Return (hitting the Escape key aborts the delete process entirely). You'll have to confirm the delete by pressing Y for Yes. Pressing N cancels the delete. *Important note: ProDesk's Delete feature will delete locked files.*

Rename File lets you change the name of any file or directory. Just press the R key, select the file or directory, and type in the new name. You can type in as many characters as you want, but only the first 15 are used. *Make sure you use only letters, numbers, and periods for the new filename.* As with Delete, pressing the Escape key aborts the process.

Toggle Lock Flags lock and unlock files and directories. Locked files and directories are marked on the screen with an asterisk (*). Select the file and press Return. If the file is unlocked, it becomes locked; if it's locked, it becomes unlocked. Press the Escape key to return to the Utilities menu.

Escape exits the Utilities menu and returns you to the main ProDesk screen.

Some Hows And Whys

As an operating system, ProDOS comes equipped with many of the same commands as the older DOS 3.3. One of the major differences, other than its faster speed, is ProDOS's parameters. ProDOS includes three parameters which can be used with most DOS commands. The parameter used most frequently in ProDesk is the T parameter.

The T parameter lets you use many commands—such as BSAVE, BLOAD, and BRUN—with any file type. That's significant, for normally only binary files (marked as BIN) can utilize those commands. BSAVE, BLOAD, and

BRUN are powerful, fast commands that take a chunk of memory and either save it to disk, load it from disk, or execute it from disk. They're much faster than the usual text file commands of SAVE, LOAD, and RUN.

ProDesk takes advantage of the commands' ease of use. Using the T parameter, the program was able to load filenames into variables for use. An example is the way directories were handled. In ProDOS, directories are considered files (DIRectory files). Since there's no way to access some file types (other than using the format *-filename*, which finds the file, then executes it), to open a current directory, you must get the pathname with the command PREFIX, and then use the statement OPEN *prefix*,TDIR. The files can then be read in one by one.

The MouseText characters are another important addition to ProDesk. I discovered them quite by accident.

To create the MouseText characters, you must print an Escape (CHR\$(27)), followed by an inverse, uppercase character. With some experimentation, you'll quickly find some very useful characters.

Four are especially hard to make out. That's because they're really half-characters—two characters must be placed side by side to print the actual figure. Both sets are used in ProDesk. One is the symbol of the directory; the other is the symbol of the running man.

The running man is printed with the FG combination, while the directory is printed by XY. To print the running man, for instance, enter 80-column mode, then type

```
PRINT CHR$(27);CHR$(15);"FG";CHR$(14)
```

Two other MouseText characters found in ProDesk are the closed Apple (@) and the open Apple (A).

ProDesk

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
BE 10 REM COPYRIGHT 1987 COMPUTE! PUBLICAT
    IONS, INC. ALL RIGHTS RESERVED.
BF 15 HOME : VTAB 6: HTAB 12: PRINT "COPYR
    IGH 1987": HTAB 6: PRINT "COMPUTE!
    PUBLICATIONS, INC.": HTAB 10: PRINT
    "ALL RIGHTS RESERVED.": FOR I = 1 TO
    1500: NEXT I
3E 100 LOMEM: 24576
82 110 POKE 768,0
57 120 CLEAR
81 130 REM POKE 216,0
96 140 DIM F$(36)
21 150 D$ = CHR$(4):CR$ = CHR$(13):ES$ =
    CHR$(27):S$ = CHR$(15):N$ = CHR$(
    14)
68 160 PRINT : PRINT D$"CLOSE"
62 170 TEXT : HOME
04 180 SF = 0
2F 190 PRINT D$;"PR#3
```

```

E1 200 PRINT ES$
90 205 ONERR GOTO 1630
38 210 PRINT D$;"PREFIX"
2A 220 INPUT P$
A2 230 VTAB 1
BA 240 PRINT CR$; TAB( 30);S$"A"N$; SPC( 2
);"COMPUTE!'s ProDesk"
09 250 IF MF > 0 THEN DF = 1
5A 260 IF MF = 0 THEN DF = 0
06 270 FOR T = 1 TO 80: PRINT CHR$( 95);:
NEXT
2E 280 VTAB 4
95 290 FOR FD = LEN (P$) - 1 TO 1 STEP - 1
3F 300 IF F1 = 0 AND MID$( P$,FD,1) = "/"
THEN FS = FD:SD$ = MID$( P$,FD + 1,
LEN (P$) - 2):F1 = 1
FC 310 NEXT
DF 320 PRINT "Pathname- ";
03 330 IF FS < = 1 THEN PRINT "/"["SD$"]/"
95 340 IF FS > 1 THEN SD$ = LEFT$( SD$, LE
N (SD$) - 1): PRINT LEFT$( P$,FS -
1);"/["SD$"]/"
50 350 DR$ = LEFT$( P$, LEN (P$) - 1)
08 360 HTAB 2: VTAB 6: FOR T = 1 TO LEN (S
D$) + 2: PRINT CHR$( 95);: NEXT : P
RINT
2B 370 HTAB 1: VTAB 7: PRINT S$"Z"N$ "SD$
" "S$"T"N$;: FOR T = 1 TO 75 - LEN
(SD$) - 2: PRINT CHR$( 95);: NEXT :
PRINT
01 380 FOR V = 8 TO 21: VTAB V: HTAB 1: PR
INT S$"Z";: HTAB 78: PRINT CHR$( 95
);N$: NEXT
3A 390 VTAB 22: HTAB 2: PRINT S$;: FOR T =
1 TO 76: PRINT "L";: NEXT : PRINT
N$;
91 400 PRINT : PRINT D$"OPEN "DR$",TDIR":
PRINT D$"READ "DR$
7C 410 FOR T = 1 TO 3: INPUT A$: NEXT : IF
MF > 0 THEN MF = MF - 1: FOR T = 3
6 * MF + 1 TO 36 * MF + 36: INPUT A
$: NEXT
50 420 ONERR GOTO 1660
BD 430 NF = - 1
FB 440 IF MF < 0 THEN MF = 0
06 450 VTAB 23: INPUT A$:A$ = LEFT$( A$,20
): IF A$ = "" THEN 530
04 460 POKE 216,0
CB 470 NF = NF + 1: IF NF = 36 THEN NF = 3
5:MF = MF + 1: GOTO 530
47 480 H = INT (NF / 12):NS = NF:NS = NS -
H * 12:V = NS: HTAB H * 23 + 7: VT
AB V + 9
EB 490 IF H < 2 THEN PRINT A$" "; CHR$( 12
4)
96 500 IF H = 2 THEN PRINT A$
09 510 F$(NF) = A$
19 520 GOTO 450
BB 530 PRINT D$;"CLOSE"
01 540 POKE 216,0
A4 550 NF = NF + 1
7C 560 IF PEEK (768) = 4 THEN GOSUB 1540:
GOTO 650
E9 570 IF PEEK (768) = 3 THEN GOSUB 1420:
GOTO 650
BB 580 IF PEEK (768) = 2 THEN GOSUB 1270:
GOTO 650
FA 590 IF PEEK (768) = 1 THEN 1060
31 600 PRINT : VTAB 23: HTAB 2: PRINT S$"K
"N$&"S$"J"N$" to Select Files : <R
eturn> to execute : <Esc> to Change
Pathname or Quit";CR$;
E0 610 PRINT S$"H"N$;
21 620 IF DF = 0 THEN PRINT " for last sub
-directory";
04 630 IF DF = 1 THEN PRINT " for last gro
up of files";
56 640 PRINT " : <Space> for Utilities : A
& Z also select";
1B 650 POKE - 16368,0
09 660 IF NF = 0 THEN VTAB 9: HTAB 7: PRIN
T S$; CHR$( 91);N$" No Files Found!
"
1C 670 IF MF > 0 AND SF < = 35 THEN HTAB 3
8: VTAB 22: PRINT "more"
22 680 IF MF > 0 AND SF > 35 THEN GOTO 700
E3 690 SH = INT (SF / 12):NH = SH:NH = SF
- SH * 12:SV = NH: HTAB SH * 23 + 6
: VTAB SV + 9: PRINT S$"U"N$
0F 700 WAIT - 16384,128
48 710 K = PEEK ( - 16384) - 128: POKE - 1
6368,0
37 720 IF K = 11 AND NF > 0 OR K = 65 AND
NF > 0 THEN HTAB SH * 23 + 6: VTAB
SV + 9: PRINT " :SF = SF - 1: IF S
F < 0 THEN SF = NF - 1: IF MF > 0 T
HEN SF = 36
5B 730 IF K = 10 AND NF > 0 OR K = 90 AND
NF > 0 THEN HTAB SH * 23 + 6: VTAB
SV + 9: PRINT " :SF = SF + 1: IF S
F > NF - 1 THEN F = SF:SF = 0: IF M
F > 0 AND F = 36 THEN IF MF > 0 THE
N SF = 36
FA 740 IF MF > 0 AND SF > 35 THEN HTAB 38:
VTAB 22: PRINT "MORE"
EE 750 IF SF > 35 AND K = 13 THEN 170
2C 760 IF K = 8 AND DF = 1 THEN MF = MF -
1: GOTO 170
0C 770 IF K = 8 THEN 870
FA 780 IF K = 13 AND PEEK (768) = 2 THEN 1
310
ED 790 IF K = 13 AND PEEK (768) = 3 THEN 1
460
6D 800 IF K = 13 AND PEEK (768) = 4 THEN 1
580
33 810 IF K = 13 THEN 920
40 820 IF K = 27 AND PEEK (768) > 0 THEN P
OKE 768,0: GOTO 1060
70 830 IF K = 27 THEN 990
AF 840 IF K = 32 AND PEEK (768) > 0 THEN 8
60
6D 850 IF K = 32 THEN 1060
27 860 GOTO 670
79 870 HOME : VTAB 11: HTAB 27: PRINT S$"X
Y"N$" Closing the Directory..": FOR
T = 1 TO 700: NEXT
DC 880 PRINT : PRINT D$;"PREFIX/"
94 890 IF LEN (P$) - LEN (SD$) = 2 THEN 99
0
66 900 PRINT D$"PREFIX " LEFT$( P$, LEN (P
$) - LEN (SD$) - 2)
96 910 GOTO 120
67 920 FL$ = MID$( F$(SF),2,15):FT$ = RIGH
T$( F$(SF),3)
56 930 ONERR GOTO 1620
35 940 IF FT$ < > "DIR" THEN HOME : VTAB 1
1: HTAB 29: PRINT S$"FG"N$" Executi
ng the File..": FOR T = 1 TO 700: N
EXT : HOME : PRINT : PRINT CHR$( 21
): PRINT D$"-" ;FL$
07 950 POKE 216,0
BA 960 HOME : VTAB 11: HTAB 27: PRINT S$"X
Y"N$" Opening the Directory..": FOR
T = 1 TO 700: NEXT
CC 970 PRINT : PRINT D$;"PREFIX ";FL$
A4 980 GOTO 120
5E 990 HOME
42 1000 VTAB 5: HTAB 1: PRINT "Prefix? (<R
eturn> for None or <Esc> to Quit)
/"S$" "N$; CHR$( 8);

```

