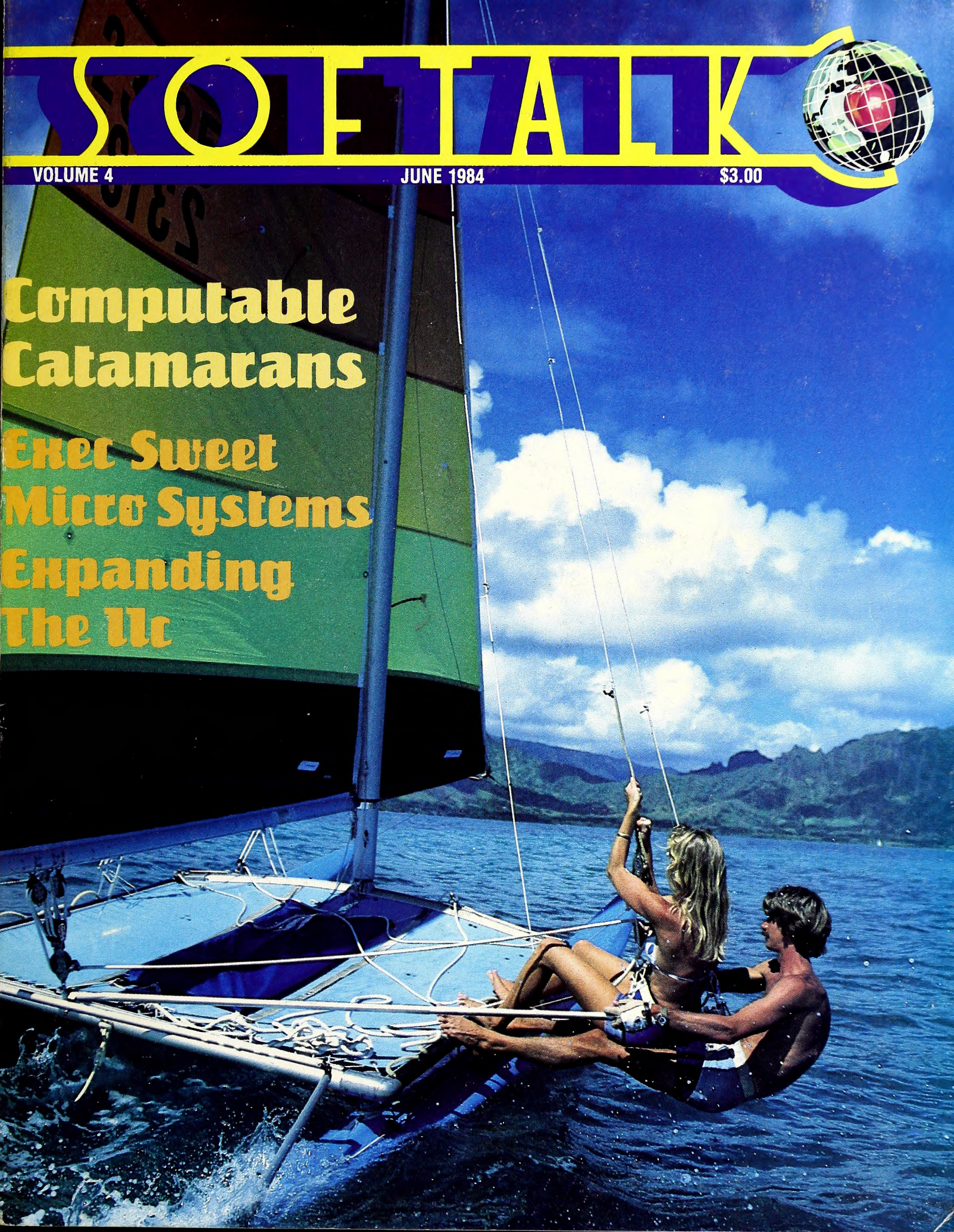
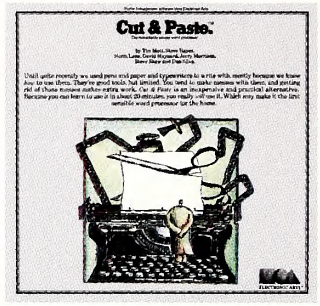
SOFTALK

VOLUME 4 JUNE 1984 $3.00

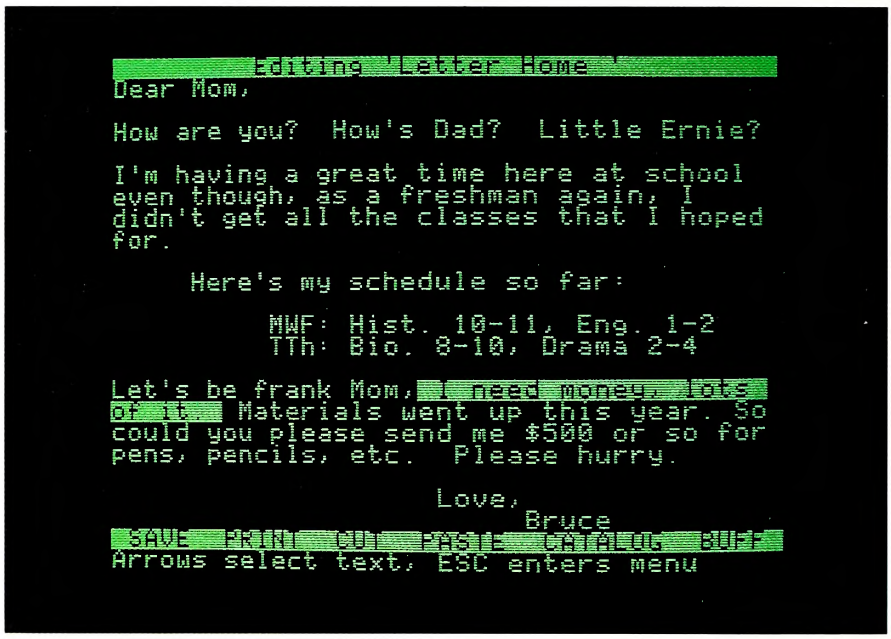


Computable Catamarans

Exec Sweet Micro Systems Expanding The IIc



If you can learn to use this word processor in 90 seconds, can it really be any good?



CUT & PASTE™ *displays its commands on a single line at the bottom of the screen. This makes working with it easier and also gives you more usable space on the screen.*

Of all word processors on the market today, Cut & Paste may well be the easiest to use. In fact, by the time you finish reading this section of the ad, you'll know how to work with Cut & Paste. So read on.

START TYPING. Working with Cut & Paste is like working with a typewriter. If you know how to use a typewriter, you already know how to type in your draft with Cut & Paste. The only real difference is, with Cut & Paste it's easier to correct typos.

MAKING CHANGES. Let's say you've decided to make a cut in your rough draft. To do this you put the cursor (the bright block) at the start of the text you want to delete, and stretch it through to the end of your cut. Then you send the cursor down to the "CUT" command on the bottom of the screen. Done.

If, on the other hand, you want to keep that line, but put it in a different part of your draft, you use the "PASTE" command. You mark the point of insert with the cursor. Then you put the cursor over "PASTE." That's all there is to it.

PRINTING IT OUT. When you like the way your work looks, you print it. Put the cursor on the "PRINT" command. Then set your margins, in inches. That's it.

You now know how to use Cut & Paste.

OKAY, IT'S SIMPLE. BUT HOW GOOD IS IT? Cut & Paste has all the features you'll ever need to use at home. Here are a few of them:

1. Scrolling dynamic menus
2. Automatic word wrap
3. Simple cut & paste editing
4. Block indenting
5. Set margins and paper size in inches
6. Tabs
7. Automatic page numbering
8. Controllable page breaks
9. Headings
10. Scrolling text windows
11. Automatic widow and orphan control
12. Clear and concise manual

In other words, Cut & Paste will do just about everything other word processors do. But Cut & Paste will do it more easily. Without complex commands and modes.

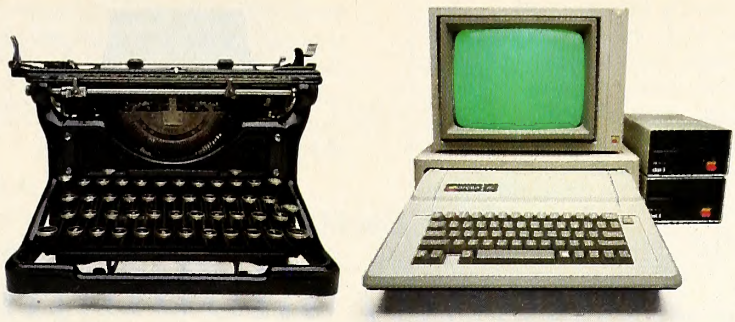
If you think about a word processor in terms of what it replaces (typewriters, pens and paper, files), Cut & Paste begins to look very good indeed.

And when you consider that *all this power can be had for approximately* $50, we think you'll see why we believe Cut & Paste is something of an achievement.

A PHILOSOPHY OF DESIGN. The people who designed, developed and programmed Cut & Paste have some fairly heavy credentials.

They are people who worked on the internationally-famous user interface designs that led to the Xerox Star® and Apple's Lisa.® They are also

Now Supports Apple IIc and AppleMouse.



THE CHANGING OF THE GUARD. *Until quite recently we used pens and paper and typewriters to write with, mostly because we knew how to use them. They have been good tools, but limited. You tend to make messes when you work with them, and getting rid of those messes makes extra work. Cut & Paste is an inexpensive and practical alternative. Because it is as easy to use as a typewriter, you really will use it. Which may make it the first sensible word processor for the home. Thus an alleged labor-saving device has come to a position where it really can save a significant amount of labor, i.e., yours.*

THE MEN WHO MADE CUT & PASTE. *The Linotype machine pictured here was the 19th century's most important contribution to word processing technology. It let typesetters compose and rearrange text in the form of metal castings. The importance of Cut & Paste, of course, must await the judgment of history. Nevertheless, the seven men who developed it look confident here. Standing left to right, they are: Norm Lane, Steve Shaw, David Maynard, Dan Silva, Steve Hayes and Jerry Morrison. Seated at the console is Tim Mott, whose idea this was in the first place.*

people who have in common a very lucid philosophy of design.

Computers and the programs they run are tools, they believe. Tools are never noticed unless they are bad tools. When they're good, they become, in effect, invisible. And if you want to make a good tool—an invisible tool—you'd best study the way people use the tools they already have.

As a result of this thinking, Cut & Paste was designed to work much in the same way that you already work with a typewriter or with pen and paper. The most complex and powerful parts of the program are hidden from view. The work they do takes place deep in the machine. All you get to see are the results.

But beyond that, there is something almost indefinable about a good design. Things about it just seem to work crisply. Little touches and features that you notice make you want to smile. If it's really good, it *feels* good.

Cut & Paste feels good.

ELECTRONIC ARTS™

THE PRODUCTS *of Electronic Arts can be found in your favorite computer stores, software centers, and in leading department stores throughout the country. Both Cut & Paste and Financial Cookbook™ are now available at a suggested retail price of $50 for the Apple IIe and the Commodore 64 and will soon be available for the IBM-PC and Atari.*

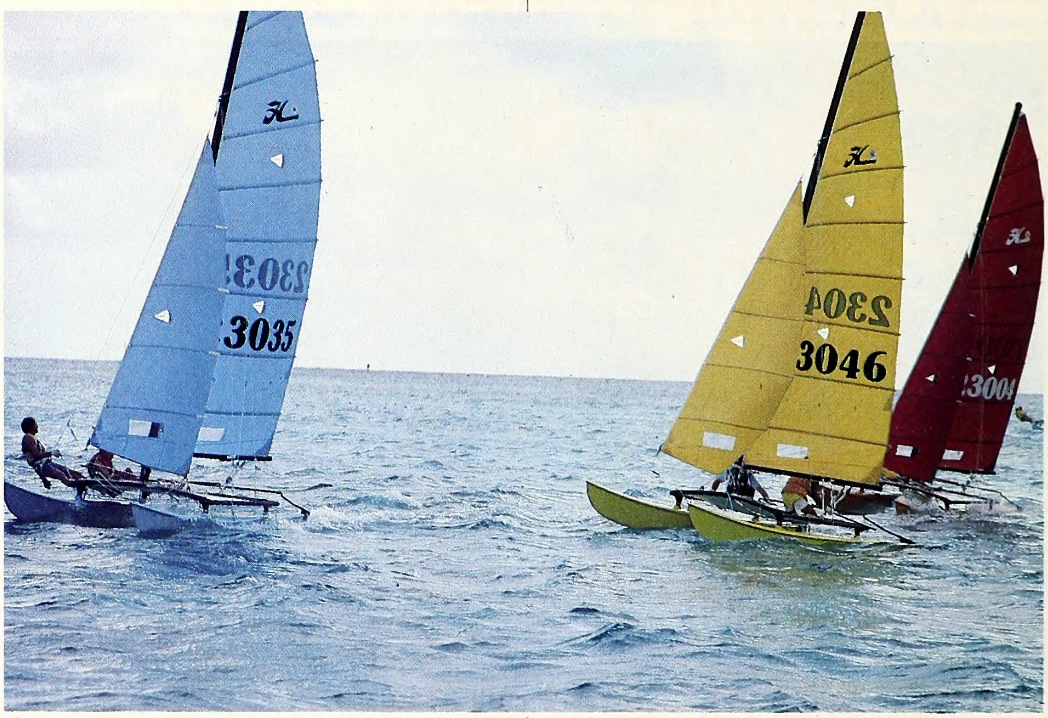
OUR COMMITMENT TO HOME MANAGEMENT.

Cut & Paste is just one of a growing number of products we're publishing within the category of "home management software." These products are all built around the same program architecture, making them all equally "friendly," as well as remarkably straightforward and practical. We believe that designs like these will soon make home computers as functional and efficient as today's basic appliances.

Our next product in this line is called *Financial Cookbook*. It's a realistic alternative to the complex, pre-programmed financial calculators we all wish we knew how to use. With a few, simple keystrokes, *Financial Cookbook* lets you make more than 30 key time-value-of-money computations—just about all the ones you'd ever use for personal finances—like calculating mortgages with changing interest rates, compounding the interest on IRA and savings accounts, and buy-versus-lease comparisons for automobile purchases.

To find out more about these home management products and about what we have planned for the future, call or write: Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403 (415) 571-7171.

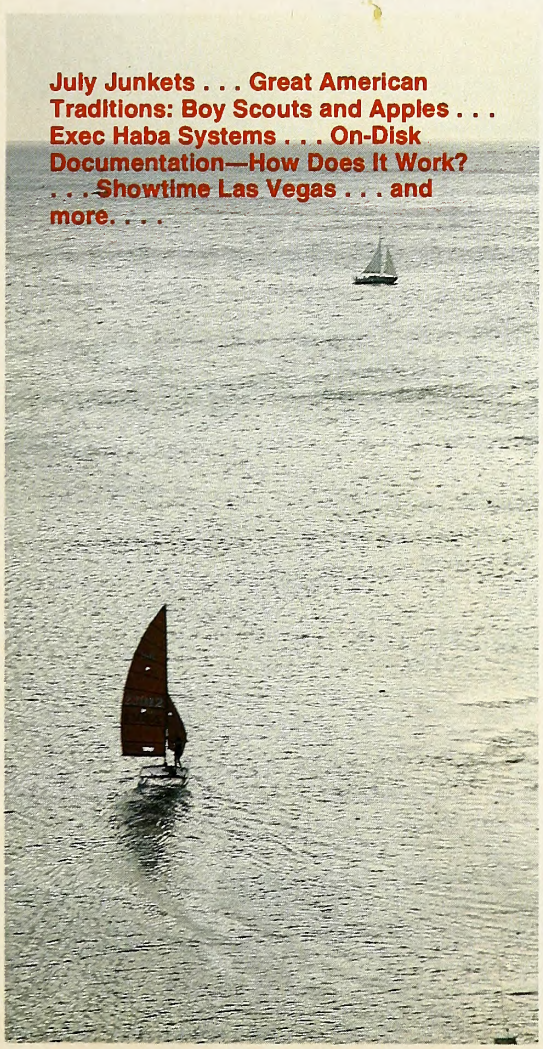
SOFTALK
JUNE 1984



DEPARTMENTS

PREVIEWS

July Junkets . . . Great American Traditions: Boy Scouts and Apples . . . Exec Haba Systems . . . On-Disk Documentation—How Does It Work? . . . Showtime Las Vegas . . . and more. . . .



INDEX OF ADVERTISERS

On Our Cover: Catamaran racing is one of those sports that require a rare combination of skills—quick reflexes, cool-headedness, a good suntan, and the ability to figure your handicap. Apples—as usual—are helping out. Photograph by Jake Grubb.

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Circulation

Customer Service: Michelle Vigneault-Kirschenbaum. **Subscriptions:** Leticia Garcia, Jan Godoy-Aguiar, Barbara Naimoli, Josie Walley, Deirdre Galen, Anna Gusland, Ramona Gordon, Jill Stroud, Nancy Kelly. **Dealer Sales:** Lanny Broyles. **Systems:** John Heitmann.

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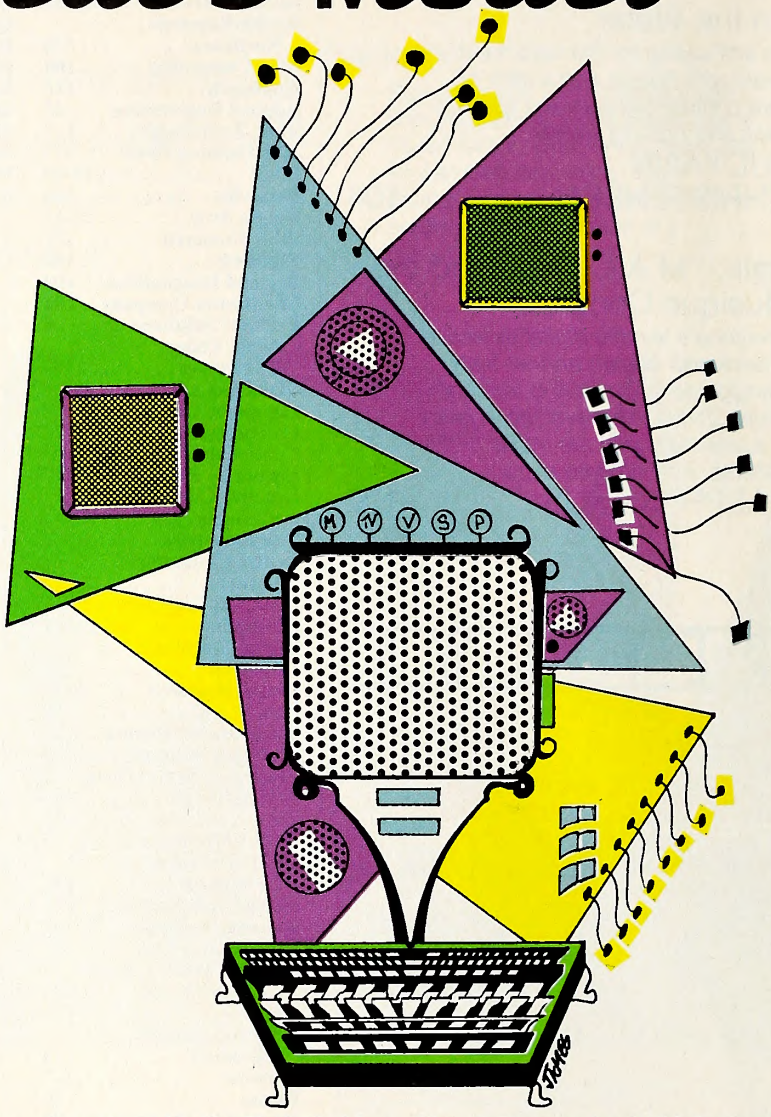
Back Issues: $2 through February 1981; $2.50 through July 1981; $3.50 through September 1982; $4.00 thereafter. November and December 1980, January, February, March, September, October, and November 1981, and December 1982 are sold out. December 1981, February and May 1982, and February and December 1983 are in short supply.

Moving: Send new address and a label from a recent *Softalk* to Softalk Circulation, Box 7039, North Hollywood, CA 91605; telephone (818) 980-5074. Please allow six to eight weeks for processing.

Problems? If you haven't received your *Softalk* by the fifteenth of the month, or if you have other problems with your subscription, Michelle Vigneault-Kirschenbaum can help out. Call (818) 980-5074 or (800) 821-6231.

Contest: Next Year's Model



This year, Apple—with its affordable Lisa Technology, Macintosh, and its powerful portable, the IIc—shook up the computer industry by setting a new state of the art in personal computers. We love the Mac. We love the IIc. But we're not satisfied with them. In this age of instant gratification, complacency is our worst enemy. It's easy to think we can just relax and let Apple, or Johnny Carson, or who knows what, satisfy our desires and assuage our boredom.

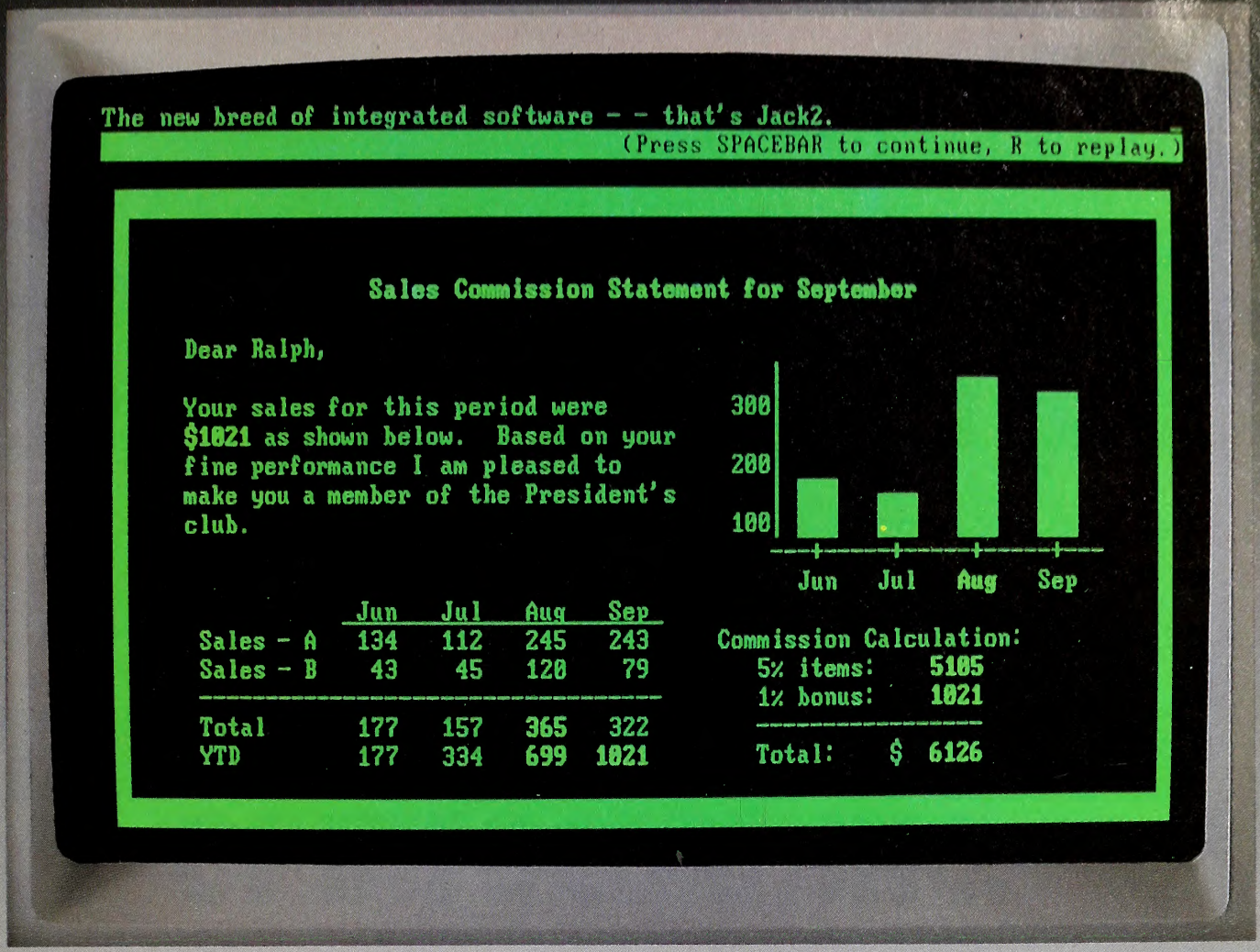
We're not having any of it. The IIc is great—we want greater. Macintosh is more. We want still more. We want stupendous. We want a computer that'll make computerphobes sit up and take notice. We want a computer that'll make your Aunt Blanche want to learn to program. We want a computer that Aunt Blanche won't have to program . . . that she can use without picking up a manual . . . that she can use when backpacking in the Sierras!

And we want you to design it.

Imagine that you're on the product development team at Apple. You've done some great things in the past, but in this business you can't rest on your laurels or someone is bound to come along and kick them out from under you. You've got to be on your toes. Write a proposal to the head of your department describing your ideas for next year's model—for a better computer. Outline your ideas and requirements and defend them. Limit the written portion to one to two double-spaced typed pages, but include whatever you think will help sell the boss on your proposal—sketches, models, you name it.

It doesn't have to be feasible using current technology, but it cannot be completely implausible, either. The judges will lean toward ideas that are wildly inventive but still earthbound. Entries can contain elements of existing computers, but the winning entry will contain at least one aspect that none of the judges know of in an existing computer.

Sound tough? Good. Send your entries to Contest: Next Year's Model, Box 7039, North Hollywood, CA 91605. The winner will be selected by the contest staff and will win neat stuff. ■



JACK2. THE BEST PC INTEGRATED SOFTWARE YOU CAN FIND. NOW YOURS ON THE APPLE IIe.

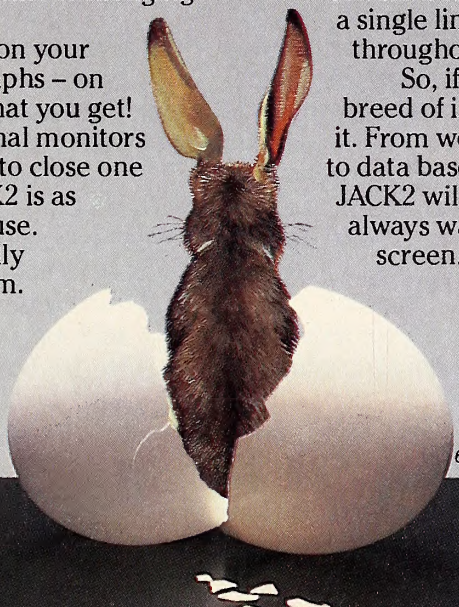
With JACK2, you can do word processing, spreadsheets, data base management, charting. All at the same time. On the same screen. Without changing diskettes or exiting programs.

And, you can print out what's on your screen – text, calculations, and graphs – on the same page. What you see is what you get!

No need for windows. Additional monitors or hardware of any kind. No need to close one file before you open another. JACK2 is as easy to master as it is powerful to use.

Picture a screen that graphically displays your disks and names them. With envelope icons that can be scrolled up or down from 1 to 50 showing you all your files. JACK2 will even show you the forms inside your envelopes. And then let you choose the one you're looking for simply by pointing to it. All commands are in English. All are displayed on a single line and all have the same function throughout JACK2.

So, if you've been searching for a new breed of integrated software, you've found it. From word processing, to spreadsheets, to data base management and charting only JACK2 will let you do everything you've always wanted to do. On the same screen. At the same time.

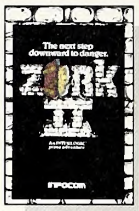


Jack2

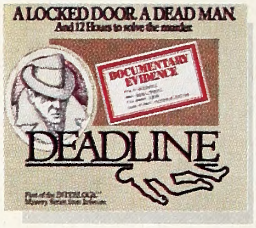
JACK2 is available for the Apple IIe with extended memory, 80-column card (total of 128k) and two Apple disk drives.

Business Solutions, Inc.
60 East Main Street, Kings Park, NY 11754 • (516) 269-1120


Your greatest challenge lies ahead and downwards.
ZORK I
INFOCOM

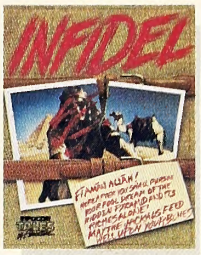

The next step downward is danger.
ZORK II
INFOCOM


It all comes down to this.
ZORK III
INFOCOM


A LOCKED DOOR. A DEAD MAN.
And 12 Hours to solve the murder.
DOCUMENTARY EVIDENCE
DEADLINE


INSIDE!
The WITNESS


SEASTALKER
INFOCOM



THE INCOMPLETE WORKS OF INFOCOM, INC.

Incomplete, yes. But it's not just because we're always bringing out new stories in the Infocom interactive fiction collection. Nor is it simply due to the fact that with all the writing and re-writing, honing and perfecting that we put into every one of our stories, our work is seemingly never done.

The real reason is: an Infocom work of fiction can never be complete until you become a part of it.

You see, as hard as we work at perfecting our stories, we always leave out one essential element—the main character. And that's where you enter in.

Once you've got Infocom's interactive fiction in your computer, you experience something akin to waking up inside a novel. You find yourself at the center of an exciting plot that continually challenges you with surprising twists, unique characters (many of whom possess extraordinarily developed personalities), and original, logical, often hilarious puzzles. Communication is carried on in the same way as it is in a novel—in prose. And interaction is easy—you type in full English sentences.

But there is this key difference between our tales and conventional novels: Infocom's interactive fiction is active, not passive. The course of events is shaped by the actions you choose to take. And you enjoy enormous freedom in your choice of actions—you have hundreds, even thousands of alternatives at every step. In fact, an Infocom interactive story is roughly the length of a short novel in content, but because you're actively engaged in the plot, your adventure can last for weeks and months.

In other words, only you can complete the works of Infocom, Inc. Because they're stories that grow out of your imagination.

Find out what it's like to get inside a story. Get one from Infocom. Because with Infocom's interactive fiction, there's room for you on every disk.

INFOCOM™

Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138

For your: Apple II, Atari, Commodore 64, CP/M8", DECmate, DEC Rainbow, DEC RT-11, IBM PC* and PCjr, KAYPRO II, MS-DOS 2.0*, NEC APC, NEC PC-8000, Osborne, Tandy 2000, TI Professional, TI 99/4A, TRS-80 Models I and III.

*Use the IBM PC version for your Compaq, and the MS-DOS 2.0 version for your Wang or Mindset.

CONTEST WINNERS

Academy Awards, Alaska, Australia, and *Art*

Finally, Some Winners! After a long break, we now have some updates on the Oracle contest.

First were the Academy Awards. To few contestants' surprise, *Terms of Endearment* and Shirley Maclaine won best picture and actress. Robert Duvall threw a lot of people off when he won for best actor; Jack Nicholson was the favorite.

So, where does that put us? For those keeping score at home, give yourself ten points for each correct answer and ten bonus points if you got all three correct.

In addition to forty points, James Karns (Marysville, OH) will receive $200 credit toward Microsoft's Softcard, which he plans to pick up at his local retailer, Micro Center. Karns was the winner selected at random from the small fraction of contestants who predicted correctly who would win Oscars.

Next in the Oracle agenda was predicting the largest difference between the high temperature in Sydney, Australia, and the low temperature in Juneau, Alaska, on one day during the first seven days in April. Keen research was necessary to get this one right, and of several hundred contestants only twelve were right on the button.

During the week, the largest difference was forty-five degrees Fahrenheit (Juneau, thirty degrees; Sydney, seventy-five degrees) on April 1. During the rest of the week, the closest was April 2, on which the difference was thirty-nine degrees.

And only twelve predicted (or guessed) correctly. From that group, Edward Radanovich (Bellevue, NE) stood out at random to claim the $200 for himself. Radanovich plans to put the money toward a Zoom Telephonics Networker modem.

We are now one-third of the way through the contest, the winner of which will receive a shiny new Macintosh computer. Currently, the lead is held by Elizabeth Lewis (Richmond, VA), which should come as no surprise, since she has consistently been a contender and frequent winner. What is surprising is that her cumulative score of forty-five is perfect. Lewis has predicted each event exactly thus far, and holds slim leads over Robert Miller (Baltimore, MD), who has a respectable forty-four points; Lewis's husband, Charles, with forty-two points; and last year's grand-prize winner, Paul Shanberg (Moraga, CA), who has forty-one points. It's a ruthless contest. Just ruthless.

Arts and Crafts. March's Design-a-Package contest produced a lot of creativity from our readers, and it raised a lot of hot tempers around here, too. Judges had their favorites and couldn't decide on a fair way of picking a winner. So, they did the next best thing; they took a vote.

Votes were counted, harsh words were exchanged, and boxing gloves were put away. In the end, it was Lora Asdorian (Bedford, TX), who claimed the Software Package Designer of the Year award, which includes *The Complete Graphics System* and *The Graphics Magician*, both from Penguin Software, *Fontrix* from Data Transforms, and bragging rights through March 1985.

Asdorian's entry (*Secrets of the Orient*, pictured here) also included some rather "slanted" remarks about China, which, to save everyone the trouble of writing to Open Discussion, we decided not to print.

Mark Needham (Louisville, KY) presented the most professional-looking entry, which laid out intricate plans for an apple-shaped box with a transparent cutout in the lid, allowing you to see inside the box. Very pretty, nicely done, and emotionally touching. The only problem was that the box was designed to lay flat. When stood upright, it kept falling over because of its curved bottom (excuse the expression). Nonetheless, grand congratulations to Needham for a nice job.

Dave Welsh (Frederick, MD) isn't making too many friends at the National Organization for Women. His entry, though very well drawn, might offend a few. "*Housewife*, from Pots & Pans Software. Arcade-style game. The object of the game is to clean the entire house of all the mess and slip into something sleazy before the husband gets home at 6:00. Joystick required."

By far, the entry that received the most oohs and aahs came from Judith Stoner (Stockton, CA). Created with *MacPaint*, *Food Fun*, from Cinnamon Bear Software, featured a cuddly teddy bear that looked just too cute, with chef's hat, pot and spoon, building blocks, and a little mouse assistant.

Well, that's about it for this month. Tune in again, when we find out oxb oby mxt ajpf mwtt gbymtfm. Ghpb, dpdn.

You bought a computer to cultivate your kids' minds. Make sure it's bearing fruit, not growing vegetables.

Introducing a whole crop of Learning Adventure games from Spinnaker.

When it comes to cultivating adventurous young minds, the computer's potential is endless.

Unfortunately, the search for software that makes the most of that potential has been endless, too.

That is, until Spinnaker created the Learning Adventure Series. A unique collection of games that reward curiosity with hours of adventure and learning. So the time kids spend with our games will help them develop valuable skills. Instead of just tired thumbs.

But what really makes our Learning Adventure games unique – educational value aside – is how much fun they are. Which isn't too surprising when you consider you can do things like bargain with aliens, search a haunted house, or build your own railroad empire.

In fact, our games are so much fun, kids will really enjoy developing some very important skills. Deductive reasoning, note taking, and problem solving, for instance.

So, if you're in the market for software that will truly cultivate young minds, pick the Spinnaker Learning Adventure Series.

It's the best way to be sure your search will be fruitful.

Spinnaker Learning Adventure games are available for Apple,® Atari,® IBM® and Commodore 64™ home computers.

It's New! TRAINS.™
You're in charge of an old-time railroad – and whether it turns into a bonanza or a bust depends on how well you run it. But either way you'll find that working on this railroad is a challenge – and a lot of fun! **Ages 10-Adult.**

It's New! ADVENTURE CREATOR.™
Design a challenging adventure game that you or a friend can tackle – or let the computer design one for you. It's complex, exciting – utterly addictive! **Ages 12-Adult.**

IN SEARCH OF THE MOST AMAZING THING.™
It isn't easy to find – even in your B-liner. But you'll have help from your Uncle Smoke Bailey as you search the universe to find the Most Amazing Thing. **Ages 10-Adult.**

SPINNAKER™
We make learning fun.

Disks for: Apple, Atari, IBM, and Commodore 64.
Cartridges for: Atari and Commodore 64 – (ADVENTURE CREATOR only).

SoftCard squeezes the most juice out of your Apple.

Microsoft® Premium SoftCard IIe is the high-performance CP/M® board that really juices the Apple® IIe.

Hard facts on SoftCard.

It has a high speed (6MHz) Z-80 that runs CP/M up to three times faster than lesser boards. Plus 64K memory and 80-column display that fits the IIe auxiliary slot and acts like Apple's own Extended 80-column Card. So it works with CP/M, Apple DOS and ProDOS programs, too.

Microsoft BASIC is built-in, so it's compatible with more Apple CP/M software than any other board on the market: Thousands of the juiciest business programs including dBase II,® WordStar® and sophisticated Microsoft languages like FORTRAN-80, COBOL and BASIC Compiler.

It also has a new low price.

Juicing up the performance of computers is nothing new for us. We invented the SoftCard and make versions for the entire Apple family. We wrote Applesoft for the Apple II.

MICROSOFT® The High Performance Software

In fact, our BASIC is the language spoken by nine out of ten microcomputers worldwide.

Get the Apple juicer from Washington. Call 800-426-9400 (in Washington State call 206-828-8088) for the name of your nearest Microsoft dealer.

OPEN DISCUSSION

Open Discussion gives you the chance to air your views and concerns, to seek answers to questions, to offer solutions or helpful suggestions, and to develop a rapport with other readers. It's what you make it, so share your thoughts, typed or printed, and double-spaced (please), in Softalk*'s Open Discussion, Box 7039, North Hollywood, CA 91605. To ensure the inclusion of as many contributions as possible, letters may be condensed and edited.*

Santa Boss and the Amdek Elves

Last year my employer gave me a Christmas bonus: an Amdek Color-II monitor. After purchasing an RGB card, compatible with my Apple IIe, I found that the Apple IIe requires a Color-II Plus. I called Amdek and they told me that I could get an upgrade for thirty-five dollars.

Once I upgraded the monitor, I hooked it up to my computer and beheld RGB color graphics for the first time. Wanting to see eighty columns in amber, I put in my *Transend* disk and hit reset. The disk was not booting, so I tried another, and then another—nothing. After checking all connections and the disk drive, I found nothing wrong. I put the monitor on the floor and tried a disk, which booted. I began to put the monitor back on its stand and the disk immediately quit reading. I assumed that the monitor was giving out magnetic interference, causing my disk to whirl unsuccessfully. I called Amdek.

Amdek told me that interference was not uncommon if the monitor was sitting within three inches of the disk drives. I tried measuring the distance; it turned out that the interference began at thirty-six inches from the monitor. Amdek then apologized and gave me a return number to send the monitor back COD. Three weeks later I received a phone call from Amdek. I was told that my monitor had interference problems (no kidding) and that I would receive a new Color-II Plus in the mail, free of charge.

I have had my Color-II Plus for almost two months now and I'm completely satisfied with it and the company.

Lionel Lavenue, Jackson, TN

Appleade

I just received a check from Apple Computer for $60! The check represents a promise Apple made and kept to the victims of the CompuPlus bankruptcy. It's also a reminder that I owe a debt of gratitude to Apple for the Apple aid program that made it possible for me to salvage my pride and finally get my Apple. Thanks, Apple.

Guy C. Hickey, Van Nuys, CA

Allied in the Source

I think Open Discussion is the best source of unbiased information on Apple hardware and software and the companies that supply them. It's the first thing I read every month, so I want to share my good experience with Allied Engineering. If you are looking for a CP/M card, eighty-column card, or a time clock, don't let Allied's low prices fool you. Their products are the best! The clock is as good as any clock on the market. The eighty-column card even supports the home command and is Videx-compatible.

Jerry A. Kroeger, Lincoln, NE

***Zardax*ian**

I've seen little about the *Zardax* word processor. I am extremely pleased with it. Most important to me was the support given to me by Action-Research (the program's U.S. agent and technical support company). I had a problem configuring my printer with the program, as it is not on set-up menu. I called the company, and I was given the fix over the phone immediately.