```

ED 1010 POKE - 16368,0: WAIT - 16384,128:
    IF PEEK ( - 16384) = 155 THEN POKE
    - 16368,0: TEXT : HOME : PRINT :
    PRINT D$"CLOSE": END
8A 1020 INPUT "" ;PF$
CC 1030 ONERR GOTO 1630
22 1040 PRINT : PRINT D$"PREFIX /";PF$
DC 1050 GOTO 120
84 1060 REM * FILE UTILITIES
C6 1070 HTAB SH * 23 + 6: VTAB SV + 9: PRI
    NT " "
75 1080 POKE 34,22: VTAB 23: HOME
19 1090 PRINT "C>reate Sub-Directories : D
    >elete File : R>ename File : T>ogg
    le Lock Flags"
1B 1100 PRINT "<esc> exits";
C0 1110 POKE - 16368,0
AE 1120 WAIT - 16384,128: GET A$
89 1130 IF A$ = "C" THEN 1190
87 1140 IF A$ = "D" THEN 1260
83 1150 IF A$ = "R" THEN 1410
C0 1160 IF A$ = "T" THEN 1540
7D 1170 IF A$ = ES$ THEN HOME : POKE 34,0:
    POKE 768,0: GOTO 600
76 1180 GOTO 1120
5E 1190 HOME
9E 1200 PRINT "Sub-Directories must start
    with an alphabetic character, must
    not exceed 15": PRINT "characters
    , and can contain only letters, nu
    mbers, and periods.": WAIT - 1638
    4,128: GET A$
4# 1210 HOME
64 1220 INPUT "Enter Sub-Directory Name (
    cr=menu) : ";SD$
AD 1230 IF LEN (SD$) = 0 THEN HOME : POKE
    768,1: GOTO 120
F8 1235 ONERR GOTO 1630
A1 1240 PRINT : PRINT D$"CREATE "SD$
E9 1250 HOME : GOTO 1210
54 1260 HOME
64 1270 VTAB 23: PRINT "Select File to Del
    ete and Press Return or Esc to Abo
    rt": IF PEEK (768) = 2 THEN RETURN
F4 1280 POKE 768,2
85 1290 POKE 34,0
D0 1300 GOTO 670
85 1310 POKE 768,0: HOME
11 1320 FL$ = MID$ (F$(SF),2,15)
58 1330 PRINT "Deleting "FL$: PRINT : PRIN
    T "Approved? (Y/N) > ";
D7 1340 GET A$: IF A$ < > "Y" AND A$ < > "
    N" AND A$ < > ES$ THEN 1340
A1 1350 PRINT A$
CA 1360 IF A$ = "N" OR A$ = ES$ THEN PRINT
    : PRINT "Canceled.": FOR T = 1 TO
    1000: NEXT : GOTO 120
#7 1365 ONERR GOTO 1630
44 1370 PRINT : PRINT D$"UNLOCK "FL$: PRIN
    T D$"DELETE "FL$
FD 1380 PRINT FL$" Deleted."
37 1390 FOR T = 1 TO 1000: NEXT
D# 1400 GOTO 120
44 1410 HOME
D9 1420 VTAB 23: PRINT "Select File to Ren
    ame and Press Return or Press Esc
    to Abort": IF PEEK (768) = 3 THEN
    RETURN
F4 1430 POKE 768,3
A5 1440 POKE 34,0
F3 1450 GOTO 670
D# 1460 POKE 768,0
8A 1470 FL$ = MID$ (F$(SF),2,15):FT$ = RIG
    HT$ (F$(SF),3)
7D 1480 POKE 34,22: VTAB 23: HOME
3E 1490 PRINT "Old Name: "FL$; SPC( 10);"N
    ew Name: ";
6D 1500 INPUT "" ;NN$
F2 1505 ONERR GOTO 1630
39 1510 IF LEN (NN$) = 0 THEN 1060
AE 1520 PRINT : PRINT D$"UNLOCK "FL$: PRIN
    T D$"RENAME "FL$"," LEFT$ (NN$,15)
9A 1530 PRINT "Done.": FOR T = 1 TO 1000:
    NEXT : GOTO 120
52 1540 HOME
6E 1550 VTAB 23: PRINT "Select File to Tog
    gle Lock On and Press Return. Esc
    to end.": IF PEEK (768) = 4 THEN
    RETURN
33 1560 POKE 768,4: POKE 34,0
FD 1570 GOTO 670
#B 1580 FL$ = MID$ (F$(SF),2,15):L$ = LEFT
    $ (F$(SF),1)
D0 1590 IF L$ = "*" THEN PRINT D$"UNLOCK "
    FL$: HTAB SH * 23 + 7: VTAB SV + 9
    : PRINT " ":F$(SF) = " " + RIGHT$
    (F$(SF), LEN (F$(SF)) - 1)
AB 1600 IF L$ = " " THEN PRINT D$"LOCK "FL
    $: HTAB SH * 23 + 7: VTAB SV + 9:
    PRINT "*" :F$(SF) = "*" + RIGHT$ (F
    $(SF), LEN (F$(SF)) - 1)
E7 1610 GOTO 670
4C 1620 HOME
61 1630 ER = PEEK (222): PRINT "Error! ";
E9 1650 IF ER = 4 THEN PRINT "Write Protec
    ted.": GOTO 1710
9# 1655 IF ER = 10 THEN PRINT "File Locked
    . Directory Must be Empty.": GOT
    O 1710
96 1660 IF ER = 6 OR ER = 8 THEN PRINT "In
    sert ProDos Disk";: GOTO 1710
CA 1665 IF ER = 7 THEN PRINT "No Such Path
    name!";: GOTO 1710
AD 1670 IF ER = 12 THEN PRINT "No Buffers
    Available!";: GOTO 1710
2B 1675 IF ER = 16 THEN PRINT "Filename to
    o Long.": GOTO 1710
7B 1680 IF ER = 14 THEN PRINT "Program too
    Large";: GOTO 1710
7B 1690 IF ER = 17 THEN PRINT "Directory F
    ull!";: GOTO 1710
F# 1700 IF ER = 19 THEN PRINT "Duplicate F
    ile Name!";
C0 1710 PRINT " Press Any Key to Continue.
    "
89 1720 POKE - 16368,0: WAIT - 16384,128:
    POKE - 16368,0
E2 1730 GOTO 120

```

33

WindowMaker

Robert Wilder Vreeland, Jr.

Make, open, and close text windows in your BASIC programs with "WindowMaker," an impressive utility that also adds word processor-like full-screen editing capabilities to your Apple II, II+, IIe, IIc, or IIgs. Language card required on Apple II and II+. Works only with ProDOS.

Create innovative screen displays with windows of all sizes with "WindowMaker," a utility that packs a double punch. Windows are just part of what WindowMaker does—it also adds extensive screen-editing features to any Apple II-series personal computer. Produce miniwindows or text screens with the convenience of a full-screen, word processor-like program editor.

All In Machine Language

WindowMaker is written in machine language, so you'll need to type it in with "Apple MLX," the machine language entry program found elsewhere in COMPUTE!'s Apple Applications. MLX is used to enter a number of programs in this issue, so make sure you have a copy typed in and saved to disk. Load and run MLX, then respond to the two questions with

STARTING ADDRESS: 0800
ENDING ADDRESS: 1177

Press E at the options menu to enter the program, then type the starting address. If this is your first session at entering WindowMaker, type 0800. Type in WindowMaker, and when you're through, save it to disk—perhaps with a filename like WINDOW.MAKER.

Check to make sure that your computer is in 40-column mode (press Escape-4 if you're not sure), then activate WindowMaker by typing

BRUN WINDOW.MAKER

and pressing Return.

Note: WindowMaker uses a portion of the language card to store screen areas covered by windows. The program works on Apple II and Apple II+ computers only if a language card is installed.

Editing First

While WindowMaker is active, the checkerboard cursor is replaced with an underline cursor. You also won't see the ?,], *, and ! prompts on the screen.

All the cursor keys function, including the up cursor key. You can edit any BASIC program line that's displayed on the screen. You don't even need to place the cursor after the last character on a line before pressing Return. It doesn't matter where you press Return—BASIC reads the entire *logical* line (see "Logical Lines" below).

Several keys now function like those on popular word processors. The Delete key works as in most word processors. In other words, it deletes the character to the *left* of the cursor, and moves the character under it and those to the right of it one space to the left. The Tab key moves the cursor to the nearest column. Columns start at the left side of the current window and appear every ten spaces.

Two control-key combinations also have special functions. Control-L clears the window and moves the cursor to the upper left corner of the current window (just like the HOME command). Control-Y homes the cursor *without* clearing the window. Since WindowMaker uses the alternate character set, except for those used for text editing, the Control key combinations produce graphics characters in a program listing.

Logical Lines

When you type in a BASIC program, the computer has to have some way of organizing the screen so that you can enter more than 40 characters at a time. WindowMaker organizes the 24 physical screen lines into *logical lines*. Logical lines can consist of as many as four physical lines (160 characters) and are treated as a single unit. When a BASIC program is listed on the screen, each program line will be one logical line, though it may occupy more than one physical line. While WindowMaker is active, a bell sounds to let you know when you've typed past the right window boundary onto a new logical line.

Quote Mode

To make formatting text within BASIC PRINT statements easier, WindowMaker enters what's known as *quote mode* every time a quotation mark is printed (you're familiar with this if you've used a Commodore computer). Typing another quotation mark or pressing Return exits the quote mode.

Cursor and control keys don't work normally in quote mode. Instead, a letter character is printed when such a key is pressed. When the PRINT statement is executed in the program, however, the computer interprets the character as the cursor or control key it replaced—even if WindowMaker is not loaded (exceptions are the Ctrl-L and Ctrl-Y combinations, which work only when WindowMaker is present or an 80-column card is active.)

Table 1. Quote Mode Results

In quote mode you type	You see on the screen	ASCII code
Up	K	11
Down	J	10
Left	H	8
Right	U	21
Clear screen (Ctrl-L)	L	12
Home cursor (Ctrl-Y)	Y	25
Esc	[31
Tab	I	9

The only two control characters not affected by quote mode are the Delete and Return keys.

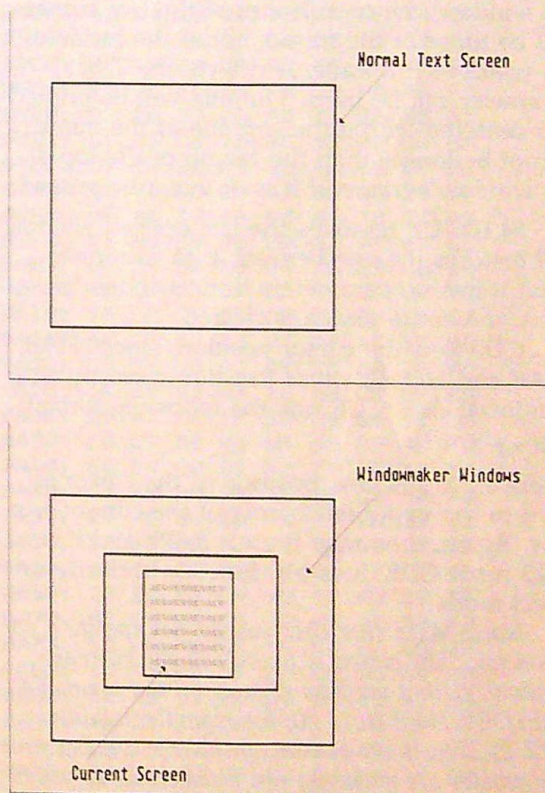
Normally, when you press the up cursor key, the computer moves the cursor up one line. But if you type a quotation mark when WindowMaker is active, then press the up cursor key, the cursor doesn't move up one line. Instead the letter K is printed. This character has the same ASCII value as the up cursor key. If this is part of a PRINT statement, the computer executes an up cursor move—it doesn't print the letter K—when the PRINT statement is performed.

Windowing Second

Imagine a collection of index cards. You can only see the top card, which covers all the rest. Imagine that every time you put another card on top of the stack, the one beneath is completely erased. This is the normal Apple text screen.

Now pretend the cards are of varying sizes. When you place a card on the top of the stack, the card now covered isn't erased, but is stored somewhere. You can write only on the topmost card, even when the one underneath is partially exposed. But when you remove the top card, the one beneath reappears. That's a perfect model of the WindowMaker system.

Figure 1: Text Screens—Normal and WindowMaker



Like the index cards, you work with only one window at a time. The entire text screen is your window when you start. As you create windows, however, you create miniature, but fully operational screens.

The current window is like the normal text screen in that all output goes to and all input is from that window. Windows scroll independently from the rest of the screen and operations like clearing the screen affect only the current

window. When a window slides up, the hidden portion of the screen is completely restored.

New Commands

WindowMaker adds three new commands to BASIC.

PULLDOWN
SLIDEUP
CUR

PULLDOWN opens a new window on the screen, and has the format

PULLDOWN *x1,x2,y1,y2,Ctrl-F,Title*

where *x1,y1* indicate its upper left corner and *x2,y2* its lower right corner. The range for *x* is 0-39, and for *y*, it is 0-23.

Ctrl-F (entered by pressing the Ctrl key and the F keys at the same time) is an optional parameter. If present, a frame is drawn around the window; the coordinates of the two corners will be those of the frame, not of the inside of the window. If a frame is drawn, the *Title* parameter can be used. The title will be printed and centered within the top line of the frame. It cannot be longer than the length of the top of the window's frame; if it is, it won't be printed.

SLIDEUP removes the last opened window and restores the one beneath it to its former state. It has no parameters. If no window is open, the entire screen is cleared.

CUR sets the cursor position, since HTAB, VTAB and HOME won't function correctly with WindowMaker. CUR has the following format:

CUR *x,y*

where *x,y* is the new position of the cursor relative to the upper left corner of the current window. Again, the range for *x* is 0-39, and it is 0-23 for *y*. CUR does not function correctly in direct mode.

Note: Make sure that you do not specify a position for CUR which is outside of the current window. With a window created by the command PULLDOWN 10,20,10,20, for example, issuing CUR 21,15 sets the cursor outside the window. The results are normally not disastrous, as you can usually cursor manually back into the window, but they should be avoided. To prevent placing the cursor outside the window, just insure that CUR's coordinates fall within the range (exclusive) used by the active window's PULLDOWN command. In the example, then, neither x nor y could be smaller than 11 or larger than 19.

When used in a program, these commands are considered to be DOS commands. As such, they must be put within a PRINT statement.

```
10 PRINT CHR$(4);"SLIDEUP"  
20 PRINT CHR$(4);"PULLDOWN 2,8,1,10"
```

The following short program "WindowMaker Demo" is a sample of WindowMaker's abilities. Type it in, save it to disk, and then run it after you've installed WindowMaker (with a BRUN WINDOW.MAKER).

The characters within brackets represent various keypresses.

[CLR]	Ctrl-L
[TAB]	Tab
[DWN]	Down cursor
[CTRL-D]	Ctrl-D
[CTRL-F]	Ctrl-F

Thus, [DWN-3] means to press the down cursor key three times.

WindowMaker Demo

```
10 SPEED=150: PRINT "[CLR][TAB]WINDOWMAKER"  
20 PRINT "[DWN 3]": FOR A=1 TO 12: PRINT  
   "[DWN]This is a Demo...": NEXT: FOR A=1 TO  
   200: NEXT  
30 PRINT "[CTRL-D]PULLDOWN 6,35,5,19,[CTRL-F],  
   DEMO": FOR A=1 TO 200: NEXT  
40 FOR A=1 TO 13: PRINT "[DWN]This is a framed  
   window...": NEXT  
50 FOR A=1 TO 200: NEXT: PRINT "[CTRL-  
   D]PULLDOWN 8,32,8,16": FOR A=1 TO 8  
60 PRINT "[DWN]This one has no frame...": NEXT:  
   FOR A=1 TO 1000: NEXT  
70 PRINT "[CTRL-D]SLIDEUP": FOR A=1 TO 1000:  
   NEXT: PRINT "[CTRL-D]SLIDEUP"  
80 FOR A=1 TO 500: NEXT: PRINT "[CLR]"
```

Input

Because of the way WindowMaker works, the INPUT command needs the following special format. Programs written like this operate normally, even if WindowMaker isn't loaded into memory.

```
INPUT "PROMPT[DWN][LEFT cursor the same number  
of times as there are letters in the prompt string]";a$
```

or if there's no prompt, the format

```
INPUT "[DWN][3 LEFT cursors]";a$
```

Some examples are

```
INPUT "VALUESJHHHHHH";a  
INPUT "JHHH";a$
```

Note: In the above example, you enter keys which appear in brackets by pressing the indicated key. You don't type the brackets. For instance, if you see [LFT], you press the left cursor key.

Machine Language

You can perform all the WindowMaker functions and three additional functions from machine language.

INPUT flashes the cursor and inputs a logical line storing the text at address 0200 (512 decimal) and up with a delimiter of 8D (141).

This is the equivalent of the FD67 monitor ROM routine.

GET flashes the cursor, waits for a key to be pressed, and returns its ASCII value in the accumulator with the high bit set. This is the equivalent of the FDOC monitor ROM routine.

PRINT prints the character or control code whose ASCII value is in the accumulator.

For WindowMaker functions PULLDOWN and CUR, values must be stored in memory before calling the appropriate routine. The locations to be loaded correspond exactly to the previously-discussed BASIC values, except for CUR's *x* and *y* values. Here they're relative to the upper left corner of the screen, not the current window.

After loading the appropriate memory locations, your program should perform a JSR to the appropriate calling location for the function you wish to access.

Address	Function
0804	JMP PRINT
0807	JMP GETKEY
080A	JMP INPUT
080D	JMP PULLDOWN (Carry set means error)
0810	JMP SLIDEDOWN
0813	JMP CURSOR
0819-C	x1,x2,y1,y2 or x,y for CUR
081D:	80=Frame, 00=None
081E-F	PTR to Title or 00 if none. Title ends with 8D.

WindowMaker

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

```

0800: 4C D4 0F 11 4C 20 08 4C 9D
0808: 8D 08 4C 3E 0C 4C F6 0C D9
0810: 4C 9E 0C 4C 91 0C 60 00 B1
0818: 00 00 27 00 17 00 00 00 C5
0820: 85 07 8A 48 98 48 20 2F DF
0828: 0E F0 44 C9 7F F0 40 A5 86
0830: 1E 29 01 08 A5 07 29 7F 55
0838: 28 D0 17 29 7F C9 1A B0 0E
0840: 11 C9 08 90 0D C9 0E 90 91
0848: 26 C9 15 F0 22 C9 19 EA E4
0850: F0 1D C9 22 D0 08 A5 1E 8B
0858: 49 01 85 1E A5 07 20 50 B9
0860: 0A A4 24 91 28 20 0C 09 1F
0868: 68 A8 68 AA A5 07 60 20 88
0870: BE 0A 4C 68 08 A2 02 A9 EA
0878: 90 38 48 2C 00 C0 30 45 53
0880: E9 01 D0 F7 68 E9 01 D0 1D
0888: F1 CA D0 EB 60 8A 48 98 73
0890: 48 A4 24 B1 28 85 06 A9 9A
0898: 9F 91 28 20 75 08 AD 00 0B
08A0: C0 30 0C A5 06 91 28 20 DF
08A8: 75 08 AD 00 C0 10 E8 85 C8
08B0: 07 AD 10 C0 A5 06 91 28 4E
08B8: 68 A8 68 AA A5 07 65 CA BD
08C0: 85 CA A5 07 60 68 0E EA BB
08C8: 88 34 06 20 D5 08 08 A4 84
08D0: 06 28 D0 F4 60 98 A2 00 02
08D8: C9 08 90 05 E9 08 E8 D0 44
08E0: F7 A8 B5 FA 39 E8 08 60 5B
08E8: 80 40 20 10 08 04 02 01 A3

```

```

08F0: 7F BF DF EF F7 FB FD FE 56
08F8: 20 D5 08 B5 FA 39 F0 08 91
0900: 95 FA 60 20 F8 08 19 E8 AC
0908: 08 95 FA 60 E6 24 A5 24 20
0910: C5 21 F0 40 90 3E A5 20 58
0918: 85 24 E6 25 A4 25 C4 23 8B
0920: F0 07 90 05 C6 25 20 B1 8B
0928: 09 88 20 C9 08 38 98 E5 B9
0930: 25 EA EA C9 FD 90 23 A4 A6
0938: 25 20 D5 08 08 A4 25 20 5D
0940: 03 09 28 D0 0F A4 25 20 9D
0948: 60 09 C8 C4 23 F0 02 B0 C3
0950: 03 20 F8 08 A4 25 20 BD 43
0958: 0B 60 20 E2 FB 4C 54 09 FC
0960: 98 48 20 BD 0B A9 A0 A4 95
0968: 20 91 28 C8 C4 21 F0 F9 07
0970: 90 F7 68 A8 60 98 48 20 76
0978: BD 0B A5 28 85 08 A5 29 24
0980: 85 09 68 48 A8 88 30 14 05
0988: C4 22 90 10 20 BD 0B A4 4B
0990: 20 B1 08 91 28 C8 C4 21 48
0998: F0 F7 90 F5 68 A8 60 AD E6
09A0: 00 C0 10 0C C9 93 D0 08 EB
09A8: AD 10 C0 AD 00 C0 10 FB A7
09B0: 60 A4 22 20 75 09 C8 C4 88
09B8: 23 F0 F8 90 F6 88 20 60 3B
09C0: 09 A9 30 20 A8 FC 20 9F E2
09C8: 09 06 FC 26 FB 26 FA A4 F5
09D0: 22 20 D5 08 F0 04 C6 25 81
09D8: D0 D7 A4 25 4C BD 0B EA 8A
09E0: C9 20 B0 03 69 40 60 C9 FC
09E8: 40 90 FB C9 44 B0 03 29 6F
09F0: 0F 60 C9 48 B0 04 38 E9 50
09F8: 41 60 C9 48 D0 03 A9 07 6E
0A00: 60 C9 50 B0 04 38 E9 3B DB
0A08: 60 C9 53 B0 05 38 EA E9 FC
0A10: 3A 60 C9 53 D0 03 A9 1A C7
0A18: 60 C9 54 D0 03 A9 1C 60 BD
0A20: C9 55 D0 03 A9 1D 60 C9 05
0A28: 5A D0 03 A9 1E 60 C9 5F FD
0A30: D0 03 A9 1F 60 C9 80 90 50
0A38: FB C9 A0 B0 04 38 E9 40 F0
0A40: 60 C9 C0 B0 03 29 7F 60 36
0A48: C9 E0 B0 F9 38 E9 C0 60 7A
0A50: 29 7F C9 60 90 09 A6 32 40
0A58: E0 FF D0 02 09 80 60 C9 EB
0A60: 40 90 04 E9 40 B0 EF C9 46
0A68: 20 B0 EB C9 08 90 08 C9 2F
0A70: 0E B0 04 18 69 C0 60 C9 92
0A78: 15 F0 F8 C9 19 F0 F4 C9 4F
0A80: 1B F0 F0 C9 04 B0 03 69 6B
0A88: 40 60 C9 08 B0 03 69 41 34
0A90: 60 C9 15 B0 03 69 3B 60 89
0A98: C9 19 B0 03 69 3A 60 C9 DC
0AA0: 1A D0 03 A9 53 60 C9 1C BC
0AA8: D0 03 A9 54 60 C9 1D D0 95
0AB0: 03 A9 55 60 C9 1E D0 03 CC
0AB8: A9 5A 60 A9 5F 60 C9 08 F6
0AC0: D0 1A C6 24 A5 24 30 05 02
0AC8: C5 20 90 01 60 E6 24 A4 75
0AD0: 25 C4 22 F0 F7 88 EA A6 5A
0AD8: 21 4C 1A 0B C9 0A D0 10 AC
0AE0: A4 25 C4 23 F0 03 C8 D0 51
0AE8: 33 4C B1 09 A4 25 10 2E 78
0AF0: C9 0B D0 0A A4 25 C4 22 CC
0AF8: F0 D2 C6 25 10 EE C9 0C 41
0B00: D0 1F A4 22 20 60 09 C8 5A
0B08: C4 23 F0 F8 90 F6 A9 00 AA
0B10: 85 FA 85 FB 85 FC A6 20 A5

```

0B18: A4 22 86 24 84 25 4C BD 2B
0B20: 0B C9 19 F0 F1 C9 15 D0 12
0B28: 03 4C 0C 09 C9 0D D0 12 1B
0B30: A5 1E 29 FE 85 1E A6 21 C8
0B38: 86 24 20 0C 09 A4 25 4C D0
0B40: F8 08 C9 09 D0 3C A5 20 81
0B48: 18 69 0A C5 24 90 F9 F0 AA
0B50: F7 C5 21 F0 09 90 07 A5 45
0B58: 21 85 24 4C 0C 09 85 24 5D
0B60: 60 20 BD 0B A5 06 48 A4 91
0B68: 20 B1 28 85 06 C8 C4 21 56
0B70: F0 02 B0 08 B1 28 88 91 E6
0B78: 28 C8 D0 F1 68 88 91 28 BE
0B80: 60 EA 20 C2 0A A4 25 C8 A7
0B88: C4 23 F0 02 B0 0B 84 06 C8
0B90: 20 D5 08 08 A4 06 28 D0 0C
0B98: EE A9 A0 85 06 88 C4 25 FD
0BA0: F0 09 84 07 20 61 0B A4 B3
0BA8: 07 10 F2 20 BD 0B A4 24 2E
0BB0: A5 06 48 4C 6D 0B BD 00 FB
0BB8: 02 C9 8D 60 EA 98 48 48 8C
0BC0: 4A 29 F3 85 29 68 48 4A E2
0BC8: 4A 4A AA BD F2 0B 85 28 BE
0BD0: 68 F0 07 38 E9 08 B0 F9 86
0BD8: 69 08 A8 88 30 0A A5 28 60
0BE0: 18 69 80 85 28 4C DB 0B FA
0BE8: A5 29 18 69 04 85 29 68 A6
0BF0: A8 60 00 28 50 00 86 46 CB
0BF8: 84 47 85 45 AE 83 C0 AE DB
0C00: 83 C0 A0 00 60 20 F6 0B 9A
0C08: B1 CE E6 CE D0 02 E6 CF A2
0C10: A4 CF C0 E0 B0 03 18 90 E6
0C18: 01 38 AE 82 C0 EA EA EA 2F
0C20: A6 46 A4 47 60 20 F6 0B A2
0C28: C6 CE A6 CE E0 FF D0 02 C3
0C30: C6 CF A6 CF E0 D0 90 E1 BE
0C38: 91 CE 4C 16 0C EA 20 8D 91
0C40: 08 C9 8D F0 06 20 20 08 88
0C48: 4C 3E 0C A4 25 20 C9 08 27
0C50: 84 25 20 BD 0B A2 00 A4 5B
0C58: 20 B1 28 20 E0 09 9D 00 5A
0C60: 02 E8 C8 C4 21 F0 F2 90 5C
0C68: F0 86 07 A4 25 C8 84 25 40
0C70: C4 23 F0 02 B0 0E 20 D5 C5
0C78: 08 F0 09 A4 25 20 BD 0B 6C
0C80: A6 07 D0 D3 C6 25 A6 07 24
0C88: 20 36 0E A9 8D 9D 00 02 7F
0C90: 60 AD 19 08 AC 1A 08 85 4B
0C98: 24 84 25 4C BD 0B A5 FD B0
0CA0: D0 05 A9 0C 4C BE 0A C6 90
0CA8: FD A5 1E 10 08 C6 20 E6 70
0CB0: 21 C6 22 E6 23 A4 23 20 CF
0CB8: BD 0B A4 21 20 05 0C 91 D7
0CC0: 28 88 30 04 C4 20 B0 F4 52
0CC8: A4 23 88 84 23 30 04 C4 FB
0CD0: 22 B0 E4 20 05 0C 85 FC 25
0CD8: 20 05 0C 85 FB 20 05 0C 92
0CE0: 85 FA A2 05 20 05 0C 95 E1
0CE8: 20 CA 10 F8 20 05 0C 85 08
0CF0: 1E A4 25 4C BD 0B E6 FD 90
0CF8: A5 CE 48 A5 CF 48 A5 1E 04
0D00: 20 25 0C 90 08 68 85 CF BA
0D08: 68 85 CE 38 60 A2 00 B5 58
0D10: 20 20 25 0C E8 E0 06 D0 4F
0D18: F6 A5 FA 20 25 0C A5 FB 19
0D20: 20 25 0C A5 FC 20 25 0C 2E
0D28: AD 1D 08 85 1E EA EA AD D9
0D30: 19 08 85 20 AD 1A 08 85 F6
0D38: 21 AD 1B 08 85 22 AD 1C 5E

0D40: 08 85 23 A4 22 84 25 20 FB
0D48: BD 0B A4 20 B1 28 20 25 2E
0D50: 0C B0 B2 C8 C4 21 F0 F4 01
0D58: 90 F2 A4 25 C8 C4 23 F0 EE
0D60: E4 90 E2 A5 1E 10 42 A4 22
0D68: 22 20 BD 0B A4 20 A9 4C 47
0D70: 91 28 C8 C4 21 F0 F9 90 14
0D78: F7 A4 23 20 BD 0B A4 20 A1
0D80: A9 9F 91 28 C8 C4 21 F0 98
0D88: F9 90 F7 A4 22 84 25 20 9A
0D90: BD 0B A4 20 A9 5F 91 28 F8
0D98: A4 21 A9 5A 91 28 A4 25 C3
0DA0: C8 C4 23 F0 E8 90 E6 B0 CB
0DA8: 02 10 7B A4 22 20 BD 0B 99
0DB0: A4 20 A9 AF 91 28 A9 9C 72
0DB8: A4 21 91 28 A4 23 20 BD D1
0DC0: 0B A4 20 A9 9C 91 28 A4 48
0DC8: 21 A9 AF 91 28 AD 1E 08 29
0DD0: 8D B7 0B AD 1F 08 F0 46 1D
0DD8: EA 8D B8 0B A2 00 20 B6 9F
0DE0: 0B F0 03 E8 D0 F8 86 08 2B
0DE8: A5 21 38 E9 03 E5 20 E5 99
0DF0: 08 90 28 4A 18 65 20 85 59
0DF8: 08 A4 22 20 BD 0B A4 08 F1
0E00: A9 BC 91 28 C8 A2 00 20 C5
0E08: B6 0B F0 0E 86 08 20 50 26
0E10: 0A A6 08 EA 91 28 E8 C8 52
0E18: D0 ED A9 BE 91 28 E6 20 54
0E20: C6 21 E6 22 C6 23 A9 0C 09
0E28: 20 BE 0A 18 68 68 60 A5 12
0E30: 07 29 7F C9 0D 60 A2 00 D5
0E38: BD 00 02 09 80 9D 00 02 80
0E40: E8 E4 07 D0 F3 CA E0 FF 84
0E48: F0 07 BD 00 02 C9 A0 F0 BF
0E50: F4 E8 60 D0 D5 CC CC C4 7A
0E58: CF D7 CE C3 D5 D2 00 00 62
0E60: 48 20 8D 9A 68 4C 17 D7 7E
0E68: D3 CC C9 C4 C5 D5 D0 00 4E
0E70: 20 4A FF BA BD 04 01 C9 A4
0E78: FD D0 11 BD 03 01 C9 6E E3
0E80: D0 0A 68 68 68 08 20 0A 4A
0E88: 08 4C CF 9A BD 06 01 C9 31
0E90: D7 D0 05 BD 05 01 C9 04 0D
0E98: F0 0D 20 3F FF C9 87 D0 6F
0EA0: 03 4C DD FB 4C 04 08 68 B7
0EAB: 68 EA A5 45 A4 07 20 04 43
0EB0: 08 C8 B1 9B D0 09 68 68 D6
0EB8: 68 68 A9 00 4C 60 0E 10 68
0EC0: ED 38 E9 7F AA 84 85 A0 2A
0EC8: D0 84 9D A0 CF 84 9E A0 9A
0ED0: FF CA F0 07 20 2C D7 10 9F
0ED8: FB 30 F6 A9 20 20 5C DB 8E
0EE0: 20 2C D7 30 05 20 5C DB 53
0EE8: D0 F6 20 5C DB A4 85 A9 1B
0EF0: 20 D0 BB C3 EF F0 F9 F2 2F
0EF8: E9 E7 E8 F4 A0 B1 B9 B8 68
0F00: B7 A0 A0 A0 A0 A0 C3 CF 1F
0F08: CD D0 D5 D4 C5 A1 C1 EC 6E
0F10: EC A0 D2 E9 E7 E8 F4 F3 86
0F18: A0 D2 F3 F6 E4 A0 A0 A0 B4
0F20: A0 A0 A0 A0 A0 A0 A0 A0 3E
0F28: A0 A0 A0 A0 A0 A0 A0 A0 46
0F30: A0 A0 A0 A0 A0 A0 A0 A0 4E
0F38: A0 A0 A0 A0 A0 A0 A0 A0 56
0F40: A0 A0 A0 A0 A0 A0 A0 A0 5E
0F48: A0 A0 A0 A0 A0 A0 A0 A0 66
0F50: D7 E9 EE E4 EF F7 CD E1 DD
0F58: EB E5 F2 A0 B1 AE B1 A0 9A
0F60: A0 A0 A0 A0 A0 A0 A0 A0 7E

0F68: A0 A0 A0 A0 A0 A0 A0 A0 86
 0F70: A0 A0 A0 A0 A0 A0 A0 A0 8E
 0F78: A0 A0 A0 EA EA 20 2F FB 04
 0F80: 20 58 FC A0 1A B9 F3 0E 1C
 0F88: 99 07 05 88 10 F7 A0 0E 0E
 0F90: B9 0E 0F 99 0D 06 88 10 2C
 0F98: F7 A0 26 B9 1D 0F 99 28 BB
 0FA0: 06 88 10 F7 A0 22 F7 44 AA
 0FAB: 0F 99 D0 06 88 10 F7 A0 44
 0FB0: 12 B9 67 0F 99 50 07 88 C8
 0FB8: 10 F7 A0 18 A9 FF 20 A8 A8
 0FC0: FC 88 10 F8 60 AD 57 C0 3A
 0FC8: AD 54 C0 AD 52 C0 AD 50 07
 0FD0: C0 4C BA 0F A9 FE BD F2 02
 0FD8: 03 A9 0F 8D F3 03 20 16 9F
 0FE0: 08 A9 AA 8D F4 03 20 16 A5
 0FEB: 08 20 7D 0F A9 80 85 67 75
 0FF0: 85 69 A9 11 85 68 85 6A B5
 0FF8: 20 6C D6 20 4B D6 A9 40 68
 1000: 8D 07 BE A9 10 8D 08 BE A0
 1008: 20 2F FB 20 58 FC 8D 0F 66
 1010: C0 A9 DF 85 CF A2 FF 86 DE
 1018: CE E8 86 1E 86 FD 86 20 E5
 1020: 86 22 A9 27 85 21 A9 17 CE
 1028: 85 23 A9 70 85 36 A9 0E 76
 1030: 85 37 A9 07 85 38 A9 08 EE
 1038: 85 39 20 10 08 4C 00 BE 9E
 1040: A9 6F 85 FE 8D 50 BE A9 86
 1048: 11 8D 51 BE A2 00 BE 54 F0
 1050: BE 8E 55 BE BD 00 02 DD D9
 1058: 53 0E D0 09 E8 E0 08 D0 FB
 1060: F3 A0 02 D0 29 A2 00 BD 81
 1068: 00 02 DD 68 0E D0 08 EB F7

1070: E0 07 D0 F3 4C 39 11 A2 28
 1078: 00 BD 00 02 DD 5B 0E D0 71
 1080: 09 EB E0 03 D0 F3 A0 00 43
 1088: F0 04 38 A9 10 60 84 FE CD
 1090: A0 00 BC 1D 08 BC 1F 08 1D
 1098: B9 00 02 29 7F C9 D0 F0 96
 10A0: 06 99 00 02 C8 D0 F1 A4 5C
 10AB: B8 84 04 A4 B9 84 05 CA C5
 10B0: 86 B8 A2 02 86 B9 A9 71 96
 10B8: 85 36 A9 11 85 37 A4 FE C0
 10C0: D0 06 20 B1 10 00 4C DA 10 E0
 10C8: 20 F5 E6 20 BE DE 8E 19 FC
 10D0: 08 20 F8 E6 20 BE DE 8E D2
 10D8: 1A 08 20 F8 E6 20 BE DE AF
 10E0: 8A A6 FE 9D 19 08 20 B7 8A
 10E8: 00 20 F8 E6 8A A6 FE E8 74
 10F0: 9D 19 08 20 00 9A 20 B7 8B
 10F8: 00 C9 8D F0 0F E0 01 D0 1B
 1100: 0E A4 04 84 B8 A4 05 84 02
 1108: B9 4C 8A 10 4C 34 11 20 E1
 1110: BE DE C9 06 D0 0D A9 80 71
 1118: 8D 1D 08 20 B1 00 4C F9 6B
 1120: 10 EA EA A6 B8 8E 1E 08 11
 1128: A6 B9 8E 1F 08 20 B1 00 F3
 1130: C9 8D D0 F9 A6 B8 20 01 AD
 1138: 11 CA 8E 52 BE A9 00 8D B6
 1140: 53 BE A5 FE D0 12 AD 1A A4
 1148: 08 18 65 22 8D 1A 08 AD D5
 1150: 19 08 18 65 20 8D 19 08 CB
 1158: A9 11 48 A9 6E 48 A5 FE 16
 1160: F0 07 C9 02 F0 06 4C 10 5E
 1168: 08 4C 13 08 4C 0D 08 18 43
 1170: 60 A9 08 38 4C 09 E6 A0 07

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Press return



Open-Apple is Tom Weishaar's monthly newsletter for knowledgeable Apple II users. It's thin but packed tight with Apple II lore, humor, letters, tips, advice, and solutions to your problems. Compared to other Apple II publications, **Open-Apple** has the highest new-idea-per-issue ratio, the clearest writing, the funniest cartoons, the longest index, the only warranty (all your money back if you're not satisfied), and it takes up the least shelf space. The only thing it doesn't have is the most subscribers. Yet.

Ill cue #22

If you OPEN and READ the directory of the built-in ProDOS /RAM volume, you'll find that you get an END OF DATA error before ProDOS reports how much free space is left there. This bug is caused by a non-standard directory on the /RAM volume — it's only big enough to hold 12 filenames rather than the usual 51. To work around the problem, CREATE a subdirectory, OPEN and READ it, then DELETE it. For more information, see "Good BYE, /RAM bug" in the August 1987 **Open-Apple**, page 3.52.

From our fan mail:

I want to say that I am extremely impressed with **Open-Apple**. I did not realize a publication that provides so much interesting and practical information about the Apple II world existed.

Joseph J. Sokolosky
 Laurel, Md.

I find **Open-Apple** to be packed with solid advice every month. Rather than becoming thinner and thinner with more advertisements, **Open-Apple** just seems to get better and better.

Michael Fisher
 Milwaukee, Wisc.

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ProDOS File Stamper

Louis-Eric Simard

No need for a clock card when you have this program handy. Run it each time you start your Apple II+, IIe, or IIc, and it automatically stamps files as they're saved or changed. Use only with ProDOS.

Type **CATALOG**, and ProDOS shows you information ranging from the names of files to their lengths. Two columns, *Modified* and *Created*, however, are usually filled with the label **<NO DATE>**. These columns should show the date and time each file was created, and the date and time of the last change to that file.

Dates and times can be important, especially when you want to know which version of a file is the oldest (the original, in other words) or which version you most recently altered. "ProDOS File Stamper" fills in the missing dates and times for you automatically.

Stamp Those Files

File Stamper is a short BASIC program. Type it in with "Apple Automatic Proofreader," our error-checking utility published in this issue. Automatic Proofreader makes typing mistakes almost impossible.

Once you've entered File Stamper, save it to a ProDOS-formatted disk using any filename you want. **FILE.STAMPER** would be a good choice.

*Note: If you want File Stamper to automatically run whenever you boot the disk, save it with the name **STARTUP**.*

To run File Stamper, type **RUN FILE.STAMP** (or whatever other name you might have given it), or use the ProDOS smart run option: Enter **-FILE.STAMP** and press Return. You'll see the default values for the current day, month, year, hours, and minutes.

The first time you run File Stamper, the screen will show **06-DEC-86** and **18:30**. Line 110 in the program uses those values. As you're typing in File Stamper, you can change them to create a more recent date if you wish.

The second and subsequent times you run File Stamper, the last entered date and time are displayed.

Note: File Stamper is unnecessary with an Apple IIGS since that machine includes a battery-driven clock which time and date stamps all files.

Date By Default

Press the **Y** key if you want to use the default date and time. If not, press **N**, and you'll have a chance to supply both date and time.

The date format is **DD-MMM-YY**, where

- DD** Date from 1 to 31. When entering dates 1-9, add a preceding 0, as in 01.
- MMM** Month, in the form of a three-letter abbreviation. Months are JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, and DEC.
- YY** Year. Use the last two digits of the year, as in 87.

The time should be entered as **HH MM**, where

- HH** Hours expressed in military time. For example, 4 p.m. should be entered as 16, midnight as 24. Hours 1-9 should be preceded by 0, as in 05 for 5 a.m.
- MM** Minutes from 1 to 59. Precede minutes 1-9 with 0.

You have to manually cursor across the hyphens when entering the date. (You can use the space bar to move from one part of the date entry to another; though this erases the hyphen, it doesn't affect the result.) Acknowledge the new default values and the messages **UPDATING PRODOS** and **PRODOS UPDATED** will appear.

Any files you save or create from this point on will have date and time supplied under **MODIFIED** and **CREATED** columns.

How Stamper Works

ProDOS stores date and time as binary information in several memory addresses. Addresses 49040 (\$BF90 in hexadecimal) and 49041 (\$BF91) of the MLI Global Page contain the date in YYYYYYMMMMDDDD format. The time is stored at addresses 49042 (\$BF92) and 49043 (\$BF93) in 000HHHHH00MMMMMM format. (The 0s stand for unused bits.) The trick is to code values in that manner.

Lines 470-550 do the job for the day, month, and year by converting all necessary values to the binary format and concatenating them all to create a 16-bit string. That string is split into two eight-bit substrings and converted back to decimal.

Data for the hours and minutes is POKEd into memory, since each part of the information exactly fits in two bytes.

Lines	Function
Lines 100-130	Check if DATESTAMP (a file which contains default date/time values) is on the disk.
Lines 140-150	Create DATESTAMP if it's not already on disk.
Lines 180-240	Display defaults and asks if they need to be modified.
Lines 280-390	Modify the default settings and stores it on disk.
Lines 450-560	Set ProDOS date and time values.
Line 590	Contains data used for the creation of DATESTAMP.
Lines 600-650	Do base conversion.

ProDOS File Stamper

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```

73 5 REM COPYRIGHT 1987 COMPUTE! PUBLICATI
    ONS, INC. ALL RIGHTS RESERVED.
75 10 DIM MO$(12)
53 20 TEXT : HOME
68 30 REM
55 40 REM <> MAIN PAGE <>
60 50 REM
68 60 HTAB 11: PRINT "PRODOS FILE STAMPER"
37 70 HTAB 13: PRINT "Copyright 1987"
52 80 HTAB 7: PRINT "COMPUTE! Publications
    , Inc."
6E 85 HTAB 11: PRINT "All Rights Reserved.
    "
79 90 FOR A = 1 TO 40: PRINT "-";: NEXT :
    PRINT : POKE 34,5
2F 100 ONERR GOTO 140
EA 110 HO = 18:MI = 30:MM = 12:DD = 6:YY =
    86
EE 120 PRINT CHR$(4)"VERIFY DATESTAMP"
97 130 GOTO 170
26 140 FOR A = 1 TO 12: READ MO$(A): NEXT
A0 150 POKE 222,0: PRINT CHR$(4)"STORE DA
    TESTAMP"
EC 160 PRINT
36 170 PRINT CHR$(4)"RESTORE DATESTAMP"
80 180 VTAB 8: PRINT "CURRENT SET-UP IS: "
5E 190 VTAB 10
5C 200 PRINT "DATE : "DD"-MM$(MM)"-"YY
81 210 PRINT "TIME : "HO":MI
8A 220 VTAB 13: PRINT "USE EXISTING SET-UP