A relatively expensive program, *Zardax* is still a good value for the money. I looked at and tried a number of word processing programs before buying this one. Not only is it flexible and powerful, it is easy to learn and very simple to use. *Zardax* is the finest word processor for the Apple IIe I have seen.

David Alan Krause, East Lansing, MI

Good Grades in Watertown

Class scheduling and grade reporting are two major school administrative tasks requiring tremendous amounts of time as well as the utmost in human accuracy. Fortunately, the microcomputer can alleviate the time and accuracy problems, provided that adequate software exists.

Charles Mann and Associates (Yucca Valley, CA) markets two such programs for both the Apple IIe and the IBM PC. At Immaculate Heart Central High School, we have successfully used the Apple II versions of these programs and found them reliable, accurate, and easy to use. We believe that Charles Mann and Associates has done a great service to schools by making such fine programs available at reasonable prices.

Robert H. Aucoin, Watertown, NY

Celestial Service

I would like to mention the help provided by Star Micronics when they responded to my request to replace the head of my Gemini 10X printer. I was in a bind for some time. When I contacted them, they promptly came to my help and furnished me with a spare head so that I could continue my work without resorting to buying another printer. Readers should be aware of the reliable service behind Star Micronics products.

Sundar Rajan, Hayward, CA

Champaign for Two

Two products I have been using are outstanding in terms of their functionality and the customer service associated with them. These products are *Format-II Enhanced Version* from Kensington Microware and *Fontrix* from Data Transforms. *Format-II* is an excellent disk-oriented word processor. While it keeps only a page and a buffer in RAM at one time, its abilities to control the printer, display on the screen what you get on the printer, automatically name and save pages, format text, and print documents make up for this deficiency. Besides, working on one page at a time sure makes it easy to fix up and print a page in the middle of a document. And the *Format-II* manual is a model of clarity.

After buying *Format-II* I had trouble with my eighty-column card and with hooking up the keyboard modification. The tech people at Kensington were extremely helpful and got me straightened out very quickly. Their help included sending me a chip for my eighty-column card free of charge.

Fontrix is a clever font-making, typesetting, and drawing program. After buying and trying it, I had trouble using the joystick for drawing and had a few minor questions, so I wrote to Data Transforms hoping for some help. A couple of days later I received a phone call from their tech person. He solved my joystick problems by explaining how to properly use the centering controls on the joystick. (Prior to entering the joystick-using mode, the vertical control should be set at the bottom, while the horizontal control should be at the left. The adjustments necessary to stabilize the cursor are minor.) My only gripe about *Fontrix* is that I had a devil of a time finding a vendor who carried it. I suspect that this will change.

Peter F. Colwell, Champaign, IL

Big Brother U

Norman J. Wood's letter (April Open Discussion) concerning the rejection of the Apple University Consortium offer by Cal Poly State University (San Luis Obispo) is wrong in one important respect. The rejection was made by the administration last fall, while most of the faculty had been lulled into believing the deal was "all set." There are many Apples at Cal Poly—used in teaching, research, and secretarial chores, as well as in the homes of many professors. The decision was made by the administration over Christmas break with no obvious consultation with faculty or students. We were the only campus to reject the offer and have yet to hear a viable reason behind the rejection.

I believe that this is symptomatic of a lot of problems in higher education. We will see more and more educational decisions made by high-salaried administrators rather than by faculty. In the California State University system, the chancellor's new management pay system, which pays administrators up to three times the top faculty salary, almost guarantees this. Taxpayers, faculty, and students beware! Decisions like those mentioned are not subject to your control or input. Faculty and student attempts to find out the truth about such decisions have met with reprimands and threats of firing. Shades of 1984!

A.J. Buffa, Professor of Physics, Cal Poly State University, San Luis Obispo, CA

McWilliams McBearded

In regard to Matthew Yuen's commentary in the Softly Comment section of the April *Softalk*: Hurray, hurray! It's about time that Mr. Peter McWilliams was exposed for what he really is. My hat is off to Yuen for his eloquent exposé. I know he speaks for many of us who have been irritated by McWilliams's subjective commentary and total disregard for technical objectivity. Now if we can just get his syndicated column replaced by an objective one, the novices of this country will be better off.

Dick Rettke, Appleton, WI

Scope Out of Focus

After reading the March *Softalk* I felt somewhat disappointed to find out that *Softalk* intends to "broaden its scope." The only reason I read *Softalk* is that it is supposedly dedicated to Apple computers. I do not care about your personal thoughts about the working of the universe (fact or theory). None of the upcoming articles mentioned interest me. When I want to read noncomputer articles, I choose more definitive publications. Please restrict future issues to computer-related articles.

Philip Story, Houston, TX

True Gentlemen

The February Marketalk Reviews contained a review of the *Apple Dot Matrix Printer Utilities* by

Bill and Tom Vilberg. The laudatory review was no exaggeration. My programming abilities are limited, but this program was immediately useful for me.

The Vilbergs are true gentlemen. When I called for information, they eagerly answered all my questions, including those that showed my ignorance as a programmer. In addition, after I bought the program I wanted to separate some of the utilities and eliminate some menus to shorten the load time. The Vilbergs walked me through the program changes so that now I have exactly what I want.

It is unusual for a consumer to receive such consideration, and it is particularly ironic that people who "play" with machines all day should be among the most considerate. Congratulations and thanks to the Vilbergs. I look forward to their next achievement.
Joseph G. D'Angelo, Ozone Park, NY

Summing Up
I wish to offer my appreciation for the reviews of the *Winning on Wall Street* series of products in the March and April issues. It is always gratifying to see our products reviewed favorably by experts in the investment software field. The reviewer, Ken Landis, was able to describe complex concepts in a way that is readily understandable to the layman, and he was very thorough in his review of our products. He also demonstrated objectivity in his criticism. His various suggestions will provide the basis for future enhancements. We are continually receptive to suggestions for improving the quality and functionality of all our products.
Paul C. Chang, president, Summa Software, Beaverton, OR

Paying the Bill
I'm writing this letter because I have no other way to express my anger. After ten months of dealing with an Apple IIe, *Apple Writer II*, an Interactive Structures PKASO interface, and a Gemini 10 printer, I'm just about ready to be rid of it all. Why did I reach this point? Because of Bill Parker's article "Picking Up the Tab."

For ten months I've been trying to get my printer to superscript—among the dozens of other functions it refuses to perform, despite the hours I've spent fooling with it. The article sparked a ray of hope; now I'm angry with myself for my naiveté. Of course, it didn't work; nothing has. But this time I can't even get the program to run: "file type mismatch in line twenty." I don't know what that means and I no longer have any interest in finding out the answer.

I've talked to Apple; I've written and talked to Interactive Structures; I've written to Star Micronics. I've installed new PROMs, rewritten software, and tried every backdoor anyone could suggest. No good; with Parker's article I conclude that no one knows. As hard as this is to believe, my certified local Apple dealer knows less about the machine than I do. The store's specialty is sales, and the staff does a fine job of that.

I bought this equipment to serve as a word processor for my work; I hoped it might prove entertaining and instructive to my family. I can't even figure out how to make it work—how should I expect my five-year-old to use it? The only question left in my mind is whether there's anything better on the market. To people anticipating buying a microcomputer: Be very cautious. Unless you plan to learn programming and the inner workings of the machine, you're very likely to be frustrated and, ultimately, disappointed.
David Schoonmaker, Arden, NC

New Haven: Escape to Hex
I was so impressed with Mark Pelczarski's number base converting routines (March If Then Maybe) that I decided to add them as escape functions to my copy of *GPLE*. The only problem was reducing the programs to one line of code that could be executed with a single keystroke by *GPLE*. The results are shown here and may be easily added to the standard escape functions. For those readers who don't have *GPLE*, the statements may be written to a text file and execked when the conversion is necessary. (Frankly, though, anyone who progams without *GPLE* is living in the dark ages.)

If you are unsure about how to edit and save escape functions, refer to your *GPLE* manual. You may have to delete some other functions to make room for these, but there are several that are used only by Integer Basic, and this should not be a problem. Note also the leading apostrophe, which suppresses printing the equation.

Set up escape-D to print the following:

```
': Call -998: HTAB 12: H$ = "0123456789ABCDEF": A$ = "": Q = 0: For X = 0 to (D > 15) + (D > 255) + (D > 4095): Q = INT (D / 16): R = D - Q * 16: A$ = MID$ (H$, R + 1, 1) + A$: D = Q: Next: Print A$m
```

Set up escape-H to print the following:

```
': Call -998: HTAB 12: A$ = "": D = 0: For C = 1 to Len (H$): A$ = MID$ (H$, C, 1): V = Val (A$) * ((A$ > "/") and (A$ < ":")) + (ASC (A$) - 55) * ((A$ < "0") or (A$ > "9")): D = D * 16 + V: Next: Print Dm
```

To convert a decimal number to hex, simply type *D = 1234 escape-D*. To convert a hex number to decimal, type *H$ = "FC98" escape-H*. The values shown are, of course, merely examples, and you would enter the actual numbers you wish to convert.
Ethan Winer, New Haven, CT

Patchwork
March's Dostalk column reminded me of a pet peeve I have with authors who publish patches for DOS. They always give you the patches for the locations in memory and then tell you to init a new disk. If the patch is very good, it's likely that you would want to incorporate it on many of your disks. With the init procedure it would take lots of file transfers to accomplish your intention. I prefer to make good patches to a disk on which I have the *Master Create* program and the relocatable version of DOS. I can then use *Master Create* to put that version onto other disks without disrupting the data files. I suggest that in the future any author submitting articles that contain DOS patches also include the track, sector, and byte offsets for the relocatable version of DOS. Contrary to most recently printed articles, there is still a very good use for the *Master Create* program.
Robert A. Anderson, Sr., Bowie, MD

Tom Weishaar responds:
Using Apple's *Master Create* program to modify the DOS on existing disks requires a good deal of expertise. It would require more space than we have available to include all of the necessary information with most patches.

The technique requires a disk sector read/write utility, as you point out. In addition, since the DOS on Master Disks is designed to execute DOS located at $1D00–$3FFF, instead of the usual $9D00–$BFFF, a second version of each patch would have to be given. A further complication is that many patches are designed to fit into the various "free spaces" inside DOS, but some of these spaces are not correctly relocated by the boot routines that move a Master DOS to its final home.

For the record, however, the area of DOS that ends up at $B600–$BFFF can be found in track 0, sectors 0 through 9. Sectors 10 and 11 of that track hold the relocation routines. The area of DOS from $9D00 to $B500 starts at track 0, sector 12, and fills sequential sectors through track 2, sector 4. The rest of track 2 is empty, although DOS marks the whole track as "in use" when a disk is initialized. Rather than updating the DOS on many disks, it is often easier to initialize just one disk and use it whenever you boot your system.
Tom Weishaar

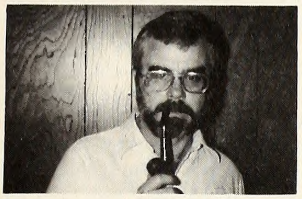
Precisely Engraved in Stone
I purchased *DB Master IV* for our Apple IIe but was unable to run certain modules of program disk one. The drive would keep running and, no matter how many times it was booted, when the add/edit module was requested it would not load.

I called the folks at Stoneware, who informed me that version IV is written very precisely on the disk and that if the drive speed were not precisely correct, this problem would occur. I tried the program on each of sixteen new Apple IIe drives and found that it worked on only one of them. Purchasers of *DB Master IV* for Apple IIe's should have their drive speeds checked before purchasing the program. I also think Stoneware should make potential customers aware of this problem.
Eric C. Welch, Freeport, IL

You Don't Have To Reach Down Under
In the December Fastalk you noted *Reach for the Stars* under strategy, with the Australian address of the publisher. This is an excellent strategy

The Penguin Page

Author Profiles*



Seen here holding a priceless relic discovered in a native camp, software author Willard Phillips is pictured reflecting upon the marvels he encountered during his research trips to the jungles of Peru. The results of his intensive study have just been published in magnetic documentary form -- Expedition Amazon.

In this exciting fantasy role-playing game, Phillips shows how a party of intrepid explorers searched for the fabled lost city of Ka, while battling hostile natives, the elements, herds of crazed capybaras, and the occasional crazed joeybarra.

Phillips is the only survivor of his expedition and he refuses to say whether or not he did, indeed, find the lost city of Ka -- "Mebbe I did, an' mebbe I didn't. If I did, do you think I'd be nuts enough to tell you? Wanna buy a map?

His only advice to would-be explorers is to pack water-wings and plenty of band-aids.

Disk arRanger--

Hark back to the thrilling days of yesteryear when life was simpler and you knew what was on which disk and where things belonged... With Disk arRanger you can regain control of disk files that have run amok.

Disk arRanger is an all-purpose catalog utility that allows you to move files to other disks, rearrange a disk's catalog, save widows and orphans, create decorative catalogs, see how free and used space is stored on a disk, summon the cavalry when threatened by hostile tribes, view and print disk and file sector usage maps, and much more. It is very simple to use and, like all Penguin applications programs, comes on an unprotected disk for your convenience.

*Profile is a trademark of Apple Computer, Inc.

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All this and more can be yours for a small one-time charge. Tour prices include food and lodgings for up to four people, along with 30 gold pieces per person spending money and valuable coupons redeemable by local merchants, provided their business establishments have not been burnt to the ground or plundered.

Contact your local travel agent or computer dealer for more details on the *Xyphus* tour. Remember, an adventure packed vacation is just around the corner.

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game. However, please note that the game is available locally. Call the Armory in Baltimore, Maryland, toll-free at (800) 638-3880. I ordered directly from one of their marketing reps with my credit card and received it within forty-eight hours.
J.S. Nachison, Washington, DC

Paddle On

This is in answer to a couple of questions in April's Open Discussion. First, Brian Austin wants to know how to reset his Apple II Plus without having to turn the power off even when the keyboard locks up. One solution involves patching the reset handler in the monitor and adding a few bytes of code to check for a special reset like the one on the Apple IIe. If you hold down paddle button 0 while hitting the reset key, it will cause the system to reboot no matter where it's hung up. If you have a RAM card, you can copy the monitor and Applesoft over and then patch it, or if you have a PROM burner, you can make a custom autostart ROM. Here's the patch:

```
FA7E: 20  B4  F8          JSR NewReset  ;Check for special case reset
FBB4: 2C  10  C0  NewReset BIT KBSTRB   ;Clear Keyboard
FBB7: 2C  61  C0          BIT Button0   ;Button 0 pressed?
FBBA: 30  01              BMI DoReset
FBBC: 60                  RTS           ;No, do normal reset sequence
FBBD: 4C  A6  FA  DoReset JMP PWRUP     ;Yes, re-boot
```

The second question, by Kevin Tso, involved sending output to both the screen and printer in Pascal. If you don't need to simultaneously echo to the printer, how about using *Write(OutFile,stuff-to-print)*. First, open the *console*: file and write to it. Then repeat the process, except this time with *printer:*. If nothing else, at least you won't have to duplicate all of the writes.
Steve Christensen, Milpitas, CA

Order in the Disk Room

This is directed to DOS expert Tom Weishaar. With DOS 3.3, as a disk becomes full there is a noticeable lengthening of the time involved in loading or saving files. This could probably be attributed to space fragmentation and the pieces of a program or text file being spread out across the disk. Are there any utilities that you are aware of that will copy all files to a new disk and in the process will reorganize so that all space for each file is contiguous and all free space is at the end? It seems to me that this would be a useful utility.
Barry Sokolik, Hazelwood, MO

Tom Weishaar responds:
You're right. Files that have a little bit added to them again and again get spread out in little pieces all over a disk. The FID program on your system master disk will collect all the pieces and put them in more-or-less contiguous sectors (the less stuff on the disk you are copying onto, the more contiguous). FID won't save extra sectors at the end of the file for you, though. I don't know of a program that will, but I suspect other readers may have some suggestions.
Tom Weishaar

Frosted

I own an Apple II Plus and am looking for a powerful word processor that can be interfaced with a database. My problem is not a lack of good software for this purpose, but the fact that almost all new business software is being written for the Apple IIe, leaving Apple II and Apple II Plus owners out in the cold. Why can't programs be written for both computers, instead of just the IIe? The Apple II with a 16K RAM card is just as powerful as the IIe. Upper- and lower-case keyboards and eighty-column cards can be easily installed. I am growing frustrated at the number of applications programs that say "For Apple IIe only." Unless software publishers start thinking about the thousands of pre-Apple IIe owners, many loyal Apple owners will have to turn to something else.
Peter T. Clark, Sacramento, CA

Deadly Ions? Negative

I have four programs that draw pie, line, and bar charts, one of which is David Durkee's *SoftGraph*. They all work reasonably well, but all exhibit some form of ease-of-use limitation, and unless they are used frequently you have to relearn how to operate them each time. I noticed the advertisements for Spectral Graphics' *Master Chart* program and figured that, with a money-back guarantee, I would try it. Boy, am I glad I did! This is a fantastic program. You can master its many varied capabilities in less time than it would take to describe them. I would recommend it to everyone, even if you have absolutely no need for a graphing program. It's just fun to play with.

Robert P. Gasparro, in the April Open Discussion, asked some questions regarding the use of an Apple with a negative ion generator. Negative ion generators fall into the same category as ultrasonic rodent exterminators, devices that let you run your car on water, and those wonderful elixirs that grow hair on sheet metal plates. As far as the potentially damaging effects your ion generator may have on your Apple: Since the Apple is enclosed in a metal shield with few openings, I seriously doubt that any damage would result unless it was placed close to a fairly strong electromagnetic field. Just to play it safe, however, I would move the gizmo out to the barn. Who knows, maybe you will find that it is an effective rodent exterminator.
S.A. Smith, San Bernardino, CA

In reference to Gasparro's letter on the use of ionizers adjacent to Apples: He has nothing to worry about. On the contrary, he may be protecting his computer. Electronics manufacturers install ionizers in their factories to dissipate charges that can damage components. However, close proximity of the ionizer's power transformer to the computer can produce magnetic and electric fields that can be harmful. Be sure the ionizer is kept at a safe distance.
Irving Dlugatch, Laguna Hills, CA

Like Tso

In the April Open Discussion, Kevin Tso asked how he could do the equivalent of a pr#1 in Pascal (that is, send output to the screen and to the printer). There is no such animal in Pascal. However, there are three ways to get a hardcopy record of what happens on the screen. If you have the Pascal source code of a program and would like to get a printed record of its output, put a writeln for the printer next to every writeln for the console. You should also include a Boolean flag (Printon), which when true will send output to the printer. You can send output to the printer like so:

```
var Pfile:text;
rewrite(Pfile,'printer:');
writeln('line sent to the console/printer');
if Printon then writeln(Pfile,
'Line sent to the console/printer');
```

The routine above is inconvenient, as you must write code that will prompt for the value of the Printon flag. You must have writelns for both the

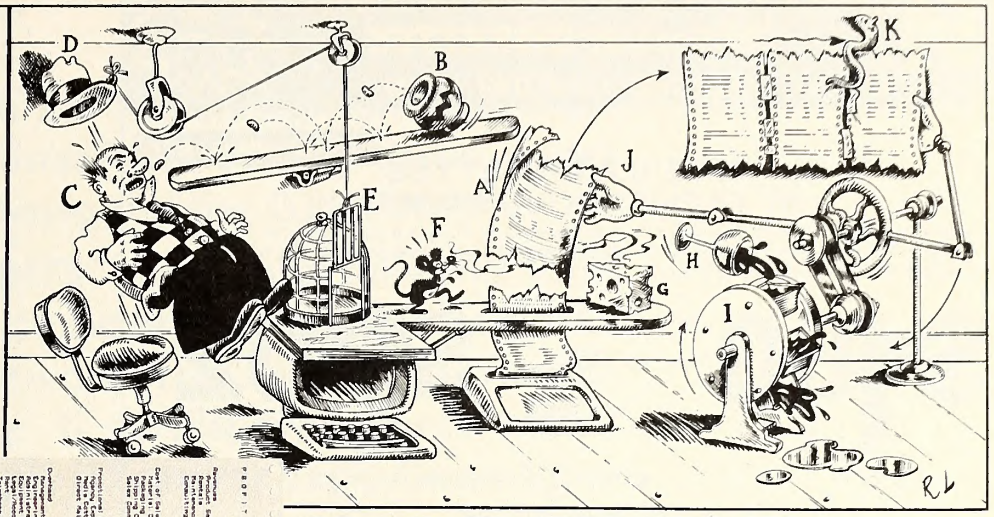
SIMPLIFIED SPREADSHEET ASSEMBLY

RISING SPREADSHEET (A) KNOCKS MEXICAN JUMPING BEANS (B) INTO MOUTH OF NEUROTIC MAN (C) WHO IS SO DISCOMBOBULATED THAT HIS HAIR STANDS ON END, DISLODGING HAT (D) WHICH OPENS CAGE (E) AND RELEASES EPICUREAN MOUSE (F).

MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, GNAWS THROUGH SPREADSHEET, ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSES GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA.

SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).



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You can go Sideways today with your Apple® II and a wide variety of dot matrix printers, including Epson,® Okidata, Apple DMP, and Imagewriter. Ask for Sideways at leading computer stores. Or mail a $60 check to Funk Software, P.O. Box 1290, Cambridge, MA 02238. (617) 497-6339. MC/Visa accepted. Send no Mexican jumping beans, please.

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console and the printer, and the routine will not solve the problem for programs to which you do not have source codes.

Another method is to write a console driver that will send output to both the printer and the console when a flag is set. To do this, you have to write assembly language code and interface it to the Pascal system using System.Attach (distributed by the International Apple Core for 1.1). This console driver would accept characters from the Pascal operating system, sending each character to the printer and then to the console. You could turn on the printer by either hitting a special printer-on designated key, or by sending a unit control signal to the console driver. Note that certain screen control commands (such as those that move the cursor to a different spot on the screen—gotoxy) will cause garbage to be printed.

The last method is to look in the utility section of the classifieds for software that will send what is on the screen to a character buffer; from there you can send it to a printer or a text file. I think this is the best way.

David M. Neves, Madison, WI

To Kevin Tso: You don't do a pr# from Pascal. It is a little more complicated than that. First you must define a variable (we'll call it dest) whose type is interactive: *var dest: interactive;*. Now try a test sentence like *writeln(dest,''Hello, printer! Are you awake?'');*. Assuming the printer is online and everything is normal, this should go to the printer. See "Boxing the Bugaboos" in the December *Softalk* for an example of using a printer with Pascal. If you don't have an Epson, replace the control codes with the control codes for your printer.

I'd like to say a word on the Macintosh. I just looked at one in a department store. (It seems Apple is not being as selective with Mac as they were with its big sister; I've seen Macs all over the place!) Anyhow, I sat down. *MacWrite* was running. I was hooked. Just by fooling around with the mouse and using the different menu options, I learned to use stuff like the filing menu and the miscellaneous options. I never figured out how you enter the word processor—the saleslady took the disk out before I had a chance to find out. However, the first time I touched a Mac it made a believer out of me.

Steve Sobol, Cleveland, OH

Searching the Three Dimensions

We are the proud owners of an Apple IIe system with the standard 64K single disk drive starter system. We have used this system primarily for data storage and analysis, scientific calculations, Basic programming, and business graphics, as well as the customary games.

We are searching for an applications package that will allow us to perform three-dimensional engineering design to augment, and in some cases replace, our traditional drafting operations. We would like this computer-aided design package to perform some of the same functions available on larger systems, such as scaling, rotating, and orthogonal projection.

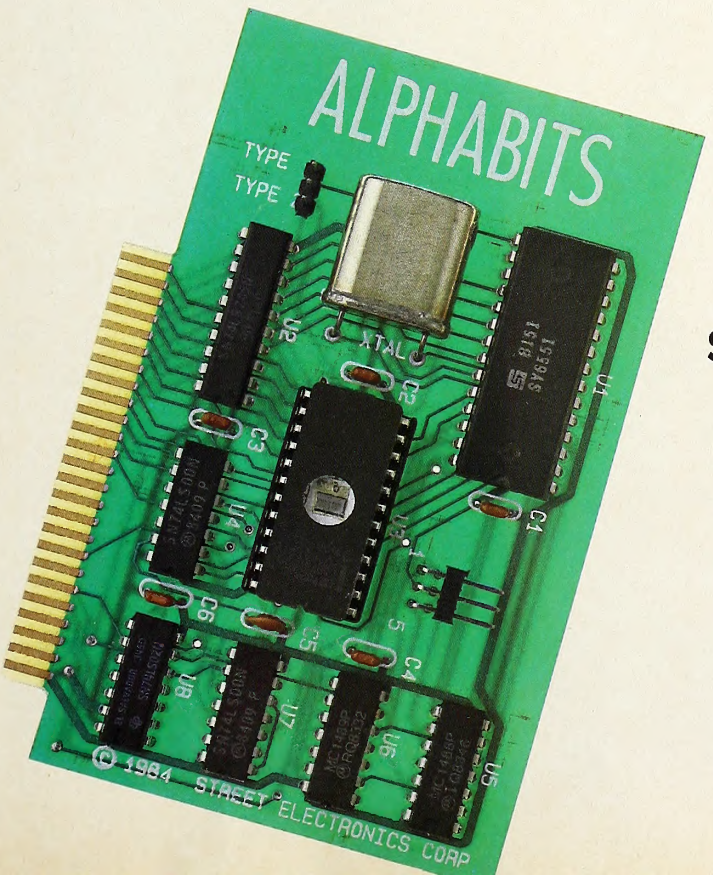
In reviewing the broad range of what is available in the field, we are dismayed by the rather large number of business graphics packages that produce spectacular bar graphs and pie charts, yet are not applicable to the engineering design discipline. We have found that the *Space Tablet/Advanced Space Graphics* system from Micro Control Systems in Vernon, Connecticut, is close, but their advanced version runs only on the IBM PC.

The Alphabits™ serial interface: New Interface Standard

Street Electronics set the design standard for parallel printer interfaces nearly three years ago when they designed the GRAPPLER™.

The new ALPHABITS™ serial interface will soon establish a new standard for serial interfaces with bundled software. This new plug-in product for the Apple® II series, which was introduced at the "Apple II Forever Expo," emulates the new Apple IIc serial ports. Now Apple II series users can run software and peripherals designed for the IIc.

A hi-res graphics screen printing package with mouse interfacing capabilities is included, as is a IIc compatible connector. The ALPHABITS™ was especially designed as a low-cost product for the increasing number of quality serial printers like the Apple Imagewriter™.



Street Electronics Corporation
1140 Mark Avenue
Carpinteria, CA 93013 California
Telephone (805) 684-4593


BASF
FlexyDisk
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3.5" Micro FlexyDisk®
Single Side

Introducing a pocketful of miracles.

It's the new BASF Qualimetric™ 3.5″ Micro FlexyDisk.® Its name is a lot bigger than its size, and a lot smaller than its capacity – one astounding megabyte. Our new Micro fits into more than shirt pockets. It fits into several of the hottest new small portable personal computers – like Apple™ Computer's new Macintosh™ and Lisa™ 2 and Hewlett-Packard's HP-150 Touchscreen PC.

The Qualimetric part is what makes our Micro FlexyDisk different from the others that will inevitably follow. It indicates a new standard in design, production, inspection, and testing. This standard enables us to warranty the Micro for a lifetime.* No more, no less. In addition, we certify that each bit of every byte on or between every track on each Micro FlexyDisk is 100% error-free. That's because we know, while each Micro FlexyDisk may only cost a couple of bucks, the hours and brain cells you put into it are priceless.

*Contact BASF for a copy of our warranty

For those occasions when you need more than a pocketful of miracles, we provide a handy and virtually earthquake-proof 5-pack. It's sized to slip easily into your briefcase, handbag, or backpack.

For a plethora of technical details about our new Micro FlexyDisk and even more important information on where to buy it, call toll-free. 1-800-343-4600.

Celebrating 50 years of magnetic recording

BASF

We find it extremely difficult to uncover what applications software is available by reading trade magazines and visiting computer stores. We are willing to consider any upgrades to our system that we can comfortably afford, such as a plotter, additional memory, or another drive.
Kenneth E. Wood, Macedon, NY

The Trouble with Mice
David Durkee's otherwise excellent article, *A Mouse for the Rest of Us*, missed one important point: *MousePaint* will not work on any printer other than the Apple Dot Matrix Printer or Imagewriter. I found this out the hard way. I was able to purchase the AppleMouse II for my IIe about a week or so before the general public. I thought it was terrific until I tried to get it to print on my Epson RX-80. Sorry, not a chance.

I called my Apple dealer, who knew less about it than I did. I called the Apple Tech Support Line, and they told me that the only way I could print on my Epson was to save the graphic to disk, convert it from ProDOS to DOS 3.3, and then go to a graphics dump. I called Epson and found that they have no present plans to work out interfacing between the Epson and Apple's mouse. I am surprised that Apple chose to support only their own printers. Perhaps there are some Open Discussion readers who can come up with a patch.
David Alexander, Long Beach, CA

Low-Cal Apple
First, *Softalk*'s subscription department is to be complimented. It could not have been three weeks from the time I sent in my subscription request to the time I received my first copy.

Second, I know of a program named *InShape* by DEG Software for the IBM PC. This program evaluates workouts according to aerobic values and calories burned. It can also evaluate diet. These functions would be very valuable to my wife, who is diabetic. If someone knows whether this program is available for the Apple IIe or knows of similar programs, I would appreciate the information.
Jon T. Deuchler, Brentwood, MO

Not So Dynamic
I am a relatively new Apple IIe owner. I have Duodisk drives, and I was wondering how I get drive 2 to load. I have asked many users and not one has been able to answer my question. I am also looking for user groups in my area and have not been able to find any.
Wayne Nelson, Florissant, MO

Sesame Screen
The use of the Apple for computer-aided instruction is widely noted, especially in California. I would be interested in learning whether anyone has developed CAI programs for babies. Yes, babies! In the past few years it appears that science has discovered that babies have a most remarkable ability to learn. One approach uses flash cards with words (for reading) and dots (for mathematics). Has anyone developed a program specifically for babies, showing screens of words or dots? I suspect that there is a very significant market for such a program.

One last request: I purchased *Apple Writer* and *Quick File* for use with my Apple IIe. They are certainly very neat programs. For the novice, however, despite what Apple may say, the documentation seems to leave out some information. Does anyone know of a reference that clarifies the use of these two programs, describing methods for developing specific uses? For any readers who wish to respond to my CompuServe electronic mailbox, I am user identification number 70366,516.
Robert J. Carter, Sierra Vista, AZ

Magic Menu
I have what seems like a simple problem with my Apple II Plus, but bear with me. I have a copy of *Magic Window II* that doesn't work well. It boots up fine, but when the main menu comes up, it is in inverse and all the explanations of the numbers are missing. In other words, all I get is a string of black-on-white numbers from one to six. The problem isn't constant, either; occasionally the menu is normal to begin with, but it always blanks out later. Also, the cursor sometimes freezes on the screen and the only way to get it unstuck is to reset, which often causes the whole thing to crash. Not only is it annoying, but it also makes for a great deal of extra work.

Of course, the obvious response is that I have a bad copy. I figured that out early on, and I got another copy of it, with the same result. I tried out a friend's copy, which works fine on his computer. In addition, when I tried my copy on another computer, it worked perfectly! *Magic Window* isn't the only program I'm having this sort of trouble with, but it is the one I use most often, so the problem is acute. If anyone could help me out on this, I'd be eternally grateful. (By the way, all of the control functions, tabs, and so on, work.)
Matt Small, San Jose, CA

Speech for Hart
Help! Can anyone tell me how or where to get a new SSI-236 speech synthesizer chip? I need it for a fantastic home project. Thanks!
John P. Hart, Gig Harbor, WA

You're Bluffin'
I had been learning about Basic and started learning Pascal. I heard about an offshoot program of *Muffin* on the System Master disk called (amusingly enough) *Huffin* and another called *Puffin*. As *Muffin* copies and converts programs from DOS 3.2 disks and *Demuffin* and *Niffum* do the opposite, *Huffin* supposedly converts Applesoft programs to Pascal and *Puffin* does the opposite. I would like to use those programs and was wondering if anyone had heard of them or similar programs and where I could get them?
J. Schenkman, Simsbury, CT

Popping the Question
I recently received a wedding invitation of simulated hand-done calligraphy that was done on a dot-matrix printer. Are you aware of any programs for an Apple II Plus that would allow me to do the same?
Thomas E. Johnson, Mequon, WI

Across the Ocean Wida
I was interested to read the letter asking for software for teaching second languages. I have also noticed a dearth of information on this side of the Atlantic. A company called Wida Software (Nicholas Gardens, London, England) supplies a reasonable choice of programs suitable for most computers. They also supply programs teaching French, German, Latin, and Spanish. I haven't actually tested these yet. Otherwise, I too would be grateful to know about the availability of such programs.
Susan Moller, Bromham, Bedford, England

These are the hands of a master typist. (Jonathan Pandolfi, age 7.)

MasterType™—the best-selling program that turns learning into child's play.

Given the choice of learning a skill or playing a game, most kids go for the game.

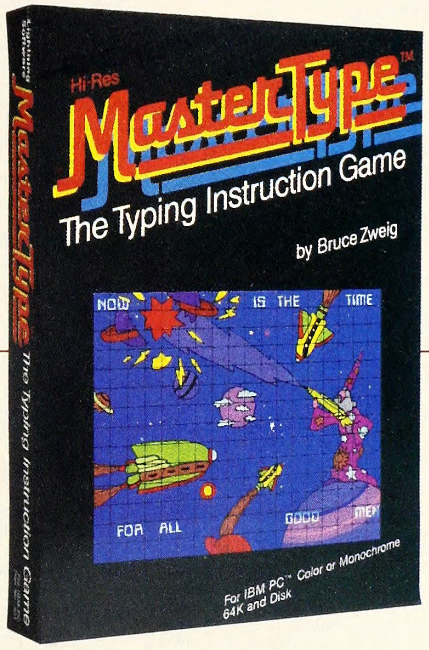
So how has MasterType™ gotten so many young kids to sit still long enough to learn to type?

By being fun. By bringing the fast action of video games to each of MasterType's lesson program segments.

Kids get so caught up in zapping spaceships, they hardly realize they've mastered the keyboard.

Warning: Parents like it, too. And may find themselves unwittingly becoming expert typists before they know it.

Disks: Apple®, Atari®, Commodore 64® $39.95
IBM-PC $49.95
Cartridges: Atari®, Commodore 64® $39.95



Try the other programs in the Scarborough System—Songwriter™, PictureWriter™, Phi Beta Filer™, PatternMaker™ and Run for the Money™. All Scarborough software utilizes your computer's capabilities to the fullest. And perhaps more importantly, all are easy to use.

Apple, IBM and Atari are registered trademarks of Apple Computer, Inc., International Business Machines Corp. and Atari, Inc. respectively. Commodore 64 is a trademark of Commodore Electronics Limited.

The Scarborough System.

You'll grow with us.

Apple® Programming Utilities

☐ GPLE™ (Supports DOS 3.3 *and* ProDOS)

GLOBAL PROGRAM LINE EDITOR by NEIL KONZEN
$49.95: Includes Peeks/Pokes Chart & Tip Book #7

THE CLASSIC APPLE PROGRAM LINE EDITOR: GPLE lets you edit 40- or 80-column Applesoft program lines *FAST* without awkward cursor-tracing or "Escape editing". Compatible with Double-Take's 2 way scrolling.

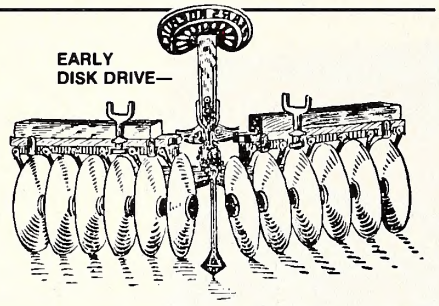
INSERT & DELETE: GPLE works like an in-memory word processor for Applesoft program lines. Simply jump the cursor to the change-point and insert or delete text. No need to trace to the end of a line before hitting Return.

GLOBAL SEARCH & REPLACE: Find any word or variable in your programs, *FAST*. For example, find all lines containing a GOSUB, or all occurrences of variable XY. REPLACE ANY VARIABLE or word with any other. For example, change all X's to ABC's, or all "Horses" to "Cows".

DEFINABLE ESC FUNCTIONS: Define ESC plus any key to perform any task. For example, **ESC-1** can catalog drive 1, or **ESC-N** could type an entire phrase or subroutine. *Anything* you want, *whenever* you want.

GPLE DOS MOVER: Move DOS 3.3 & GPLE above main memory for an EXTRA **10K** of programming space.

PLUS APPLE TIP BOOK #7: Learn more about your Apple! Includes all-new useful GPLE tips and tricks.



☐ BEAGLE BASIC™ (REQ. 64K)

APPLESOFT ENHANCER by MARK SIMONSEN
$34.95: Includes Peeks/Pokes Chart & Tip Book #6

RENAME ANY APPLESOFT COMMAND or Error Message to anything you want. For program clarification, encryption/protection or even foreign translation. Example:

10 POUR X=1 TO 3: ECRIVEZ "BONJOUR": ENSUITE

RAM Applesoft is *better* Applesoft! Beagle Basic replaces those obsolete cassette commands (SHLOAD, etc.), with powerful new commands that you can USE—

ELSE follows Applesoft If-Then statements, like this:

IF X=2 THEN PRINT "YES": *ELSE* PRINT "NO"

HSCRN reads the color of a hi-res dot for collision testing, **SWAP** exchanges variable values, **TONE** writes music without messy Pokes or Calls, **SCRL** scrolls text in *either* direction, **TXT2** lets Text Page 2 act exactly like Page 1...

GOTO AND GOSUB may precede variables, as in "GOSUB FIX" or "GOTO 4+X". Escape-mode indicated by a special ESCAPE CURSOR. Replace those awkward Graphics screen-switch pokes with one-word commands. Change your ctrl-G Beep to any tone you want. **INVERSE REM STATEMENTS** too! GPLE/Double-Take compatible.

☐ DOS BOSS™

DOS 3.3 EDITOR by BERT KERSEY & JACK CASSIDY
$24.00: Includes Peeks/Pokes Chart & Tip Book #2

RENAME DOS COMMANDS and Error Messages—DOS 3.3's "Catalog" can be "Cat"; DOS's cryptic "Syntax Error" can be "Oops" or almost *anything* you want it to be.

PROTECT YOUR PROGRAMS. Unauthorized Save-attempts can produce "Not Copyable" message, or *any* message. **List-Prevention** and other useful Apple tips and tricks. Plus one-key program-execution from catalog.

CUSTOMIZE DOS. Change Disk Volume headings to your message or title. Omit or alter catalog file codes. Fascinating documentation, tips & educational experiments.

ANYONE USING YOUR DISKS (booted or not) will be forced to use DOS formatted the way YOU designed it.

☐ DOUBLE-TAKE ← DOS 3.3 / ProDOS
☐ DOUBLE-TAKE/PRO™

2-WAY SCROLL/MULTI-UTILITY by MARK SIMONSEN
$34.95: Includes Peeks/Pokes Chart & Tips Chart #1

2-WAY SCROLLING: Listings & Catalogs scroll Up *and* Down, making file names and program lines easier to access. Change Catalog or List scroll-direction with Apple's Arrow keys. Machine Language and Hex/Ascii dumps scroll two-ways too. All features support 80-column display.

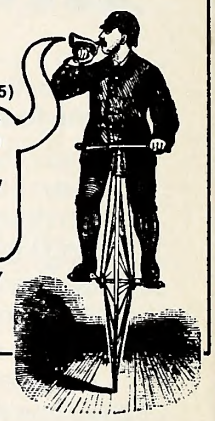
BETTER LIST FORMAT: Each Applesoft program statement lists on a new line for *FAST* program tracing & de-bugging. Printer-compatible in any column-width.

```
A$="DOGFOOD"  ← VARIABLE-DISPLAY: prints
X=3.14159       all of a program's strings and van-
Y=255           ables with their current values.
A$: 100 200 250  ← CROSS-REFERENCE: Sorts
X: 10 20 3000      & displays line numbers where
Y: 10 40 55 60     each variable & string appears.
```

AUTO-LINE-NUMBER, instant Hex/Dec Converter, better Renumber/Append, Program Stats, Eliminate/Redefine Cursor, Free Space-On-Disk... All GPLE/Pronto compatible.