```

```

? (Y/N) ";
29 230 VTAB 13: HTAB 29: GET A$: IF A$ < >
    "Y" AND A$ < > "N" THEN 230
81 240 IF A$ = "Y" THEN PRINT "YES": GOTO
    440
80 250 REM
AF 260 REM <> CHANGE SET-UP <>
91 270 REM
86 280 PRINT "NO"
57 290 HOME
5E 300 VTAB 10: HTAB 15: PRINT "DD-MMM-YY"
    : VTAB 10: HTAB 15
A5 310 INPUT " ";N$:DD = VAL ( LEFT$ (N$,2)
    )
74 320 YY = VAL ( RIGHT$ (N$,2))
77 330 IF DD < 1 OR DD > 31 OR YY < 1 THEN
    300
3A 340 M$ = MID$ (N$,4,3)
32 350 FOR A = 1 TO 12: IF M$ < > MO$(A) T
    HEN NEXT : GOTO 300
57 360 MM = A
13 370 VTAB 12: HTAB 17: PRINT "HH MM": VT
    AB 12: HTAB 17
28 380 INPUT " ";N$:HO = VAL ( LEFT$ (N$,2)
    ):MI = VAL ( RIGHT$ (N$,2)): IF MI
    < 0 OR MI > 59 OR HO < 1 OR HO > 24
    THEN 370
29 390 PRINT CHR$(4)"STORE DATESTAMP"
A6 400 RUN
87 410 REM
2F 420 REM <> UPDATE PRODOS <>
88 430 REM
A9 440 VTAB 15: PRINT "UPDATING PRODOS..."
89 450 POKE 49042,MI: POKE 49043,HO
4A 460 REM ++ CALCULATE DD-MMM-YY VALUES +
    +
FE 470 ST$ = "":N$ = STR$(YY): GOSUB 610
56 480 IF LEN (N$) < 7 THEN M$ = "": FOR M
    = 1 TO 7 - LEN (N$):M$ = M$ + "0":
    NEXT :N$ = M$ + N$
8A 490 ST$ = N$:N$ = STR$(MM): GOSUB 610
E3 500 IF LEN (N$) < 4 THEN M$ = "": FOR M
    = 1 TO 4 - LEN (N$):M$ = M$ + "0":
    NEXT :N$ = M$ + N$
86 510 ST$ = ST$ + N$:N$ = STR$(DD): GOSU
    B 610
89 520 IF LEN (N$) < 5 THEN M$ = "": FOR M
    = 1 TO 5 - LEN (N$):M$ = M$ + "0":
    NEXT :N$ = M$ + N$
47 530 ST$ = ST$ + N$
EE 540 N$ = RIGHT$ (ST$,8): GOSUB 630: POK
    E 49040, VAL (N$)
1A 550 N$ = LEFT$ (ST$,8): GOSUB 630: POK
    E 49041, VAL (N$)
F9 560 PRINT : PRINT "PRODOS UPDATED."
98 570 END
6E 580 REM ++ MONTH DATA ++
5E 590 DATA JAN,FEB,MAR,APR,MAY,JUN,JUL,AU
    G,SEP,OCT,NOV,DEC
65 600 REM ++ DECIMAL->BINARY ++
E8 610 A = 10:B = 2: GOSUB 650: RETURN
98 620 REM ++ BINARY->DECIMAL ++
66 630 A = 2:B = 10: GOSUB 650: RETURN
64 640 REM ++ GEN. PURPOSE BASE CONVERTER
    ++
70 650 N = 0: FOR M = 1 TO LEN (N$):C = AS
    C ( MID$ (N$,M,1)) - 48:N = N * A +
    (C > 9) * (C - 7) + (C < 10) * C:
    NEXT :C = 0:N$ = ""
E4 660 FOR M = 1 TO 0 STEP 0:C = C + 1:D =
    N / B ^ C + 1E - 4:M = INT (D):R =
    INT ((D - M) * B):N$ = CHR$( (R <
    10) * (R + 48) + (R > 9) * (R + 55)
    ) + N$: NEXT : RETURN

```

Hardball

David Florance
Programming Assistant

Baseball is an American phenomenon, one that embodies the traditional American spirit. Where else but at a ball park can you find a Wall Street broker and Wall Street sweeper sitting side by side, both eating hotdogs and drinking sodas?

Baseball's vernacular is as universal as its fans. *Three strikes and you're out!*, *getting to first base*, and *out in left field* have meanings far removed from the sport.

Now from *Accolade* comes a game for your Apple II+, IIe, IIc, IIGS, or Macintosh computer that comes close to literally bringing the sport into your home. It's not like watching the game on TV. You're involved. With *Hardball*, you can instantly become player and manager. You call the shots and get the hits—or strike out. *Hardball* looks realistic enough to make you smell the roasted peanuts. Play a friend or foe, or play the computer.

The Apple II version lets you use the joystick to choose the home-field advantage and decide which type of game you'll play. The Macintosh version uses the mouse and is completely menu driven. Macintosh *Hardball* also features digitized sound. When you first hear the umpire yell *S-T-R-I-K-E*, you'll think you're at the ball park.

The Defensive Game

Baseball is a strategic game. So is *Hardball*. The program allows you to select pitchers, substitute hitters, and keep track of statistics on which you can base your strategic decisions.

Choose your pitcher carefully. Some have plenty of off-speed stuff, some have plenty of hard stuff, and some have a mixed bag

of tricks. They're all good once you learn how to work over the batters. A helpful hint: A high earned run average (ERA) doesn't mean that the pitcher can't get batters out. Some of the pitchers may have just come up from the minor leagues. Others may have been through a slump recently. The more you play *Hardball*, the more you'll see that each pitcher has his own strengths as well as weaknesses.

You can pitch the ball anywhere you like. Your catcher has the inhuman (but handy) habit of not allowing passed balls or wild pitches. He'll catch anything you throw at him.

Once the ball is hit, the nearest defensive player begins to blink. That's the player currently under joystick or mouse control. After fielding the ball, throw it to the base or player desired: Move the joystick right for first, up for second, left for third, or down for home on the Apple II version. The Macintosh game has a diamond insert at the bottom of the screen that highlights the base you're throwing to. Once the base is highlighted, press the mouse button to pump your toss.

You're On Deck

You can substitute not only pitchers, but other players as well. Remember that a high batting average doesn't always mean automatic base hits. You can swing the bat anywhere in the strike zone—inside, outside, high, or low. Timing is the most crucial element here. Batting is tougher to learn than pitching. The designer, Bob Whitehead, must agree with famous pitcher Don Drysdale, who said that good pitching will likely beat good hitting. It seems only fitting, especially in light of today's home-run extravaganzas, that *Hardball* brings back a bit of



Great color graphics are the trademark of the Apple II version of *Hardball*. The behind-the-mound perspective changes to a view into the field once the ball is hit.

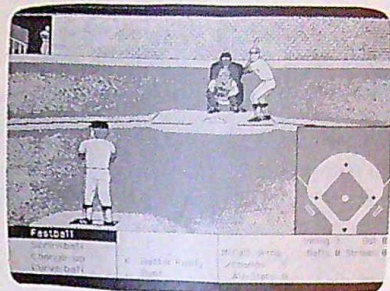
the old game, with a clear advantage given to the pitchers.

Keep your eye on the ball. Practice will yield better results than anything else. Don't worry if the hits come slowly. They're supposed to in the majors. Use smooth strokes, wait for the ball down the middle, and you'll quickly be knocking it long. And don't forget the steal and bunt options. Should you get behind, remember the words of Yogi Berra (or was it Casey Stengel?): It ain't over till it's over.

How Does It Stack Up?

Hardball has almost everything you could want from a baseball simulation. It stacks up well against the computer-baseball competition because it's a versatile program. There are three types of baseball software. In one, you're the manager. In another, you're the player. And in the third, you're the statistician.

You get to do all three in *Hardball*. You must demonstrate manual skills for simulated fielding, pitching, and batting. If things look bleak (or unusually good), you can instantly become manager and change the players around to your liking. You can keep up with the statistics as well.



Macintosh Hardball offers crystal-clear graphics, smooth animation, and superb sound effects. The mouse controls pitch selection and batting.

The exceptionally clear and precise graphics are another big part of *Hardball's* success. You've got a clear view of the field from two perspectives: right behind the pitcher and high above home plate. A clever divided-screen technique provides a more panoramic view of the field.

Hardball's realism is outstanding—at a level unmatched by other baseball software to date. The game, like real-life baseball, has endless variations. Each game is different.

But then, that's baseball, isn't it?

Hardball
Apple II-series computer with 64K minimum; joystick required. Macintosh requires 512K minimum.
Accolade
20813 Stevens Creek Blvd.
Cupertino, CA 95014
\$34.95 (Apple II); \$44.95 (Macintosh)

DiskFit

Gregg Keizer, Editor

You *must* back up your hard disk. It's not just a good idea, it's the law.

Or at least it should be. There will come a moment when you wish you had just finished backing up the disk. For whatever reasons—and they're almost legion—all or part of the 20, or 30, or 40 megabytes of your hard disk will be unreachable. A head crash; garbled document files; a strange System file that decided to go south permanently—these things have happened to others. It's only a matter of time and bad luck before they happen to you.

Preventing hard disk horrors is as simple as regularly backing up the data on your hard disk. Everyone tells you to do it. Following through, though, is another matter. Backing up a hard disk—one that has enough data to fill 25 to 50 800K disks—can be time consuming, tedious, and wrist wrenching. That's why tape-back-up manufacturers are doing such land office business. But if you're like most Macintosh owners who use the computer at home, school, or in a small business, you may not be able to afford an expensive tape-backup system.

So you have two choices: Either

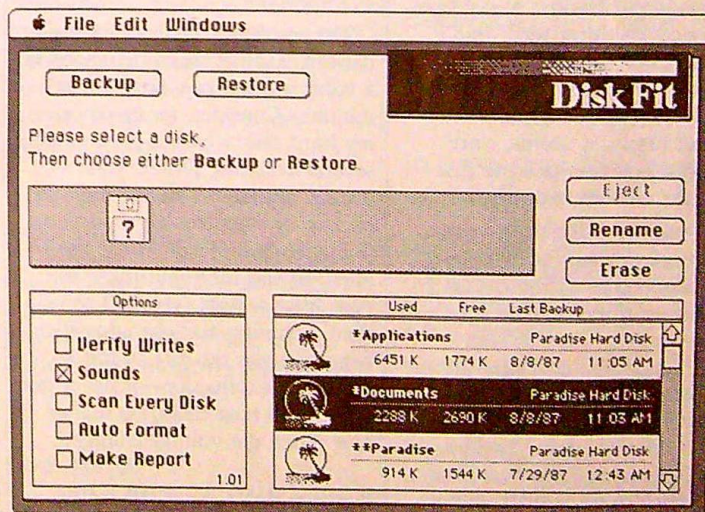
do not back up at all, or back up to floppy disks. The second choice is much more palatable, and almost painless, if you use *DiskFit*, a backup program for the Macintosh from SuperMac Software.

SuperMac, best known for its line of hard disks and large screens, has published a backup utility that's quite good at global, or disk-wide, backups, and is superb at incremental backups. This is how it should be. After all, few people need to back up their entire disk more than a few times. It's much more common to want to copy only those files which have changed or been added to the disk since the last backup. An excellent implementation of incremental backups is what makes *DiskFit* stand above most every other such program.

SmartSets

Once *DiskFit* is installed on your hard disk (a simple process since *DiskFit* is not copy protected), you can run the program and begin your first backup. *DiskFit's* screen appears.

The hard disk device(s) connected to your Macintosh appears in the window at the lower right. If you've partitioned a hard disk into several *volumes*, perhaps for file-serving purposes, or on an older hard disk, each volume ap-



DiskFit's screen shows the hard disk volumes available for backup, in the window at the lower right. Select the volume, click on *Backup*, and insert a floppy disk the drive to start your first backup. Note that you can erase or rename any selected volume by clicking on the appropriate button.

pears in the window.

Carrying out your first backup is similar to most other hard disk backup utilities. Select the hard disk volume, click on the Backup button, slap a floppy disk into the drive, and hit Return. From then on, it's just a matter of feeding the Macintosh floppy disks whenever it beeps and asks for one. You can, of course, set any or all of the features listed under Options at the lower left of the screen. They range from verifying writes (unnecessary in most cases) to automatic formatting (nice if you're using blank disks right out of the box). Most of the time, the only one option you need checked is Sound. As you back up the volume, make sure you label the floppies correctly. That will become important when you begin making incremental backups later.

With the backup successfully completed, you now have your first *SmartSet*, a term SuperMac uses to describe the entire set of floppies and its corresponding hard disk volume. A *SmartSet* knows what files are on which disks in the set. Store the floppies in a safe place.

But as soon as you change just one file on your hard disk, you make your *SmartSet* obsolete. Not to worry. Incremental backups are where *DiskFit* shines.

What's Different?

An incremental backup should be able to do one thing well: find and copy only those files which have been changed or added since the last backup was done. *DiskFit* does that easily, it seems, once you feed the Macintosh the first disk in the correct *SmartSet*.

Most backup utilities, however, pretty much leave it at that. They create new copies of the changed files, leaving the old—and now useless—versions intact. This means that as you continue to make incremental backups, your floppy collection will become enormous. If the first global backup takes 18 disks, and the first incremental backup finds 900K of new and changed files, you'll have 20 disks. The next incremental backup might add another disk or two, and the next incremental another couple of floppies until you have

more floppies occupied in backing up your hard disk than you thought imaginable. The solution is to do another global backup, freeing up most of those floppies. But global backups are, by nature, the most time consuming.

DiskFit solves this problem elegantly. Instead of just making new copies of altered files, it copies the new version atop the old, or deletes the old before copying the new version—depending on how much room is available on the appropriate disk in the *SmartSet*. *DiskFit* is also smart enough to know that it can safely delete a file from the floppy-based *SmartSet* if you've deleted that same file from your hard disk. It scans the hard disk volume, compares it to the *SmartSet*, and adjusts everything accordingly.

You don't have to tell the program what to back up and what to leave alone. *DiskFit* simply backs up everything that's changed since the last backup. It's a small time-saver that you quickly take for granted.

Select the hard disk volume, pop the first floppy in the *SmartSet* into the drive, and the incremental backup begins. *DiskFit's* intelligence is apparent here, too, for it will ask only for those disks that contain files which were changed or deleted since the last backup. This is why labeling the floppies is so important.

The result is a fast and efficient backup. Even extensive changes to a volume often take only a few minutes. Consider, for instance, my hard disk which is divided into several volumes. *DiskFit* was usually able to do an incremental backup of even the largest volume (8 megabytes, 6½ of which were filled) in less than four minutes, even after several weeks of constantly shifting and changing files. Better yet was the size of the floppy disk collection—it never got larger than nine disks, no matter how much the volume changed.

Backup Bells And Whistles

Backing up a hard disk doesn't do much good if you can't easily restore the disk when things go wrong. *DiskFit* does its job here, as well, requesting each disk in

the right *SmartSet*, reading the files, copying them to the disk, and ejecting automatically.

Another big plus of *DiskFit* is that it copies files to floppies in the normal Macintosh format, not in a compressed or special form as do some other backup programs. In the worst case, then, when you have to replace or repair your hard disk, you can still access the files and applications on the backup floppies.

Other features include automatically splitting files that are too large for one floppy into pieces placed on two (or more) disks, substantial error-recovery powers, and the ability to recreate a disk in a *SmartSet* should you lose or damage it. You can even mix 400K and 800K disks in your *SmartSets*.

DiskFit is an outstanding backup utility. I've used several in the last two years, and none of the others has the quickness and ease-of-use of *DiskFit*. It actually makes me *want* to back up my hard disk, not dread it.

And that makes it easy to follow the law of hard disks: Back up now, back up often.

DiskFit

Macintosh (512, Plus, SE, and II); one or more HFS-format hard disks

SuperMac Software

295 N. Bernardo Ave.

Mountain View, CA 94043

\$74.95

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Create A Calendar

Duncan R. Teague

Time is nature's way of keeping everything from happening all at once.

—A famous, but anonymous, grafitto on the walls of a building at the University of Arizona

Create a Calendar helps you keep track of what happens when. This program from Epyx produces seven different chronicles of events, ranging from a desktop calendar whose pages you flip (or forget to flip) each day to a one-page calendar that displays the entire year in one glance.

Each calendar can be created from scratch, or you can opt to use one of several master calendars. These contain a predefined list of events and holidays automatically placed in your calendar. Master calendars exist in several forms, all of which contain some common elements. The Holidays master calendar includes federal government holidays, like New Year's Day, Memorial Day, Independence Day, and Labor Day; widely-celebrated religious holidays that affect department store sales, like Valentine's Day, St. Patrick's Day, Easter, Halloween, and Christmas; gift-giving occasions such as Mother's Day, Father's Day, and Grandparents' Day; and seasonal events such as the spring and fall equinoxes and summer and winter solstices.

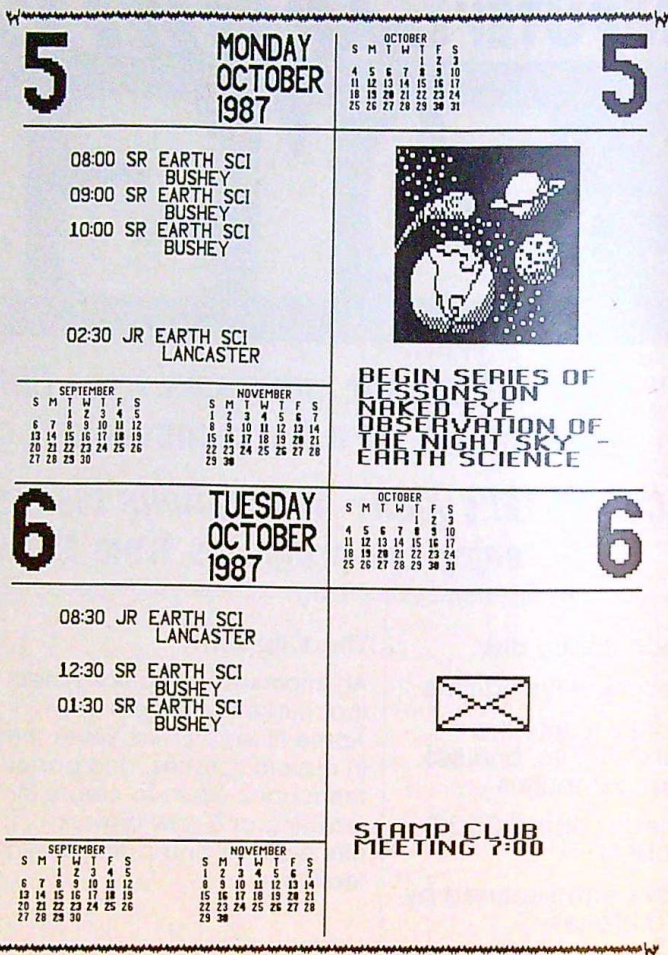
The Holidays master calendar contains 34 events for 1987. In contrast, the Holidays.Plus master includes 58 events. The events are listed not only in greater number but also in greater detail.

The Jewish master calendar has 46 events, 18 of which are religious celebrations not appearing on other masters. And the Historical master boasts a whopping 98 events, a list that could serve as a final exam for a social studies class.