2-WAY VIDEO SCROLLING

```
]LIST
10 HGR2
   : FOR Y=0 TO 191
   : POKE 228, C
   : C=C+1/9-256*(C=255)
20 REM "Double-Take optionally lists each Applesoft program statement on a new line, making program code much easier to read."
30 HPLOT 0,Y TO 279,Y
   : NEXT Y
   : POKE 2053,58
   : GOTO 10
```



High-Speed DOS

☐ PRONTO-DOS™

HIGH-SPEED DOS/DOS-MOVER by TOM WEISHAAR
$29.50: Includes Peeks & Pokes Chart

TRIPLES THE SPEED of disk access and frees 10,000 bytes of extra programmable memory by moving DOS 3.3.

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec.	3 sec.
LOAD 60-SECTOR PROGRAM	16 sec.	4 sec.
SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.

(Text-files no change) **Bload language cards** at *triple* speed. Create bootable high-speed disks with the normal INIT command. Compatible with *all* commands, GPLE, Double-Take, DOS Boss, DiskQuik & most unprotected programs.

MOVE DOS 3.3 above main memory to free *10,000 bytes* of memory for your programs (64K required to move DOS).

15 EXTRA SECTORS per disk. Catalog Free-Space is displayed on the screen every time you Catalog a disk.

NEW TYPE-COMMAND ("TYPE filename") prints the contents of any Text File on-screen or to your printer.

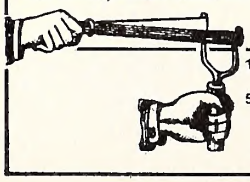
☐ DISKQUIK™ (Requires IIe with 128K)

DISK EMULATOR by HARRY BRUCE & GENE HITE
$29.50: Includes Peeks & Pokes Chart
Requires IIe with EXTENDED 80-column card (128K)

ACTS LIKE A DISK DRIVE in Slot 3, but super-fast and silent! Enjoy many of the benefits of another drive at 1/10th the cost. Catalog with "CATALOG, S3" command. Access all kind of files in RAM with normal DOS commands.

SILENT AND FAST: Since no moving parts are involved, DiskQuik operates at super-high speeds. See to believe! Your Apple IIe's Extended 80-column Card (required) holds about half the amount of data as a 5¼" floppy!

MANY USES: For example, load often-used files like FID into RAM when you boot up, so they are always available when you need them. Copy files from RAM onto disk and vice versa, just as if a disk drive were connected to slot #3.



COMPATIBLE with all normal DOS procedures.

```
1234 TEXT: HOME: NORMAL:
     PRINT CHR$(21)
5678 R=INT(RND(1)*10): N(R)=
     N(R)+1: VTAB R+9: HTAB
     40: PRINT CHR$ (124); SPC
     (N(R)); CHR$(R+65); :
     IF PEEK(36) THEN 5678
```

Multi-Utilities

☐ UTILITY CITY™

21 PROGRAMMING UTILITIES by BERT KERSEY
$29.50: Includes Peeks/Pokes Chart & Tip Book #3

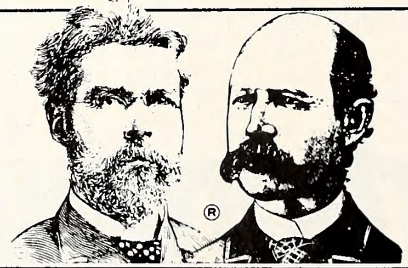
LIST FORMATTER prints each Applesoft program statement on a new line. For-Next Loops are indented with printer Page Breaks. A great Applesoft program de-bugger.

MULTI-COLUMN CATALOGS to your printer, with or without sector and file codes. Organize your disk library.

INVISIBLE AND TRICK catalog File Names. Put invisible functioning commands in Applesoft programs too.

21 UTILITIES TOTAL, including auto-post Run-number & Date in programs, alphabetize/store info on disk, convert dec to hex or int to FP, protect and append programs, dump 40-column text to printer. And More.

LEARN PROGRAMMING TRICKS: LIST-able programs and informative documentation. includes Tip Book #3— Hours of good reading and Applesoft experiments.

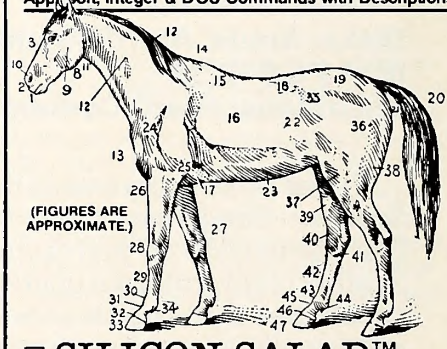


Beagle Bros Micro Software Inc.

3990 OLD TOWN AVENUE, SUITE 102C
SAN DIEGO, CA 92110 / 619-296-6400

Attention Applers: Most Apple dealers and software stores have Beagle Bros products on their shelves. If you can't find the disk you want, bug the manager—he can have *any* of our products in his store for you within a couple of days.

FREE APPLE COMMAND CHART: Each SILICON SALAD and TIP DISK #1 comes with an 11x17 poster of all Applesoft, Integer & DOS Commands with Descriptions.



☐ SILICON SALAD™

WITH TIP DISK #2 by BERT KERSEY & MARK SIMONSEN
$24.95: With Peeks/Pokes Chart & Apple Command Chart

MANY MINI-UTILITIES: Program Splitter makes room for hi-res pix in large Applesoft programs, **Disk Scanner** finds bad disk sectors, **Key-Clicker** adds subtle sound as you type, **DOS-Killer** adds two tracks of space to your disks, **2-Track Cat** allows up to 210 DOS 3.3 file names per disk, **Text Imprinter** converts text-screen text into hi-res text, **Onerr Tell Me** prints the appropriate error message but continues program execution, **Text Screen Formatter** formats and converts text layouts into Print statements... plus much more Apple wizardry from the boys at Beagle Bros.

MORE TIPS ON DISK: Over 100 programs from Beagle Bros Tip Books 5, 6 and 7; *and* from Tip Chart #1.

TWO-LINERS TOO: From our customers around the world—and elsewhere. New tricks for your old Apple!

☐ TIP DISK #1™

100 TIP BOOK PROGRAMS ON DISK by BERT KERSEY
$20.00: With Peeks/Pokes Chart & Apple Command Chart

100 LISTABLE PROGRAMS from Beagle Tip Books 1-4. Make your Apple do things it's never done! All 100 programs are LISTable and changeable for experimentation. Two-Liners too, plus a free *Apple Command Chart.*

COMING JULY 84 Apple® Graphics Utilities

☐ BEAGLE GRAPHICS™

DOUBLE HI-RES GRAPHICS by MARK SIMONSEN
$59.95: Includes Peeks & Pokes Chart
Requires Apple IIc (or IIe with EXTENDED 80-col. card).

560-WIDE WITH 16 COLORS! Beagle Graphics gives your 128K-Apple (required) a full range of colors plus *double* high resolution—560 x 192 pixels. All Applesoft hi-res functions, including shape tables, are supported.
NEW COMMANDS let you draw fast circles, ellipses and rectangles from the keyboard or from your programs.
FAST COLOR FILL fills any outline with one of 16 solid colors or 256 color mixes (usable in your programs).
PROGRAM & PICTURE-CONVERTERS change your existing Applesoft programs *and pictures* to double hi-res. "Double-ize" *Apple Mechanic* shape table programs too!
DOUBLE-PLOT PROGRAM lets you draw and manipulate pictures in double hi-res. Add type to pix too. Move sections of images to either page. Save pictures to disk.
HI-RES TRICKS: Amazing stuff— any portion of a picture may be rotated, flopped, moved, inverted, superimposed, scrunched or even SAVED to disk. Saving image-portions conserves disk space.

COMING JULY 84

☐ TRIPLE-DUMP™

SINGLE/DOUBLE HI-RES "PRINT-ANYTHING" UTILITY
$39.95: Includes Peeks & Pokes Chart

PRINT ANY SCREEN IMAGE on your dot-matrix (graphics-capable) printer— Hi-Res, Lo-Res, **Double HI-Res,** Medium-Res, as well as 40 **and 80-Column Text**. All print functions may be used in your Applesoft programs and disks. Don't settle for a "locked up" printer-dump program.
SPECIAL EFFECTS: Crop, rotate, enlarge, distort, invert... Preview pictures on the screen before you print.
BANNER MAKER: Make impressive 8"-high signs and banners for your family, home or office. Type any message—no length limit—and let your printer do the work!

☐ ALPHA PLOT™

STANDARD HI-RES GRAPHICS UTILITY
by BERT KERSEY & JACK CASSIDY
$39.50: Includes Peeks/Pokes Chart & Tip Book #4
(Alpha Plot offers 6-color 280-pixel resolution and requires only 48K; see Beagle Graphics for 128K double hi-res.)

DRAW IN HI-RES on both pages using easy keyboard commands. Pre-view lines before plotting. Use solid or mixed colors and Reverse (background opposite). One-keystroke circles, boxes and ellipses, filled or not. All pictures are Save-able to disk for access by your Applesoft programs.
COMPRESS HI-RES DATA to 1/3 disk-space, allowing 3-times the number of hi-res pictures per disk (avg. figures).
MANIPULATE IMAGES: Superimpose pictures or *relocate* sections of images anywhere on either hi-res page.
HI-RES TYPE: Add variable-size color & b/w text to your pictures. Type *anywhere* with no htab/vtab limits. Type sideways too, for Charts & Graphs. Includes Tip Book #4.

☐ FLEX TYPE™

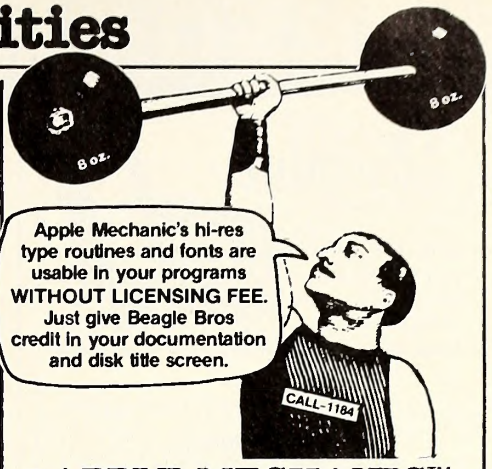
FLEXIBLE-TEXT UTILITY by MARK SIMONSEN
$29.50: Includes Peeks & Pokes Chart

PUT VARIABLE-WIDTH TEXT on both hi-res screens with normal Applesoft commands (including HTAB 1-70). Normal, expanded & compressed text with no extra hardware. (70-column text requires b/w monitor, not a tv).
COMBINE TEXT & GRAPHICS. Run existing Applesoft programs with Flex. GPLE/Double-Take compatible.
DOS TOOL KIT® font compatibility. Access up to 9 fonts in memory. Text editor lets you redesign text characters.

☐ FRAME-UP™

FAST APPLE DISPLAY UTILITY by TOM WEISHAAR
$29.50: Includes Peeks & Pokes Chart

PROFESSIONAL PRESENTATIONS: Turn existing Hi-Res, Lo-Res & Text pix into Apple "slide shows". *FAST* 2½-sec. hi-res loading! Paddle or Keyboard-advance frames.
UNATTENDED SHOWS optional— each picture arranged and pre-programmed to display 1 to 99 seconds. Text Screen Editor creates black & white text "slides"; lets you key-in type "live" during shows. Mail copies of presentations-on-disk to friends & associates (or home to Mom!).



☐ APPLE MECHANIC™

HI-RES SHAPE EDITOR & FONTS by BERT KERSEY
$29.50: Includes Peeks/Pokes Chart & Tip Book #5

SHAPE EDITOR: Keyboard-draw hi-res shapes for animation in your Applesoft programs. Easy "List & Learn" Applesoft demos teach how to do hi-res animation as well as professional-looking hi-res Charts and Graphs.
HI-RES FONTS: Access & create proportionally-spaced hi-res type; each character totally re-definable. Six complete fonts are included on the disk (4 large & 2 small).
MORE: Useful music, text and hi-res tricks for your Applesoft programs. Clear educational documentation and step-by-step instructions for writing graphics programs.

APPLE MECHANIC HI-RES ☐ TYPEFACES™

26 FONTS FOR APPLE MECHANIC by BERT KERSEY
$20.00: Includes Peeks & Pokes Chart

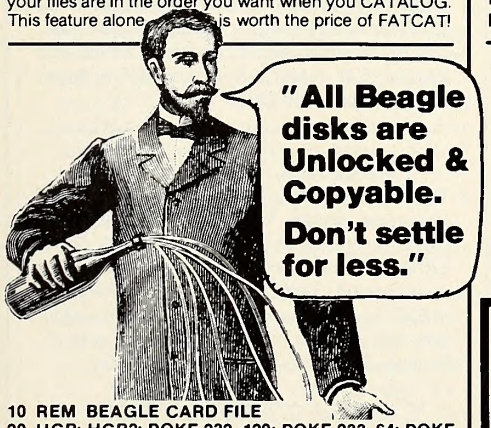
26 NEW FONTS for use with Apple Mechanic programs. Many different sizes and typestyles, both ordinary and *Artistic*. Every character—from A to Z to "★" to "□"—of every typeface—from "Ace" to "Zooloo"—is re-definable to suit your needs. All type is *proportionally spaced* for a more professional appearance. People *do* notice the difference!

Disk Librarian

☐ FATCAT™ NEW!