Moving Around The Calendar

The opening and all following screens are presented in a consistent and logical format. The name of the current operation or the selected date appears at the top. At

Figure 1: Daily Calendar



One side of the daily calendar (on the right in this example) holds any graphic and text already entered in the monthly format. The other side contains additional text you type in.

the bottom is a prompting area, which reminds you of the input expected, the disk required, and the keys used to make menu selections or editing maneuvers. The center is used for menus and the display of the current calendar format.

From the main menu, you can start a new calendar, retrieve a previously created calendar, work on the current calendar, or access disk utilities. The last option is the first choice you'll want to make. Two-drive users can specify which disk drive will hold the calendar data disk and which drive will hold the master program and/or graphics disks. One-drive users will likely lose their sanity in a flurry of disk swapping.

To start a new calendar, the program formats a disk dedicated

to hold all the information for a single year. The master program will access this disk to create screen displays and hard copy in whatever format you choose. It will also access its own flip side or some *Print Shop* compatible disks for new graphics, borders, and fonts for your calendar.

If you decide to use one of the master calendar options, some dates will automatically be entered. When you select the month for which you want to enter new events, you'll see the numerals for those dates underlined.

Maneuvering around the monthly calendar display highlights individual dates. Pressing Return selects one for an expanded view. If an event has been entered by a master calendar option, an appropriate graphic may

be loaded from the program disk and displayed in the top half of the box. Text appears below the graphics area.

Six lines of text will fit below a day's graphic. About 14 proportional characters fit on a line. Text entry includes global cursor movement (within the confines of the date box), word-wrap, and character insertion and deletion.

Days, Weeks, And Months

It's possible to change the screen display to show daily, weekly, or monthly formats. Hard copy can also include two different yearly formats—single page or banner—and a simple chronological listing of events. The text, graphics, or both are resized to fit each format.

The daily calendar allows you to enter another 12 lines of text. One side of the daily calendar shows any graphics and any text already entered in monthly format. The other side, left or right at your option, can hold additional text, which will appear only in this format (see Figure 1).

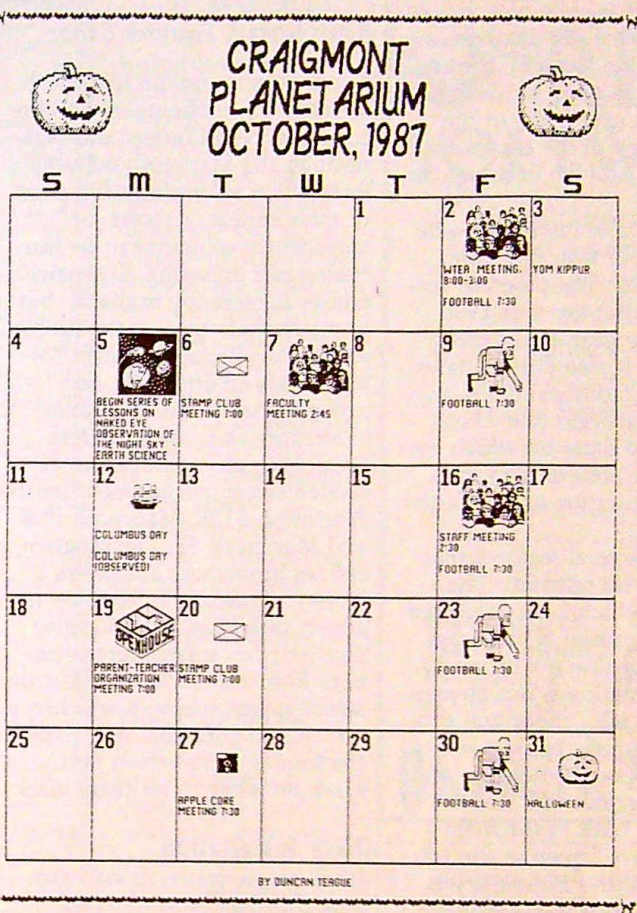
Graphics

When you select a date from the default monthly calendar screen, you have the option of including a graphic with any text you type. Graphics are not just a cute idea. They're attention getters—they tell you at a glance what's significant about that day's events (see Figure 2). You can load graphics from side B of the program disk or from another disk.

Side B of the program disk contains 81 graphics, some of which are included with some of the master calendar events. Epyx has also produced three additional graphics disks, called *Graphics Scrapbook Collections*. Sports, Off the Wall, and School are the categories. Each contains about 100 new graphics, a couple of fonts, eight borders, and several full-panel displays.

It's also possible, according to the documentation, to load graphics from any *Print Shop* compatible disk. However, *Print Shop Graphics Library* disks did not work. *Print Shop Companion* graphics, though, did load, as did graphics from *Beagle Minipix Disks* 1, 2, and 3.

Figure 2: By The Month



In the monthly format, *Create a Calendar* can display up to six lines of text and an eye-catching graphic for each date.

Repeat That Day

The most useful function of *Create a Calendar* is its ability to repeat an entry. You may schedule events that occur at regular intervals—the first Monday of each month, every other Tuesday, and so on. The *Repeat this date* option lets you copy a single event and duplicate it over a selected range of dates in subsequent or previous months, on the appropriate day of the month.

The program correctly identifies each date by its ordinal position within the month. Thus, you can schedule staff meetings on the third Friday of each month, faculty meetings every first Wednesday, a beauty shop appointment every Tuesday, and aerobics exercise every second day.

If a repeated event conflicts with one previously entered, you have the option of replacing the first event or skipping that date.

Some careful planning eliminates many conflicts, which most often occur with events included by a master calendar option.

Hard Copy

Create a Calendar supports a variety of printers and interfaces for hard copy. Before printing, you can customize the calendar with a title printed in the font and graphic of your choice. While there is no choice of graphic size, repetition, or placement, you can choose what type of calendar to print, can add a credit line at the bottom, and can specify how many copies you want printed.

The print routine is excellent, properly maintaining the line-feed count to bring the top of the next page to the correct position. It avoids using a form feed, which does not take into account the 1/9-inch spacing used by graphics mode.

A Red-Letter Day

The end result is quite nice, but as in the creation of any database (which the calendars are), the entry process is tedious. Master calendar options save some of the labor, but some of the events they automatically add are of marginal importance.

I was especially impressed with the treatment of leap years and seasonal events. The program correctly shows that the year 1900 was *not* a leap year, but the year 2000 will be. It also differentiates between the traditional dates on which seasons begin (the 21st) and the actual dates on which the seasons begin according to the precise configuration of the Earth and the Sun.

There are several features that detract from the program. The screen font, which I call *bold peculiar*, has an unusual *m* character. It's easy to confuse it with an *n*. The documentation is not always in agreement with the actual program. The 16-page booklet omits one font present on the disk, and it incorrectly states that Control-Q will take you back to the main menu from any screen in the program. Instead, the Escape key is used to back your way to the menu. And the program could not read *Print Shop Graphics Library* disks.

One additional flaw was the inability of the master Historical calendar to find the graphic for Hanukkah. The source of the problem was found in a screen message that declared *HANUKAH graphic not found*. Note the missing *k*.

An electronic calendar is more elegantly corrected than a paper one. *Create a Calendar* is easy to learn, text entry is versatile, and the ability to include appropriate graphics for each date is a clever idea. Educators and families will probably find *Create a Calendar* output a useful addition to their bulletin boards and refrigerator doors.

Create a Calendar

Apple II-series computer with 64K minimum

Epyx, Inc.

600 Galveston Dr.

Redwood City, CA 94063

\$29.95

Stepping Out

Keith Ferrell, Features Editor

I've always found the Macintosh screen to be confining. For all the conveniences of format and organization the Macintosh delivers, its inability to display a full page or more of text, graphics, or spreadsheet columns can be frustrating and annoying. Expensive add-on screens are available, but at prices that verge on the prohibitive. Now, Berkeley System Design offers an affordable way around small screen frustrations.

Stepping Out: The Macintosh Screen Extender, provides an extended screen environment for the Macintosh 512K, Macintosh Plus, and Macintosh SE. The program resides in memory and offers a variety of features in addition to screen extension. With *Stepping Out*, you can enlarge screen images from 1 to 16 times, select the screen image size with which you are most comfortable, and change the format of the screen from black on white to white on black.

Easy Installation

It's a simple matter to start *Stepping Out*. The program is not copy-protected, and it can be placed on a working disk.

Stepping Out itself needs approximately 80K of RAM—and more to hold the screen size you've selected. The program's manual suggests that *Stepping Out* needs 648 bytes of memory for each square inch of the oversize screen image it holds.

While the memory required to hold a larger screen in memory can be restrictive with huge programs, the fact that *Stepping Out* is in RAM makes its features immediately accessible, eliminating scroll delays and jerky transitions.

Installation, as you might expect with a Macintosh-specific program, is mouse-driven. Upon booting up, *Stepping Out's* installation screen offers the opportunity to change the default screen size (576 × 720 pixels, the size of a *MacPaint* document) to the size you desire. The program's brief, well-organized manual gives information on several screen sizes, including full-page display

(640 × 864 pixels) and workstation display (1024 × 1024 pixels). Of course, you can select your own screen display size, bearing in mind that the larger the display, the more memory the program requires.

Memory Intensive

The amount of memory required for a particular size screen is displayed in the lower right-hand corner of the installation window. It's handy to have this information, especially if you have a sense of the amount of memory your applications will require. If you're not careful, *Stepping Out* may not leave enough RAM for those applications.

For example, a full-page display requires about 70K, plus the 80K that *Stepping Out* takes. The workstation display consumes a whopping 207K (program and screen memory combined). If you define a screen that won't fit into memory, the program tells you that there's not enough RAM available.

Stepping Out does not automatically display your full page of text. Unless you invoke *Stepping Out*, the Macintosh's screen display remains unchanged. *Stepping Out* features are accessed from the keyboard, with access conveniently confined to combinations of Command/Option and letter or numeral keys. When not in use, *Stepping Out* terminates, but remains resident in RAM, ready to step out when you are.

Suppose, for example, you are writing an article and wish to see a full page of text. Press the Command and Option keys and the spacebar, and your screen divides. The left half displays a portion of the traditional Macintosh screen; the right half of the screen shows the full-page image reduced by a factor of either two or four (selectable from the keyboard). Both halves have cursors, and you can continue to enter text, with new characters reflected on both halves of the screen.

Since the left (Macintosh) section of the screen is only a partial screen, you must wait for the image to scroll as you enter text. This scrolling is slow and unwieldy, depending upon the size of the *Stepping Out* screen you've

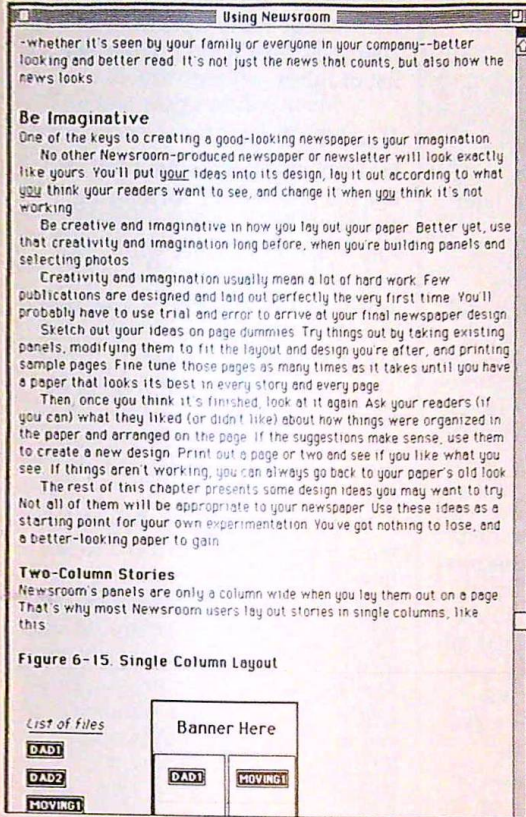


Figure 6-15. Single Column Layout

Another interesting feature of *Stepping Out* is that any screen dump to disk (accomplished by pressing Command-Shift-3) transforms an area up to 576 pixels wide by 720 pixels high into a MacPaint file.

selected. Likewise, the right side of the screen shows the whole page, but because the image is reduced its characters can be hard to read.

To return to the full view, simply repeat the Command-Option-spacebar sequence.

Applications

I doubt if word processing will be one of the major applications for *Stepping Out*. For simple text processing, the program's advantages seem a little limited, although it's convenient to be able to see a full page or more in order to tell how long a subsection is, or how a series of paragraphs appear in relation to one another.

But where *Stepping Out* really begins to shine is in desktop publishing and graphics applications. Here, the advantages of being able to see a full page or more at a time become obvious.

Equally effective is the program's ability to extend the width

of a page, making it possible to scroll easily across even a wide spreadsheet or drawing.

Scrolling is fast—almost too fast. It's easy to over-scroll, and simply brushing the mouse can move you a long way from your home image. (This can be confusing if you're at a point requiring interface with a dialog box. *Stepping Out*'s manual suggests that in such a situation you either use the mouse to scroll around the display or call up a reduced view of the whole page.

Neither solution seems particularly efficient.)

The Big Picture

In addition to offering screen reductions, *Stepping Out* can expand your screen image from 2 to 16 times. This function gives users the opportunity to magnify the

area where your cursor rests.

Again, the screen divides, with normal view on the left and enlarged view on the right. Magnified areas can be resized using a combination of keyboard input and the mouse.

Enlargements of areas of the screen are particularly useful for some graphics packages that don't otherwise permit easy close-up or detail work. *Stepping Out*'s character enlargement also reflects another Berkeley System Design product, *inLARGE*, aimed at making the Macintosh more accessible to the visually impaired.

Stepping Out also lets you alter the screen format to project white images on a black background, although the black-on-white Macintosh screen is so readable that it's hard to think of too many situations where such a reversal would be advantageous.

I like *Stepping Out*. It's an honest program that does what it sets out to do. Were I in constant need

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of a full-page screen image, I'd consider getting a larger monitor. But for occasional applications, or frequent previewing of large documents or images, *Stepping Out* makes a lot of sense.

Stepping Out
Macintosh 512K, Plus, and SE
Berkeley System Design
1708 Shattuck Ave.
Berkeley CA 94709
\$95

Writer's Choice Elite

Jim Trunzo

Writer's Choice Elite, an Apple IIGS word processor from Activision, offers a generous glimpse into the world of the Macintosh. As a matter of fact, the program bears more than a passing resemblance to *MacWrite*, and uses many features that could once be found only in the Macintosh environment. Windows, dialog boxes, and mouse-activated menus are all part of *Writer's Choice Elite*.

Writer's Choice Elite possesses all of the standard editing features—cut and paste, automatic insert, find and replace—that one expects to find in any word processor. But where does the program exceed expectations, break new ground, or take advantage of the IIGS's capabilities?

The first place the program shines is in its use of the desktop environment. *Writer's Choice Elite* can place 16 open documents on the desktop at one time and let you manipulate them in a number of ways. You can change the size of documents, move them to different locations on the screen, and have multiple versions of the same document open and on the desktop at once. This feature is invaluable if you want to compare two drafts of the same piece of writing, move material from one document to another, or create a notepad for ideas and memos. However, the more documents open on the desktop, the slower *Writer's Choice Elite* operates. This becomes noticeable when more than three documents are open at one time.

Cutting And Pasting

Cut and paste is another standard word processing feature that's included in *Writer's Choice Elite*. With the program's Clipboard (a special offscreen location that acts as a holding area for material you're editing or moving) you can cut and store one piece of material at a time, pasting it into the desired portion of your document.

A final editing option is the Cross command. This feature crosses out unwanted text rather than erasing it. Cross can be used in two ways—first, it can show

changes that have been made in a document you've edited. Second, it can simply mark off an area that doesn't fit in its current position but which will be used later in the document.

Writer's Choice Elite makes excellent use of color, and cross marks (solid horizontal lines) can be shown in black, red, or white. The color you choose will depend on the color of your text and background—those colors also being selectable.

Rules

The program uses Rulers to help lay out a page. The ruler controls left and right margins, automatic indentation of the first line in new paragraphs, tab stops, decimal tab stops (for easy alignment of numbers containing decimals), line spacing, and alignment. To make changes in the formatting defaults, simply click the mouse on the appropriate icon shown on the current Ruler.

Rulers are quite powerful, and once mastered, can be used to speedily and accurately format complex documents. *Writer's Choice Elite* manages its Rulers by having you assign a name to each new Ruler. The Main Ruler usually governs the majority of the document. If formatting changes are needed, a new Ruler or Rulers must be created and named; this naming process is the key to using Rulers effectively, as the following example illustrates.

The default name of any new Ruler created is LOCAL. Any ruler named LOCAL never affects more than one paragraph. All paragraphs typed after a paragraph affected by a LOCAL ruler are formatted according to the Main Ruler. This, in itself, is a powerful and useful feature. But what if you know that you're going to repeatedly use a specific nonstandard format? You might wish to single space and double indent long passages of quoted material, for example. Rather than create new Rulers every time you want to format long quoted passages, name a Ruler as LONGQUOTE. Then, when you wish to

use that particular format, select the Change Ruler option and choose LONGQUOTE from the list of rulers.

Head To Foot

Headers and footers also fall under the province of formatting, and these features play a special role in *Writer's Choice Elite*. Not only do they determine where, when, and how headers and footers are used, they also determine top and bottom margins.

Activate headers and footers by selecting the Header or Footer option from the pull-down Format menu found on the Main Menu line.

Headers and footers default to margins ranging from zero to six lines, with six lines equaling one inch. You determine the margins by hitting the spacebar the desired number of times. If you wish to use larger top or bottom margins, the header and footer windows can be expanded beyond one inch by enlarging the window.

Page numbers, dates, and even the time are easily placed anywhere within a header or footer by positioning the pointer on the appropriate icon, clicking and holding down the mouse button, and dragging the icon to the spot where you want the item located. *Writer's Choice Elite* can also designate a page as a Title Page. When you do, the program automatically skips the first page when it places its headers and footers, and begins numbering with page 2.

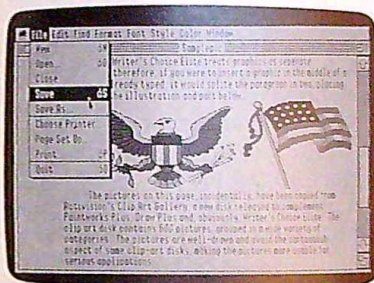
A Picture Is Worth...

The G in IIGS stands for *Graphics*, and the designation hasn't escaped the people at Activision. Pictures created with either *Paintworks Plus* or *Draw Plus* can be copied into *Writer's Choice Elite* with a special function called Copy Image. Just insert the disk containing the picture and select Copy Image from the Edit menu. Next, use the mouse to draw a marker box around part or all of the picture, depending upon your needs. Click the word COPY in the dialog box and your selection is placed on the Clipboard. From there it can be placed anywhere in your document. Pictures can be

further manipulated by creating a LOCAL ruler for them, giving you the ability to center or justify the picture as you see fit.

The last stage of document preparation is printing. *Writer's Choice Elite* can mix 12 different fonts with 7 different styles, including bold, italic, shadow, and outline. Several different styles can be used at the same time. For instance, you might select the New York font and want it to be printed in both boldface and italics.

Writer's Choice Elite uses the WYSIWYG (What You See Is What You Get) approach to word processing, so most of the guesswork is eliminated before the final copy is printed—most of the guesswork, but not all.



Writer's Choice Elite for the Apple IIgs uses a graphic interface very similar to that seen on Macintosh software. The program can also import graphics from a variety of sources and print them (and text) in color using an ImageWriter II.

Here's an example. Fonts can be printed in different point sizes. Eight points produces a small print; 16 points is twice as large. On the pull-down Style menu, *Writer's Choice Elite* always boldfaces the smallest point size that will still be clear on the screen. There are fonts, though, so detailed that when you use them in a point size smaller than recommended, the image on the screen is not clear. This isn't the program's fault; it's the fault of the RGB monitor. The resolution, as high as it is, still doesn't compare with the capabilities of the ImageWriter or LaserWriter printers. Therefore, although the print will appear clear and readable on paper, its monitor appearance may be anywhere from blurry to

unreadable.

Styles and fonts are selected from the Style and Font menus found on the top line of the screen. Clicking on the name of the font you wish to use activates that font; clicking on the style you wish to use, as well as the size, further defines the appearance of the print. Anything typed after the selections have been made will conform to the prior selections.

Fonts and styles can be changed as often as you like, even within sentences. Furthermore, none of the selections you make need be permanent. Fonts and styles can be changed at any time by highlighting the words or sentences and then selecting a new font or style.

Printing

You've composed your document, edited it, and formatted it. Now you want to print it. Before actually printing, however, you might want to identify your printer type and do a Page SetUp. *Writer's Choice Elite* supports the ImageWriter printer and the Apple LaserWriter. Several impressive options are available when using either printer. Paper types may range from standard US Letter (8½ × 11) to International Fanfold (8¼ × 12).

Special effects are also possible. With an ImageWriter you can select a 50 percent option; condense vertically, printing text in normal density but at half height; or print the document in the Wide mode, which prints the text sideways on the page. Additionally, print quality can range from draft to near letter.

If you're printing with a LaserWriter, you can select several other options. More control over the vertical sizing of the print is available, for one thing; a process known as Smoothing (having the printer add extra dots between points that form a line, producing a higher resolution copy) can be employed. Finally, LaserWriter users can either reduce or enlarge text between 25 and 400 percent.

One or all pages can be printed, regardless of printer choice, and up to 99 copies can be designated prior to printing. Also, printing can be done in color if you have an ImageWriter II and a color ribbon.

Caveats

Obviously, *Writer's Choice Elite* has many excellent features. It also has several weaknesses, some of which are minor annoyances, others which are compromises forced by the program's special features.

The program's biggest drawback is its speed, or rather its lack of it. The program is slow. It takes three minutes to boot from the time the disk is inserted in the drive to the appearance of a document screen. It takes 15 or 20 seconds each time a new font or style is used. These are tolerable. You only load once, and if you want to fancy up your document, there's a price to pay. However, where speed becomes a major factor is in the actual typing.

Writer's Choice Elite keeps up with your typing until it comes to the end of a line. At that point, the wordwrap process delays the appearance of any text for several seconds. This may not seem like much, but put it in perspective: You can type a portion of the next line before the actual print begins to appear on the screen.

Equally bothersome is the lack of speed during backspace deletes. When the cursor is to the right of the letter you want to delete, you simply press the Delete key. Delete doesn't keep up with key-strokes—you can easily press Delete four times before two letters are deleted. The tendency is to keep pressing the Delete key until the letters disappear. What you're doing, however, is Deleting ahead (just as you typed ahead) and before you know it, a whole line's erased.

Another problem is that only two printers are officially supported. Apple did not, understandably enough, provide print routines for other printers. Any printer that's ImageWriter compatible should perform admirably. However, other printers may not allow *Writer's Choice Elite* to operate to its fullest capabilities.

The program is not copy protected, but to use a copy of the application, you must have the original (called the Master) disk available. On one hand, this method seems fair—it lets you protect your master disk from

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wear and tear and protects Activation from being cheated out of potential profits. On the other hand, it's a nuisance to do the disk swapping.

To end on a positive note—because the program deserves a strong finish—*Writer's Choice Elite* can edit ASCII text files from *AppleWorks* or other word processors. It also permits interaction with AppleTalk if you use a modem. Frills such as a Clock and Memory Check are available by clicking on the Apple symbol on the Main Menu line.

Finally, although the program makes very good use of the mouse, many of the most frequently used commands can be accessed through the keyboard.

Writer's Choice Elite requires at least 512K of memory but works better with more. If you use only 512K, you must preselect pictures you wish to use, and store them before you do anything else. *Writer's Choice Elite* then reserves memory for the images, rather than assigning that memory to other tasks.

Writer's Choice Elite has many features which make it a strong entry in the word processing field, especially among those currently available for the Apple IIGS. Its drawbacks are acceptable when compared to the flexibility offered by the program, especially if your priorities include graphics, fonts, and styles.

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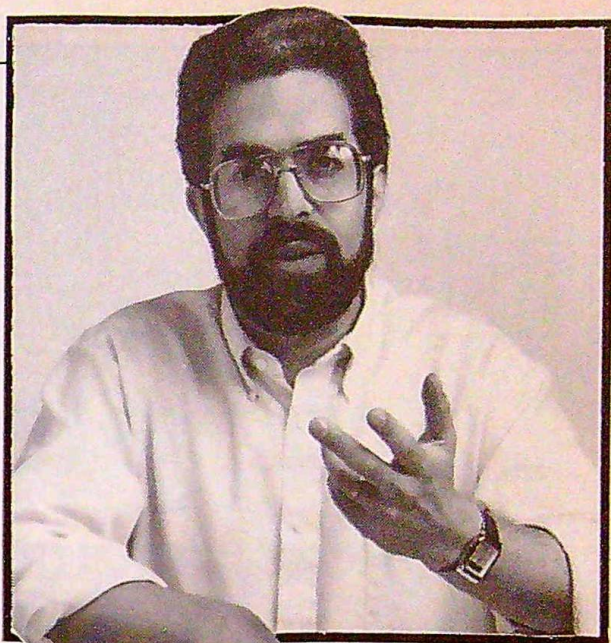
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- statistics: count, total, average, min., max., & standard deviation
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Apple MLX

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 IIfx, with either DOS 3.3 or ProDOS.

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 Special*, 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 or IIfx, 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.

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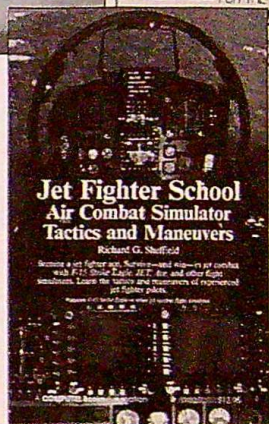
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Invalid Characters Banned

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 redisplay 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



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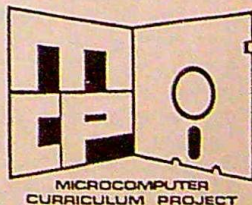
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data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses; then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load 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: Machine Language Entry Program

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```

86 100 N = 9: HOME : NORMAL : PRINT "APPL
E MLX": POKE 34,2: ONERR GOTO 610
CC 110 VTAB 1: HTAB 20: PRINT "START ADDR
ESS": GOSUB 530: IF A = 0 THEN PR
INT CHR$ (7): GOTO 110
8C 120 S = A
E3 130 VTAB 2: HTAB 20: PRINT "END ADDRES
S "": GOSUB 530: IF S >= A OR A
= 0 THEN PRINT CHR$ (7): GOTO 130
26 140 E = A
85 150 PRINT : PRINT "CHOOSE: (E)NTER DATA
": HTAB 22: PRINT "(D)ISPLAY DATA
": HTAB 8: PRINT "(L)OAD FILE (S)
AVE FILE (Q)UIT": PRINT
AE 160 GET A$: FOR I = 1 TO 5: IF A$ < >
MID$ ("EDLSQ",I,1) THEN NEXT : GOT
O 160
93 170 ON I GOTO 270,220,180,200: POKE 34
,0: END
AF 180 INPUT "FILENAME: ";A$: IF A$ < > "
" THEN PRINT CHR$ (4);"BLOAD";A$;"
,A";S
AI 190 GOTO 150
6D 200 INPUT "FILENAME: ";A$: IF A$ < > "
" THEN PRINT CHR$ (4);"BSAVE";A$;"
,A";S;"",L";E - S
92 210 GOTO 150
C2 220 GOSUB 590: IF B = 0 THEN 150
9E 230 FOR B = B TO E STEP 8:L = 4:A = B:
GOSUB 580: PRINT A$;"": ";L = 2
85 240 FOR F = 0 TO 7:V(F + 1) = PEEK (B
+ F): NEXT : GOSUB 560:V(9) = C
F2 250 FOR F = 1 TO N:A = V(F): GOSUB 580
: PRINT A$" "": NEXT : PRINT : IF
PEEK (49152) < 128 THEN NEXT
94 260 POKE 49168,0: GOTO 150
CC 270 GOSUB 590: IF B = 0 THEN 150
48 280 FOR B = B TO E STEP 8
A6 290 HTAB 1:A = B:L = 4: GOSUB 580: PRI
NT A$;"": "; CALL 44668:A$ = "" : P
= 0: GOSUB 330: IF L = 0 THEN 150

```