PERSONAL DISK LiBRARY by ALAN BIRD
$34.95: Includes Peeks & Pokes Chart

MULTIPLE-DISK CATALOG: FATCAT reads all of your DOS 3.3 and ProDOS disks into one or more "Master Catalogs" that can be searched, sorted and printed. Get organized, and find out what's *really* on all of those floppies!
ALPHABETIZE FILE NAMES: FATCAT lets you sort your DOS 3.3 and ProDOS disk catalogs alphabetically, by file name, type, etc., to make files easier to find. Once arranged, a new disk directory may be written to the disk, so your files are in the order you want when you CATALOG. This feature alone is worth the price of FATCAT!




```
10 REM BEAGLE CARD FILE
20 HGR: HGR2: POKE 232, 120: POKE 233, 64: POKE
   16504, 7: SCALE=80: P=16: X=99: FOR R=0 TO 31:
   P=P*-1: POKE 230, 48+P
30 FOR Y=0 TO 1: ROT=ABS(64*Y-R): HCOLOR=3:
   FOR A=1 TO 25: DRAW 1 AT X+2*A, X: NEXT
40 HCOLOR=0: DRAW 1 AT X, X: ROT=32: DRAW 1:
   DRAW 1 AT X, X: NEXT Y, R
50 FOR A=0 TO 20: FOR B=0 TO 1: POKE 49237-B,0:
   X=PEEK(49200): FOR C=1 TO 6*A
60 NEXT C, B, A: GOTO 50
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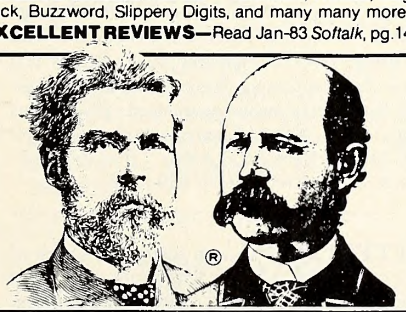

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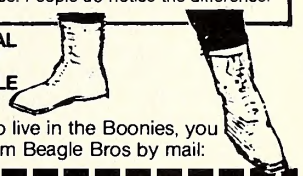

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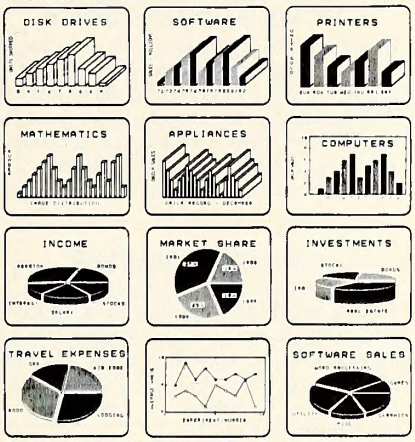

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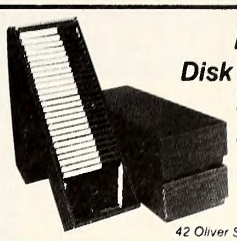

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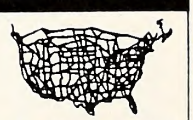

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Industry

In the Shade of Big Business, the Cottage Industry Carries On

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Dreams.

They're the stuff America's made of. We've even elevated the concept to a proper noun, as in The American Dream.

The American dream is highly democratic—everyone gets their own version. It's always been that way. Once the dreams centered on core concepts such as religious freedom, economic freedom, freedom from tyranny, or freedom from prejudice.

Today, those freedoms are pretty much taken for granted. But still the American dream persists. It takes different forms for different folks, from desire for a color television set or a new car or a rare stamp to a desire for being your own boss.

No industry in modern times has so fulfilled that latter desire for so many people as the microcomputer industry. Steve Wozniak, Bill Gates, Gary Kildall, Ken Williams, Doug Carlston, Fred Gibbons. The list could go on and on of people who have carved out successful companies where nothing existed before.

We've coined a name for the pursuers of the dream. We call them entrepreneurs. When they succeed, they're America's new heroes.

These days, though, we're told not to believe in the American dream in connection with the microcomputer industry. We're told the cost of entry is too high. The markets are too competitive. The distribution channels are closed to products from new companies. These are not negations of the American dream, just difficulties standing in the way of its realization.

The entrepreneurial instinct remains strong in the microcomputer industry, and you don't have to be already successful to pursue it. The moguls mentioned previously all had their moments of doubt, crossroads of crisis, and times of trial. That they negotiated those tribulations is attested to by their success.

There are dozens of others negotiating similar paths at this moment. The odds against these middle-size companies becoming major successes are long, but that doesn't deter their principals.

The example of one such company, which appears about ready to make a major breakthrough, illuminates the problems that face the small company striving for a major market share.

The company is Accent Software and the principals are Herve and Nancy Vanclef.

The story of Accent's origin is not an unfamiliar one. Herve Vanclef had written a graphics utility called *Accu-Shapes* in 1981. He showed it to a couple of the major software publishers, including Personal Software (now VisiCorp). Personal's product manager in that area was a bright young fellow named Mitch Kapor, who thought the program had promise.

The only difficulty was that Kapor wanted more time to get a feel for the program. He indicated that it would take Personal six months or more to get it ready to sell. The six-month lead time in getting to market was shorter than any other publisher had estimated, so Herve dutifully gave Personal the extra evaluation time.

Was he ever in for a surprise when he checked in to determine how Personal was progressing. As it turned out, Kapor had left the company and returned to New England, where he polished off *VisiTrend* and *VisiPlot*. Everyone knows what he did from there—started Lotus Development and designed *1-2-3*, the hottest software product in the history of microcomputing.

Of course, Herve Vanclef could have had no knowledge of all these things to come when he rang up Kapor and found him gone. But that, and the long product preparation time, made him all the more determined to market his product himself.

In short, Herve and Nancy became business partners as well as marriage partners.

Their company opened the doors in October 1981 with three products, a game and an Applesoft debugger, which are long forgotten, and *Accu-Shapes*. The success of *Accu-Shapes* made them realize that Accent's future was in graphics. That realization led to *The Graphic Solution*, a full-featured graphic utility that premiered in November 1982 and has formed the foundation of the company since.

That all seems nice and simple and straightforward—and maybe even easy. Guess again, folks. What the Vanclefs went through to get to June 1984 was no picnic.

Adam Smith extolled the virtues of the division of labor two centuries ago. Regardless of whether anybody agrees in theory with his analysis, the world seems to function that way. But when you're a two-person company, where are the personal resources to divide the labor?

If Nancy's doing market research, who's making sure the manuals get printed and the disks get purchased? If Herve is doing customer support, who's developing the company's new products? When it's time to attend a promising computer expo, who stays behind to ship current orders if you need two persons manning your booth?

For the Vanclefs, the perfect answer would have been a forty-hour workday. Unfortunately, Herve suffers the same limitation as other programmers—he can program a microcomputer but not the planets. The sun continued its twenty-four-hour day. The last remaining alternative was to stretch the normal day by working twelve to sixteen hours. During normal work hours, the Vanclefs did the business that could only be done then—banking, purchasing, answering customer questions, nurturing their distributors and their retail outlets, and planning their advertising and packaging. At night, they prepared the next day's orders to go out and slaved over a hot Apple developing new features. And they had to find time to remain loving and available parents.

None of this is all that uncommon. Any number of entrepreneurs have the same stories of long hours. And the Vanclefs had almost all the bases covered. But there was no time for some of the other activities that contributed to the success of some similar companies.

When movers and shakers met to move and shake, the Vanclefs were in the office shipping product. When software publishers and magazine editors met to wine and dine, the Vanclefs were microwaving a frozen dinner or grabbing a fast food sandwich. Missing these activities seemed to have a negative result. While many companies grew, Accent seemed to remain in the backwater of the software industry.

Let's face it. It's hell to have such a strong puritan ethic that you put your customers ahead of your own business's well-being. After all, that's a long-range approach to business in what seemed to be a short-range industry.

Happily, this story has an upbeat ending. First, the Vanclefs were joined a year ago by Lynn Robinson, increasing their staff by a full 50 percent. Second, their attention to their customers paid off. As they listened to what their customers wanted in a graphics package, they continued to develop features for *The Graphic Solution*. The result of all the listening is a package perhaps unmatched for its versatility of use.

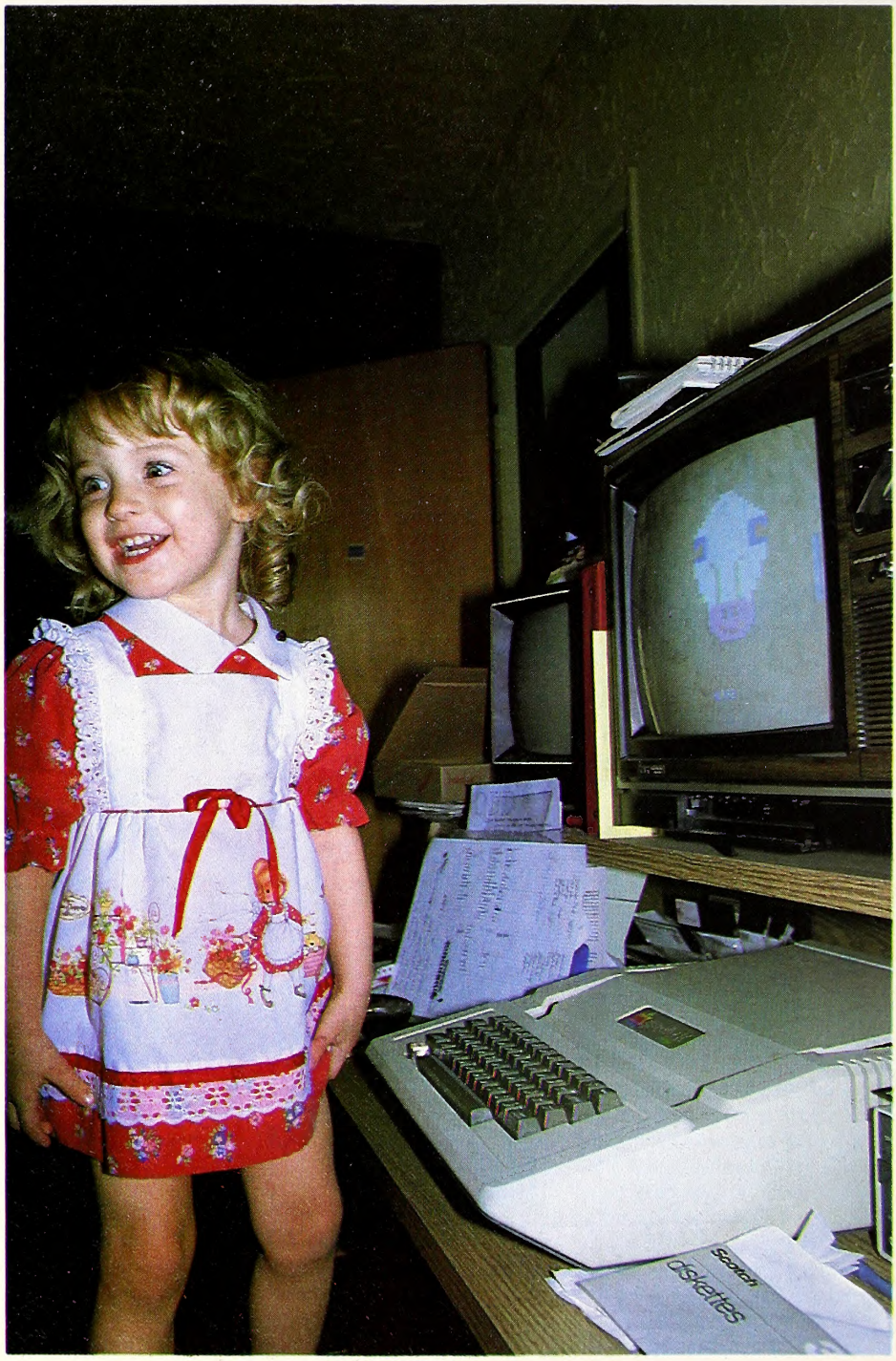
A stained-glass manufacturing company uses *TGS* to develop its catalog. A broadcaster uses it to develop promo spots. Professors use it for developing instructional and training aids in such areas as boating safety. *TGS* is used to present scientific data in graphic form. The Army School of Intelligence is relatively mum about its use of *TGS*. A researcher is using *TGS* as an aid in developing psycholinguistic experiments.

It does pay to keep your shoulder to the wheel. After completion of a business plan late last year, Accent received outside financing to prepare them for their next growth step, a product that should be ready in September and revolves around an enhanced *TGS*. The company now has three full-time programmers in addition to Herve and will soon be announcing the successful recruitment of a veteran industryite as president.

The financing makes these steps possible, but the numbers also indicate how the industry has changed. Nancy Vanclef recalls, "It cost us $5,000 to get out three products in 1981 and $50,000 to get out one product in 1982. It looks like our next product will cost about $500,000."

Nobody is mentioning Accent Software in the same breath with Microsoft or VisiCorp or Lotus. But the growth of Accent Software should be heartening to those who desire to follow in the Vanclefs' footsteps.

The American dream isn't dead for Herve and Nancy Vanclef; it's just taking a little longer to achieve realization. ***—Al Tommervik***



Education

Please Touch: Toddlers and Typing

Hunting for letters makes it harder to touch-type later on. Learning touch-typing along with the ABCs may be the answer—and make the ABCs easier too.

The majority of educational software being written and marketed in the USA today has a fundamental flaw. Simply stated, authors write programs that assume children know how to touch-type. In fact, very few children who are using these programs know how to touch-type.

This encourages a self-taught, hunt-and-peck style of learning typing. While this may seem innocent, it can be very damaging, making it difficult for the student to unlearn hunt-and-peck typing in the future. Looking at the keys becomes second nature.

During my high school days, boys didn't learn how to type. That was something girls did. My senior year touch-typing course was the single most valuable course I ever took, including fifteen years of university education.

How does one learn to type? What is involved physiologically? Between the bones in your fingers, there are muscles called the interossei. Within the interossei are buried special sensory nerve endings called "muscle spindle nerve apparatuses." Squeeze your fingers together. Now, spread your fingers apart. Now, do that again with your eyes closed. You can tell where your fingers are, can't you? The reason is that thousands of muscle spindle fibers are firing nerve impulses to your brain. The pattern of their firing tells a portion of your brain, called the cerebellum, what the relative position of your finger is. This sense of position is called proprioception.

Proprioception is the basis for learning touch-typing. What a student does in hours of typing practice—or in hours of learning to play a musical instrument—is to train the brain to learn unconsciously what the proprioceptive input patterns are for specific keys on the instrument. That's what it's all about. It's as simple as that.

But why is the hunt-and-peck method bad? There is a hierarchy of sensory input to the brain. And sight takes precedence over proprioception (touch). In fact, sight-learning tends to extinguish touch-learning. Thus, students who learn to type by sight suppress their abilities to learn typing by touch. If students practice typing by looking at their fingers, they aren't learning anything; it is a total waste of time. The more students look at their fingers, the more they have to look at their fingers. This is old news to teachers of typing and music. Music teachers have been telling their students this for four centuries.

What this has to do with educational software is simply this: The time is here that students must learn touch-typing at a very young age—kindergarten—in order to compete in the computer age.

Not only is it possible for young children to learn typing, there are side benefits as well. Studies over a seventeen-year period by Wilma Oksendahl of the State of Hawaii's Department of Education in Honolulu have shown that five-year-old children learn how to type very well on standard IBM Selectric typewriters.

I have observed this personally and have set up touch-typing programs in several preschools, kindergarten classes, and first-grade classes in Montana using the materials developed by the Hawaii DOE.

Learning to type in kindergarten was shown to facilitate learning letters. It's very difficult for a five-year-old to write letters. It isn't difficult for a child to type them. Learning letter recognition by typing is much less frustrating to the child and much more rewarding. It separates the process of learning letters from the more difficult task of learning to write.

The time has come: Children must learn to touch-type in their early school years in order to compete in their generation—like it or not. It's been tried and proven in Hawaii, and it can work anywhere.

In the meantime, educational software authors can help a lot of kids by designing software that avoids hunt and peck. Designers can depend more on menus, or, consider the noble mouse.

—John R. Tkach

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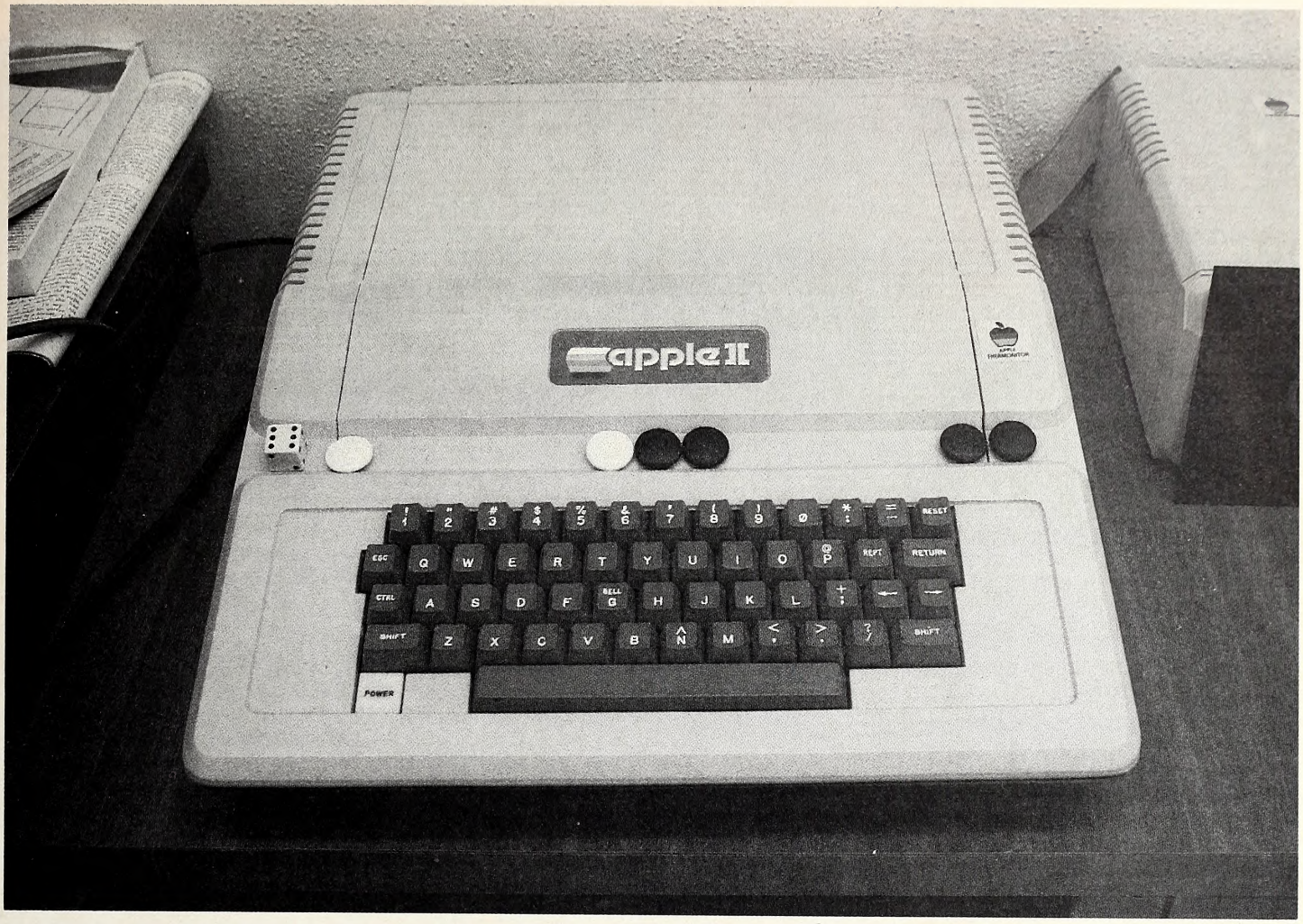


Hardware

One-Column Stone-Age Abacus

In which it is demonstrated that the most important circuitry remains that of the human brain.

Computer accessories are usually complex and expensive. Some advertisements even boast about it: "Our turboencabulator card is the most complex and expensive on the market, so it must be the best!" They want you to believe that a simple and inexpensive gadget doesn't belong in the same room with your Apple.

Is there any truth to that idea? Of course not! Why, you can make a useful Apple accessory out of a handful of pebbles.

Here is a simple tally counter that you can add to your Apple for a cost of nothing, with no electrical connections or physical modifications required. It counts from zero to fifty or more, in decimal, hexadecimal, or a hybrid base (to be described). It is derived from a fully mature technology (two kiloyears or so), requires no skill to operate, and can be dismounted in approximately five hundred milliseconds if you don't like it.

It was designed to keep track of Murphy's Ghosts in a Wizardry game, but you may have other uses for it. . . .

In effect, it's a one-column abacus, laid sideways. The hardware for the decimal version consists of six small counters or markers, two of one color and four of another. The prototype uses go stones, four black and two white, but any small, roundish objects—beans or buttons or wads of old chewing gum—will do. However, note that spherical objects (such as marbles, which are the right size) are no good: You need things that will stay where they are put, not roll away.

The trick is in the track. You know the groove, or linear horizontal recess, that runs from side to side above the keyboard on your II or IIe? That's where you put the markers, black on the right for units, white on the left for groups.

Of course, as with any computer, the software is what makes the hardware powerful. The main algorithms for this system are:

1. Active stones are in the middle—the ones on either side don't count.

2. One white stone equals five black stones. (Decimal version only.)

Operation should be obvious from the setup. To add one or more units to the tally, slide the correct number of stones into the center; to subtract, return them to standby position on the side.

One system function may take a moment's thought: the carry/borrow mechanism. For example, how can you add two when there are already three in the center? There's only one more left on the side—you haven't got two to add.

It's simple enough, really. Since three and two make five, you add two by adding five and subtracting three: Slide in a white one and slide the three black ones out.

The decimal system described here—two white and four black—will count up to fourteen. If that isn't enough for your purposes, you can add more white stones.

But there's a much more powerful technique.

That is the hybrid base system alluded to earlier. It will count up to 64, if pushed, but it's more comfortable in the fifties.

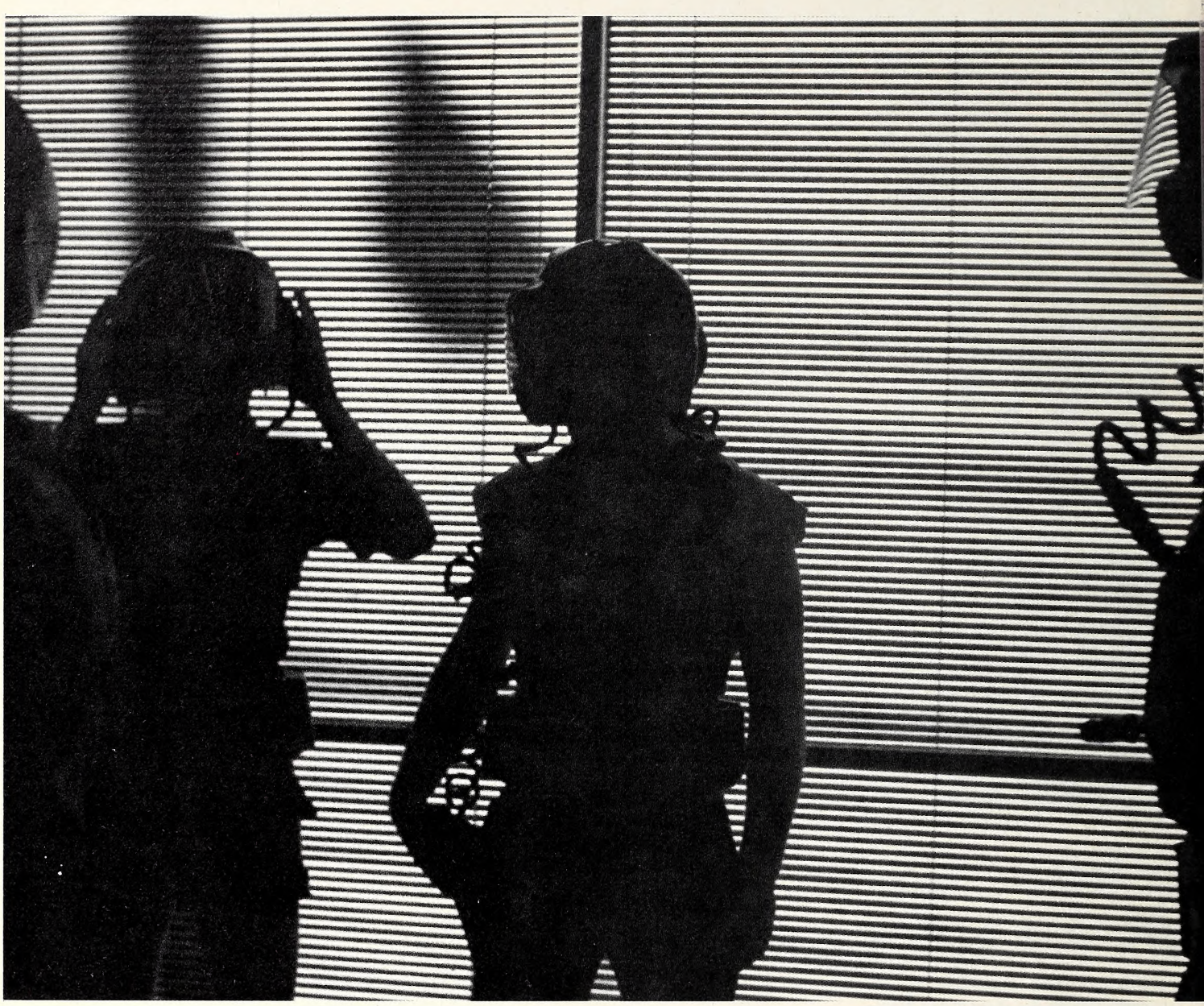
One item of additional hardware is required: a six-sided die (as in dice). The zero configuration is with the six up, and the other sides represent face value times ten. Put the die on the far left side, outside of the inactive whites.

It takes a bit more processor time (that means you) to manipulate the die than to slide the stones back and forth. You have to use two or three fingers and actually watch what you're doing. But the logic is similar to that of the stones: Slide the two whites out and advance the die or slide them in and decrement it.

For the hexadecimal version, you use three stones of each color—four blacks to one white. This will count up to fifteen, or $F; you can use a die for multiples of sixteen, if you need them.

Oh, yes—one last point. How do you dismantle the system in half a second? Sweep the counters off sideways, all at once. (If you're not in too much of a hurry, you can catch them in the other hand.)

—Jock Root



Society

Murder for the Masses: An Amorality Play

In this live-action arcade game, you're the hero—and the victim—literally. If the concept succeeds, we're all losers.

Eerie music suspends time as a female voice warns, "Intruder alert! Intruder alert!" Red lights in the tower flash. Duck! The minutes tick down as you bump through a foggy, strobing maze. You itch, you sweat, your blood is screaming. You must get across the field to the green side and score three blasts at the opposing team's goal. Will you make it? There's a break in the action. You run and shoot. Success!

A lot of entertainment in this world is brilliant and sick at the same time.

The perverse humor of Joan Rivers, Wile E. Coyote, and the Ramones are good examples. And who can deny the bad-taste brilliance of Pia Zadora, the A-Team, or Brother Theodore?

There are computer games that display some of the same qualities. More than questionable motivations have inspired such games as *People Pong*, *Custer's Last Stand* (recently condemned by the Quakers), and *Buzzard Bait*. The concept of a game may be good and the playability top-notch, but if the philosophy is questionable, the game is off for a lot of players. Moral bizarreness turns them away.

Down in Dallas, Texas, a new concept in interactive gaming called Photon is out of kilter in a way no computer game could ever be. The concept behind Photon is mind-bending—an arcade, fantasy, or adventure player's dream come true. A place where you can suit up and act out your favorite kind of computer game is a concept that would drop any gamer's jaw. Forget movies, forget Disneyland; heck, forget computer games! This is it—you're the hero in a 3-D life-and-death fantasy. Photon is an exciting new kind of game, and it's absolutely the future of the sport.

Players enter the Photon complex, pay three dollars per game, and suit up. As the *Star Trek* theme and other space music plays, they are fitted with helmets and chest packs, and then they strap their holsters on. Divided into red and green teams, they wait in line to enter the dark Photon arena where the six-minute game is played. A locker room spirit builds as the players—mostly teenage boys—wait for their big chance to take electronic pot shots at their designated targets.

However, the game has a serious flaw. The players in the game don't shoot at targets or at pop-up dragons, or at anything like that. None of that wimpy carnival stuff. In this game the players shoot at each other. The big points are scored by zapping the living daylights out of the other guy, just like in real, blazing combat. And

there are plans to allow spectators to take electronic pot shots at the players for only a quarter!

Tenth Victim, anyone? Be the first on your block to accumulate ten authorized terminations. Like a bunch of rampaging Dirty Harrys, Photon players take aim at each other's chest pieces or helmets and squeeze the trigger. Their helmets give off loud, electronic reports every time they pull the triggers of their guns. If a player is hit—or "disrupted"—by an opposing team player, a *pting* is heard in the helmet's speakers. Points are minus or plus, depending on which team their kill was on, either their own or the opposing one.

Admittedly, the first time you play the game, none of the vicarious thrill of taking aim at another human being is really felt. You're too disoriented, lugging eighteen pounds of gear and trying to remember the rules of the game and lost like a rabbit in a turtle's shell. Only experience will give you the satisfaction of a clean kill. Only when it sinks in that you're stalking man, the most dangerous game, will the game really make your day.

Nobody is really shooting anybody in Photon, the designers state. So what, it could be reasoned, if a bunch of upscale jocks in Dallas want to pretend they're gunslingers from space and blow each other away? Maybe it could be dismissed so, as a single bizarre perversion, if the game would only stay in Dallas.

This is where Photon gets tough—and dangerous. The real purpose of the game, hidden behind all its genuine electronic innovation, is to score in the lucrative franchise market. Its creators envision every town of two hundred thousand or more having several Photons, and those Photons staging master Photon-playing tournaments between each other. And at three dollars a pop for six minutes of play, you can imagine what a guy would have to spend to blast his way to the top.

Creator George A. Carter's inspiration for Photon was reportedly *Star Wars*. The fact that the Force has an overwhelmingly good side based on compassionate nonviolence is lost in the realization of Photon. A more enlightened fantasy role-playing game, like in the science fiction novel *Dream Park* (Ace Books, Larry Niven and Steven Barnes), where characters cast spells and fight hologram horrors, would have been too expensive for mass marketing. What better way to cut corners on a game for fast national distribution than to have the players shoot each other?

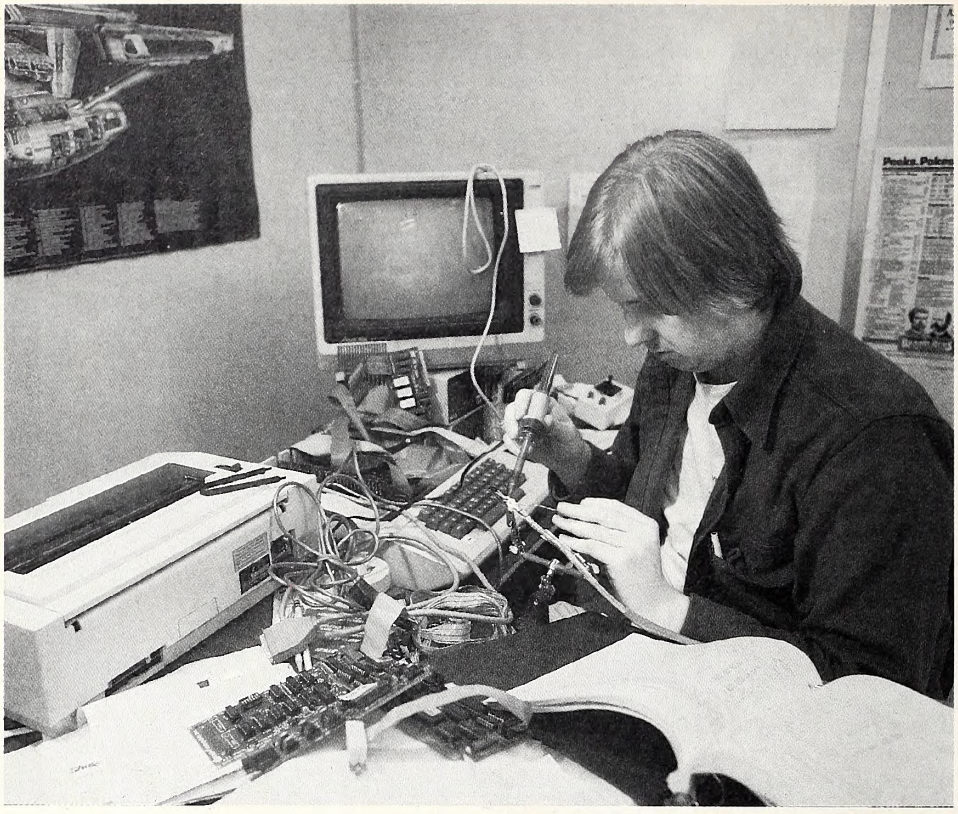
Now, that's entertainment! Why, it's absolutely science fiction! The king of sleaze, John Waters, could admire the twisted pervo-genius of it all. The upscale teenage males the game is aimed at are sure to overlook this nasty little slip of conscience. After all, the reasoning would be, it's either Photon or the Marines at that age.

The lighter a concept is philosophically, the further you can stretch it. And MacMurder as a bloodless suburban sport rivals the thinnest cheese on a Whopper. Sadly, "ground floor opportunity" is the incentive behind the creation of Photon, although the techniques employed in the game are sure to be the inspiration for many a great interactive extravaganza to come, minus, hopefully, the laser gunplay. Challenges in a game should be tossed at a player like gauntlets, not delivered under the guise of "living video" from the business end of a gun.

By narrowing a game like Photon down to its lowest, Neanderthal appeal in the name of cost-conscious profit, players are only brutalized in the name of commerce. Building gaming skill and confidence through direct, gun-wielding aggression toward fellow human beings, even in a game, is unsavory sportsmanship. The image of a nation of cocksure Photon masters strutting around every shopping mall makes heavy metal punks look like fops. The most they ever aim at each other is a can of beer. Franchising Photon says more about what the game's inventors think about America and what they think about healthy sports outlets or good gaming.

The fantasy world created in *Dream Park* is tarnished in the end when a murderer goes unpunished to save the park from financial ruin. It sours the wonderful appeal of the book's imaginary gaming theme. Alas, even in fiction a good game can be spoiled by the corruption of its philosophy.

—Michael Ferris



Issues

Raising the Standard for Progress

Standardization makes life easier—in the short run. It also discourages the progress that could make life better in the long run.

Why don't computers and peripherals work together better? Why does there have to be such great difficulty to interfacing such universal items as printers and computers, for instance? Unfortunately, we have no real standards for this sort of thing, at least none that everybody sticks to. Perhaps that's because competing manufacturers can never agree on anything. On the other hand, perhaps the personal computer world isn't ready for standards.

Until recently, it was easiest for the Apple II owner to ignore the fact that there was such a thing as a serial printer. Serial printers are difficult to interface to an Apple II. Centronics-style parallel interfaces (the cheaper ones at least) were easy to connect and fairly standardized. Of course, as the cards were designed to do more, they became specialized to work with only one brand or even one model of printer. They began to have too much firmware on board; there are some things that it's easier and more economical for the user to do with software. The cards evolved beyond their standards.

Lately, Apple has taken to making all its printers serial devices, rather than parallel. From Apple's point of view, there's a good reason for this: to create a degree of peripheral standardization across its entire line of computers. The IIe is the only computer in Apple's current line that doesn't have at least one serial port built in, and serial cards in the Apple IIe still tend to be difficult to deal with.

If you want to change from a printer to a modem with an Apple Super Serial Card, for instance, you can't just exchange cables. You have to remove the card, reset some DIP switches, and turn a jumper block upside down. Lisa, Macintosh, and the IIc each have one serial port for printer and one for modem. On the Apple III, you have to add a simple modem eliminator to the cable assembly if you want to connect a printer; that's still relatively easy. Everything else is configured by the software.

But the interfaces of Apple's other computers aren't completely standardized. They lack what's called plug compatibility. The Macintosh has nine-pin D-shaped connectors for its two serial ports. The Lisa and the Apple III (like the Super Serial Card) each have one twenty-five-pin D-shaped connector. Although only a few of those twenty-five lines are ever used for anything, that configuration fits the standards of other computers better. The new Apple IIc uses a five-pin round connector called a DIN plug, formerly seen mostly on audio equipment and Commodore and Atari computers. Now Apple also had a good reason to use smaller connectors on the Mac and the IIc; in both cases, Apple's engineers were trying to cram a lot of connectors into limited spaces. But why did they choose a different small connector for each one?

Considering that the RS-232C design that all these serial ports are based on is supposed to be a communications standard, this is all pretty arcane. You would think, on the face of it, that trying to get a peripheral device—a printer, for instance—hooked up to one of these computers might be a large-scale nightmare. The truth is it can be. But if you buy the peripheral from Apple, it's pretty easy.

Apple has a small but growing line of serial peripheral devices. It has three printers: the Imagewriter, the Letter Quality Printer, and the Scribe (the Silentype uses a nonstandard interface); two modems (a 300-baud model and a 1200-baud model); and a color plotter. All of these are of high quality and priced competitively. And all of them are at least as easy and probably easier to connect to any Apple computer than any of their non-Apple competitors. Why? Because Apple sells a separate accessory kit to hook each peripheral to each computer. This kit typically includes the proper cable, a part 2 to the peripheral manual describing the device's use with that particular computer, and a disk with demonstration and testing software.

Recently, we attempted to connect to an Apple II, an Apple III, and a Macintosh a new serial printer that is mechanically very similar to the Apple Imagewriter. It took several hours of studying manuals and scratching heads to get the printer working with the Apple II and III. We had to take the entire case off of the printer and reset a bank of DIP switches to get the proper baud rate. We never got anything legible at all out of the Macintosh with that printer, even in *MacWrite*'s text-only mode.

Maybe it would be nice to pick a standard and stick with it. But the rapid evolution of computer technology makes any standard outdated before it can be agreed upon. Standards make life easier, but they hold back progress. Granted Apple can't use standard twenty-five-pin plugs on its smaller computers, but suppose they decided to standardize on the smaller nine-pin plug. Would anyone else follow that standard? Would Atari put nine-pin plugs on its computers? Would Epson include cables with those plugs on them with every printer? Probably not. Any more than Apple follows the IBM de facto standard.

Realistically speaking, the only standards that ever stick are those that result from competition. Which means that the entire market has to speak as one and demand it. And the only way it can do that is by buying or not buying. Since the way a machine plugs into printers and modems (assuming that it does) is such a minuscule part of a buyer's deciding which computer to get, it's likely to be a long time before we get standards in these and in a lot of other things. Nevertheless, as with record speeds and videotape cartridge sizes, they'll be established eventually.

Convoluted as it may seem, Apple, with its accessory kits, may have come up with the best interim solution to the nonstandard standards problem, at least in regard to connecting serial devices to computers. It's a strategy that other peripheral manufacturers would do well to adopt, although their problem is a little bigger than Apple's. Apple doesn't care if it doesn't sell printers (or modems or plotters) to non-Apple owners, but other companies do. Meaning they have to make accessory kits for Apple's whole line of computers plus IBM's line, Atari's line, Commodore's line, Radio Shack's line, et cetera, et cetera, et cetera.

It won't be an easy job, but the company that does it will make a lot of users into very happy, and loyal, customers. ***—David Durkee*** ■

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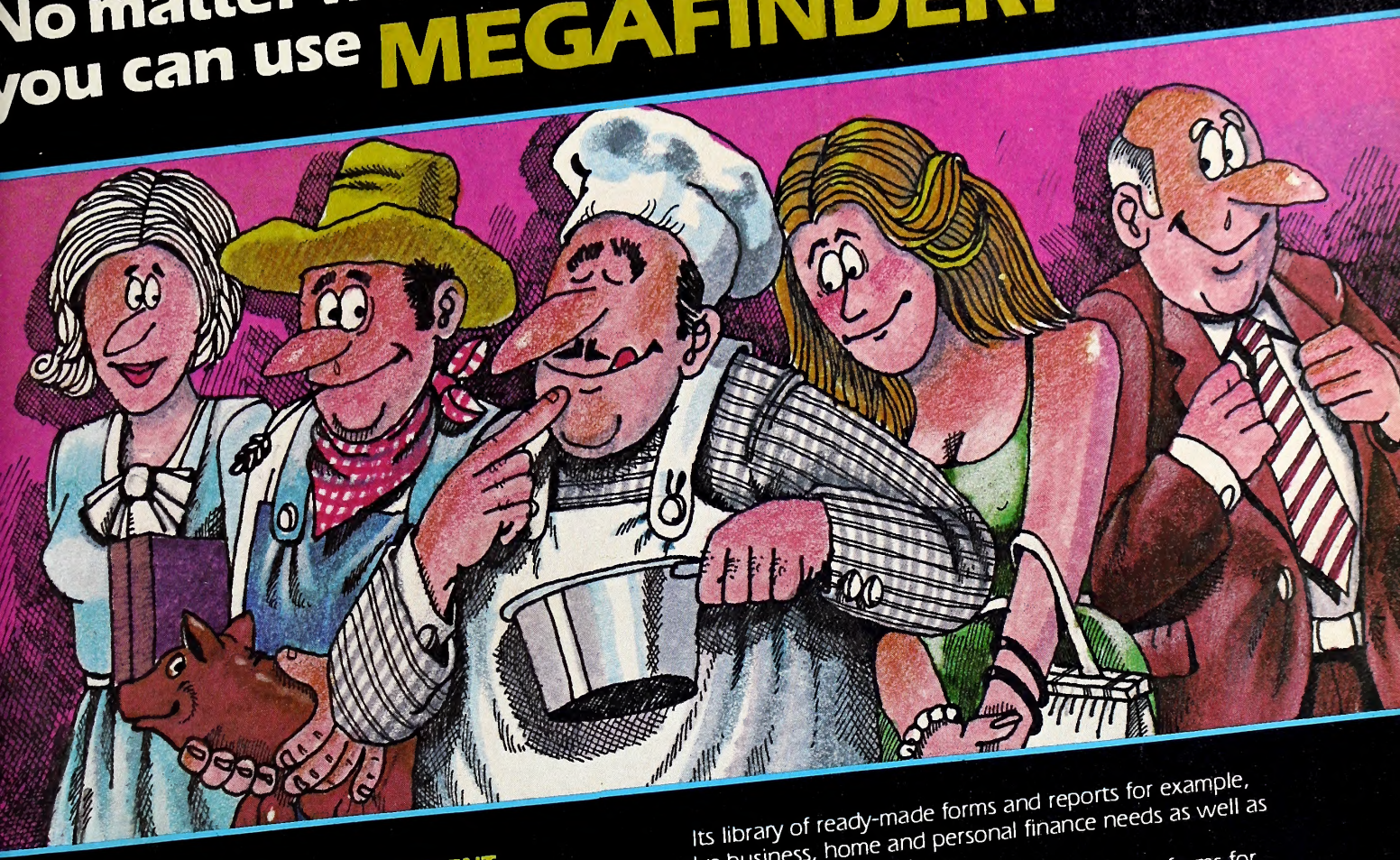

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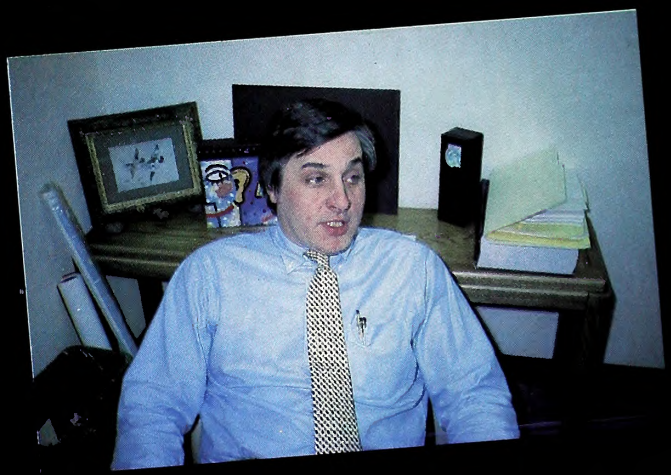

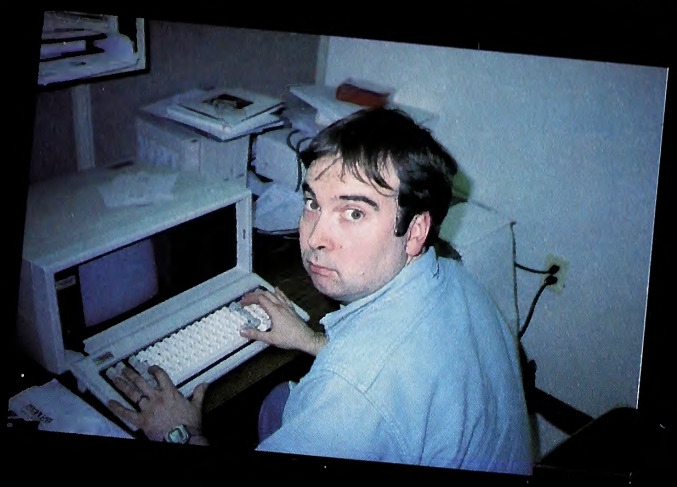

EXEC SWEET MICRO SYSTEMS: THE SOUNDS OF SUCCESS

BY ROE R. ADAMS III

In the beginning there was not silence but a terrible cacophony of tinny sounds and screeching voices. The Apple was born with a sophisticated mind and a voice that sounded like a nail being scraped across a chalkboard.

Until recently, computers were usually regarded as only a visual medium. Even the Apple's innovative parent, Steve Wozniak, who lavished such care on all other aspects of its development, treated the machine's sound capability as an afterthought.

In those early Apple days, sound was only considered useful for arcade games. The *Star Wars* generation did not like playing games in silence—they wanted to hear lasers fire and enemy ships explode. Synthesized speech was rarely considered at all, except for esoteric educational curios.

Opposite page, clockwise from upper left: Sweet Micro's president and founder Rod Nakamoto; vice president of product development Nancy Nakamoto; vice president of sales and marketing Nick Kondon; chief operations officer Fred Graswald. This page, top left, director of software applications Ken Fairchild; bottom right, sales group supervisor Sherri Altrui.

The Mockingcrew outside their Cranston, Rhode Island, offices: left to right, Melissa Farrall, Nick Kondon, Dean Duckworth, Dan Ducharne, Michael Ruzzo, Nancy Nakamoto, Sheila Yarbough, Ken Fairchild, Jane Haynes, Mary Anne Catalano, Pamela Courville, Bruce Nelson, Fred Graswald, and Rod Nakamoto.

The Sound and the Fury. A couple of companies challenged this perspective and tried to help the Apple find a voice. The first to achieve recognition was Votrax. The company's Type 'n' Talk machine was developed as an accessory to the Apple, complete with software, peripheral board, and external speakers. It provided understandable speech that was a beginning. Street Electronics followed shortly with the Echo II, a similar setup that has found wide use in schools and in work with handicapped people.

Although Votrax's Type 'n' Talk was a fascinating technical achievement, few practical applications were generated for the product. The high price of the package, $395, also made it unattractive for most Apple owners. Votrax's eventual failure was not total, however, in the larger drama of bringing quality sound to the Apple. It was Votrax that inspired one person to take up the challenge—Rod Nakamoto, president of Sweet Micro Systems.

Rod and Nancy Nakamoto, husband and wife, are the technical wizards responsible for the Mockingboard—the sound and synthesized speech board that has provided sound effects for numerous arcade games and even a full musical sound track for the fantasy *Exodus: Ultima III*. Rod Nakamoto was born in Hawaii and Nancy hails from Japan. A model entrepreneurial team for the information age, the Nakamotos share their Providence, Rhode Island, apartment with a lot of computers. At one time, they had more than a dozen different computers. Yet Rod Nakamoto's computer knowledge is completely self-acquired.

Nakamoto has always loved music. During high school and college, he played guitar in a rock 'n' roll band. He is also a habitual tinkerer. He loves designing and building things just to see how they'll work.

In 1977, Nakamoto designed and built his own computer, a Z-80-based machine. He wanted to create a robot and he needed the computer as a control device. Nakamoto's first homebrew machine was too limited for his purposes, so he designed and built a second computer, this time based on the 6502 microprocessor. This machine also proved inadequate, so he looked around for something more sophisticated. In late 1978 Nakamoto found the Apple II and fell in love.

The Apple did everything Nakamoto required, but it had one severe drawback. The tinny sound of the machine appalled Nakamoto, especially when compared to the lush sounds of video arcade games. Nakamoto could see no reason why the Apple should remain a beep and squeak machine. So he set out to do something about it himself.

Armed with the knowledge that Votrax would sell the SC-01 voice chip separately to hobbyists, Nakamoto entertained thoughts of designing and manufacturing his own board. The SC-01 voice chip, manufactured by Silicon Systems, is the heart and soul of the Votrax system. It electronically generates human speech through the principles of speech phonemes, which are the smallest units of sound in language. All words in any language are built by combining phonemes together.

In the tinkerer mode, Nakamoto worked in his spare time to create a prototype board; he etched his own circuit boards in the darkness of his apartment bathroom. Nakamoto's significant design innovation was putting an AY-8910 sound chip and several versatile interface adapter chips on the board in addition to the SC-01. The VIAs allow sound or speech to be generated at the same time that the computer handles graphics.

Nakamoto's first board plugged into one of the Apple's expansion slots. On the board were two small amplifiers, one for sound and one for synthesized speech. The amplifiers were sufficient to power small speakers, or they could be hooked up to a stereo system and really blast away.

Software tools had to be built to use this hardware. Nancy Nakamoto was an important factor in helping Rod develop the software algorithms.

A Rookery Mockery. The company's production schedule rapidly outstripped the space available in the bathroom. "We had to hang large sheets of black plastic all over the place to lightproof the kitchen area," recalls Nancy Nakamoto. "The whole apartment reeked of chemicals and looked like a mad scientist's laboratory." Nancy says she and Rod have often joked, "What we need is a wife for both of us."

Rod Nakamoto continued consulting and teaching industrial

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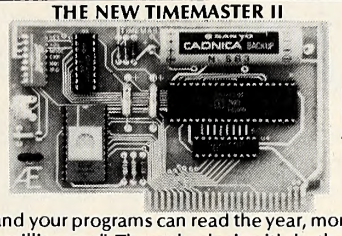

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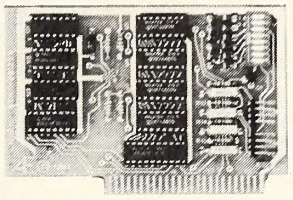

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- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
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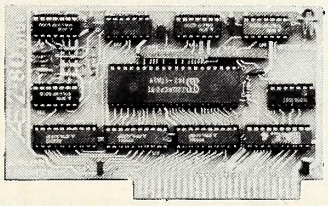

- TOTALLY compatible with ALL CP/M software.
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VIEWMASTER	179	YES	YES	YES	YES	YES	YES	YES	YES
SUPRTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
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design full-time at the Rhode Island School of Design while all this was occurring. It was when he was developing a chemical and electronic process for the local jewelry industry—he designed both the equipment and the chemical process—that Nakamoto met Morris Sweet.

Sweet was so impressed by Nakamoto's ingenuity that when Nakamoto approached him later about financial backing to begin a company, he agreed to provide some initial funds. Sweet brought in Nick Kondon to advise him on the marketing of Nakamoto's ideas. Kondon had previously been involved with Sweet on a real estate investment project and Sweet highly valued Kondon's astute perceptions.

Actually, it was not the sound/speech board that Nakamoto planned to market first. He had also developed a communication package for the IBM PC. Sweet, who had always made conservative investments, thought this product was very exciting and believed the company ought to pursue the "blue chip" IBM PC market. It was only as an afterthought that he asked to see what else Nakamoto had in the works.

Kondon and Sweet were completely swept away when they heard the Apple talk with the help of Nakamoto's sound/speech board. "It was easily the most pyrotechnic of the things Nakamoto had developed," recalls Kondon. "The other project was a serious piece of software for the IBM PC. That package was very intimidating to someone who didn't know anything about computers, like me. Sound for the Apple was so much easier to understand and appreciate."

The marketing potential of Nakamoto's board interested Kondon so much that he convinced Sweet to go solely with this invention. The company was formed and named Sweet Micro Systems, after its chief financial backer.

Kondon asked an old friend, Fred Graswald, to take a look at Nakamoto's board. Graswald was impressed, and both he and Kondon decided to get involved with the development of the company; they became founding partners of Sweet Micro. Initially, Kondon and Graswald could only assist part-time, as both had regular full-time jobs. Kondon was in marketing, and Graswald, also a CPA, was president of Delta Rubber—a company manufacturing bearings and seals for the auto industry.

If Tweetyboard Could Sing Like You. Coming up with the right product name for Nakamoto's board stumped the team for quite a while. It was Nancy Nakamoto who suggested Mockingboard—a computer board with the imitative range of a mockingbird.

Now the problem was how to get software companies to use Mockingboard sound in their programs. Theirs was a classic chicken-and-egg marketing problem. Companies would write software for the board if consumers had the board; consumers would buy the board only if software that used the board existed. The path other sound developers have taken is to write and sell their own software.

Nick Kondon devised an unusually good-willed marketing strategy for the company to follow. "From the beginning, we guarded against being in two parts of the industry at the same time, making both software and hardware," explains Kondon. "We did not want to enhance our software with our hardware or sell our hardware by providing software. We realized that the only way this unique hardware was going to take off was if many independent software companies got behind the Mockingboard and supported it."

Kondon believed that if he tried to sell the sound technology to software companies, even at cheap prices, few would be willing to pay for the enhancement. So he hit upon the idea of giving the development tools and hardware away. "That was the colossal gamble that Sweet Micro took: support ourselves while giving our product away to influential people in the industry, and survive as a company until people start releasing software using Mockingboard."

This marketing revelation came to Kondon when he attended Sweet Micro's first computer trade show. Before then, everything he had seen or heard about computers came from listening to Nakamoto. The show was not one of the giant annual trade shows, where all the major captains of the industry gather, but it was an eye-opening experience for Kondon. The first and last Applefest in Houston, Texas—held in October 1982—may have been the humblest of all Applefests, but it was the start of great things for Sweet Micro.

The company exhibited the Mockingboard in a small 10-by-10-foot booth. Kondon and Graswald went down to Texas with great expectations of selling Mockingboards by the dozen. After all, this was a terrific new product that people would fall all over themselves to buy. What the company encountered was something entirely different.

"I took a look around and saw how much noise and excitement there was at this show," remembers Kondon. "I realized that we had to do something bigger and louder just to be noticed. Everybody was there with a new product." As he walked around the booths and met the people from Penguin, Synergistic, Strategic Simulations, and Datamost, the giveaway marketing approach gradually occurred to him. It seemed like the only workable strategy given the dynamics of this volatile industry.

This was the first time Sweet Micro demonstrated the Mockingboard to the general public. On the second day, Kondon was in the booth answering questions while the Mockingboard gabbed away in the stilted robotic voice, when up stepped a native Houstonian, who drawled, "How is it doing that?" "Well," said Kondon, "it uses text to speech." "Bull, that ain't Texas speech." Kondon called home and said, "Boy, am I in trouble down here!"

The very first Mockingboard was sold at the show to a physician from Pasadena, Texas. The doctor wanted the board to reproduce accurate cardiac sounds of arrhythmia for teaching interns. Normal tape recordings of arrhythmia produced too much auditory distortion. With the Mockingboard, the doctor was able to adjust the waveforms of the sounds for an exact replica.

The sales scorecard for the show showed fifteen boards sold for $299 each and twenty-five boards given away free. But the Houston Applefest, if not a monetary success, showed the company that the new marketing plan required high visibility. As appearances are often more important to industry perceptions than sales, Sweet Micro undertook a campaign of rapid booth expansion.

Three weeks after the Houston show, they had a 10-by-20-foot space in Boston at the New England Computer Show. At the San Francisco Applefest five weeks later, the booth had grown to 20 by 20. Another month went by and the industry saw a Sweet Micro booth in Anaheim that was 20 by 30.

All of this activity conveyed tremendous excitement and energy. Software developers saw this apparently rapid growth and thought, "Wow, they must really be doing something. We should get in on this." The ball had finally started rolling.

The Maltese Mockingboard. November 1982 saw the arrival of Sweet Micro's first employee, Sherri Altrui. A big boost for the company came the following month when a seasonal promotional deal with *Call -A.P.P.L.E.* during Christmas generated hundreds of Mockingboard sales to the magazine's subscribers.

In the spring of 1983, Sweet Micro moved out of the Nakamoto apartment and into inexpensive quarters in an old jewelry factory located in downtown Providence, Rhode Island. During the

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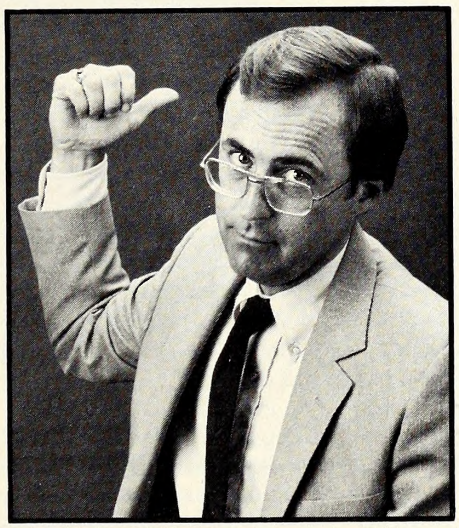

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days that followed, Kondon and Graswald worked at their regular jobs, while the Nakamotos worked hard to perfect the Mockingboard's design. Each evening the four of them would get together and work far into the night.

The crew at Sweet Micro had to surmount a unique obstacle. Their low-rent office was directly above the Last Call Saloon. The partners could only work together for an hour or so; at 7:30 each night, when the live band in the saloon began to play at concert level, the ancient building would vibrate loudly. After that, the partners would continue working—but individually.

In the early months of 1983, software using the Mockingboard began appearing on the market. The first program was Synergistic's *Microbe*, by Bob Clardy. The next program, *Thunderbombs*, came from Penguin. Synergistic and Penguin had believed in Sweet Micro's product from the first time they had seen it at the Houston Applefest.

Now many games support the Mockingboard—a few of them are *One-on-One*, *Broadside*, *Bouncing Kamungas*, *The Spy Strikes Back*, *Exodus: Ultima III*, *Zaxxon*, and *Apple Cider Spider*.

Nakamoto and Kondon attribute the company's successful evolution also to support and encouragement from Robert Sirotek of Sir-tech and Ken Williams of Sierra On-Line. They're convinced that without the positive support of those software industry leaders they might not have survived the early growth pains.

And Sweet Micro's growing pains were severe at times. Although the Mockingboard was an underground hit among computer gamers, the company had dug a financial hole the size of the Grand Canyon by the summer of 1983.

Around this time, Morris Sweet decided to get out of computers and into another venture and wanted the partners to buy his interest in the company. But, in true entrepreneurial spirit, not only were none of the four active principals in the company drawing any salary, they had all extended their personal funds to the limit for the company.

Just as things were beginning to fade to black, Votrax went out of business. Votrax had just completed the development of the next generation speech chip, the SC-02 (later renamed the SSi-263). The new chip had four new addressable parameters: inflection, speech rate, amplitude, and filter rate. With these extra parameters, more realistic voice sounds could be produced. Rod and Nancy Nakamoto had already designed the new algorithms the chip would need. The problem was how to capitalize on this new chip while averting impending collapse for the company.

The team found a novel way to solvency. Instead of seeking venture capital from people who had no idea what Sweet Micro was trying to accomplish, they went to the only company really familiar with their corner of the industry—the manufacturer of the original voice chip.