```

F9 300 GOSUB 470: IF F < > N THEN PRINT C
HR$ (7);: GOTO 290
27 310 IF N = 9 THEN GOSUB 560: IF C < >
V(9) THEN PRINT CHR$ (7);: GOTO 29
0
72 320 FOR F = 1 TO 8: POKE B + F - 1,V(F
): NEXT : PRINT : NEXT : GOTO 150
8E 330 IF LEN (A$) = 33 THEN A$ = 0:P =
0: PRINT CHR$ (7);
22 340 L = LEN (A$):0$ = A$:0 = P:L$ = ""
: IF P > 0 THEN L$ = LEFT$ (A$,P)
E0 350 R$ = "": IF P < L - 1 THEN R$ = RI
GHT$ (A$,L - P - 1)
55 360 HTAB 7: PRINT L$; FLASH : IF P <
L THEN PRINT MID$ (A$,P + 1,1);: N
ORMAL : PRINT R$;
7B 370 PRINT " "": NORMAL
E6 380 K = PEEK (49152): IF K < 128 THEN
380
C1 390 POKE 49168,0:K = K - 128
58 400 IF K = 13 THEN HTAB 7: PRINT A$;"
" : RETURN
8A 410 IF K = 32 OR K > 47 AND K < 58 OR
K > 64 AND K < 71 THEN A$ = L$ + C
HR$ (K) + R$:P = P + 1
C1 420 IF K = 4 THEN A$ = L$ + R$
5F 430 IF K = 9 THEN A$ = L$ + " " + MID$
(A$,P + 1,1) + R$
6A 440 IF K = 8 THEN P = P - (P > 0)
93 450 IF K = 21 THEN P = P + (P < L)
90 460 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
88 480 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 THE
N D = 0:F = F + 1
66 500 NEXT : IF D = 0 THEN F = F - 1
17 510 RETURN
85 520 J = ASC (C$):J = J - 48 - 7 * (J >
64): RETURN
48 530 A = 0: INPUT A$: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" AN
D C$ < "A" OR C$ > "Z" THEN A = 0:
RETURN
2D 550 GOSUB 520:A = A * 16 + J: NEXT : R
ETURN
28 560 C = INT (B / 256):C = B - 254 * C
- 255 * (C > 127):C = C - 255 * (C
> 255)
26 570 FOR F = 1 TO 8:C = C * 2 - 255 * (
C > 127) + V(F):C = C - 255 * (C >
255): NEXT : RETURN
DA 580 I = FRE (0):A$ = "": FOR I = 1 TO
L:T = INT (A / 16):A$ = MID$ ("012
3456789ABCDEF",A - 16 * T + 1,1) +
A$:A = T: NEXT : RETURN
IF 590 PRINT "FROM ADDRESS "": GOSUB 530:
IF S > A OR E < A OR A = 0 THEN B
= 0: RETURN
8D 600 B = S + 8 * INT ((A - S) / 8): RET
URN
86 610 PRINT "DISK ERROR": GOTO 150

```



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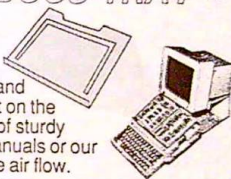
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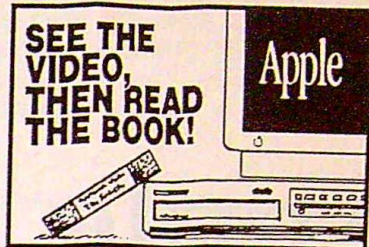
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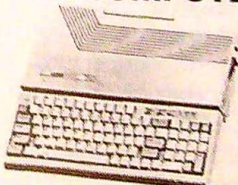
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Apple Automatic Proofreader

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: READ A: C = C + A: POKE I, A: NEXT I
20 IF C < > 7258 THEN PRINT "ERROR IN PROOFREADER DATA STATEMENTS": END
30 IF PEEK (190 * 256) < > 76 THEN POKE 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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Apple Disk

All Apple II programs in this issue are available on the companion *Apple Applications Disk*. Formatted for both DOS 3.3 and ProDOS, the *Disk* costs \$12.95, plus \$2.00 shipping and handling, and can be purchased only through *COMPUTE!* Publications. See page 109 for details.

Talking Rabbit Teaches Children

The Learning Company has introduced *Reader Rabbit*, an educational software program for children ages 5-7, using digitized speech technology that produces human-quality speech, without extra hardware.

Four games teach children the basics of early reading, spelling, and vocabulary. The program includes a vocabulary of more than 200 three-letter words and is designed to build thinking, problem-solving, and analytical skills.

Reader Rabbit is part of a series of educational software programs for children ages 4-14 and is available for the Apple II+, IIc, and IIe at a suggested retail price of \$39.95. A School Edition for the Apple IIGS is available for \$79.95 and without speech for \$59.95. Each School Edition includes a program disk and a backup disk, a teacher's guide, blackline masters with student activities, and a scope-and-sequence chart.

The Learning Company, 545 Middlefield Rd., Suite 170, Menlo Park, CA 94025

Circle Reader Service Number 150.

Thunderscan For Apple II

Thunderware has released an Apple II version of *Thunderscan*, a scanner which transfers any image on paper into an Apple II computer, where it can be modified with a computer painting program or combined with text in a word processor. The scanner has previously been available for Macintosh computers.

Thunderscan is an optical digitizer that fits into Apple Computer's ImageWriter printer in place of the ribbon cartridge. It scans images line by line as they feed through the printer. Images produced by the system can be used with programs that accept standard Apple II screen files.

The program runs under the ProDOS operating system and works on any Apple IIe, IIc, or IIGS computer with an original ImageWriter, a wide-carriage ImageWriter, or an ImageWriter II. Thunderware recommends a second disk drive, a 3½-inch



Thunderscan for the Apple II replaces the ribbon cartridge in the ImageWriter for easy scanning. Images can be saved for use with such programs as PaintWorks Plus and Deluxe Paint II.

drive, ramdisk, or hard disk.

The scanner retails for \$219.

Thunderware, 21 Orinda Way, Orinda, CA 94563

Circle Reader Service Number 151.

HyperCard Stackware Head

Activision has announced *Focal Point* and *Business Class*, two of the first Stackware programs for Apple Computer's *HyperCard*, a personal information toolkit for the Macintosh.

Focal Point is a time- and information-management system that features a daily appointment calendar, address cards, outgoing and incoming phone logs, a spreadsheet, graph and invoice generator, phone dialer, and other desktop accessories. The program allows the user to search for data between features, transfer information back and forth, and create custom accessories. An applications launcher allows for jumps between any other Macintosh applications or between documents. Suggested retail price is \$99.95.

Business Class turns the Macintosh into a powerful desktop travel-planning tool that provides access to helpful and practical travel facts on countries around the world. Travelers have access to currency exchange

rates, transportation schedules, the current time, climate, holidays, tipping, customs, language, and much more. A built-in telephone interface allows connection with phone reservation systems of airlines, hotels, and car rental agencies. The program's customization and linkage allows the traveler to print out complete itineraries, maps, and other travel documents. It has a suggested retail price of \$69.95.

Activision, P.O. Box 7286, Mountain View, CA 94039

Circle Reader Service Number 152.

Apple CAD System

Learn CAD basics on the Apple II with Hearlihy & Co.'s *discoverCAD*. This entry-level CAD package runs on any Apple II with two 5¼-inch disk drives, 128K RAM, an extended 80-column card, and an AppleMouse.

With the AppleMouse you can use Mac-like pulldown menus to select commands and draw virtually any mechanical, architectural, or electrical drawing. Features include zoom, pan, autodimensioning, draw text, move, mirror, and rotate copy. There also is a grid-locking system and 128 layers to achieve different line weights and multicolored plots.

discoverCAD has printer dump capabilities and will automatically drive the Houston Instrument, Hewlett Packard, Roland, and Apple plotters. Price is \$209.00.

Hearlihy & Co., P.O. Box 869,
Springfield, OH 45501
Circle Reader Service Number 153.

AppleWorks And Desktop Publishing

The Q-mar group has added desktop publishing capabilities to *AppleWorks* with *Publishing Company*, which uses macros to add layout functions such as columnar format, justified columns, onscreen, text wrapping into columns, and other layout tasks.

The macros are designed for the three available *AppleWorks* macro programs: *Super MacroWorks* by Beagle Bros, *Key Player* by Pinpoint, and *AutoWorks* by The Software Touch.

The program does not require any rebooting, and it uses *AppleWorks* data.

The publisher recommends the addition of a font downloading program for the Apple II, such as *FontWorks* from The Software Touch, *Print Quick* by Third Wave Technologies, or *Power Print* from Beagle Bros, which adds more power, including the ability to change fonts within a publication.

The program is currently available for *Super MacroWorks* macros and will soon be available for *Key Player* and *AutoWorks*. Suggested price is \$24.95.

The Q-mar group, 5677 Oberlin Dr., San Diego, CA 92121

Circle Reader Service Number 154.

Apple-Compatible Laser 128 EX

Video Technology Computers has introduced the Apple-compatible expanded Laser 128 EX, a transportable personal computer that offers a built-in triple-speed processor that's keyboard selectable at 1 Mhz, 2.3 Mhz, and 3.6 Mhz.

The computer's built-in RAM has been expanded to 192K and is expandable to 1 megabyte via a fully-socketed internal RAM board, enabling it to recognize *AppleWorks* software.

The Laser 128 EX still packs the features found on the original model, including a built-in 5/4-inch disk drive, but a universal disk controller has been added to support either a 3/2-inch or 5/4-inch external drive. A new card cover for the expansion slot has been added to allow an additional card to be plugged in without losing portability.

Other features include 40/80 column text displays, 16-color capability, double high-resolution graphics up to

560 × 192, mouse interface, parallel and serial interfaces, modem interface, numeric keyboard, and expansion slot.

Suggested retail price is \$579.00.

Video Technology Computers, 400 Anthony Trail, Northbrook, IL 60062
Circle Reader Service Number 155.

Legal Documents On Disk

Common legal documents can be prepared at home with *Microlawyer* by Progressive Peripherals & Software. The disk library is designed to work in conjunction with your word processor and can save attorneys' fees. Attorneys can also use the disk as a library of common forms.

Over 100 documents are included in the library, which is divided into personal, business, and corporate sections. Documents include: power of attorney, premarital agreements, leases, real estate contracts, wills, and notary public forms. All forms were designed by an attorney, and the manual included with the software is written in clear English, not legal jargon.

Progressive Peripherals & Software warns that *Microlawyer* is intended to supplement, not replace, legal counsel.

Microlawyer is available for the Macintosh and the Apple II and retails for \$59.95.

Progressive Peripherals & Software, 464 Kalamath St., Denver, CO 80204

Circle Reader Service Number 156.

Mac-Laser Videodisc Connection

The Voyager Company has announced a new product line to support *HyperCard*, which allows users to connect a Macintosh to a laser videodisc player. *Laserstacks* are *HyperCard* stackware that control laser videodiscs, turning still photos and motion pictures stored on many existing videodiscs into visual databases.

The first title to be released will be *The National Gallery of Art Laserguide*, which is designed to work with *The National Gallery of Art* disc. The user can design a tour of the National Gallery of Art in Washington D.C. Works of art can be organized and then presented according to categories, including artist, nationality, school, date, medium, and subject. The suggested retail price is \$49.95.

The videodisc retails for \$95.00. Other titles to be released later this year include: *Apollo 17: Last Mission to the Moon*, *Vincent Van Gogh*, and *The BioSci Disc*, which is a visual library for the study of biology. The corresponding videodiscs are also available.

The Voyager Company, 2139 Manning Ave., Los Angeles, CA 90025
Circle Reader Service Number 157.

Understanding The Constitution

Mindscape has announced *Understanding the United States Constitution*, a new software package for Apple II computers.

The program is designed to help students understand the meaning of the Constitution of the United States. It allows students to test their knowledge of the Constitution, to learn about the political system, and to expand their range of civic awareness. It is designed to help students get ready for the Constitution test that is required in some states and to prepare for the U.S. citizenship examination. The flip side of each disk contains a Spanish-language version of the program.

Understanding the United States Constitution has a suggested retail price of \$49.95.

Mindscape, 3444 Dundee Rd., Northbrook, IL 60062

Circle Reader Service Number 158.

MultiScribe Desk Accessories

StyleWare has released *MultiScribe Desk Accessories* for online use with its *MultiScribe 2.0*, a Macintosh-like word processing program. The package features several accessory programs, which can be installed on a pull-down menu and called from *MultiScribe*.

The accessories include a full scientific calculator, which provides users with trigonometric functions, memory, inverse functions, and all math functions. A clock lets users time-stamp *MultiScribe* documents in addition to displaying the current time and date, and a calendar helps users plan their day with a day-by-day notepad. A control panel provides sound-control and cursor-adjustment capabilities as well as up to eight sets of eight macro sequences, which allow users to reduce multikeystroke passages to a single keystroke. A puzzle is also included to provide a break from work.

Suggested retail is \$39.95.

StyleWare, 5250 Gulfston, Suite 2E, Houston, TX 77081

Circle Reader Service Number 159.

Cigarette-Lighter Adapter

Roger Coats has introduced a cigarette-lighter adapter that allows the Apple IIc to be used in an automobile with a 12-volt negative ground electrical system. The adapter features a ten-foot cord with a two-color LED to indicate safe power status. If power is incorrect or reversed, the LED glows red. A DIN plug at one end and a cigarette lighter plug with power status indicator at the other allows

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connection to the Apple IIc. List price is \$25.00.

Roger Coats, P.O. Box 171466, San Diego, CA 92117

Circle Reader Service Number 160.

The Big Scoop

Target Software has released *Scoop*, a high-end desktop publishing package for the Macintosh 512K Enhanced and up. It is designed with the desktop publishing features consumers have come to expect, as well as features previously available only to professional typesetters and mechanical artists.

Scoop lets the user select type sizes from 5 points to 127 points, vary space between words (interword spacing), change space between letters (fractional kerning), and vary the space between lines (fractional leading). If you want to wrap text around images, slant margins, elongate a typeface, or rotate images in as little as one-degree increments, *Scoop* can handle it with the click of a Mouse. *Scoop* accepts scanned images and *PostScript* files and is compatible with *MacPaint* and other graphics packages. It comes complete with a word processing program and a 140,000-word spelling checker. Suggested retail price is \$495.

Target Software, 14206 S.W. 136th St., Miami, FL 33186

Circle Reader Service Number 161.

Cotton Tales For The Apple II

MindPlay has released *Cotton Tales*, an introduction to word processing and desktop publishing for beginning readers. This easy-to-use word processor features writing with 192 pictures and 616 words. Cotton, the friendly "bunny" cursor, hops along to help youngsters scroll, insert, copy, and delete. Pictures and menus guide children through the picture and word libraries and disk utilities.

A Challenge Upgrade option allows a parent or educator to enter 168 additional words into the library, select specific pictures and words for use, and allow children to type if desired. A worksheet function is available for creating worksheets with *Cotton Tale* graphics. Printing options include color printing, a picture-to-text translator, and adjustments to printing layout and size. The Home Edition sells for \$39.99, while the Teacher's Edition (with backup disk) is available for \$49.99.

Methods and Solutions, 82 Montvale Ave., Stoneham, MA 02180
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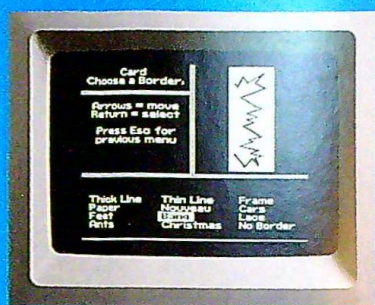
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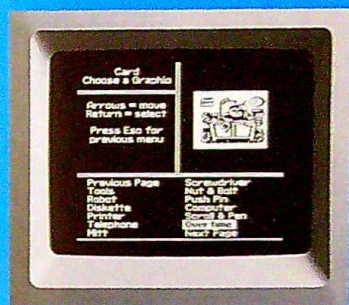
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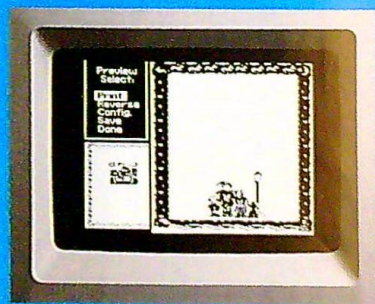
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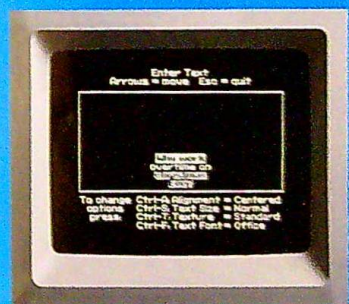
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