Silicon Systems, based in Tustin, California, was the custom circuit foundry that produced SC-01 for Votrax. With Votrax no longer in the picture, Silicon Systems had no means of marketing the chip. What Sweet Micro proposed was that Silicon Systems manufacture the new SC-02 chip for Sweet Micro to market exclusively. Kondon, Nakamoto, and Graswald flew to California in May 1983 to negotiate with Silicon Systems. As Kondon tells it, "We were flat broke, at the end of our American Express cards."

Refusing to be put off until a later time, the trio stayed and negotiated hard for four days. Late Thursday, May 11, the deal was finally completed and Sweet Micro stayed in business.

The contract was just in time. One day before, May 10, the company was technically insolvent, and the lone employee, Sherri Altrui, had been laid off. For one day, the company did not exist. From this dark time, Sweet Micro has never looked back. Morris Sweet's shares were bought back, and Altrui returned to her job, where today she is the sales group supervisor.

Mocking the Phoenix. Now supporting twenty-nine employees, the company has just moved into spacious new offices in a Cranston, Rhode Island, industrial park. Rod Nakamoto has been elected president of the company, with Graswald as chief operations officer. Nancy Nakamoto is vice president of product development, and Kondon is vice president of sales and marketing.

Nancy Nakamoto serves as a bridge between Rod Nakamoto's areas of responsibility and Kondon's areas. She also manages the office staff while overseeing technical support, production testing, and personally developing the product manuals.

Recently, Graswald successfully concluded negotiations for the company's third round of venture capital and the company has launched a series of unique and daring print advertisements.

The Sweet Micro people aren't workaholics at heart. Rod Nakamoto is a collector of antique mechanical toys, while Nancy Nakamoto enjoys weaving on a floor loom. (Kondon considers Nakamoto to be a modern-day Renaissance man. "He is an accomplished musician, artist, photographer, metalsmith, and programmer.") The all-time champ for relaxing and having a good time after work is Kondon. His enormous collection of wooden duck decoys is a source of amazement to his co-workers, as are his cross-country pilgrimages to duck decoy conventions.

"When the company lacked the funds to buy wall decorations for the offices in the old jewelry factory, Kondon came through with wall-to-wall duck prints," says Nancy Nakamoto. "They stayed up for quite a while."

Kondon also plays a mean game of miniature golf—mean enough to dampen the best competitor's spirits.

Currently, Rod and Nancy Nakamoto are working on a series of new products. The company is introducing the next generation of Mockingboard with the SSi-263 chips. There are four versions of the Mockingboard. Version A is the basic stereophonic music and sound generator board, with an empty socket for Mockingboard B, the new speech chip, with text to speech software. Version C combines the features of versions A and B in one package. These three models will work on all Apple II Plus and Apple IIe machines.

The fourth version is an encased portable peripheral board designed for the Apple IIc. Matching the IIc's snowy color, the Mockingboard IIc plugs directly into one of the computer's two built-in serial ports and features six musical voices, arcade sound effects, and synthesized speech. The system consists of onboard stereo speakers, a parallel processor, and a small amplifier.

Morning Song. The future of Sweet Micro lies in developing new areas of speech improvement. Much effort is directed toward the development of a voice-recognition system that uses speech synthesis, enabling data entry by voice alone. Another area of research is developing the next generation of speech chips.

"We feel we are on the threshold of a real breakthrough here," says Rod Nakamoto. "The industry is ripe for a change, as software is getting stagnant in terms of innovations. Sound is going to be much more important in the future to the marketability of games. Software is going to look choreographed. We are dedicated to providing the finest in audio-visual displays to our customers. Our sound will be the look of the next generation of software."

When an underdog succeeds against tremendous odds, when its story is coupled with the attainment of a dream, and when that dream is for the betterment of an industry and for the consumers who love it, then a legend is born. The story of the people at Sweet Micro is the story of the beginning of just such a legend. They are the Jazz Singers of the microcomputer industry. ■

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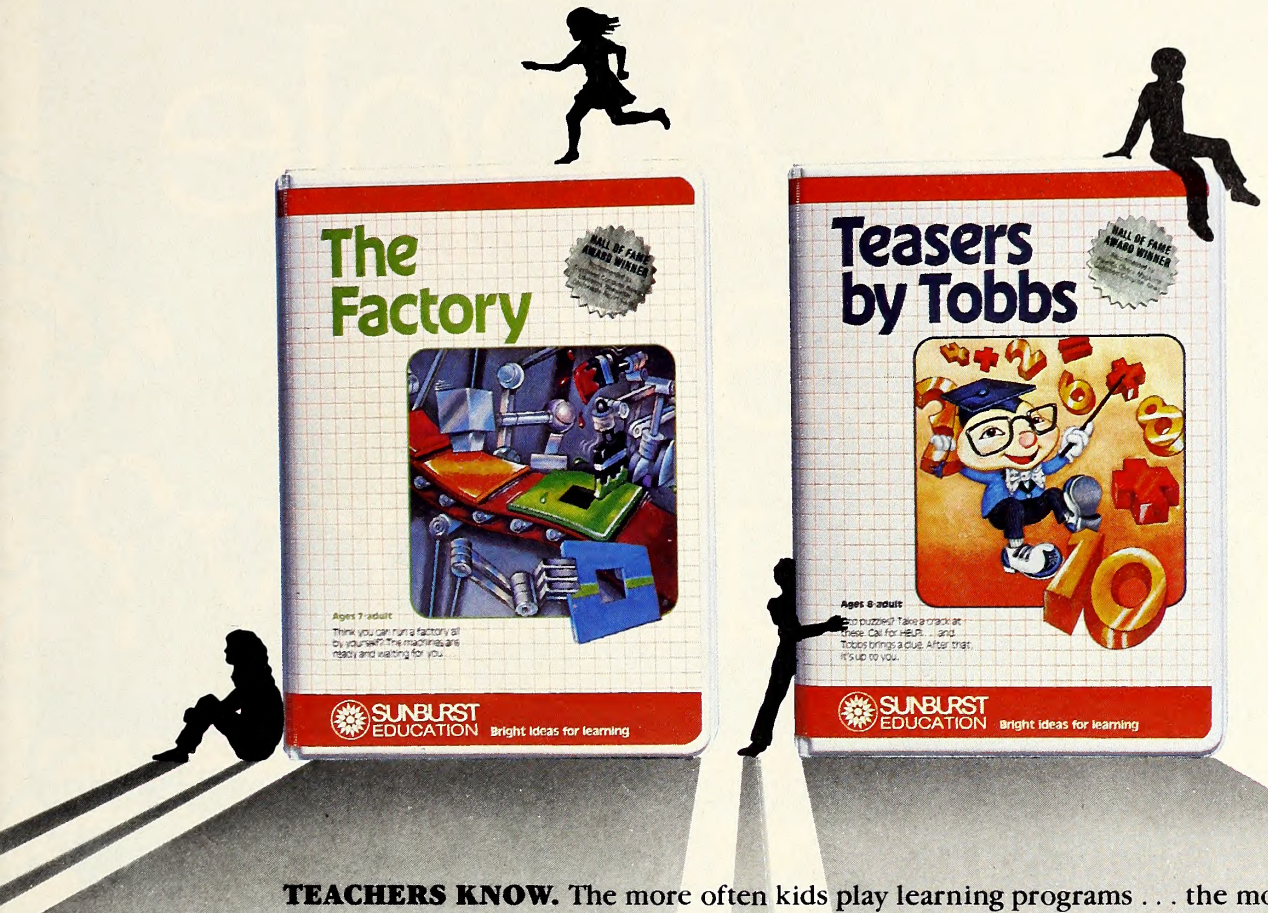

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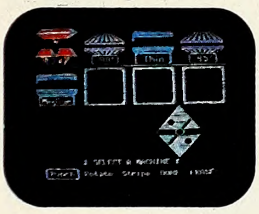

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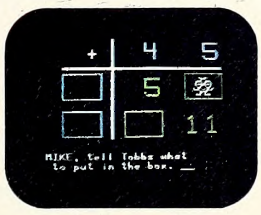

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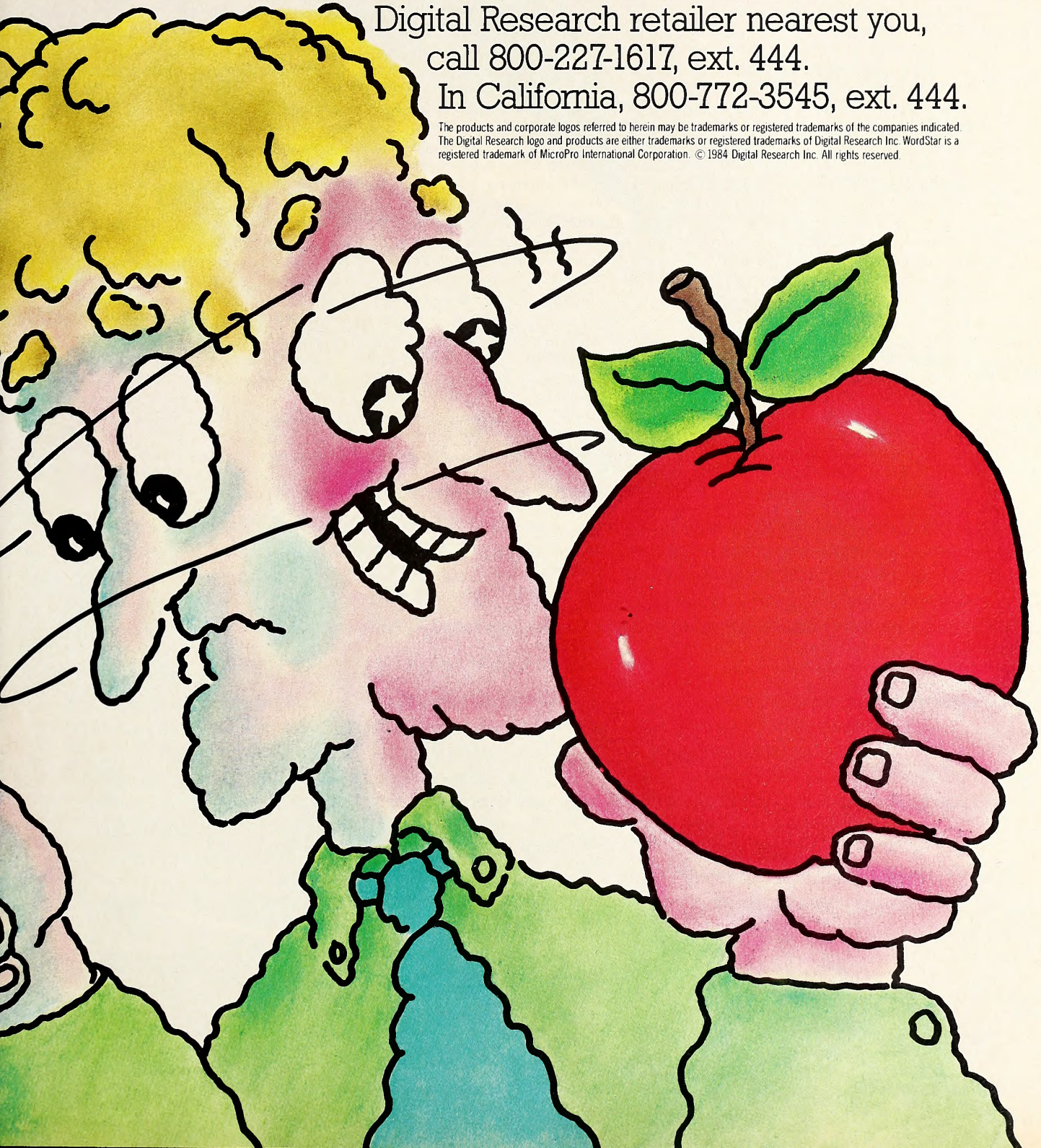

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Mind Your Business

BY PETER OLIVIERI

Speed Reading, User Friendliness, the Big Four, and More

At a time when most of us are feeling bombarded with more information than we can comfortably handle, few among us would deny the advantages that accrue to those who can read fast and comprehend what they read. With that in mind, we'll begin this month's column by looking at some ways to improve our reading skills.

A computer equipped with speed-reading software can be a very useful reading improvement tool. It can place reading material on the screen and keep it there for decreasing periods of time, thus forcing you to improve your rate of speed; it can monitor your progress and give you a printed report of how you're doing; and it lets you practice, practice, practice—after all, it never gets tired.

Speed reading may not strike you as a legitimate business application, but think again. If using such a software package helps you increase your reading speed even a little bit, the payoffs in time saved and reading accomplished could be substantial.

The first package we'll look at is Magnum Software's *Super Speed Reading*. This menu-driven program requires a 48K Apple II, II Plus, or IIe with one disk drive. It offers three options: You can work with sample reading passages provided on disk, sample reading passages from the user manual, or passages of your own (but you'll have to do a bit of word counting in order to work with your own material). Menu choices include first steps to speed reading; recording progress; timing your reading; high-speed reading; school, business, and computer techniques; and practice text and charts.

Many speed-reading systems use a pacer, which the user moves down the page to help train eye movement. *Super Speed Reading* has a built-in pacer for use with text on disk. The pacer moves at the speed you select. You also tell the system how long you want to read and which block on the page you wish to read. When reading material stored on disk, you can choose to read from a low of 100 words per minute to a high of 3,000 words per minute.

The documentation that accompanies this program is well done. It would be nice if Magnum Software released more practice disks with material already on them. Disks customized to users' needs (containing a financial report or a statistical summary, for example) might also be a welcome addition.

Davidson and Associates's *Speed Reader II* is another package you might want to consider. This program was designed for adults, although disks geared to the high school and elementary levels are also available. Like *Super Speed Reading*, *Speed Reader II* requires an Apple II, II Plus, or IIe with at least 48K.

This package provides drills that were specifically designed by reading experts to help you break some of your bad habits with respect to reading. Included are a warm-up exercise with letters, a warm-up exercise with words, an eye movement lesson, a column movement lesson, a reading passage lesson, and a timed reading test. In addition, you can use either one or two disk drives, have sound accompany your testing, analyze your performance, save your current score, take a comprehension test, and use the text editor that's provided to create your own text passages for use with the system.

It's important to remember that packages of this sort don't do the work; you do. Buying a package and letting it sit on the shelf does nothing for your reading speed, and using it once or twice does very little. A speed-reading package has the potential to make the job a bit easier, but you must have the discipline to practice; the results you get will be in direct proportion to your degree of commitment to improving your reading speed.

What Is User Friendly? It's a phrase that's badly misused, that's what. Computers certainly aren't user friendly. Software developers try to create programs that make computers *seem* friendly, but we're a long way from a really friendly machine (though the Macintosh is a big step in the right direction). Until we get there (through some amazing new hardware development, some revolutionary new software, or something brand new, like chipware), here are some thoughts about what user friendly means:

1. The necessity to type or use the keyboard should be kept to a minimum.
2. One should not have to press three keys at once to perform a task.
3. Cryptic commands (control-M, /gc8, and the like) should be avoided.
4. Menu-driven programs should be standard, and the menus should be clear, concise, and thorough.
5. It should be easy to exit a program or procedure, and doing so should not damage any of the data or files being used.
6. When a question is asked of the user, the response should always be confirmed in a consistent way (such as hitting return).
7. A package should recognize all the keys on the keyboard. If a key is labeled TAB, that's the action it should accomplish within an application program.
8. The user should be able to find out how much disk space remains at any time.
9. Two modes should be available in every program: a help mode for the novice, and a speed mode for the experienced user.
10. From within any application, the user should be able to print an exact copy of what appears on the screen.

These first ten principles of user friendliness (put forth in no particular order) are just a beginning. Perhaps you have some of your own that could be added to the list. If so, send them along. Who knows—maybe some software vendors will see your suggestions and use them.

The Big Four. Are you an Agatha Christie fan? If so, the phrase that begins this paragraph may bring to mind her novel, *The Big Four*, which tells the story of a secret global organization bent on witnessing the disintegration of civilization. In the business community, the phrase "the big four" is used to refer to general ledger, accounts receivable, payroll, and accounts payable. Failure to handle these elements can result in the disintegration of one's business.

Of course, there are various software packages on the market designed to help business users handle one or more of the big four. If you're considering the purchase of such a package, here are some suggestions:

1. Make sure your accountant is in on the evaluation and selection of any such package. If you don't have an accountant, consider getting one (even if only for advice).
2. Thoroughly test any system you are considering. It is likely to take you much longer to test a system of this sort than to evaluate most other packages (spreadsheets, database management systems, or whatever). You should probably input some real data (and lots of it). Don't feel bad about taking up a dealer's time; these packages cost a lot of money and deserve careful scrutiny.
3. Ask to speak with, visit with, or get reactions from people at businesses that have been using the package you're considering.
4. Think about having the payroll done by an outside agency. Many firms with substantial computer resources still have the payroll done by an outside vendor; there are obvious advantages to this approach.
5. Consider carefully the security built into the system. A vendor who has taken this factor into account has probably done his homework concerning the design of accounting applications.
6. Find out what audit trails the system provides. If you don't know what an audit

trail is, then you probably don't need any of the big four, but if your curiosity is tickled, see the letter from a B.U.G. (business user group) member at the end of this column.

Resource Corner. One of the best things this column can do is to steer readers toward additional resources that may help them use their computers more effectively. One category of resources is what we might call "the fourth R"—reference. If you're looking for additional information about software packages, here's a list of publications that you may find useful:

—*Vanlove's Apple Software Directory* (PC Telemart, 11781 Lee Jackson Highway, Fairfax, VA 22033; 913-648-4442). $24.95 for 1984 edition. Thorough and well organized.

—*DataPro Directory of Microcomputer Software* (DataPro Research Corporation, 1805 Underwood Boulevard, Delran, NJ 08075; 800-257-9406). $420 annual subscription. Very extensive, monthly updates, includes user ratings. Not just Apple software.

—*List Magazine* (Redgate Publishing Company, 3407 Ocean Drive, Vero Beach, FL 32960; 305-231-6904). $23.10 for one-year subscription. Lists 4,500 applications, useful reference. Not just Apple software.

—*The Software Catalog* (Elsevier Science Publishing Company, 52 Vanderbilt Avenue, New York, NY 10017; 800-223-2115). $69 per edition (two per year). Thorough and well indexed, more than ten thousand software listings. Not just Apple software.

—CompuServe (5000 Arlington Centre Boulevard, Box 20212, Columbus, OH 43220; 800-848-8990). After paying an initial fee of $20-plus, subscribers are charged for time used (this is an on-line service).

—Dialog Information Services (3460 Hillview Avenue, Palo Alto, CA 94304; 415-858-2700). After paying an initial fee of $35, subscribers are charged for time used (this is an on-line service). Extremely large collection of software references, with information from *The Software Catalog* available.

Time to Move Up? As you may know, Apple has stated that its machines are targeted to specific markets. The Apple II line is geared to education and home use, the Macintosh and Lisa line is expected to become the company's small to medium business computer line, and the Apple III will be geared to what are referred to as vertical markets—that is, very specific applications such as the management of medical, legal, and other professional offices.

Now that Apple has introduced some new machines and has begun to define its product line more clearly, the familiar question of whether to upgrade to a newer, perhaps better system arises once again in the minds of many Apple II owners. But before moving ahead in haste, consider the following:

1. You may never need to upgrade at all. If your microcomputer is doing what you want and doing it well, then there's no real necessity to change. An axiom of business computer life might be expressed as, "If it works, leave it alone!" The fact that the programming language Cobol (Common Business Oriented Language) is still so predominant in the business community is testimony to this principle.
2. It is certainly not yet time to "jump to the Mac or Lisa." Yes, these machines are flashy. They are easy to use, and they are addictive. But it can also be said that they are not yet fully ready for the business person. This is not quite true. A Lisa 2/10 with the Office System, Lisa application packages, and a daisy-wheel printer is certainly an excellent system for a business. But the Mac will get better. When the new 256K chips become available, Mac will get two of them. And later this year, the Mac's disk drive will be able to access both sides of a 3½-inch Sony disk (that makes available about eight hundred thousand characters' worth of storage space on a disk).
3. The software you need probably isn't available yet for the newer machines. Even if a similar application is available, transferring your data to the new system may involve a lot of work; you may even have to make some major modifications to some of the models you've built or to the reports you're using.

Clearly, upgrading to a newer machine is not simply a matter of getting a faster, flashier version of what you have now. Much more is involved. It could be a major step for your business. So why not take those steps slowly, drawing on the experience you've gained since that time when you were a naive, first-time computer shopper? While an upgrade might be in your future, it could be more prudent to wait a little while to see what hardware and software are developed for Apple's new line.

Apple III Things. Is the Apple III dead? Certainly not. Apple says "no," and Apple III users say "ridiculous." And the marketplace seems to think the Apple III will be around awhile.

Apple would like people to know about the kinds of applications that are available on the III. To this end, they've released a small booklet called *Apple III: Will Somebody Please Tell Me What an Apple III Can Do? (A Guide to Apple III Software)*. This appropriately titled publication is a kind of "one-stop shopping guide" to Apple III software. It contains all the information you need to locate software that might be of interest to you. Categories include accounting, agriculture, computer languages, database management, education, finance, graphics, job costing, law office management, mailing lists, manufacturing, medical/dental office management, spreadsheets, tax planning, telecommunications, utilities and word processors.

The guide also describes specific vertical-market applications (for a library system, fuel oil distribution, insurance, and surveying), lists Apple III software that's available in Great Britain, and supplies the names and addresses of vendors, related publications, and references. If you're interested in Apple III software, this guide belongs on your desk; at $3, it's a bargain.

The Readers Speak. A reader wrote in recently to ask what an audit trail is in relation to computers. Since we've just been talking about some of the accounting applications in a business system, it seems appropriate to provide this information for all who might be interested.

Certainly one of the more important aspects of designing accounting or financial applications is providing for security. A system of passwords for limiting access to your records isn't enough; after all, unauthorized access to key data could cost you a good deal of money. In addition, Uncle Sam and the local state tax authorities might want a little more accountability built into your system.

An audit trail gives you a record of what has been going on "inside" your computer application. Some of the features built into software that gives you this option include a list of all changes (updates, additions, and deletions) made to any and all data files in the system, automatic dating of all documents printed by the system, and automatic numbering or labeling of all transactions that take place.

Some audit systems provide even more detailed information about who has been using your system and what they have been doing. While not foolproof, such features certainly go a long way toward discouraging unauthorized use of a system.

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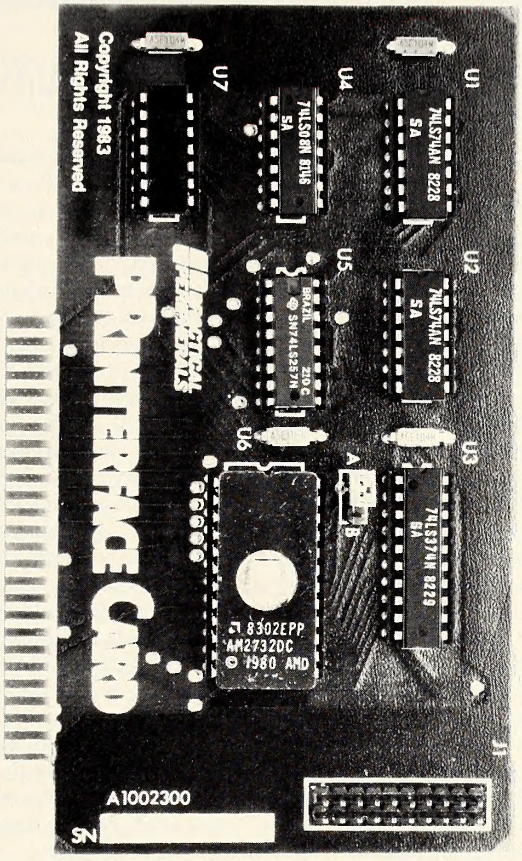

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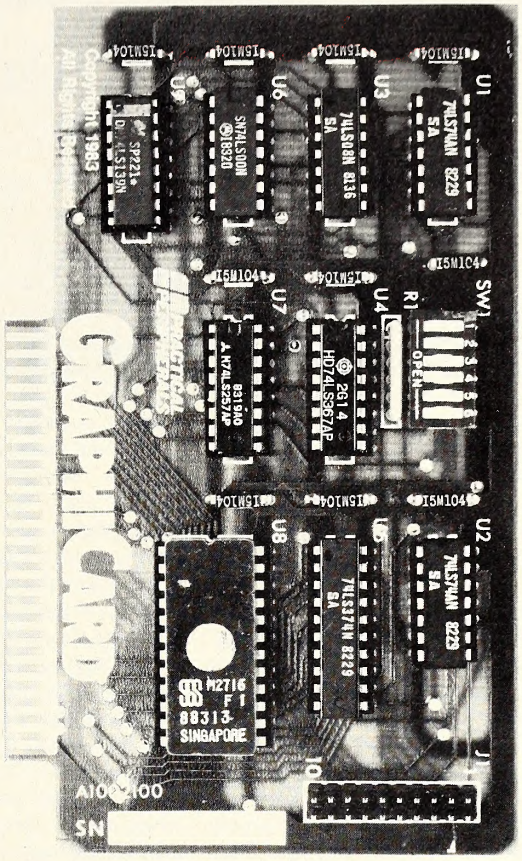

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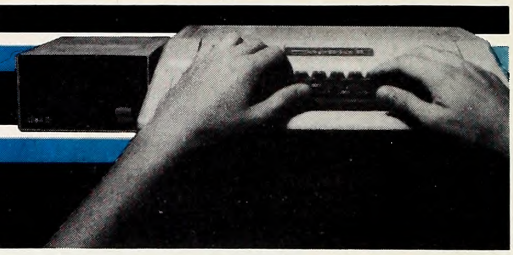
TRADETALK



APPLE'S IIC PARTY: PIZZAZ, PANACHE, AND AN UNEXPECTED PUNCH

It was a bright chilly day in April. The sky was blue and the breeze was constant. Apple Computer, who usually chooses frigid January to roll out new products, couldn't have picked a better day weatherwise to unveil the portable Apple IIc.

It was a bright, clear, sunny group of dealers, developers, journalists, and Apple employees that gathered at Moscone Center in downtown San Francisco on April 24, 1984. The underdog was firmly on its feet again, about to deliver the second of a one-two punch. The home team had rallied in the bottom of the seventh inning, tied the game, and was poised to take the lead. Luke, Leia, and Han had been reunited and were on their way to crush the empire.

Part revival meeting, part sermon, part round-table discussion, part pagan rite, and part county fair, the Apple II Forever bash will be remembered for a long time.

The objectives of the Apple II Forever gathering were clear-cut: introduce the new portable Apple IIc to dealers and the press, complete with a detailed explanation of how the machine fits into the company's marketing strategies; exhibit new software that has been created for the IIc and existing software that has been adapted to run on it; emphasize that Apple is firmly behind the Apple II line of computers and the dealers who sell it; and report on the sales of Macintosh.

The message to the rest of the industry, and the world, was also crystal-clear. Apple is back! So watch out IBM, Coleco, Commodore, Hewlett-Packard, Atari, Radio Shack, and AT&T.

The festivities began with a long, entertaining, if occasionally tedious revival meeting-like presentation by Apple's heavy hitters—president John Sculley, chairman Steve Jobs, and cofounder Steve Wozniak. Sculley was the most charismatic of the trio, hammering home his messages of "we are now a marketing company," "the people's computer goes portable," and "we are changing the ground rules for the personal computer industry forever!"

Sculley was dwarfed by three giant video screens. Somewhat reminiscent of the Us Festival setup, the screens were used to show films (including several previews of Apple's TV commercials for the IIc) and slides, as well as to project the images of the speakers so that the several thousand attendees in the cavernous Moscone Center could get a good view of the proceedings. As Sculley preached on and on, one couldn't help but think of Apple's famous *1984* commercial for Macintosh. But no pinstriper dared attempt to run down the aisle and toss a PC*jr* through one of the screens.

In total contrast to Big Brother, Sculley's interest was in *sharing* "power"—which, with the help of hundreds of Apple employees, he demonstrated dramatically. After holding up the tiny IIc for everyone to see and eliciting a response that they'd like to see it better, Sculley ordered the house lights on. As the light burst forth, nearly every fifth person in the audience stood up, waving high a IIc. As startled dealers cheered uproariously, the Apple plants passed the IIcs to them. Within seconds of its introduction, more than a thousand Apple dealers had had a production-line IIc in their hands.

Steve Jobs, looking young, happy, rich, and satisfied, got up before the crowd and led cheers for Macintosh. Putting in slightly more than a mandatory appearance and slightly less than an all-out move to steal the show, Jobs reported on Macintosh sales for the crucial "first one hundred days." Apple's goal was to sell fifty thousand machines in the hundred days after Macintosh was announced, giving it a good start on becoming the next "industry standard."

The first industry standard was the Apple II, which sold fifty thousand machines in two and a half years. The second industry standard was the IBM PC, which sold fifty thousand units in eight months. Jobs proudly announced that Apple sold its fifty thousandth Macintosh on April 6, day seventy-four, and estimated that about seventy thousand units would be sold by the end of the hundred-day period. (At press time, that figure had already been reached.)

But, try as he might, Jobs couldn't steal the show from the real star—the IIc. And recently-returned-to-Apple Steve Wozniak, bad jokes and all, symbolized that the Apple II is indeed a machine that will live on.

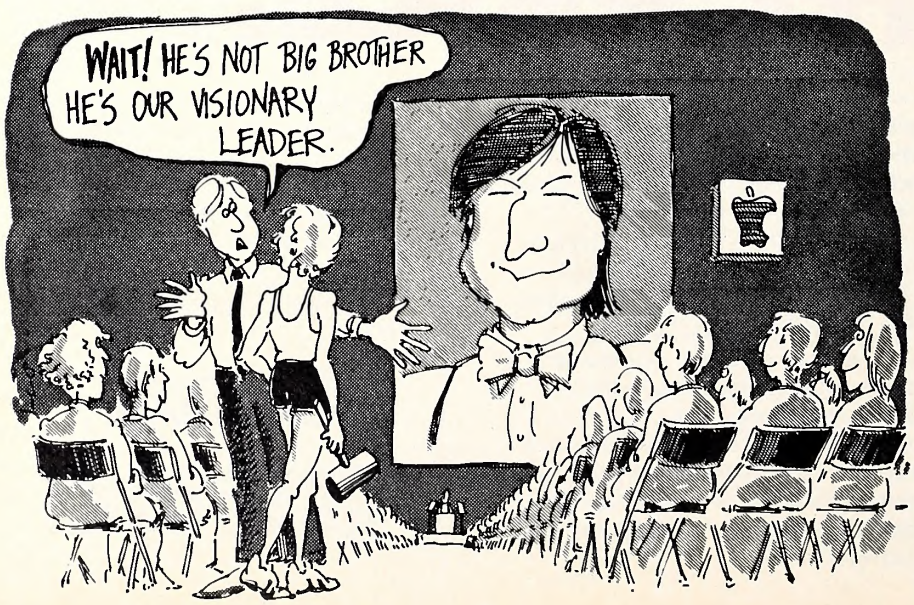
The roster of exhibitors supporting the IIc was impressive. There were Summa, BPI, Sweet Micro, SubLogic, HowardSoft, Broderbund, Milton Bradley, Spinnaker, Quark, Bank of America, Sterling Swift, Peachtree, Business Solutions, Grolier, Electronic Arts, Datasoft, Street Electronics, Prometheus, Hayden, Dow Jones, Applied Software Technology, Software Arts, and many others.

The flood of software for the new machine was equally mind-boggling. Apple made IBM's much-touted introduction last fall of the PC*jr* look like a premature funeral gathering.

The atmosphere throughout the day was very optimistic. Dealers and software developers alike were impressed with Apple's new machine. At the beginning of the evening's entertainment, Dave Larson, head of Apple's IIc group, announced that orders for fifty thousand IIcs had been taken during the day—in "just about 7.4 *hours*."

Dealers were both pleased and disturbed by Apple's colorful one-box packaging for the IIc. Comments such as this one from a dealer in Texas, "A year from now you'll see them in K-Marts," were not necessarily jokes.

If nothing else, Apple was trying to prove with the Apple II Forever affair that the company is not forsaking its dealers with the mass-marketable IIc. Apple put them up in hotels and fed and entertained them. Attractive deals for



Signe Wilkinson, San Jose Mercury News. Reprinted with permission.

the IIc were offered, including a one-time price of $400 for one IIc per dealer.

With its highly competitive price, self-demonstrating software, and one-box packaging, the IIc should be easier to sell than traditional personal computer systems—a dealer's delight.

Apple reportedly spent $2 million to hold the Apple II Forever event. The company rented most of San Francisco's Moscone Center—the site of this summer's Democratic Convention—for the entire day. A third of the center's main auditorium was devoted to the software exhibition, while the other two-thirds was filled with several thousand seats facing the stage and video screens. Between the exhibit area and the auditorium was the Apple II Museum, a delightful walk-through display of Apple memorabilia—including Woz's original Apple I and a mock-up of Jobs's garage, where that legendary first Apple was built.

Apple provided lunch for all the attendees as well as dinner, which was served at local hotels. The evening entertainment at Moscone was jazz and funk musician Herbie Hancock and his Rockit Band. Hancock is no stranger to Apple-related events and performed several songs including "Rockit," for which he received a Grammy earlier this year. A dance floor was cleared and filled up with twisting bodies the moment Hancock hit the stage. Still, there were more than a few heart-of-America, not-so-funk attendees who headed for the escalators, unable to relate to Apple's definition of entertainment.

Apple even got some help from mother nature in the form of an entertaining, raise-the-goosebumps, call-home-to-the-family earthquake in the early afternoon. Centered south of San Jose and measuring 6.2 on the Richter scale, the major quake shook downtown buildings and rocked cars in San Francisco, giving out-of-town attendees the willies, but causing no damage. Elsewhere—particularly Morgan Hill, sixty miles to the south—the quake was no laughing matter.

After the quake, nervous jokes making the rounds at Moscone oscillated between, "Apple has more clout than I realized," and "The quake was IBM putting its foot down." **DH**

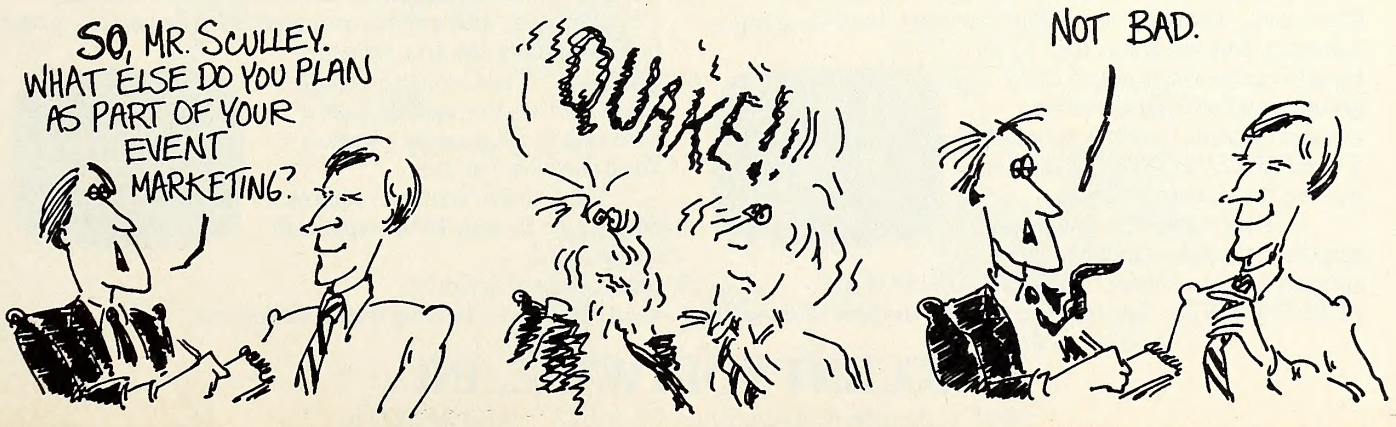
Hundreds of Apple IIcs appeared on cue above the heads of every fifth person or so in the audience at Apple's San Francisco splash. Their only fear, commented one participating Apple employee, was that the sound of all those carrying cases being unzipped at once under the seats would drown out John Sculley's voice. It didn't.

☐ The successful conclusion of litigation for copyright infringement against **Megaware Systems** (Laguna Hills, CA) has been announced by **Ask Micro and Ask Computer Systems** (Folsom, CA). The lawsuit charged that two Megaware officers were infringing on Ask Micro's *Accounting Plus* software by selling software called *Micro Mate III* and *Dollar Trak III*. The U.S. District Court of Los Angeles issued a preliminary injunction against all defendants forbidding the further production, distribution, or sale of the two products and impounding all copies in the defendants' possession or control.

☐ Considering himself more of a software artist than a manufacturer, **Steve Gibson**, designer of the Gibson Light Pen, has disbanded his **Gibson Laboratories** and signed an agreement with **Koala Technologies** (Los Altos, CA). The agreement will allow Gibson to develop software independently for the company, leaving the marketing and distribution of it to Koala. First product off the boards is new software for the Gibson pen.

☐ Now that **Spinnaker Software** (Cambridge, MA) is accessible on every major home computer, the company is branching out to foreign markets. **Acorn Computers**, the British firm that controls the computer school market in Great Britain, is making its Acorn computer available to schools in the United States. Spinnaker has entered into an agreement with the company to translate five of its children's educational packages for the Acorn. The products, which include *Facemaker*, *Kids on Keys*, and *Snooper Troops Case 1*, are also being marketed in stores throughout the United Kingdom. **Ravensburger**, Germany's biggest toy company, has launched several Spinnaker products translated into German. Also, **Priscilla Seuss** has been promoted to vice president of sales at Spinnaker. She formerly held the post of director of sales.

☐ **Stoneware** (San Rafael, CA) has been acquired by **DB Master**, a company formed for that purpose by **Barney Stone**, **Stanley Crane**, and **Jerry Macon**. The trio head up three software development firms specializing in microcomputer business software and are the designers of Stoneware's *DB Master* and *Advanced DB Master*. The new owners have retained **John G. Dickerson** as president of the company. "The new owners are making a significant commitment to Stoneware," says Dickerson. "The most important effect will be the de-



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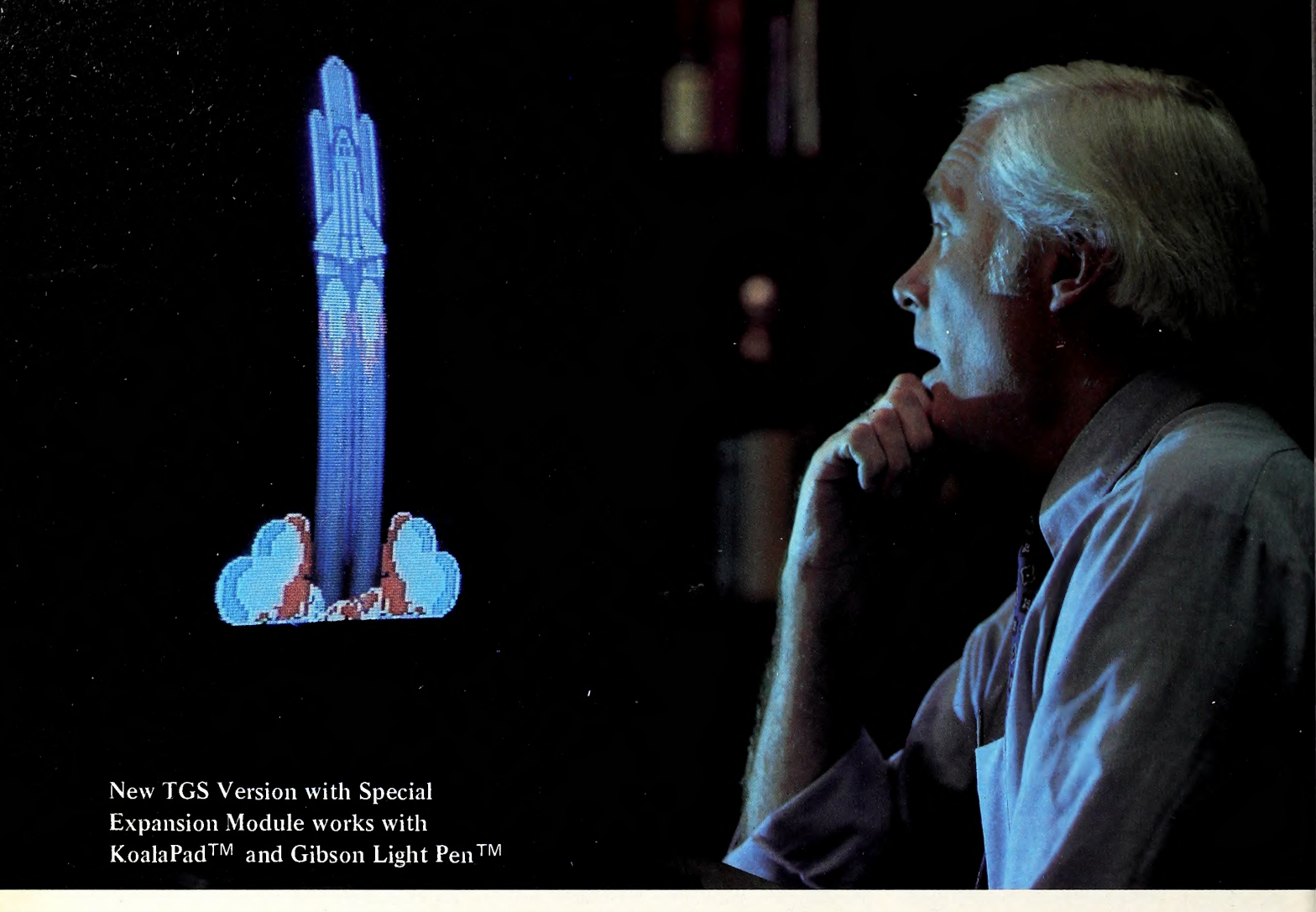

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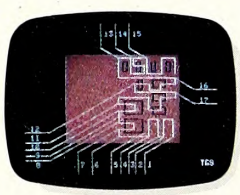

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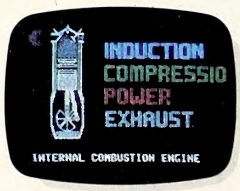

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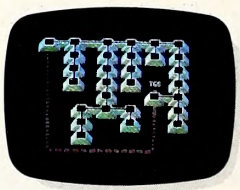

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livery to the market of a number of strong business software products developed by a proven team."

☐ **Activision International** (Mountain View, CA) reached into the senior ranks of Great Britain's music publishing industry and has named **Geoffrey Heath** managing director of Activision in the U.K. Heath will concentrate on the home computer marketplace, directing the company's advertising, marketing, and promotion activities. Previously, Heath was with the music division of ATV Music, where he managed the writing careers of John Lennon, Paul McCartney, and others during the early seventies. **Byron Turner** has been named director of creative development for Activision in Europe. Initially, he will focus on acquiring design talent in Europe. "We are aware of the vast resources of European design talent," Turner says, "and we intend to recruit that talent." Before joining Activision, Turner was with Thorn EMI Video for eleven years.

☐ A portfolio of reports, newsletters, and industry forums focused on the home computer software marketplace has been announced by **Future Computing** (Richardson, TX). According to the research and analysis in the *Software Visions '84* package, software for the educational, recreational, and home management segments of the personal computer industry will approach $5 billion retail by 1988. A parallel information service, *Software Perspectives '84*, covers office personal computer software.

☐ In a gesture to establish a statewide telecommunications network among more than four hundred New York historical agencies and museums and sixteen hundred county and municipal historians, **Apple Computer** (Cupertino, CA) has awarded a grant of four IIe computer systems and necessary hardware and software to **The Regional Conference of Historical Agencies**, the **Division of Historical and Anthropological Services of the New York State Museum**, the **Federation of Historical Services**, and the **Lower Hudson Conference**. When the network goes into operation, it will be possible for the formerly isolated historical agencies to share required information with each other instantly throughout the state. Additional software and hardware donations for the venture have been made by **Software Publishing**, **VisiCorp**, **Cdex**, **Verbatim**, **D.C. Hayes**, and **dilithium Press**. In Philadelphia, a twenty-nine-year-old student became the first American to receive a jail sentence for infringing copyrights on computer software in connection with the smuggling of counterfeit Apples into this country from Taiwan. The conviction was a major victory in Apple's war on counterfeit computers from Asia. "After this," said a Los Angeles copyright attorney for Apple, "the pirates should begin to get the message." Apple has agreed to sell its hard disk technology to **Sony** (Tokyo, Japan). The terms of the agreement weren't disclosed, but a spokesperson for Apple has said the agreement reflects the growing relationship that has developed between the two companies. Sony currently supplies the floppy disks for Mac and Lisa and plans to market hard disks in the U.S. by early 1985. According to the two companies, a future agreement for supplying Apple hard disk drives is a possibility. The current accord doesn't allow Sony access to any of Apple's future hard disk technology.

☐ **Anne O. Filippone** has joined **Source Telecomputing** (McLean, VA) as vice president of sales and marketing for The Source. Prior to joining the company, Filippone spent ten years with General Electric Information Services.

☐ **Howard M. Zack** has been named director of marketing for **Warner Software** (New York, NY). Zack joins the company after ten years with Random House, where he served as marketing manager for educational software. He is also credited with negotiating publishing and marketing agreements with Apple, Radio Shack, IBM, and Atari.

☐ **Microrim** (Bellevue, WA) has appointed **Warren Sly** to the newly created position of director of marketing communications. Sly brings to his new job eleven years of experience in business/marketing planning for consumer goods. Prior to joining the company, he was vice president of McCann Erickson, an advertising agency.

☐ A letter printed in *Softalk* several months ago from **Derek Enlander** asking for program contributions for his forthcoming book *Microcomputer Programs in Medicine* generated an "astounding response," says the author. Enlander says he received "letters, post cards, packages of disks, and printouts from all over America, various parts of Canada, England, Ireland, South Africa, Saudi Arabia, Israel, Australia, Malaysia, and even one from mainland China." The book has been published by **Computer Medica** (Center Moriches, NY).

☐ The **Boston Computer Society** (Boston, MA) has moved to new headquarters at One Center Plaza in Boston. "Our new space marks a milestone in the growth of the Boston Computer Society," says **Jonathan Rotenberg**, society president. "The society now has nearly twelve thousand members."

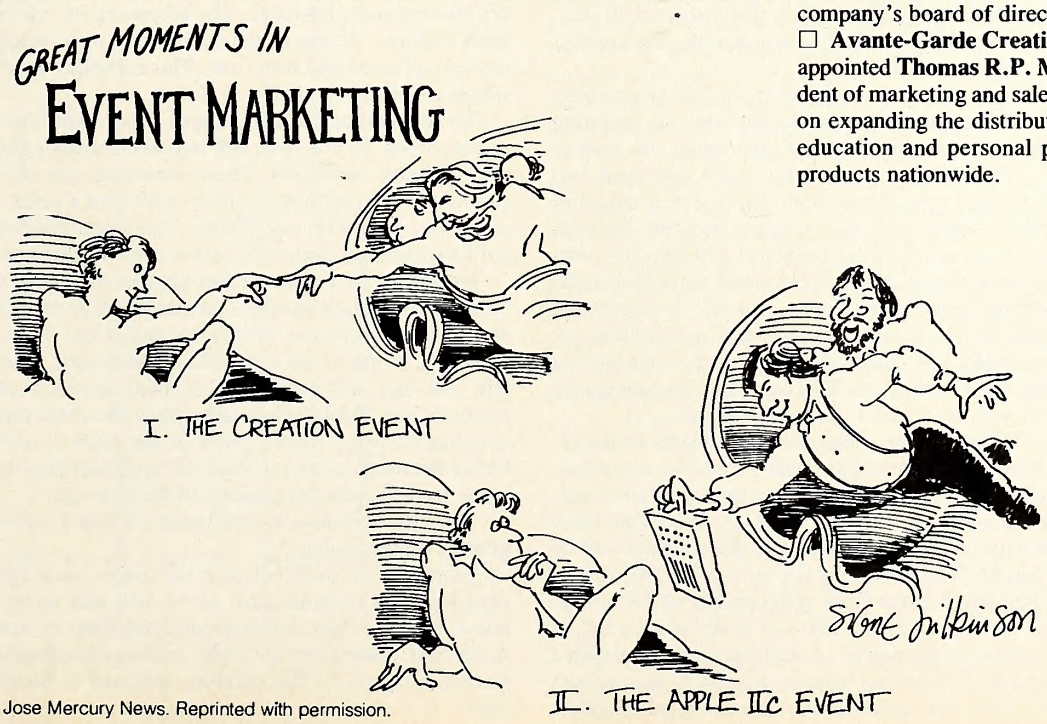
☐ **Robert M. Guilbert, Jr.** has been appointed public relations representative by **Aardvark/McGraw-Hill** (Milwaukee, WI). Guilbert was director of public relations with Saint Mary's Hill Hospital in Milwaukee prior to joining the software publishing company.

☐ **Warren R. Shore**, founder and president of **Dynatech Microsoftware** (Niles, IL), has purchased the company. Shore said the company will be renamed **CodeWriter Corporation** to more accurately reflect the company's main line of business, which is publishing and marketing the CodeWriter family of programming software.

☐ **Segul Enterprises** (Rehoboth, MA) has moved. Their new address is 65-A Wheaton Avenue, Rehoboth, MA 02769.

☐ Former senior vice president of marketing with Mattel's electronics division, **Peter Pirner** has been appointed executive vice president and chief operating officer at **Lifetree Software** (Monterey, CA), as well as being elected to the company's board of directors.

☐ **Avante-Garde Creations** (Eugene, OR) has appointed **Thomas R.P. Measday** to vice president of marketing and sales. He will concentrate on expanding the distribution of the company's education and personal productivity software products nationwide. ■



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FOLLOW THE FLOATING POINT

By DAVID DURKEE

Shape Up for Summer

A lot of people have trouble with Applesoft's shape table capabilities. The commands for manipulating shapes are simple enough, but the procedures for creating a shape table look a lot like an introduction to hand-coding machine language. That's part of the reason why, for the past two months, we've been abstracting visual information into numeric data and then making programs that re-create the visual images from that data. It's all kind of like beaming someone up on *Star Trek*, only two-dimensional.

The purpose of all this is to make you feel comfortable with pictures expressed as numeric data, because that's all a shape table is. The Applesoft manuals (both the old one they used to give you when you bought an Apple II Plus and the new ones they now sell you when you buy an Apple IIe or IIc) are a major source of confusion when it comes to shape tables. They have you take the basic plotting commands, convert them to binary numbers, convert those to hexadecimal numbers, and enter those numbers by using the Monitor. This is a good, low-level way of doing it, if you are already familiar with binary, hexadecimal, and the operations of the Monitor. If you're not, why should you have to learn them all at once? Furthermore (and here's the rub), if this is really so complicated, why don't we learn how to do it once and then program the computer to do the hard work for us forever after?

The pseudo-shape tables we constructed during the last two months each had different sets of commands and different ways of encoding them. Real shape tables have yet another set of commands and another way of encoding them. To simplify matters a bit, we'll take these two aspects of shape tables one at a time. This month, we'll look at the set of commands used to create shapes, and we'll create a program that will allow us to enter those commands at the keyboard and have the corresponding actions displayed on the screen. Next month we'll look at the encoding of those commands into actual tables, and we'll program the Apple to take the results of this month's program and encode them for us. We hope you'll understand how shape tables are created after reading those two columns. But if you don't, you'll have a fully functioning set of programs to do it for you, so it won't make a difference.

Acrobatic Shapes. Before devoting the next two months to the arcane study of shape tables, let's find out just what we can do with them. A shape table can contain instructions for as many shapes as you want, provided that they'll all fit in available memory and you don't want more than two hundred fifty-five of them. First of all, these shapes can be drawn on the hi-res screen. The command *draw 1 at 140,80*, for instance, will draw the first shape in the table in the middle of the screen.

Second of all, they can be scaled. Not like you would scale a fish or a building, but drawn larger on the screen. A scale of one is considered "normal." A scale of two is twice as large as a scale of one in both dimensions, and so on. There are no fractional values allowed for scale.

Third, a shape can be rotated. At a scale of one, a shape can be plotted facing in eight different directions. At higher scales, more degrees of rotation are allowed, up to a maximum of sixty-four different rotations.

Neither scale nor rotation is perfect, however. As a shape is scaled larger, its image becomes distorted in a particular way. An object at scale one looks fine when rotated in increments of ninety degrees but heavily distorted at the four diagonal rotations. At large scales, although the shape is already distorted by the scale command, fairly accurate rotations of the scaled shape are possible. These limitations are all relative. If a shape was designed to be used at a scale of one, it won't be very impressive (and it may not be recognizable) when scaled or rotated. If it is designed to be used at a higher scale, however, rotation usually produces satisfactory results.

Finally, there are different ways to draw a shape. It can be drawn in any of the six hi-res colors. It can also be xdrawn. That means any dot created by drawing the shape will be plotted in the inverse state of the background dot it is plotted on. Against some backgrounds this looks good, while against others it looks like garbage. A shape xdrawn against any background, however, can be erased by xdrawing it there again. Such erasure will restore the background to its original form, no matter how complicated that form was. This capability is primarily what allows shapes to be animated effectively.

To the Vector Go the Shapes. There are nine commands used to create shapes. In this case, that means commands within the shape table, not Applesoft commands. These commands are far lower-level than the commands used to draw a line or even plot a point in Applesoft, which allow you to specify coordinates; the shape-building commands don't. All locations in a shape table are relative to the starting point.

Except for the command that signifies the end of the shape, all shape-building commands specify a movement of an imaginary pen one unit in one of four directions, arbitrarily called up, down, left, and right (at scale one, a unit is one pixel). In rotation zero, what we call up, down, left, and right will correspond to those directions on the screen. Other rotations will translate those directions into other directions. Four of the commands specify that a point (if the scale is one) should be plotted before the pen is moved. If the scale is greater than one, that point will be a line from the old pen position to the new one.

The four directions of movement are called *vectors* in the parlance of graphic programming.

From now on we'll talk as if the shapes we are plotting will all be in scale one and rotation zero, so we will talk about plotting points up, down, left, and right, without qualifying them to take other situations into account. Therefore, the eight commands other than end-of-shape are shown in figure 1. The numbers assigned to them will have meaning later.

1. Plot and move up
2. Plot and move right
3. Plot and move down
4. Plot and move left
5. Move up
6. Move right
7. Move down
8. Move left

Figure 1. Shape-building commands.

Take out a piece of graph paper, define an arbitrary starting point in the middle, and draw a perfect replica of the Mona Lisa using only these commands. What? Can't be done? That's okay; shape tables aren't meant for doing great art. Let's do a simple house instead. Figure 2 shows one interpretation of the shape table house. Figure 3, presented for reference, shows the house at various scales and rotations. Notice that the diagonal lines become like stairs at higher scales and that the forty-five degree rotation of the scale one house looks larger than the zero- and ninety-degree rotations.

As you can see, the shape-building commands are simple, but putting them together into something meaningful can take some planning. Even when you're using a shape table creation program like the one we'll get to any paragraph now, plan the shape on paper first. At least plan out where the dots will go; once you're used to it, it won't be necessary to draw in all the arrows.

The program we're creating, which we'll call *Shape Designer*, will allow us to enter the building commands for a shape through the keyboard into the computer's memory. At the same time, it will show us what the shape will look like at scales of one and four. When we indicate that we're done, it will save the shape to disk for us. The eight building commands will be entered through eight keys on the keyboard, arranged for convenience in two diamonds: the familiar I-J-K-M diamond for moving only, and the less familiar but no less valid E-S-D-X diamond for plotting and moving. The escape key will serve as an end-of-shape command, and we'll add one editing command: Delete (backspace on the Apple II Plus) will remove the last command added to the list, remove any point or line it plotted on the screen, and move the pen to the previous location.

The structure of the program will be a lot like the input routine we built a few months back using the get command. The whole algorithm is a giant loop that takes in a character, interprets it as an editing command or a character to be added to a list (or in this case both), and processes it.

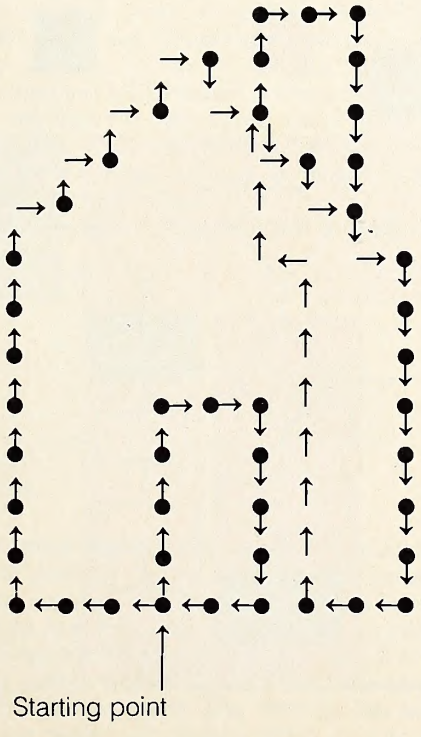

Figure 2.

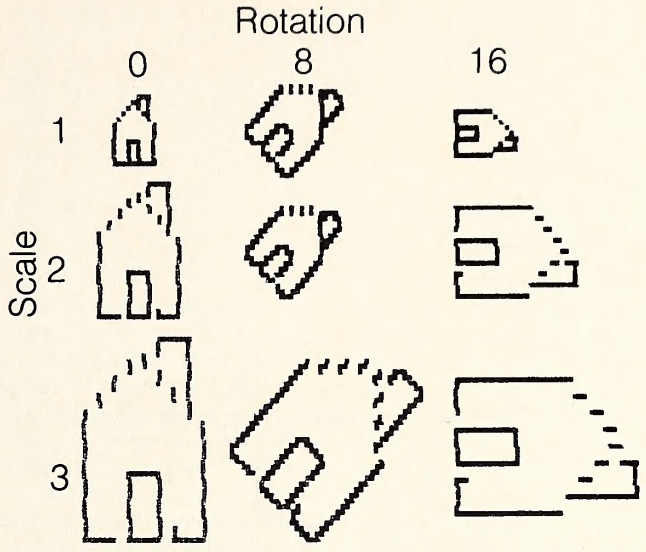

Figure 3.

The loop includes branches, of course, to take all of the possible situations into account; but it's still, essentially, one large loop.

Figure 4 is a flow chart for the whole program. It is much less specific than previous flow charts in this column, because by now the structure of smaller routines within the program should be clearer to you than they were at first. Figure 5 shows the same chart broken into the sections in which we'll look at the program.

Part 1: Initialization. Most programs have a section like this. Generically speaking, the initialization section of a program performs actions that need to be done before the rest of the program can operate. It sets the graphics mode, sets dimensions of array variables, defines functions that will be used frequently, and sets certain variables to default values. The initialization section of this program does all those things except for setting array dimensions, because the program uses no arrays.

In addition to those more typical functions, it sets up the operating environment on the screen. This just means that it draws two boxes where the two shapes (at scale one and scale four) will be drawn and prints prompts for the keyboard commands at the bottom of the screen.

The defining of the functions in lines 90 and 100 is also a part of setting up the operating environment. Without going into a detailed explanation of the four functions, just accept that they allow us to translate arbitrary X and Y coordinates within the shape into their corresponding screen coordinates within both boxes. The boxes allow shapes to be plotted within an arbitrary universe of 55 by 39 squares. Any attempt to leave that universe will be thwarted. Sorry.

Line 80 pokes in a very elementary shape table containing a single very elementary shape. In scale one, the shape is a point. In scale four, it is a short line. This shape will be used for plotting the components of the shapes that we'll draw using this program.

Line 110 sets up a command interpretation string that is used by part 2 of the program. It consists of eight letter characters plus delete [CHR$(127)] and escape [CHR$(27)], the characters the program accepts as commands. If you're using an Apple II Plus, change the 127 in that line to an 8. Also change the word *delete* in line 50 to the word *backspace*. Now, without further delay, here is part 1:

```
10  HGR : HOME : VTAB 21
20  HCOLOR= 3: SCALE= 1
30  HPLOT 0,0 TO 56,0 TO 56,40 TO 0,40 TO 0,0
40  HPLOT 56,0 TO 279,0 TO 279,159 TO 56,159 TO 56,0
50  PRINT "   E          I      DELETE "
60  PRINT " S+D PLOT J+K MOVE"
70  PRINT "   X          M      ESC DONE"
80  POKE 768,1: POKE 769,0: POKE 770,4: POKE 771,0: POKE
    772,4: POKE 773,0: POKE 232,0: POKE 233,3
90  DEF FN X1(X) = X + 1: DEF FN Y1(Y) = Y + 1
100 DEF FN X2(X) = X * 4 + 60: DEF FN Y2(Y) = Y * 4 + 3
110 CM$ = "IKMJEDXS" + CHR$ (127) + CHR$ (27)
120 X = 28:Y = 19:LOC = 16384
```

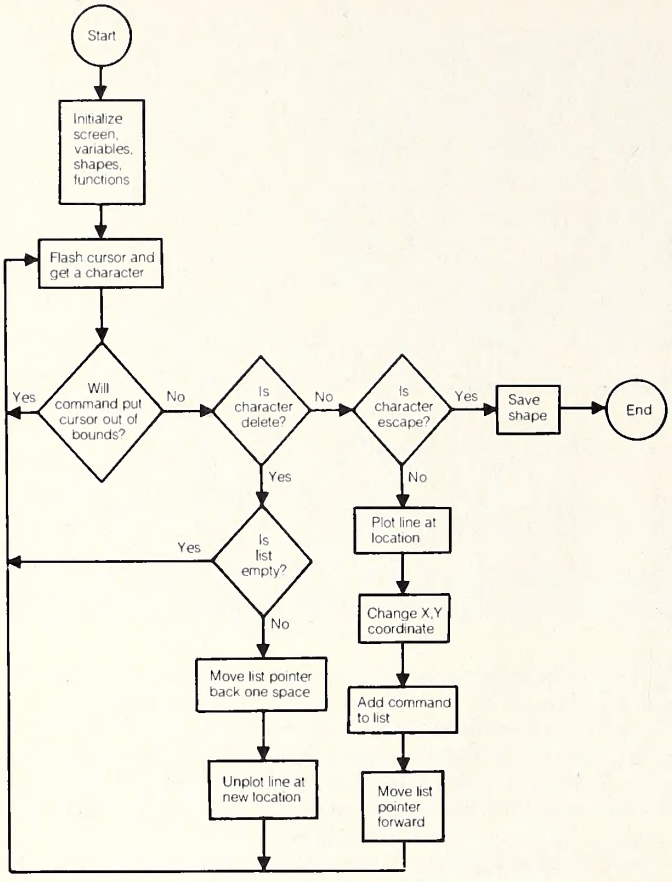

Figure 4.

Part 2: The Main Loop. This part of the program begins with a gosub. The routine being called didn't have to be done as a subroutine; it could have been put in the listing in place of the gosub, because it is only called in this one line. The routine takes the place of a command that doesn't exist in Applesoft. For that reason, it's broken out of the main loop so that you may study and appreciate it as a separate entity and so that we can put off talking about it until later. For now, assume that the gosub is a get command that puts its flashing cursor on the hi-res display instead of the text screen.

The variables X and Y define our imaginary pen's location within the arbitrary box (we occasionally allow ourselves the luxury of being several steps removed from reality). If the pen is on one edge of the box and the command entered tells it to go off of that edge, one of lines 220 through 250 prevents that from happening by ignoring the command and going back to the hi-res pseudo-get routine:

```
200 REM MAIN INPUT HANDLING LOOP
210 GOSUB 1000
220 IF X = 0 AND (C$ = "S" OR C$ = "J") THEN 200
230 IF Y = 0 AND (C$ = "E" OR C$ = "I") THEN 200
240 IF Y = 38 AND (C$ = "X" OR C$ = "M") THEN 200
250 IF X = 54 AND (C$ = "D" OR C$ = "K") THEN 200
```

Lines 260 through 310 convert the key pressed into a number from zero to ten and then act on it. Compare this to a routine of similar function in the lo-res banner program (April 1984, page 148, lines 270 through 460). This month's method (gleaned from a technique described in Doug Carlston's book, *Applesoft Isn't Hard*, page 92) is considerably more streamlined. It's also more readable, once you learn to recognize it. (Thanks, Doug.)

The key that was pressed is held in the variable C$. The variable C is set to zero. When the program exits the for-next loop in lines 270 through 290, C will hold a number that corresponds to the key pressed. The loop goes from one to the length of the command string that was

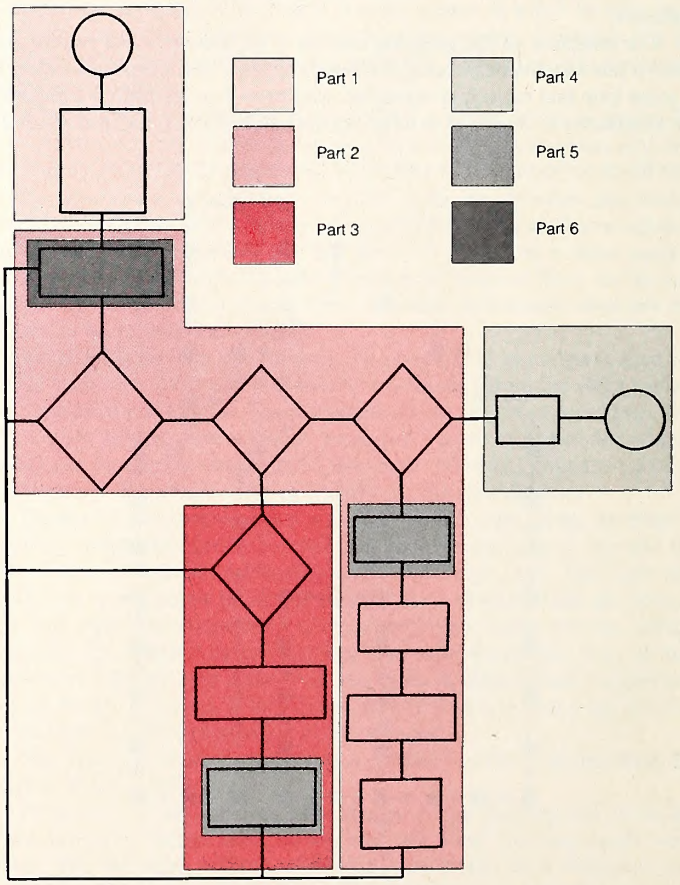

Figure 5.

defined in line 110. Line 280 compares each character of the string, in turn, with the character in C$. If it finds a match, C is set equal to CH (the index variable) and CH is set equal to the length of the command string, forcing an immediate exit from the loop.

We now have a number from 1 to 10 in C if there was a match or a 0 if there wasn't. The *on-goto* command in line 300 handles program flow at this point. An on-goto command takes this form: The keyword *on* is followed by an expression—usually just the name of a numeric variable—that is followed by the keyword *goto* and a list of line numbers separated by commas. It works like this: If the expression is equal to 1, the program goes to the first line number in the list. If the expression is equal to 2, the program goes to the second line in the list, and so on. If the value of the expression is less than one or does not have a corresponding line number in the list, program flow goes to the next statement after the on-goto. In this case, that means no usable key was pressed and the program goes back to wait for another keypress.

Here's that portion of the program:

```
260 C = 0
270 FOR CH = 1 TO LEN (CM$)
280 IF C$ = MID$ (CM$,CH,1) THEN C = CH:CH = LEN (CM$)
290 NEXT CH
300 ON C GOTO 320,330,340,350,360,370,380,390,500,700
310 GOTO 200
```

The rest of the main loop processes the first eight of the ten commands. Not coincidentally, these lines are eight of the ten called by the on-goto in line 300.

We don't need to look at all of these individually; two examples will do. Line 320, which is called upon if the I key is pressed, merely subtracts one from the pen's current Y coordinate and advances to line 400. Since I is one of the four move-only commands, nothing is plotted on the screen.

Line 360 is executed when the E key is pressed, meaning plot a point and move up. It sets the rotation for the plotting of the scale four line and then calls the subroutine beginning at line 900, which plots a point on the scale one box and a short line on the scale four box. It's a very short routine, but it's called by eight different lines of the program. Therefore, it is a very good example of where to use a subroutine to make a program shorter and less complicated. The rest of line 360 performs the same actions as line 320 did: Move the pen and move on.

Line 400, where all of these lines move on to, records the command key in memory. LOC is a variable that we set to 16384 in part 1. The command *poke LOC,C* puts the value held in C, the command code, directly into the location in memory specified by LOC. The next statement increments LOC so that each keystroke will be recorded in a different memory location. Before you go just poking numbers in anywhere, be warned that indiscriminate poking can crash the operating system, destroy disk files, and cause a great deal of consternation. However, unless you create a shape that involves more than twenty thousand keystrokes, you are not going to damage anything with this program. We're using a big, safe area of memory.

More will be said about the poke command in a later column.

```
320 Y = Y - 1: GOTO 400
330 X = X + 1: GOTO 400
340 Y = Y + 1: GOTO 400
350 X = X - 1: GOTO 400
360 ROT = 0: GOSUB 900:Y = Y - 1: GOTO 400
370 ROT = 16: GOSUB 900:X = X + 1: GOTO 400
380 ROT = 32: GOSUB 900:Y = Y + 1: GOTO 400
390 ROT = 48: GOSUB 900:X = X - 1: GOTO 400
400 POKE LOC,C:LOC = LOC + 1
410 GOTO 200
```

Part 3: The Delete Handler. This section is almost a mirror image of the last part of section 2. First it moves the LOC pointer backward, then it reads the command stored in the specified location into the variable C with the *peek* command. (Peek, which works like a function, is essentially the opposite of poke. It reads the contents of a location in memory.) Using another on-goto, it goes to a line that does the opposite of what the command read usually does. First the line moves the X,Y pointer, then it sets rotation and gosubs to 900 to *erase* the point and line that command plotted, if necessary.

```
500 REM DELETE HANDLER
510 IF LOC = 16384 THEN PRINT CHR$ (7);: GOTO 200
520 LOC = LOC - 1:C = PEEK (LOC)
530 ON C GOTO 540,550,560,570,580,590,600,610
540 Y = Y + 1: GOTO 200
550 X = X - 1: GOTO 200
560 Y = Y - 1: GOTO 200
570 X = X + 1: GOTO 200
580 Y = Y + 1: ROT = 0: GOSUB 900: GOTO 200
590 X = X - 1: ROT = 16: GOSUB 900: GOTO 200
600 Y = Y - 1: ROT = 32: GOSUB 900: GOTO 200
610 X = X + 1: ROT = 48: GOSUB 900: GOTO 200
```

Part 4: Saving the Shape. This is the part of the program called by line 300 when you have hit escape. Although it is represented only by one box on the flow chart, this section has a fairly complex structure of its own. It is presented as good programming form, user-interfacewise. It tries to cover all situations and come up with reasonable responses. For instance, if you hit escape before entering any shape information, it tells you that there's no shape to save and offers you the option of quitting or going back to design a shape. Having determined that there is a shape, it asks if you want to save it, again offering you two responses. Pressing Y saves the shape, pressing N exits the program. In both of these exchanges, the computer accepts input with the get command, specifies all legal responses, and takes precautions to ignore illegal keypresses.

Finally, it asks for the file name to save the shape under. This is done with an input because it needs more than one character. Other alternatives accepted are the user's typing a question mark, in which case the program catalogs the disk and asks for the file name again (*Apple Writer II* users will recognize this convention), and the user's hitting return, wherein the computer assumes that the user is confused and goes back to the "Save this shape?" prompt.

An Impromptu Challenge. Making this section even friendlier is a puzzle left for the reader. One more option should be allowed at this point: The user should be allowed to continue working on a shape in case escape was pressed accidentally. The hard part of this is that the prompts at the bottom of the screen have been erased, and you must have the pro-

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gram restore them without resetting all the variables to the default value. Keep the user interface consistent and avoid spaghetti logic. This kind of assignment comes up all the time when you are submitting programs for other people to use. It is obvious to you, as the programmer, not to hit escape until you are finished, but it isn't necessarily obvious to the user, and sometimes hitting escape is accidental.

A problem like this helps you get to know a program better, even if you wrote it yourself. It builds character. So stop grumbling, already.

The only remaining parts of the section that should require an explanation are lines 830 and 850. The pokes in 830 restore the graphics display without clearing the screen to black. They are a useful set of pokes to remember, and at a later time we'll go into how they work.

Line 850 saves the shape data to disk as a binary file. A binary file is an exact replication, a snapshot if you will, of the contents of a specified section of memory. Two commands exist in DOS to manipulate binary files: *bload* and *bsave*. Typed from the keyboard, they typically look like this:

```
BSAVE FILE, A16384, L50
BLOAD FILE, A8192
```

The first of these saves a chunk of memory beginning at location 16384 and having a length of fifty bytes. Neither the A (address) parameter nor the L (length) parameter is optional with bsave, although either or both may also be written as a hexadecimal number. The corresponding command with hex numbers would be:

```
BSAVE FILE, A$4000, L$32
```

If you don't do hex, that's okay; just use the decimal form. The second command, bload, loads the file back into memory. No parameters are necessary after the file name with this command, but if an optional address parameter is used, the file is loaded at that location. Otherwise, it will be loaded to the location whence it was saved.

Bload and bsave will come in very handy to us as we continue to study Applesoft graphics. The commands are used to store and recall hi-res and lo-res pictures as well as shape tables and other "poked-in" data.

```
700 REM SAVE THE SHAPE
710 HOME : VTAB 22
720 IF LOC > 16384 THEN 770
730 PRINT "NO SHAPE TO SAVE": PRINT "QUIT OR CONTINUE?
    (Q/C) ";
740 GET A$: IF A$ < > "Q" AND A$ < > "C" THEN 740
750 IF A$ = "C" THEN RUN
760 GOTO 860: REM EXIT
770 PRINT "SAVE THIS SHAPE? (Y/N) ";
780 GET A$: IF A$ < > "Y" AND A$ < > "N" THEN 780
790 IF A$ = "N" THEN 860
800 TEXT : HOME
810 INPUT "FILENAME (? TO CATALOG): ";F$
820 IF F$ = "?" THEN PRINT CHR$ (4);"CATALOG": PRINT : GOTO
    810
830 IF F$ = "" THEN POKE - 16304,0: POKE - 16297,0: GOTO
    710
840 POKE LOC,0:LOC = LOC + 1
850 PRINT CHR$ (4);"BSAVE SH."F$",A16384,L"LOC - 16384
860 TEXT : HOME : END
```

Part 5: Plot Commands on the Screen. This short and sweet routine draws the lines and points called for by the keyboard commands you enter. It's also used to erase those same lines and points; remember that if you xdraw a shape in the same place twice, the second xdraw erases the first. FN X1 and FN Y1 are the functions to translate X and Y to coordinates within the small box. FN X2 and FN Y2 are the corresponding functions for the large box.

```
900 REM PLOT ON BOTH DISPLAYS
910 XDRAW 1 AT FN X1(X), FN Y1(Y)
920 SCALE = 4: XDRAW 1 AT FN X2(X), FN Y2(Y): SCALE = 1
930 RETURN
```

Part 6: The Hi-Res Pseudo-Get Routine. This routine loops through (flashing a hi-res cursor in both boxes) until you hit a key, then returns with the key pressed stored in C$. In line 1060 is another mysterious peek. The value in the location being examined tells us whether or not a key has been pressed. If a key has been pressed, the line *gets* it and returns. Note that the get command is executed *after* the key has been pressed, which is perfectly legal. The value of one key will always wait in memory until a get or an input (or the equivalent in another language) comes to get it.

The rest of this routine just repeatedly plots and erases the hi-res cursor. Again, remember that xdraw can be used to erase previously xdrawn shapes.

```
1000 REM HI-RES CURSOR
1010 ROT = 0
1020 XDRAW 1 AT FN X1(X), FN Y1(Y)
1030 XDRAW 1 AT FN X2(X), FN Y2(Y)
1040 XDRAW 1 AT FN X1(X), FN Y1(Y)
1050 XDRAW 1 AT FN X2(X), FN Y2(Y)
1060 IF PEEK ( - 16384) > 127 THEN GET C$: RETURN
1070 GOTO 1020
```

Well, that's it. Next month we'll continue with a program that puts shapes created with this program into a usable shape table. If you're looking for another challenge until then, try writing a program that bloads a shape file (of the type this month's program creates) from disk and displays it on the screen. Don't start from scratch: Most of the necessary routines exist in this program. Use them; you should never have to write the same routine twice. ■

GLOSSARY

Address: An integer from 0 to 65536 expressing the unique location of a single byte of memory. In Applesoft commands, address numbers greater than 32766 can be expressed as the address minus 65536. In DOS commands, addresses, as other parameters, may be expressed in hexadecimal, preceded by a dollar sign.

Binary file: A disk file that contains an image of binary data taken directly from memory.

BLOAD: The DOS command to load a binary file from disk into memory. The command is followed by a file name and, optionally, a comma and an address parameter of the form A8192 (decimal notation) or A$2000 (hexadecimal notation).

BSAVE: The DOS command to record the contents of a section of memory directly to disk. The statement takes the form *bsave* filename, *A*address, *L*length, where address and length are required parameters that can be expressed in decimal or hexadecimal.

Initialization section: The part of a program that sets array dimensions, defines functions, presets default values, and performs other functions in preparation for the rest of the program. It is advantageous to lump all of these functions together because it makes the program easier to read, and it makes the functions easier to find if you want to change them in the course of program development.

ON-GOTO: An Applesoft control structure command that takes the form *on* expression *goto* line number list, with the line numbers delimited by commas. Assuming that the value of the expression is *n*, the program branches to the *n*th line number in the list. If *n* has no corresponding line number, the program continues with the next statement.

Pixel: A dot on a graphics display.

PEEK: An Applesoft function to read a byte of memory. *Peek (*address*)* returns the value stored in that memory address, an integer from 0 to 255.

POKE: An Applesoft command to put a value into a byte of memory. Takes the form *poke* address,value, where the value must be an integer from 0 to 255.

Shape table: A list of numeric data intended to be interpreted as a graphic image. Applesoft supports a specific kind of shape table with commands to draw the shape in various colors, scales, and degrees of rotation.

User interface: The part of a program that presents itself to the user, and through which the user gives input to the program. A lot of attention is being given nowadays to making user interfaces more intuitive, familiar, and internally consistent.

Vector: An instruction in a shape table to move an imaginary pen in one of four directions, with or without plotting a point first.

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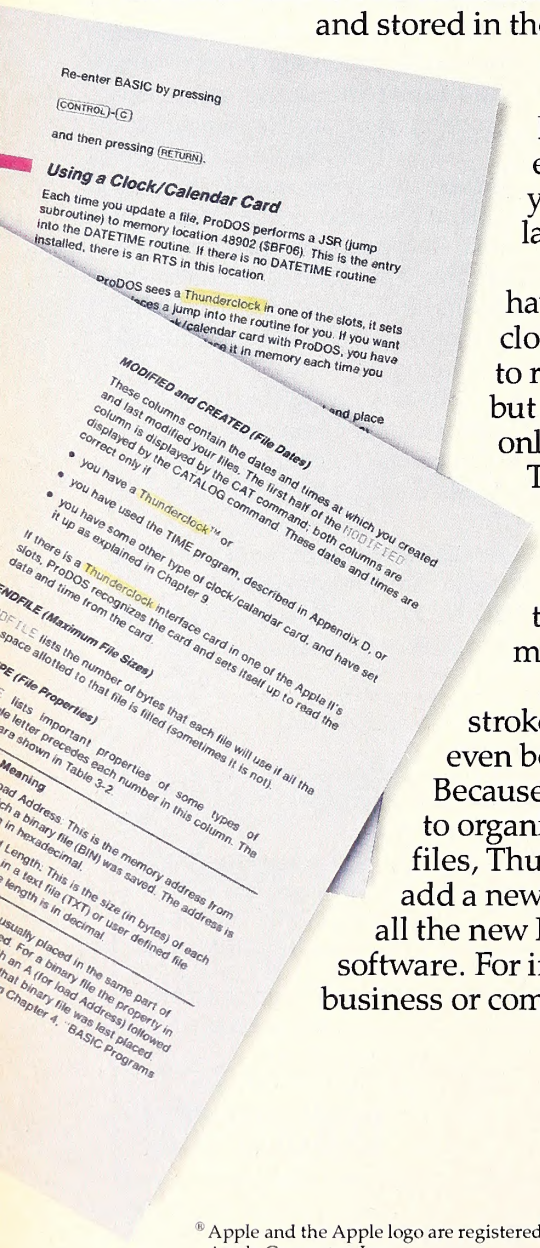
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and place

MODIFIED and CREATED (File Dates)

These columns contain the dates and times at which you created and last modified your files. The first half of the MODIFIED column is displayed by the CAT command; both columns are displayed by the CATALOG command. These dates and times are correct only if

- you have a Thunderclock™ or
- you have used the TIME program, described in Appendix D, or
- you have some other type of clock/calendar card, and have set it up as explained in Chapter 9.

If there is a Thunderclock interface card in one of the Apple II's slots, ProDOS recognizes the card and sets itself up to read the data and time from the card.

NDFILE (Maximum File Sizes)

DEFILE lists the number of bytes that each file will use if all the space allotted to that file is filled (sometimes it is not).

PE (File Properties)

lists important properties of some types of le letter precedes each number in this column. The ar a shown in Table 3-2.

Meaning

ad Address. This is the memory address from ch a binary file (BIN) was saved. The address is in hexadecimal.

Length. This is the size (in bytes) of each in a text file (TXT) or user defined file length is in decimal.

usually placed in the same part of . For a binary file the property in h an A (for load Address) followed hat binary file was last placed Chapter 4, "BASIC Programs

Now you can instantly know the exact time your files were last updated.

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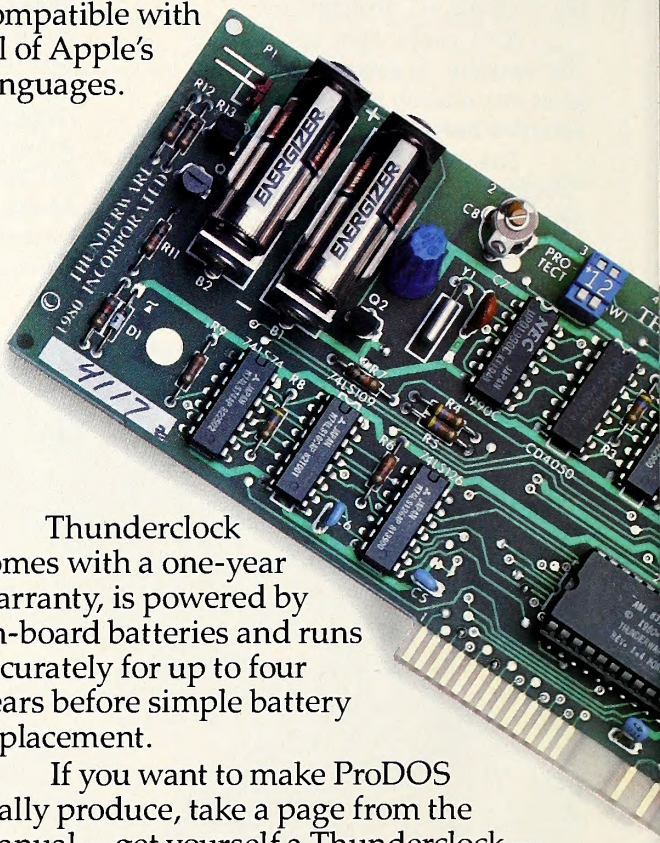
Thunderclock gives you access to the year, month, date, day-of-week, hour, minute and second. It lets you time intervals down to milliseconds and is compatible with all of Apple's languages.



Thunderclock comes with a one-year warranty, is powered by on-board batteries and runs accurately for up to four years before simple battery replacement.

If you want to make ProDOS really produce, take a page from the manual—get yourself a Thunderclock—the official ProDOS clock.

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Apple II ProDOS User's Manual

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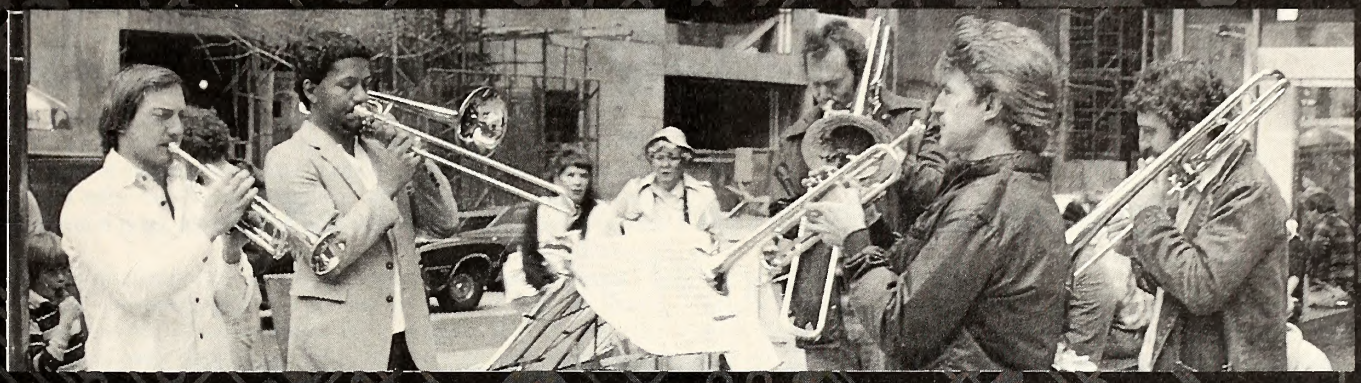
EVERYONE'S GUIDE TO ASSEMBLY LANGUAGE



BY JOCK ROOT

Keyboard Input

Input and output are two of the most important functions of a computer, for obvious reasons. If you use your Apple to answer questions (or to process data, as a businessperson would say), you will need a way to get the questions in and the answers out. If you use it to play games, you'll need a way to tell the Apple what your next move is and for it to tell you what the results are.

You knew that already, of course. But have you ever wondered why you never see much written about such an important subject?

The simple answer is, you don't need to know. The Apple has a set of built-in routines for that, and all you have to do is call the one you want: Use input or print from Basic, JSR KEYIN or COUT from assembly language. This is very simple and convenient, and quite enough for most purposes; but suppose you want to know how it works anyway—just in case you might want to do tricks with it someday.

The Usual Way In. The Apple normally inputs characters through its keyboard. This is a simple process, but not as simple as you might think. The input routine was designed as a series of steps so that your programs could use the whole routine, or only part of it, as needed.

The purpose of an input routine is to put data (the character you want to input) into the *microprocessor*—the integrated circuit that is the "brain" of your Apple. That's simple enough: All we need is for the keyboard circuit to be able to send out the data and for the microprocessor to be able to receive it. The computer can do that in less than a millionth of a second.

The computer can, but you can't, and that's where it gets complicated. It's going to take you at least a tenth of a second, and possibly several seconds, to come up with the next character; and what should the computer do in the meantime? If you want it to do nothing and just wait for you, you can use the standard input routines; but if you want to modify those routines a little, you can set the Apple free to do its own work while you think and have it check back with you only occasionally.

It works like this: When you press a key, the keyboard sends a signal to the microprocessor to that effect (called, not surprisingly, a *key-pressed* signal). At the same time, the keyboard puts the ASCII value of the key in the *outgoing window*: This is a memory location that the microprocessor can read. Things will stay like this—the key-pressed signal active and the key value in the outgoing window—until the microprocessor sends back a signal that it has received the input. When that happens, the key-pressed signal will be turned off, and the keyboard will then accept another key press from you. Note that three different signals are used: the key-pressed signal (sometimes called a *ready* signal, meaning "ready to transmit new information"), the data signal (the ASCII value of the key you pressed), and the microprocessor's response (sometimes called an *ack* signal, short for acknowledgment).

Why is the process so complicated? Well, there are two answers to that. The first is, it doesn't have to be complicated; if you use the standard Apple input routines, you can ignore the complicated part. The second is, it was made that way so you could change the pieces around if you wanted and still have it work.

A Different Way In. With the normal input technique, waiting for an input takes all of the Apple's attention: It keeps testing for a key-pressed signal, over and over again, until it gets one. Once it starts doing that, it cannot normally do anything else until it gets an input of some kind.

But suppose you're writing a game and you want something to keep happening until an input comes in. Perhaps you want the display to keep changing until the user presses a key. You can't do that with the normal input routine, but you can if you modify the routine slightly.

What you have to do is this: First, you have to break your display-changing routine into little pieces. Then, after each piece you have the microprocessor check for a key-pressed signal; if it hasn't come in yet, then do another part of the display-changing routine and check the key-pressed signal again. If the signal is active, then jump to a subroutine to collect the input; otherwise do another piece of the display and continue. In this way, the display is continually being updated and you are checking for an input at the same time.

The key-pressed signal (sometimes called a *flag*, named for the signal flags once used on railroad tracks) is the high bit of memory location $C000 (decimal −16384). When the keyboard is waiting for you to press a key, the flag is clear: The bit is set to a low voltage, or *logic 0*. When you have pressed a key and the keyboard is waiting for the microprocessor to pick it up, the flag is set: It carries a high-voltage, or *logic 1*, signal.

If this all seems exceedingly technical to you, just hang in there a wee bit longer—it's all going to make sense in a moment. To summarize, the key-pressed flag is the high bit of $C000: If that bit is 0 (clear), the keyboard is waiting for an input; if it's 1 (set), then a key has been pressed and a character is waiting for the microprocessor to take it.

So how do you read one bit from memory? Well, if it's the high bit (as this is), it's easy: You can even do it from Basic! If the high bit of a byte is set, the byte represents a number greater than 127; if the high bit is clear, the number is 127 or less. Thus the test from Basic is, if peek (−16384) < 128, then the keyboard is waiting for an input. You can use this in the form, *if peek (−16384) > 127 then gosub 500*, in which 500, or whatever, is the line number of your routine to collect the input—it should begin with a get statement to pick up the key already pressed.

In assembly language, the technique is a little different. To begin

with, we have a more elegant test than the "greater than 127?" we use in Basic. The microprocessor sometimes uses the high bit of a byte as a "negative flag": If the high bit is set, the number is negative. Because of that, there are two commands in assembly language designed to test that bit and branch accordingly: the BMI (branch if minus or high bit set) and BPL (branch if plus or high bit clear) commands.

The simplest way to use this technique is to put the input processing routine right in with everything else and then skip around it when it isn't needed. It looks like this:

```
        (main program)
        LDA     $C000
        BPL     ONWARD
        (input processing)
ONWARD  (main program continues)
```

But there's more to it than that. In the Basic version, we swept a lot of housekeeping details under the rug by using a get statement, which does all the necessary housekeeping without being told. But we can't do that here, can we?

Sure we can—we can't use get, but we can use KEYIN, which is the assembly language routine that get uses. KEYIN is one of the subroutines in the Monitor, the supervisor program that is built into the Apple (for more details on the Monitor, see this column in the March 1984 issue).

The address of KEYIN is $FD1B. This is the Apple's standard routine for keyboard input: It not only reads the keyboard, it also takes care of a whole series of housekeeping chores.

Input Housekeeping. The obvious job of KEYIN is to read the keyboard: to get the ASCII value of the pressed key into the accumulator. But that's the easy part—you could do that yourself with an LDA instruction, if that's all there were to it. No, what makes KEYIN valuable is all the other things it does.

First of all, remember that there are three signals required for keyboard input: the data ready signal, or key-pressed flag; the data itself, which is the key value; and the microprocessor's acknowledgment. We've described how you can read the flag with LDA and BPL and how you can read the data with LDA, but we haven't mentioned sending the ack signal.

The keyboard circuit doesn't care whether it gets an ack signal or not. The only function of the ack signal is to clear the key-pressed flag, and the *keyboard* behaves the same way whether the flag is set or clear: It sets the flag every time you press a key, but it doesn't care whether the flag is already set when it does that.

The purpose of the key-pressed flag is to tell your program that the keyboard has new data: that a key has been pressed since you read the last one. The only way it can do that is for your program to clear the flag when it reads the character by sending an ack signal; after that's been done, you can be sure that if the flag becomes set again it means a new keypress has arrived.

You can send that ack signal from your own program, after you've picked up the key value, by reading (or writing) location $C010, with LDX or STA, for example. (This location is called the *keyboard strobe* in the Apple reference manual—strobe is a vague word in computerese that sometimes means a reset signal.) But why not save yourself the trouble and let KEYIN do this for you?

Among its other chores, KEYIN also helps with cursor management (get the blinkin' thing out of there!), and increments the random number seed.

Mixed Messages. Are you looking for something? You may have noticed that we gave you an address to read for the key-pressed flag, as well as an address to read (or write) for the ack signal. However, we did not give you an address to read for the value of the pressed key. Well, actually we did, but we didn't; it's important to be precise in these matters.

Sorry about that. You see, the address you have to read for the key value is $C000 . . . that's right, it's the same address as the key-pressed flag. No wonder you're confused!

Here's what's happening. The Apple uses a type of character set called *seven-bit ASCII*, which means that any character in the set (including lower case, punctuation and symbols, and control characters) can be expressed as a seven-bit number. You remember, of course, that the Apple thinks in eight-bit numbers (we call them *bytes*), which means that there's one bit left over. That is, if you store a seven-bit ASCII character in an eight-bit memory location, you have one spare bit, which you can use for some other purpose . . . such as a key-pressed flag.

Yes: The high bit of $C000 is the key-pressed flag, and the other seven bits are the value, in seven-bit ASCII, of the key that set the key-pressed flag. And note that you can read this location as often as you like (with LDX or LDA or, for that matter, peek (−16384)) without changing it. It will change only when another key is pressed.

High-Bit ASCII. The double use of location $C000 has a side effect that is sometimes confusing. Some of the Apple input routines strip the high bit of a character, so you get a normal seven-bit ASCII value (in the range 0–127, or $0–$7F); but some do not, and you get an ASCII value with the high bit set (in the range 128–255, or $80–$FF). This latter form is called *high-bit ASCII*, or sometimes *Apple ASCII*.

When you're designing an assembly language routine that needs a keyboard input, it's not always possible to be sure in advance whether you will get an input in high-bit or normal ASCII form. For example, if your program is expecting an input of $0D (carriage return, normal ASCII) and it's getting $8D instead (the same, but high bit set), it will hang up forever.

If in doubt, test for both forms. The conversion is easy: To get the high-bit ASCII value, just use the normal ASCII value from the Apple manual and add 128 to it (or $80, if you're working in hexadecimal). Or you can strip the high bit yourself, before you examine the character; that will take care of all cases. To do that, use the command AND #$7F (logical AND of the accumulator with the value $7F, which is a byte with a high bit of 0 and all the other bits equal to 1).

Now you know how the keyboard input routine works and how to create your own such routine. You have to deal with three different signals: flag and data at $C000 (−16384) and ack at $C010 (−16368). Or if you want to be lazy you can JSR to KEYIN at $FD1B, or you can even use get. ■

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* On the flip side of the Spellcaster disk is a free issue of The Spellswappers' Gazette, a diskette magazine of readers' games, comments and programming know-how.

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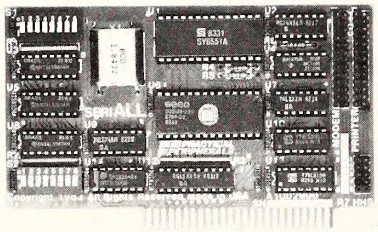

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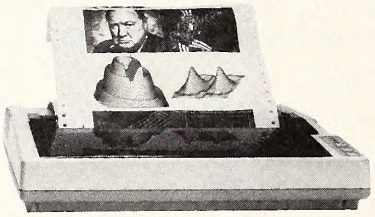

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Fattening Up the Li'l Mac

Lots of hot news this month, plus a few rumors and some interesting speculation; so let's dispense with the idle chitchat and dive right in.

First off, by the time you read this, Mac's long-awaited external disk drive should be on your dealer's shelves. That was the plan at press time, in any case. Apparently, Sony couldn't crank out the baby drives as fast as Apple was shipping Macintoshes, which gave Apple the choice of allotting the drives it *could* get into either production of new Macs or second drives for existing systems. The company wisely opted for the first choice, but that left us early users playing the double-timed disk shuffle stomp. Such is the life of a pioneer.

If you guessed from this that Apple is selling Macs pretty fast, you're right: As of April 24, the company had sold more than fifty thousand, shipping ten thousand to schools alone. The factory is whirring along at the rate of fifteen hundred machines per day and should hit their target of two thousand per day shortly. That works out to an annual production rate of close to three-quarters of a million units, which if maintained will overshoot even Apple's first-year predictions. Furthermore, Microsoft says that 5 percent of its sales are already for Macintosh products.

Apple must have been doing some repredicting of its sales figures, because it's now planning to open a *second* factory next year, thereby doubling MacOutput. Early Mac fans tend to think that Apple knew it was going to sell Macs faster than it was predicting but decided to play it safe to avoid a replay of the "Great Expectations" scenario of the Lisa introduction—it looks far better to oversell a lower goal than to undershoot a higher goal. In any case, with little Macs entering the world in such numbers, even IBM is going to have to respond. Incidentally, Apple says that less than 2 percent of the cost of producing a Mac at its high-tech automated factory goes into labor.

Course, there's always the chance that the new factory will be cranking out not little Macs, but big Macs . . . er, let's make that Fat Macs. It's pretty well known (and if it wasn't, it is now) that Burrell Smith, the designer of Mac's digital board (which is to say its brains), after indulging in at least one full day of vacation (such slothfulness!), is back and hard at work on *something*, although everyone at Apple professes total ignorance of the hard-working Mr. Smith working hard at anything special. But never mind that, because we've discovered that he is, and further, that what he's working on is a Fat Mac.

Just where the new Mac will carry its extra avoirdupois has not yet been positively determined, although a good guess is in a hard disk. The new Mac will of course have 512K of memory, if not more—Mac's software can support up to four megabytes—and will also probably have a higher port speed, possibly around five megabytes per second. Five megabytes per second just so happens to be the transfer rate called for by the small computer systems interface (SCSI) standard, the standard to which practically all small, medium performance, commercially marketed hard disks adhere. Such an improvement to the ports would pump hard disk performance up to where it should be for a machine of Mac's caliber and overcome what may be the major shortcoming of the Mac. Just for the record, Tecmar's hard disk is said to be three times faster than the Sony disks, and Davong's entrant will probably be just as fast, if not faster. Performance figures will vary according to your application and type of computing; use these figures as a guide only, and don't forget to take a test-drive. (Pun intended.)

Speculating about potential new products can be dangerous to the health of the industry; some people are likely to put off a purchase in anticipation of new developments, which could hinder Apple's selling as many Macs as it can as soon as it can, thereby stomping handily on the elephant's toes, nose, and PCs. But in this case you probably needn't worry about buying a machine that's going to become last year's model this year, since Apple will almost surely offer an upgrade—you'll get those high-speed ports (plus who knows what else) in the same board swap that gives you 512K of memory.

That may help to explain the unexpectedly high projected (and still both unofficial and very tentative) price of the 512K upgrade, said to be around a thousand dollars. What that price probably won't buy you is an upgrade to double-sided drives. (Let's hear lots of feedback about this, and maybe we can get the folks at Apple to change their minds. Write to Mac'n'Lisa at *Softalk*; we'll gleefully forward all letters to Apple.)

Since the only real obstacle to concurrency (running multiple tasks at the same time) on a Mac is the limited 128K memory, it's likely—very, very likely, as a matter of fact—that Apple will add that feature when it intros the 512K machine. That will put a Fat Mac right up there in the same league with the Lisa, capable of having several windows open at one time, with different programs running in each window. Even after the introduction of a 512K Mac, however, you can expect to see the 128K Mac continue in production, probably selling at a somewhat reduced price—maybe around $1,950 or so. A reasonable guess for the price of a Fat Mac (sans hard disk) might be around $2,950, but that's only a guess and could be way off.

While we're on the subject of new products, here's one that's really off in the future: a Mac model that uses Motorola's 68020 microprocessor. The 68020 machine is a full thirty-two-bit version of the 68000, the 68000 itself being a sort of hybrid between a sixteen-bit machine and a thirty-two-bit machine. (It has some thirty-two-bit instructions and thirty-two-bit registers, but it can't do a full thirty-two-bit-by-thirty-two-bit multiply, and it has only a sixteen-bit external bus.) Apple has said it is "looking at doing something with the 68020 and will also do bigger memory system products."

Speaking of new products, the first stand-alone development system (meaning it will run on your Mac, rather than requiring a Lisa development system), the MacAssembler/Debugger, should be out around July, with MacPascal and MacC following around December. The debugger portion of the assembler sounds great—it has multiple windows (so you can see the program executing, look at the listing, and observe changes to the registers and other locations in real time), breakpoints, single-stepping, and a bunch of other nice features. There's a catch, though—it requires two Macs to use. A simpler debugger requiring only a single Mac will also be available, though it will have fewer fancy features.

Because of the large library of routines in ROM—close to 500, split between utilities, interface, and resource routines—you'll be able to use both Pascal and C for programs that would require assemblers on other machines. That's because the higher-level languages not only give you access to the machine via the ROM routines, they also call on those same routines to implement their libraries. That means each program doesn't have to have a long library tacked onto the end of it, which makes for extremely short programs—there's already a very functional Pascal program that runs only 2K, and it's said that C programs can be just as short. Considering the fact that the C library usually runs at least 15K, that's nothing short of amazing. Furthermore, the object format (that is, the final output of the compiler) for C, Pascal, and the assembler are all the same, so you can very easily mix and match languages. ■


Sarajevo
CONRAC

The Effects Of Apples On Real-Time Videos

BY ANDREW CHRISTIE

Studio City, California, is the new, true entertainment capital of the world. Some years ago, "Hollywood" and the business of fantasy creation essentially migrated four miles northwest; determined moguls trudging through the canyons, marking their trail with split-level condos, and coming out at the other end to carve this little company town out of the wilderness. Today, Universal Studios reigns over all from high on a hill, joining hands across the water of the mighty L.A. River with the Burbank Studios.

Several blocks west of these twin titans, and one block east of CBS/Fox, amidst the antique shops, vegetarian restaurants, new-wave boutiques, and sushi bars that mark Ventura Boulevard as the entertainment industry's main artery of commerce, sits Image West. Formed in 1974 as a unit of Computer Image in Denver, it was bought by its current owners eight years ago, a time when two golden words had just begun to point the way to the new bonanza of filmdom: "electronic animation."

At Image West, animator Peter Koczera (seated at left) and art director Sonny King team up to bring professional sports into the age of computer graphics. The *NBC SportsWorld* introduction (above) is an example of motion-control animation. One channel from the Apple controls the sliding world map; another moves the camera photographing it.

Left: Quintessential Apple write-on graphics give a cotton-candy neon effect to a logo, while the sparkle program adds a lens flare. Below are results of Image West's longstanding involvement with the world of televised pro sports.

When the big studios, networks, ad agencies, or independent producers want special effects, they go to the special effects houses. *Star Wars* and Levi's commercials did a considerable amount in creating and stoking the ongoing appetite for those bright, flashing images of the fantastic that now regularly grace home and movie screens, and companies like Image West keep it supplied.

The Men Who Make the Magic. People like Image West's head of research and development, Jim Ryan, make the images. They are steeped in the lore of film and video and spend much of their time pondering the differences in those two formats, their advantages and disadvantages, and ways to bring the two together.

Ryan gives an example of the problem of streaking:

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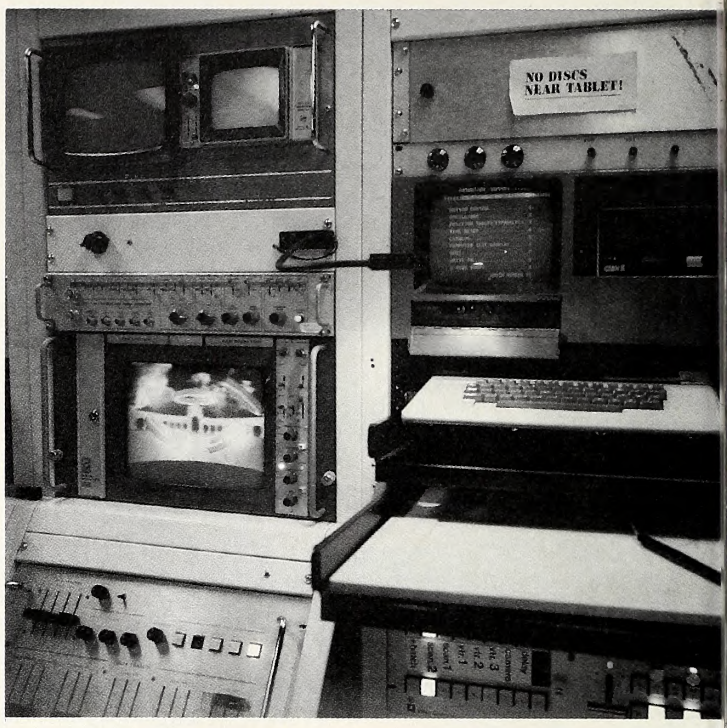
"The ABC logo in white goes back and kind of twists, and a blue streak comes up, hits it, and keeps going . . . 'ABC Sports Presents.' That's a film effect. No one has yet figured out how to do a streak on video. With film, it's very nice; you just move the camera with the shutter open, close it, go back to another start point, open the shutter, and do it again. With video, you're essentially taking a snapshot thirty times a frame. And video is made up of two fields, consisting of odd and even lines. Each field is scanned sixty times a second. To do an effect, first you scan out the odd field, then you scan out the even field."

Behind all of this, of course, is the computer—in Image West's case, two analog computers called Scanimates (used for real-time video animation), five videotape machines, an Ampex ADO digital effects box . . . and an Apple II Plus.

The Apple joined in 1979 when a couple of Image West employees saw some potential in the new machine. By building special interfaces to connect the Apple to their electronic animation system, they could take advantage of the Apple in two different ways: photographing the image produced by it or using signals coming off of it to control other equipment. They built a digital-to-analog converter to hook up the Apple to the Scanimate ("a rather old machine but there are still quite a few uses for it," comments Ryan), running the voltage from the Apple through the d/a converter into a section of the Scanimate to control the vertical and horizontal orientation of an image and make it smaller or larger.

The Apple's entry into the fast lane of the electronic animation biz was largely the doing of Roy Weinstock, an Image West employee who bought an Apple for himself and, in another version of the story that has so often repeated itself around the world



No, you can't quite do this at home. The tilting movement of the Olympic rings was achieved using an Apple motion-control animation program. The 1,000 lines of resolution are provided by a Scanimate analog computer.

in the last seven years, saw a use for it in his work. He set about writing some unique programs to just that end.

They do not have fancy names—they barely have designated titles—but they pull off some pretty fancy effects. They can control X and Y deflection on the CRT, making dots appear in different places, or take an image off of a bit pad—a word or symbol—and repeat the drawn image at a preselected rate.

Weinstock's write-on program can create flashes of light, random patterns using a random-number-generator program, or be used to repeat a set pattern. As Ryan explains, "If you want to write the letter m, you do a write-on of the letter m on the data tablet, run the program to remember how you moved the pen on the graphic tablet, put the program into a learn mode, and after it's learned what you want it to write, then put it into run mode, where it will take an interrupt—a start pulse—and will start writing it on the screen. We can vary the rate." The end product usually takes the form of small, glittering lights, flashes, simulated lens flares, highlighting, or random background sparkles. All of these effects are dear to the hearts of the national networks, their affiliates, and most local TV stations, and are amply on view in their currently broadcast logos and station IDs.

Beyond the realm of pure graphics, the Apple also handles Image West's model animation needs. This involves using d/a converters and custom interfaces to run stepper motors and servomotors for motion control setups. Stepper motors will usually be used to rotate models being photographed, while servos control camera pan, tilt, and zoom. The motion control program allows for up to eight different channels, thus controlling eight different steppers and servos at once. The operator can select which channels he wishes to use.

Time Is Real. Traditional film animation takes a certain kind of personality, a particular state of mind—"nuts" is an adjective commonly appended to the animator. A long apprenticeship, ridiculous hours, and the incredible tedium of redrawing the same image over and over in near-imperceptibly advancing stages of movement . . . this has long been the animator's lot.

Image West doesn't mess with this. Electronic animation avoids the problems of film animation, while presenting a few of its own.

"You can do cel animation electronically," says Ryan, "but after you first draw it out, you have to record it on videotape a frame at a time as opposed to recording it on film a frame at a time. With videotape, we do it in real time. That means you have to produce it at the the same rate at which you see it on television. That's what real-time-television video is. With the Apple, we can control the speed at which an image is written onto the screen, the speed at which a sparkle moves around the screen. We put the Apple's (nonstandard NTSC) signal on our Scanimate, which has a 1,000-line black-and-white resolution and can run at any rate. Scanimate takes the Apple rate and performs a standards conversion to American television standards, making a reasonable picture out of it that can be rephotographed. A TV camera photographs that image and puts it out at broadcast-quality rate."

The video camera, running at the normal NTSC rate, takes care of the difference in speed (the Apple puts out an image at twenty frames per second, recorded to tape at thirty frames per second), and the Scanimate takes the picture up to the minimum-broadcast-quality 525 line of resolution that the Apple can't quite manage. At that point, if the animator is using the write-on program, he can take a black-and-white matte and fill it with any color he wants, or fill it with another image using a video switcher mixing device.

Most of the day-to-day work at Image West is done by art directors and animators. They figure out what they want to do, and if it includes something the Apple can do, they'll come to Jim Ryan and ask for a specific program to be written. Art director Sonny King, knowing what he has to get across in a thirty- or sixty-second spot for *Monday Night Baseball* (opening title, location, stadium name) will draw up the storyboards breaking down the elements of the action—background, foreground, and everything in between; what portion will be titles—or will adapt a storyboard brought in by a client to the kind of images that can be generated by the equipment available at Image West.

"In the past," recalls animator Peter Koczera, "you had to have an animator there when the client made the proposal because the art director might accept something in a design that was technically impossible to do. Today, the art directors take care of that preproduction work and are familiar enough with the process that they know what we can't do."

When he gets the storyboard, the animator lays down tapes on different machines and plays them back, mixing the images with a video switcher. One machine may have a background roll with prerecorded elements; another machine will have the title key roll with titles over black. When all elements are satisfactory, the switcher keys the black out and inserts the background. In order to make one background, they may run five machines three or four times, adding a layer of imagery each time.

"It's like working backward," says Koczera. "You say, 'what do I want my final picture to look like; how can I break that down into elements; how can I break those elements down to fit four machines?' and work backward from there. I just use a flow chart or 'map,' which tells me where I should be when I've finished totally compositing a scene."

Koczera starts with the background so he can get all the color,

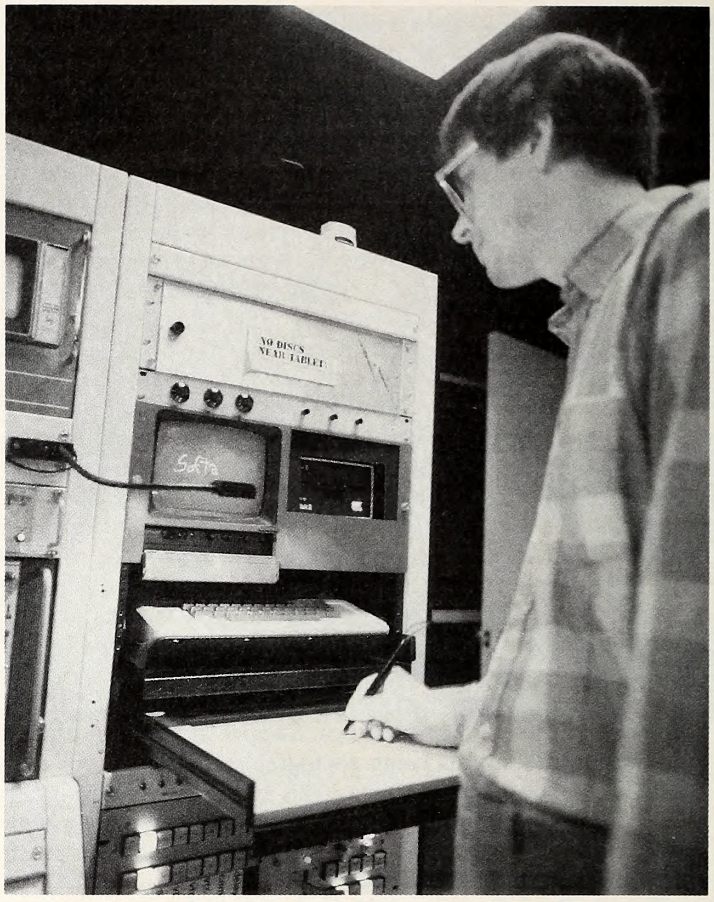
movement, and timings in, so that any other element put on top of that can be seen over a completed background. He leaves his flow chart with King or the client, trying to leave himself flexible enough with his machines to accommodate on-the-spot creative decisions.

Clients viewing the work in progress can get frustrated seeing only different elements of a scene for hours. It can take three or four hours for Koczera to create a completed background, and in the meantime the client only sees pieces of it and has to be able to imagine what the rest of it is going to be like.

"Cubes are very big," muses Koczera. "The ADO cube is four panels of rotating raster with some kind of live action or animation on them. We have a program that does the math and figures out where the cube should go and what size it should be. They're very popular with clients; lots of people want them."

"Usually we just use the programs we've got—motion control, sparkles, and write-on," says Ryan. "All the programs are user-friendly enough that our creative people are reasonably successful in using them. They're written so the art directors can use the computer: They can bring up a program and enter points for a write-on, or actually do a write-on and enter points for where the sparkles are supposed to be, or for moving the camera or prop around for motion control."

See the Games Begin. The company's latest work has consisted mainly of opening credits for a lot of the TV shows that started last season and weren't renewed (the *We Got It Made* opener is theirs, and the updated opening for *9 to 5*). They have supplied graphics for the Winter Olympics and *Monday Night Baseball*, and are currently working on the opening of Hal Linden's new show, *Second Edition*, but Image West's biggest job at the moment is in fulfilling the job requirements of its recently won title of Official Electronic Broadcast Animator of the 1984 Olympics.



Animator Peter Koczera demonstrates a basic write-on.

Their task is to provide the introduction for the Olympics telecasts, plus graphic introductions for each individual event, usually an animated Sam the Eagle bicycling, canoeing, and so on. The work is being done for ABC but will be available for international networks as packages of animated titles and intros. ABC, as the host network, will send all its signals to the international television center, and each country's broadcasters will choose which signals they want to use and beam them to their country for broadcast. Here or overseas, they'll be able to combine the Image West package with the raw signals for a finished show (Olympics ID: "The Summer Olympics from Los Angeles, California, U.S.A. Today: the pentathlon"). The animations can be used at the beginning of coverage for a particular event, or with edited highlights of particular events.

Animating All Over the World. "The Olympics have been a large part of our business for the first part of this year," says Ryan, "but we're still handling the new TV show openings, and as for our clients from Brazil, Argentina, Mexico, Italy, Spain, France. . . . What they're looking for, they can't get at home. Some of the more sophisticated animation is still done in the United States. In the electronic effects field, there isn't too much work done in just pure electronic (video) animation. And electronic animation tends to be less expensive than film animation.

"We use the Apple wherever we can in our productions," says Ryan, the keeper of the micro flame since Robert Weinstock's departure from Image West. "Wherever it fits in, and any time we come up with a new effect, something the Apple could be used for, we'll go ahead and use it as a piece of our effects system." ■

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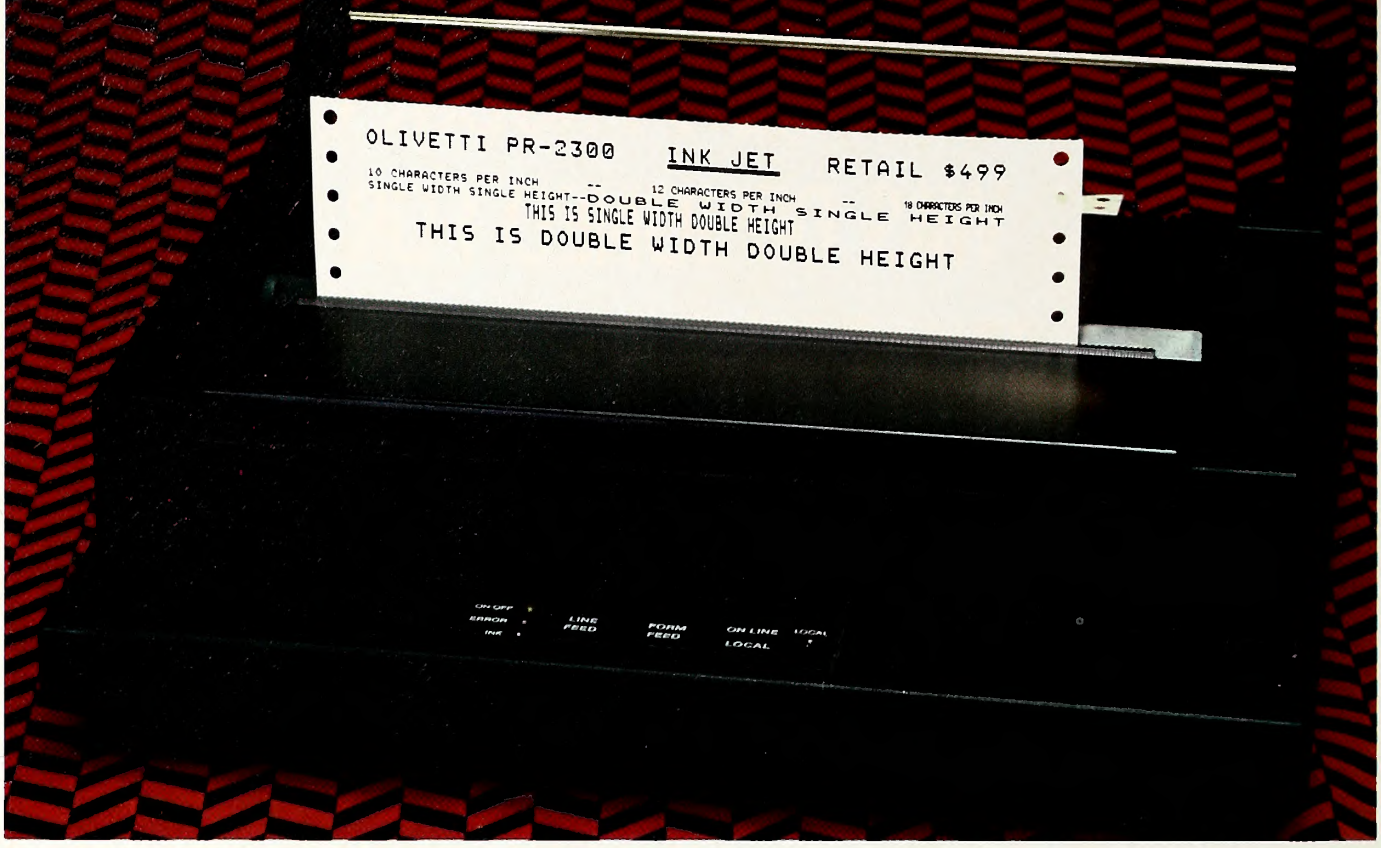


Here's Olivetti's $499 state-of-the-art, dry ink jet, plain paper printer. It prints up to 110 characters per second. You can use it with virtually any home or office personal computer. Price slashed to $199.

By Drew Kaplan

Energize your computer. I've energized my Apple, but you can add super graphics and text capabilities to just about any personal computer you own.

Now you can literally turn your computer into an electronic paint brush with this revolutionary new Ink Jet, graphics capable, plain paper printer.

And look at this! In addition to great looking 'correspondence-quality' upper and lower case text, simple 'ESC' commands allow you to mix normal size text with double height and/or double width characters. You can even underline words three different ways.

You'll have all 96 standard American ASCII characters for your text. Plus, you can print in any of the 8 foreign languages whose characters are resident in this industrial office quality printer.

I've been using a daisy wheel printer with my Apple, but this Ink Jet printer is 3 times faster, whisper-quiet, and it allows me to produce phenomenal graphics.

You'll experience the thrill of actually writing your letters and reports on your computer. Now you'll be able to use all of your computer's word processing and correcting capabilities.

I can't overemphasize the convenience of never having to retype a letter or a long report because you find a mispelled word or a sentence you'd like to change. Wow, think of the time you'll save.

This printer connects to your computer through its standard Centronics parallel interface. So, whether you have an Apple or an Atari (as I do), an IBM PC, a VIC 20 or anything in between, this is **the one** printer for you now and in the future.

THE PRINTER YOU'LL KEEP

This printer's sophisticated features and industrial dependability would normally make it too expensive for home use.

It was designed for heavy industrial work such as printing thousands of address labels. And, its super-fine graphics are perfect for scientific work.

The printer lets you use all types of paper. It comes with adjustable pin-feed tractor drive for fan-fold computer paper. It also has friction feed for single sheet paper (like your letterhead). And it has roll supports for continuous roll fed paper.

So, while you may upgrade your computer in the future, once you've tried Olivetti's whisper-quiet Ink Jet printer, you'll simply plug this printer into any new computer you buy.

And, if you already have a slow daisy wheel printer like I did, a thermal or even a dot matrix printer, when you compare the speed, graphics capability and dependability of this printer, you may just plug in both printers.

Plus, if you carry a briefcase-type portable computer, at DAK's $199 super close-out price, you can now have printers both at home and at the office.

FINEST GRAPHICS

Wait till you see the graphics capabilities of this printer. Ink Jet printing allows for solids and detail simply not possible with conventional dot matrix printers.

You can copy words or pictures from disks or memory. Or, you can dump what's on the screen onto paper. Think of what you can do with a Koala Pad.

And, look what this printer will do. You can double the size of your graphics by using the Zoom command. You can turn the image with a rotation command. And you can even reverse (negative image) your graphic image.

You can do **any** or **all** of the above commands and more, as many times as you wish from the same screen dump.

With an incredible 110 point per inch horizontal resolution and 216 point per inch vertical resolution, Olivetti's Ink Jet technology leaves virtually any conventional dot matrix printer in the dust.

INK JET PRINTING EXPLAINED

Forget everything you've heard about dot matrix printing. Ink Jet printing is light years ahead.

This Olivetti printer at only $499 is the world's first low cost (under $3000) non-impact printer that uses plain paper.

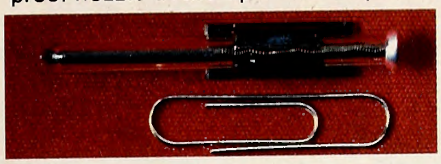
There's no heavy print head containing steel pins that are mechanically driven out against a ribbon that in turn strikes your paper and the rubber platen roller.

Since there's no ribbon to fade and wear out or platen to become hard or irregular, you won't experience the variations and inconsistencies associated with conventional dot matrix printing.

The Olivetti Ink Jet printer head consists simply of a low mass microprocessor controlled disposable glass ampule containing dry ink.

There is an electrical contact at the

back of the ampule, and a minute jam-proof nozzle at the tip of the ampule.



The technical name for the printing process is 'Spark' Ink Jet, because wherever a dot is required to form a letter or graphic design, an electrical arc blasts a dot of carbon out of the ampule and fuses it to the paper

The process is incredibly fast, accurate, and except for the crackling sound of the arc itself, virtually silent.

Plus, you'll have continuously variable electronic control of the dot intensity. A volume-like control lets you vary the amount of power supplied to the arc at the print head. So, you can print very light, very dark or anywhere in between.

You can forget the 65db to 85db oppressive sound of other dot matrix printers, Ink Jet printing is whisper-quiet. So, you can use this printer while you talk on the phone or in a crowded office.

You can forget messy ribbons. Each inexpensive (less than $2) glass ampule will print about 150,000 perfectly identical characters. Then just pop in another ampule and get back on line in seconds.

And, unlike ribbons which fade with use, the first dot from an ampule will be identical to the last.

ALL THE EXTRAS

Reviews have said this printer is more durable than most commercial systems.

You'll find all the extras. Its printing is bi-directional for maximum speed and life. It seeks the shortest printing path, not going to either margin extreme unless there are characters to print.

Simple 'ESC' commands let you print at 10, 12 or 18 characters per inch up to a full 8" width. Choose variable vertical spacing, or fixed 6 or 8 lines to the inch.

You'll have a full 1K buffer with overflow protection. And, you'll have a printer self-test and configuration print out on demand. Of course, there are 'Line Feed' and 'Form Feed' buttons. And, form length is programmable.

Olivetti's Ink Jet printer has an extremely small footprint that makes it ideal for office or home use. It is just 15⅓" wide, 4½" high, and 10½" deep.

WHY SO CHEAP

Olivetti's office products division introduced this industrial quality Ink Jet Printer last April to rave reviews.

At its $499 suggested retail price, they said: "The printer is priced lower than most comparable printers on the market today, yet it far outperforms its most fierce competitors. . ."

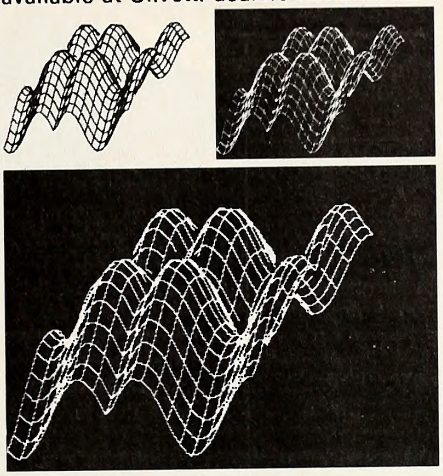
But, you can forget the $499 almost comparable printers. At DAK's $199 super close-out price, you'd be lucky to find a thermal printer that requires expensive special paper.

Olivetti USA is now controlled by Docutel, the people who make the electronic bank teller machines. There's been a major change in management and sales people.

Since Docutel is into massive printers and the like, they simply aren't interested in this inexpensive $499 printer.

DAK bought all 12,000 that Olivetti had. So, you can have an inexpensive $499 printer for just $199, complete with a standard Olivetti limited warranty.

And, don't worry. Thousands of these printers have already been sold at retail. Of course, Olivetti guarantees that the standard Ink Jet ampules are and will be available at Olivetti dealers nationwide.



Just plug-in and start printing these characters
abcdefghijklmnopqrstuvwxyz0123456789!#$%&'()*+,
-./:;<=>[]^ABCDEFGHIJKLMNOPQRSTUVWXYZ

With this printer you can alter your graphics as you desire. I actually produced the graphics and characters above on this printer. (They're shown at 44% nomal size to fit in this catalog). The top left is normal, the top right is reversed and the bottom is double size and reversed. The text above shows the alphabet, but check all the sizes I printed in the main picture to the left.

COMPATIBLE COMPUTERS

Any Computer with a standard Centronics parallel port, such as: **Apple, Franklin, IBM PC, TRS80, Osborn, Atari, Commodore VIC 20, Commodore 64, Kaypro and, virtually any other personal computer. Plus, most briefcase portables.**

FEAR OF INTERFACES?

Your computer is smart. But, it doesn't know how to 'talk' to other devices. That's why you need an interface.

An interface isn't just a simple cable. It's actually an intelligent translator that lets your computer talk to another piece of equipment.

Usually the computer manufacturers don't include the various interfaces when you buy your computer, because they don't know if you'll ever add peripherals such as disk drives, printers or modems.

So, rather than sell you something you don't need, you don't buy an interface until you add onto your computer.

There are two types of printer interfaces. The first allows you to do text word processing. For 99% of computer use, this is all that is needed. It translates all the possible letters and punctuation known as ASCII. Olivetti's printer understands all 96 possible American characters plus 8 foreign languages.

A second type of interface also allows you to dump pictures or graphics from your screen or memory. This is more complicated because every dot must be told where to go. This interface, or 'driver program' as it is called, is available in two forms. Built into an interface card, or as a program on a disk which you use in conjunction with any standard interface.

Either way, you'll have the printer operating in just a few minutes. And if you already have a printer, the same Centronics parallel interface and cable (about 85% of all printers are compatible) should work with this printer.

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Now we can all have printers with our computers. If you've got a VIC 20 hiding in the closet, you can now have a real word processer. If you've got an Apple or IBM PC, now you can have almost silent 110 character per second printing.

Now you can print out your programs, your notes or your letters. If you're not 100% satisfied, simply return the printer and any accessories in their original boxes to DAK within 30 days for a refund.

To order Olivetti's Ink Jet 110 Character Per Second Plain Paper Printer with Traction Feed, Friction Feed, Roll Paper Mounts, Dust Cover, Full Instructions and 4 Ink Jet Ampules (600,000 characters) risk free with your credit card, don't send the $499 suggested retail price.

Don't even send the $312 August 1983 dealer price. Send just **$199** plus **$8** for postage and handling. Order Number 9875. CA residents add sales tax.

Boxes of Ink Jet ampules are available for just **$6.50** ($0.50 P&H) per box of 4 (600,000 characters). Order No. 9876.

Standard Centronics interfaces are available at any computer store for your computer. Below are our favorites for 5 of the most popular computers.

For your Apple. We have Practical Peripherals' text interface for just **$49** ($2 P&H) Order No. 9877. We have their graphics capable interface for just **$79** ($2 P&H) Order No. 9887. If you have a Centronics parallel interface, we have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 9878.

For your IBM PC, you don't need an interface. It's already built-in. But, you do need a cable. We have a cable, ready to connect this printer to your computer, for just **$19** ($2 P&H) Order No. 9879. We have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 9880.

For your Atari 800, 800XL, 400, or 600XL, we have a text interface for just **$69** ($2 P&H) Order No. 9881. We have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 9882.

For your Commodore VIC 20 or 64, we have a text interface for just **$39** ($2 P&H) Order No. 9883. We have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 9884.

For TRS 80 computers, you don't need an interface, just a cable. We have a cable for **$18** ($2 P&H) Order No. 9885.

For **briefcase-type** portables, the Centronics interface is usually built-in. Just stop by any computer store. All Centronics printers use the same cable at the printer end, but you'll need a cable that fits your particular computer's plug.

Get hard copy print outs of your programs or your graphics. Turn your computer into a powerful word processor. Forget retyping ever again. And forget Olivetti's $499 suggested retail price!

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Softerm 2 connects you with your company's computer.
This expanded version of Softerm lets you gain access to the information stored in your company's main computer from your home or office. With either version of Softerm, you can down load information into your Apple and capture it on your own disk in any format you choose—DOS, CP/M®, or Pascal. Also included with Softerm is a source program for your host computer to ensure compatibility with Softerm's file transfer capabilities.

Makes your Apple work exactly like any major terminal.
Softerm 2 provides complete emulation of these terminals: ADDS Regent 20, 25, 40, 60; ADDS Viewpoint; Data General D200; Datapoint 3601; DEC VT102, VT52; Hazeltine 1400, 1410, 1500, 1520; Hewlett-Packard 2622A; Honeywell VIP7205; VIP7801, VIP7803; IBM 3101 Model 10 and 20; Lear Siegler ADM-3A, ADM-5 and TeleVideo 910, 925, 950. And the list is growing all the time. We'll send you a User's Guide, handy reference card, and a telephone number to call if you need more assistance.

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BBSs: Best of All, They're Free

This month's column is dedicated to Mike Tarrani and everyone else who gets tired of hearing about how spiffy and wonderful the commercial information utilities are.

Most of the articles written about CompuServe, Delphi, and The Source probably have had a lot of glowing things to say about how they're the way of the future and that they're convenient and full of useful information. Well, the truth is that they are all those things, but they also cost more than a lot of us can afford.

In addition, most of us will very rarely or never use a lot of the services offered. For example, how many subscribers actually use The Source's restaurant and hotel guides or its guide to New York City? An $8 guidebook that you can keep for future reference is a lot more practical than an hour on-line at the non-prime-time $7.95 hourly rate.

Services that information utilities offer are indeed useful, but a lot of them just aren't worth the cost when you compare them to off-line alternatives such as books, commercial software, newspapers, travel agents, and local retail stores.

A popular feature of information utilities are their communication sections, which offer forms of electronic mail, bulletin boards, conferencing, and chatting. Computer communications offers a fascinating and fun way to "meet" people you would normally never meet. But you don't need a subscription to one of these services to take advantage of computer communications.

The alternative is a bulletin board system (BBS). There are BBSs in virtually every community, and they're free.

Waiting by the Phone. For newcomers to the modem world, a bulletin board system is a modem-equipped computer that's set up to let other people connect to it with their computers. Most of the time, the BBS is set up on a microcomputer in a person's house, as opposed to a business (some BBSs are still run on mainframes). Generally, BBSs let callers read and post messages, download programs, and exchange private "mail" with other callers. Of course, particular functions are subject to the whims of the sysop (system operator).

BBSs come in various species, for lack of a better term. That is, many of them are run by the same kind of software, so that if you're familiar with a particular kind of BBS, you'll be pretty familiar with almost all BBSs of that kind across the country. Commands for all ABBSs (Apple Bulletin Board Systems) are the same, commands for all PMSs (People's Message Systems) are the same, and so on.

No one can agree on the number of BBSs operating across the United States and in Canada, because new ones are springing up each day, while others fade away, curl up, and die silently. Some estimate the number of BBSs to be about eight hundred, while others say there are twice that many. As they used to say of movie theaters, "There's one near you."

What follow are brief descriptions of some of the popular BBS genres. Unfortunately, some of the best boards are run on computers other than Apples, which means if you become hooked on one and decide to start one yourself, the software might not be available for your Apple. At the same time, there are other superb boards that are Apple-based.

CBBS (Computer Bulletin Board System). This is the one that started it all. CBBS was set up on February 16, 1978, by two guys from Chicago named Ward Christensen and Randy Suess. No one had even heard of a BBS until this one went on-line. According to its creators, CBBS was conceived during a phone conversation between Christensen and Suess exactly one month earlier.

What they had in mind was a system that would provide message communication between computer hobbyists. CBBS messages typically list things for sale, pleas for help on computer-related matters, and notices of club meetings. Christensen and Suess don't really care what's posted on the system, as long as it's clean and related to computer hobbyists.

CBBS isn't the most sophisticated kind of board around, but it is the foundation upon which other boards were built. The original CBBS supports 300- and 1200-baud rates and can be reached at (312) 545-8086. For those who can afford it, try the CBBS in London, England. You'll be surprised to see how many North American callers it gets. (044) 1 399 2136.

RCP/M. As its last three initials indicate, this is a board primarily for people interested in CP/M, but anyone can log on, regardless of operating system. Of the different kinds of boards, RCP/M boards number the most, and not all of them are built around the same format. The basic format is that of message exchange, with no private mail function. But that doesn't mean you have to go trudging through all the system's messages just to find those that are addressed to you (though you'll probably want to look at all the messages anyway). RCP/M software lets you pull out and read at once all messages addressed to you; to save time, you can also have the system automatically display messages that were posted since the last time you called.

Message exchange isn't the strong point of RCP/M; it's the software download section that's the real meat. From the BBS command prompt, *bye* or *CPM* will take you off of the board and put you directly into the system. From there, you can issue the *dir* and *type* commands; the commands for renaming and erasing files, *ren* and *era*, aren't available, for obvious reasons.

Depending on how many drives are installed in a particular RCP/M, the *dir* command can become quite complex, especially for people not familiar with CP/M. In addition to the regular *dir*, *dir filename.typ*, and wildcard commands, some RCP/Ms have a multidisk multiuser area search and library display function. For example, RCP/M RBBS DataTech 001 (San Carlos, CA), which uses four disk drives, has implemented several options to ease the

search for files.

The type command works just as it does on your own computer if you have CP/M; typing *type mboot.doc* or *type newuser.txt* will display the contents of that file for you to read or capture in the buffer. Reading files is fine and good, but you're not considered a real CP/Mer unless you demonstrate the ability to download and upload software to and from your own computer. First, downloading.

There are two ways of downloading programs and files from an RCP/M system. The first is called ASCII capture. If the communications program you use can save information to a buffer and then put it to disk, then breathe easy. Opening the buffer, typing *type filename*, and then saving the buffer to disk is all it takes to download an ASCII file. Non-ASCII files, however, can't be downloaded this way.

The other way of downloading is by using a terminal program that employs the Christensen protocol. If your terminal program doesn't use it, you can still download programs by first downloading from RCP/M the ASCII file called Mboot, which, when executed, allows you to download other, more elaborate modem programs such as Modem 712 or Modem 790.

To upload or download, RCP/M uses a popular program called Xmodem, which incorporates the Christensen protocol. Typing *xmodem*, with no other information, activates the program on RCP/M. From there, it's pretty easy to figure out. The R and S commands tell Xmodem whether to receive or send a program; remember, R tells RCP/M to receive (you're going to send) a program.

High costs of magazine paper prevent us from listing the different kinds of programs found on RCP/M systems. It's sufficient to say that the vast selection of Basic and assembler programs, text and library files, and document files should be enough to satiate CP/Mers for quite some time. Again, the amount of information available on a system depends on the available storage space. Some use as few as two disk drives, while others boast hard disk storage.

The best advice is to save up a lot of money, call any of the hundred or so RCP/M BBSs around the country, and build yourself a nice big library of CP/M software to impress your friends with. Sysops of RCP/M boards tend to be die-hard computer hobbyists (don't be surprised to find that some run their BBSs on mainframes), and quite a number of their systems can accommodate 1200-baud rates (Vadic, 212A, or both), which should help keep your phone bill down.

RCP/M RBBS DataTech 001 is the original RCP/M; it's owned and operated by Cro's Nest II (San Mateo, CA), to which all calls are forwarded. DataTech 001 is on-line twenty-four hours a day at 300/1200 baud. (415) 595-0541. Cro's Nest II can be reached at (415) 341-9336.

PMS. Don't even think that this might have anything to do with monthly physical states. It doesn't. PMS, for People's Message System, is a sophisticated BBS that is extremely easy to use, even for novices. Despite its facility, PMS also offers high-level features for experienced users.

Messages left on the system may be public; semiprivate, so that only the person to whom they're addressed may read them; or completely private, so that people can read them only if they know the password used when the message was entered. The last option is handy for leaving a private message for a group of people.

A regular part of PMSs is the features and articles section, which allows the sysop to set up files that can contain any type of information. Features typically include brief programming tips, lengthy technical articles, software reviews, reprints of news items that might be of interest to callers, program listings, humorous stories, and other notices that are too long for the message section or that are untimely enough to warrant being permanently available to callers.

Another section of PMS is the General section, which allows callers to upload and download programs of all types. The General section can be made available to all callers, to only those who hold password accounts, by separate password only, or other combinations. It usually requires the system to have a separate disk drive dedicated to storage of General data only. The upload buffer holds about 21K, or 800 lines of up to 160 characters per line, which should be enough for most files.

PMS operates on an Apple II Plus with two disk drives. It's meant to be used with a Hayes Micromodem, so the software supports only 110 and 300 baud. Although it runs on as few as two disk drives, a PMS can be expanded to almost any configuration supported by the Apple itself, including eight-inch drives or hard disks.

Some of the extras built into PMS include scan and quickscan modes that let you flag messages for later retrieval, a selective retrieval mode that allows you to specify any type of data in the message header (to, from, subject, date, and so on), and one of the most sophisticated line editors found on a BBS.

Callers who have established identification passwords have their specifications automatically set up. When a caller with an I.D. logs on, PMS reads the file and configures to the caller's parameters, such as upper or lower case, linefeed, line length, system parity, system prompt, clear-screen character, and last message read. In addition, callers also have the luxury of using R! and S! commands, which read or scan all messages since their last call.

If you have a lot of time, try out the O command, which displays a national listing of more than six hundred BBSs. If you don't have a lot of time, you can get a list of boards in your area by typing *O;(xxx)*, where xxx is the local area code; or you can get a list of any specific type of board. For instance, to list all PMSs, you'd type *O;PMS*. To list all RCP/Ms, you'd type *O;RCP/M*. And so on.

One feature that deserves special mention is PMS's built-in censor. Sysops can build their own files to contain all words and phrases that they don't want on their systems. Every message saved to disk is checked against the file; if any matches are found, the message won't be saved. As PMS author Bill Blue puts it, "It is unfortunate that such a file must exist, but we have to relate to the real world. . . ." So true.

PMS #1 (Santee, CA) operates on four Micro-Sci A70 dual-density drives. (619) 561-7277.

Bullet-80. This is probably the closest thing to PMS that's not run on an Apple or some kind of mainframe. Bullet-80 even has some features not available on PMS. If you have any friends armed with TRS-80s who want to set up their own BBSs, you might suggest they look into Bullet-80.

Beyond the usual bulletins, messages, and chat functions, Bullet-80 also offers uploading and downloading of software. Of the four protocols of file transfer, Apple callers can use the xmodem and standard ASCII modes of transfer. However, since it is run and used primarily by TRS-80 owners, the available software tends to serve that audience.

Bullet-80 offers games for callers to play. Because of the games' level of simplicity, it might not make too much sense to be playing *Oregon Trail*, *Scramble*, or *Jumbles* when you could easily be having much more fun off-line with *Zork*, *One-on-One*, or the microwave oven. But remember, the games on Bullet-80 are free. Strangely enough, you might find yourself wanting to try those insipid BBS games "just one more time." Unlike some games found on subscription services, games on Bullet-80 respond fast to input, since there is only one person on-line at a time.

Other Bullet-80 features include an extensive list of other BBSs, a personal ad section, club functions, and, depending on the sysop, electronic shopping by credit card.

Joe Simon's Bullet-80 in Anaheim, California, can be reached at 300 or 1200 baud by calling (714) 530-4765. On the East Coast try the one in Boston, which also accepts 300- and 1200-baud callers, at (617) 266-7789.

P.dBMS. It stands for People's d.Base Message System, which is written in a combination of d.Base high-level programming language and Z-80 machine code. That P.dBMS is closely related to PMS in design and philosophy is no accident; the software was written by the same author, Bill Blue.

It's not really fair to include P.dBMS in these capsules of BBSs, since the software for it isn't commercially available . . . yet. But it deserves mention because if the functions of P.dBMS are any indication of the direction BBSs are taking, we're going to be in for some pleasant surprises in the years ahead.

The first P.dBMS went on-line in Lakeside, California, in September 1983. The only other one is operating in Aurora, Colorado, and is run by *ASCII Express: The Professional* coauthor Mark Robbins.

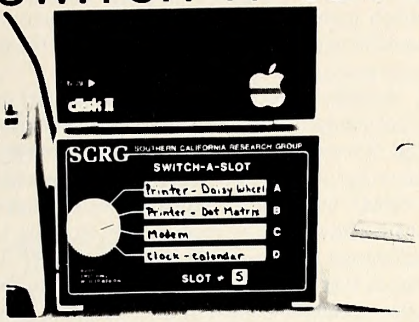
P.dBMS consists of six message bases, each with a different purpose:

Base 1. General topics, for sale, wanted.
Base 2. Conferencing, discussion, specialized topics, private mail.
Base 3. Game board for *Dungeon* gaming.
Base 4. Another game board for *Dungeon* gaming.
Base 5. Private section for technical discussion. By invitation only.
Base 6. Private section mail for software design and development. Exclusive.

There aren't any software uploading/downloading sections, but because there's virtually no limit to message length, it's possible to up-

SCRG

SWITCH-A-SLOT



The **SWITCH-A-SLOT** is an expansion chassis, which allows the user to plug in up to four peripheral cards at one time. One of these cards is selected for use, and only that card draws power.

This product is especially useful where the software requires the printer to be in a particular slot, and the user wishes to choose between two or more printers.

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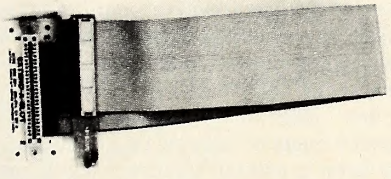
EXTEND-A-SLOT



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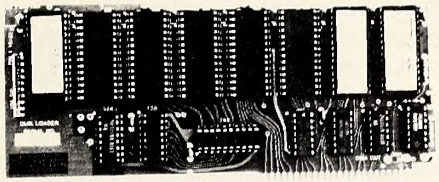
quikLoader™



Designed by Jim Sather

SPEED

The quikLoader is the *fastest* way to load programs, ***BAR NONE!*** Applesoft, Integer, or machine language programs can be loaded in fractions of a second. More importantly, DOS is instantly loaded every time the computer is turned on. Integer is even loaded in the language card. This process takes less than a second, saving valuable time. The quikLoader operating system can keep track of over 250 programs stored in **PROM**s (Programmable Read Only Memory). The user simply transfers any of these programs to PROM using the instructions packed with the unit, and any PROM programmer, or we will provide this service.

CONVENIENCE

How many times have you started to work with a frequently used program, only to find that you have misplaced the disk, or worse, had the disk damaged, or the dreaded "I/O ERROR" message flash on the screen. With the quikLoader, these nightmares can be a thing of the past. Frequently used programs are available *instantly* when you need them, without having to look for the disk, or hoping that the lengthy disk loading procedure goes smoothly. If you do need to use standard disks, the quikLoader even speeds up that process. For example, to catalog a disk, just press ctrl-C Reset. To run the "HELLO" program, press crtl-H Reset Other "one-key" commands include entering the monitor, booting the disk, calling up the mini-assembler, etc. The major difference between the quikLoader and the other ROM cards is the complete operating system (in PROM). This enables you to get the quikLoader catalog on the screen (by pressing ctrl-Q Reset), allowing you to see what programs are available. Loading or running of the desired program requires one keypress. Program parameters, such as starting address and length of machine language programs can be seen on the catalog screen, if desired.

VERSATILE

The quikLoader will accept any of the popular PROMS available on the market, 2716, 2732, 2764, 27128 and 27256. These types may be freely intermixed on the card. Long programs can take up more than one PROM, or several short programs may be stored on one PROM. The quikLoader operating system even handles multiple cards, so you can easily double or triple the amount of PROM memory available. The ultimate memory capacity of one card is 256K, so many frequently used programs and utilities can be stored. We even start your library of programs with the most popular utilities on the card, FID and COPYA. Now, if you have to copy a disk, you don't have to search for the master disk. You can start copying within 3 seconds after turning on the computer.

INCREASED DISK CAPACITY

Since DOS is loaded from the quikLoader every time the computer is turned on, it is not necessary to take up valuable disk space with DOS. This will give you more than 10% additional space for programs and data on your disks.

SYSTEM REQUIREMENTS

The quikLoader plugs into any slot of the APPLE][+ or //e. If used in a][+, a slightly modified 16K memory card is required in slot 0. A disk drive is required to save data.

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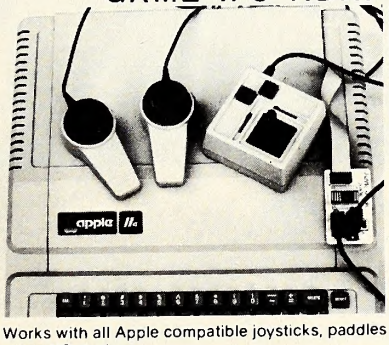

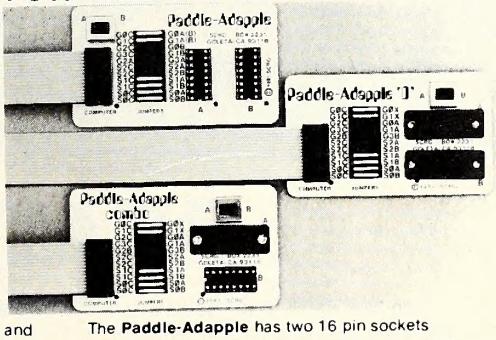

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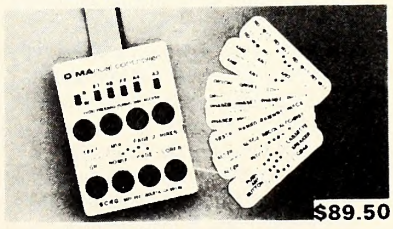

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load program listings as messages for others to download. Recently, a caller posted MBasic program listings for some public-domain Macintosh programs. The resulting "messages" were several hundred lines in length. Thank goodness for 1200 baud.

In addition to the basic functions of PMS, P.dBMS also includes the powerful capability to receive forwarded mail. On this and other systems, there are two ways to send a message. You can type it in while on-line, tying up the line for others, or you can prepare the message off-line, log on, and then upload the message after inputting the appropriate message headers. As a third option, P.dBMS lets you prepare messages off-line and then upload them without ever logging in. Huh?

After the modem connection is made, callers have about three seconds to type a control-E, which stops the system from beginning the log-in process. At that point, callers upload as many messages as they want, all strung together. Each message begins with a header that starts, "P.DBMS MESSAGE," which tells the system that what follows is a message.

P.dBMS reads the header information (the name of the person the message is being sent to, who is sending it, the sender's location, subject, and on which message base to post it), parses it, and sends the message to addressees on the appropriate message bases. At present, it's a one-way operation (receive only), but plans for the system include forwarding to other, similar host computers. Mail forwarding, as it's called, speeds up the process of uploading messages, which means more time that the system is available and allows callers to use their favorite word processors to prepare messages.

Another bonus is that in case the carrier tone is accidentally lost (because of Call Waiting, Call Forwarding, someone tripping over or chewing on the phone cord, or whatever), P.dBMS includes a command called *recover*, which allows you to recover any message you had started at the time the carrier was lost. The trick is that you have to call back immediately. After reentering the To: and Subject: fields, typing *.recover* reinstates what you had written up to the point of the lost carrier.

Not too many callers report ever having to use the *recover* command, but it's nice to know it's there if needed. Besides, if you become adept at using the mail-forwarding function, you'll probably never need to use *recover*.

P.dBMS has the potential to be the next step in BBSs. According to the software's author, it can be transported to various kinds of hardware setups. So far, P.dBMS has been run on an Apple III with Microsoft Z-80 card and internal clock, a Victor 9000 (under CP/M-80 2.2) with a Corvus twenty-megabyte hard disk, a Kaypro 10 with an internal ten-megabyte hard disk, and an Apple II Plus with a Personal Computer Products Appli-Card and Xcomp sixteen-megabyte hard disk.

P.dBMS #1 in Lakeside, California, accepts callers at 300 or 1200 baud. The worst time to call is at night. The best time is any morning after watching *Late Night with David Letterman*, so you'll know what everyone else is talking about. (619) 561-7271. P.dBMS#1 in Aurora, Colorado, operates at 300/1200 baud. (303) 755-5380.

It's a Schizophrenic World. Personalities of BBSs differ from board to board, even if they're the same kind of board. One system might be exclusively technical, with no joking or laughing allowed, while another might be set up for the sole reason of exchanging jokes ("Bob" jokes are in; ethnic jokes are out). Still another might be carrying on a discussion about the latest in telecommunication legislation.

The kinds of boards mentioned this month are just a few of many. Next month we'll look at some others. In the meantime, call around, find out what kinds of boards there are, and start making notes. You probably won't have to try hard to find a board of interest. As soon as you notice yourself calling the same board day after day, you'll know you're hooked.

For exhaustive lists of more BBSs than you'll ever be able to try:

The On-Line Computer Telephone Directory BBS Information Exchange (OLCTD BIE) lists BBSs in numerical order, beginning with area code. OLCTD supports 300 and 1200 baud at (913) 649-1207.

PMS-Santee and Bullet-80 (in this column) also list hundreds of numbers.

If you don't care much for dialing long distance, you can find regular updates of the PMS listing on CompuServe MAUG XA4, The Source at Public 112, and most PMS systems. File size is around 43,000 bytes. ❑■

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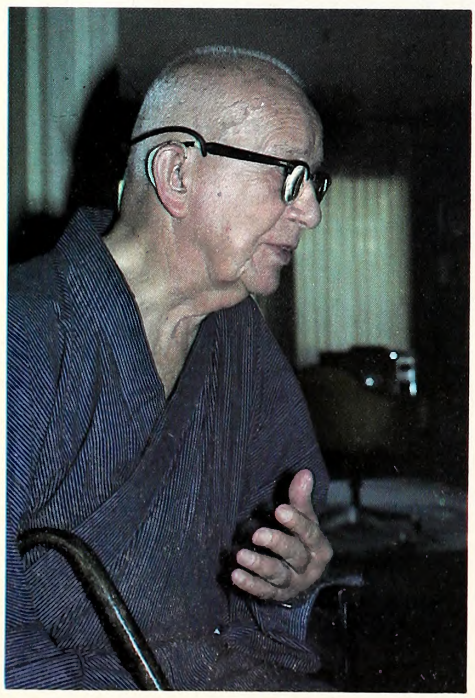
BUCKY'S WORLD GAME SPINS; APPLE EXEC BLAZES WOMEN'S TRAIL

Fuller's Dream Is Coming True: Micro Forum for Everyone's Ideas

Few modern-day thinkers are as concerned with the betterment of our world as was R. Buckminster Fuller. His thoughts ranged from abstract mathematics and the implementation of new and more efficient design concepts to helping find ways to overcome world hunger and war.

Softalk presented an interview with Fuller and an overview of his ideas in January 1982. Fuller had an Apple II system; he believed that micros could help us solve the problems threatening our continued life on Earth.

"Think of it," Fuller said. "We are traveling on a planet, revolving around the sun, in almost perfect symmetry. We are blessed with technology that would be indescribable to our forefathers. We have the wherewithal, the know-it-all, to feed everybody, clothe everybody, give every human on Earth a chance. We dwell instead on petty things. We kill each other. We build monuments to ourselves. What a waste of time . . . think of it. What a chance we have."



Social philosopher, architect, and Apple owner, the late Buckminster Fuller looked to everyone's future.

To make it easier for everyone to understand the life-enhancing options open to us, he formulated the World Game concept.

World Game Not War Games. The World Game is a tool designed to address the issues involved in solving the planet's problems with food, energy, health care, education, clean water, adequate shelter, gainful employment, and cultural opportunities. It couples a global database with an easy-to-use planning approach, educational materials, special workshops, and a world information service. In 1972, the World Game Foundation was formed in Philadelphia to develop the concept further. The World Game Foundation's goal is to bring about a better understanding of global problems and prospects, which will enable more people to be involved in designing solutions.

This is where Apples come in. Fuller saw computers as a means to understand and solve global complexities—an effective way to present major issues to large numbers of people via easily understood graphic representations and maps. When foundation directors Judith Pariseau Holt and Medard Gabel sought help with the project, Janek Kaliczak, a designer of lighting systems and special effects for film and stage productions, came to the rescue.

Kaliczak, who holds degrees in both television and civil engineering, became familiar with Fuller's World Game concept when he organized the first international conference on the geodesic dome, one of Fuller's better-known design breakthroughs.

When the World Game foundation came to him, Kaliczak offered to contact Steve Wozniak directly for help. He had worked with Wozniak on both US festivals; it was Kaliczak at the controls generating the computerized graphics that entertained concertgoers between performances.

For a little over a year now the foundation has been up and running on an Apple III system, complete with hard disk and printer, that was donated by Wozniak personally. All the foundation's office operations, including funding development and promotional mailing, are handled via the computer. The ever-changing database of global resources that makes up the greatest part of the World Game is compiled on the III from research by a multitude of international organizations and from in-house studies. The foundation also finds the Apple invaluable for organizing its international workshops and for marketing its audio-visual materials and publications.

Graphic Solutions. The World Game is still in the preliminary stages. Fuller foresaw that the database used to play the World Game would have to be extensive in order to be realistic; he also knew it would have to be easy for people to interact with. In its present form, the World Game database includes an inventory of the world's natural resources, statistics on the production totals for all life-support commodities in the world, a listing of current technologies at our disposal that could be used to solve problems, a quantification of the global problems that face us, and a catalog of specific strategies that use technology and resources to meet human needs.

At present, a multidisk version of the World Game database exists for the Apple II, with all the information presented country by country, but it's hard to use. What's really needed is a way to present this statistical information graphically on a world map that illustrates the interdependence of all the factors involved.

"Without a graphic presentation, the World Game looks dull, dry, and boring, when it should be very exciting," Kaliczak admits. "In its current numeric and text form, it's very difficult for people to comprehend what the program is doing. Now here's a real game you can play that actually means something. When it's presented as a spreadsheet of world resources by country, it becomes clear that if there's a shortage in one part of the world, another part of the world will be affected. So far there's nothing like it up and running on a micro; it permits people to make up their own minds about what's happening economically in the world."

Kaliczak expects to have a hi-res version of the World Game database ready later this year, in spite of the graphics limitations he encountered in attempting to implement it on the Apple II.

"With the normal Apple II resolution certain things are impossible, but the IIe's double hi-res mode makes it look a little more promising, especially with the additional color."

Then there's Mac.

"The Macintosh may be *the* World Game machine," says Kaliczak. "There's so much data on the database that I doubt an Apple II would ever be completely satisfactory. What I envision is using a spreadsheet that's currently available for the Mac and large enough to handle the entire database. I think the World Game should be up and running on both the Macintosh

and the Apple II."

Bucky's World. The object for players of the World Game was stated best by Fuller himself: "To make the world work for 100 percent of humanity in the shortest possible time through spontaneous cooperation without ecological offense or the disadvantage of anyone."

Fuller died believing this to be a viable and necessary goal. The World Game remains as his legacy to us, a reminder of our shared responsibility that he so keenly felt.

Jean Richardson Shines as She Polishes Apple's Image

In March 1981, *Softalk* featured Jean Richardson in the Exec Apple spotlight. Since that time, Richardson has gone from being marketing services manager with a staff of twenty to being the director of Apple's marketing communications department with more than a hundred people working under her guidance.

Richardson's role has broadened, though her department's focus remains the same. "When I had a staff of twenty it was like working for a small company. Now Apple is a Fortune 500 company and the responsibility is enormously increased," she says.

"I used to be a lot more involved in implementation. Now, rather than just managing people, I'm involved in strategic issues as part of the decision-making group."

Communication and Cooperation. The department that Richardson directs is responsible for the corporate image as it pertains to all Apple products, as well as for the company's visual image. The marketing communications people deal directly with Apple's outside public relations and advertising agencies in a kind of partnership, working on promotional objectives together, although the department itself doesn't produce any ads.

"We do develop materials for dealers to use in our cooperative advertising programs," Richardson explains, "such as print, radio, and television ads they can place in their particular markets. We also develop things like brochures, pamphlets, posters, and counter cards and displays—all kinds of tools to help dealers promote Apple products in their stores. We're responsible for anything that is involved with their selling to the consumer—direct mailings, warranty programs, trade shows, and so on." In the international area Richardson also directs agencies and marketing communications organizations that Apple relies on around the world.

It all started for Richardson about the time her kids were growing up and becoming less dependent. She had taken a secretarial job at a local college but it lacked challenge. Seeing a newspaper article about Apple, she decided to seek work in this new industry that looked so promising. Richardson was hired as a secretary when Apple still had only a skeleton staff of engineers and manufacturing people; and it was a company open to change and quick to recognize talent. When Mike Markkula, then vice president of marketing and chairman of the board, offered her the job of marketing services manager, she jumped at the chance.

"I couldn't have found myself a job more closely related to my interests," she recalls.

Period of Adjustment. Richardson recognizes a decided change in Apple's direction since she began working there, and she's had to adjust her department's way of operating to fit the company's changes in organization. Right now Apple is organized around three marketing groups: the Lisa/Macintosh product division and the Apple II product division—each handling its marketing functions from within—and the centralized marketing group. These three groups decide Apple's marketing strategies, with a lot of direction from president John Sculley.

"In the past there were a number of little groups," Richardson recalls, "so in my department we were always running around trying to develop marketing programs for all these different divisions. It was much less efficient then. Now we can get involved in looking strategically at what needs to be accomplished with the two big product divisions. As corporate marketing communications, my department works closely with the divisions, though we're not a part of them."

Over the years, Richardson has made useful observations about women in business.

"I've found that many women in management positions have to learn how to be more assertive with their employees. If they're having a performance problem, it's often really hard for them to address it. Of course it's hard for anyone, but I've seen it present a little more of a problem for women. Being hard-nosed at times is a difficult thing for many to learn. Yet, in many ways, women make better managers than men because they're sensitive to people's feelings. They just have to make sure they don't carry that too far.

"A lot of men have trouble seeing women in a role of authority. Many see a woman as someone who should be supportive of them. They often expect you to be somewhat subservient because that's the way they view women. If you don't enjoy that role, you're probably going to have a few clashes. I've found that when you come across a very chauvinistic attitude in a man, you can't really confront it because he will totally deny that it exists. You can't let your ego get too bruised when this happens, just continue to do your job the best way you can."

Women in Computing—1984 Versions. Richardson advises women seeking work in the computer field to try to understand the culture in companies where they're seeking employment—does the environment they're interested in encourage women or not? Apple is one company that she feels has been especially supportive of women in a field that predominantly attracts men. Realistically, the employment situation is now very different from what it was when Richardson was promoted from secretary to manager.

"In the personal computer industry, chances are less and less that anyone is going to move up in the ranks very fast," she says. "Most of the companies that are going to be successful are already out there, and they already have people on board. It's a lot harder to move up as fast as I did. The opportunities are now few and far between, and I know I was very lucky to find the job that I did."

Richardson defines a good manager as one who learns to delegate responsibility. "Otherwise," she says, "People don't feel they are part of things. Besides, you would kill yourself if you didn't."

"I work closely with the people I give responsibility to, to understand what they're doing and why and to give them a lot more guidance and direction than I first got. I think that's very important. I don't think you can just tell a person to go do a job, even if there are some people who can take the ball and run with it. Most need some guidance and direction—we all do, really." ■

When Jean Richardson joined Apple, there were fewer than fifty employees. Now her department's staff alone exceeds one hundred.

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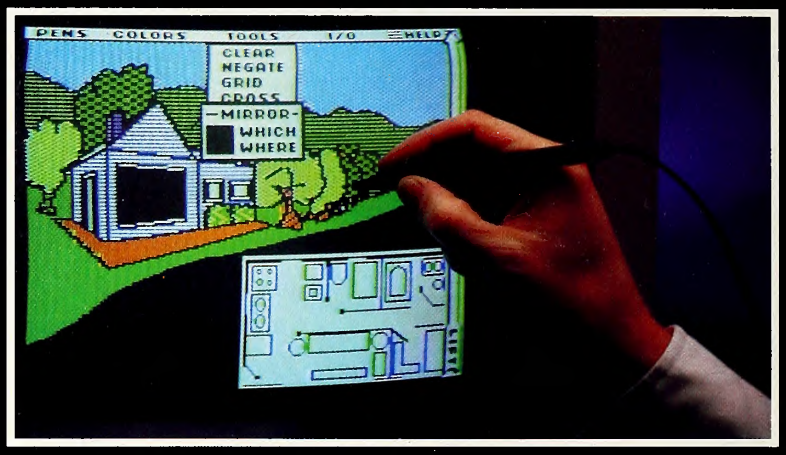

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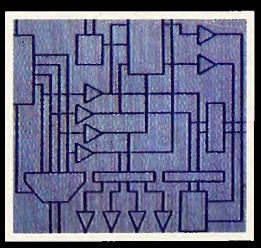

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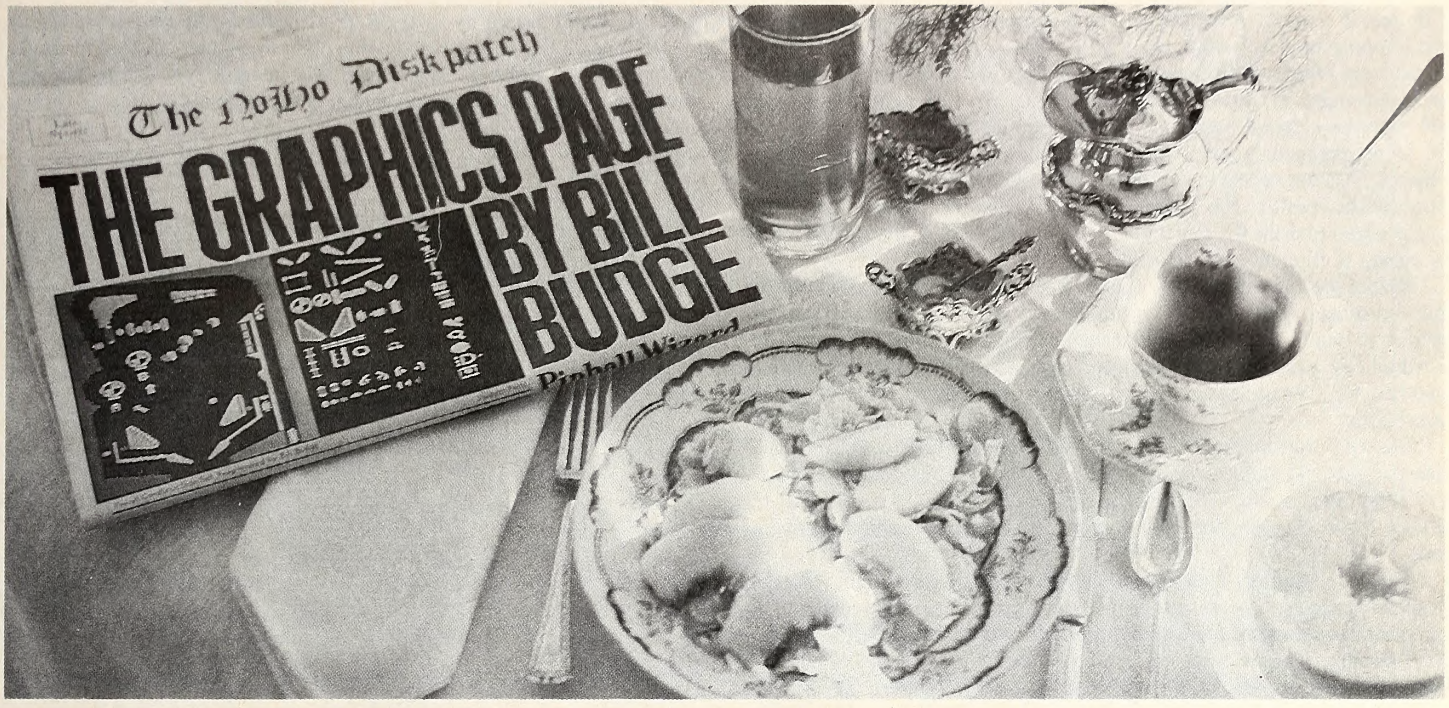

Going Cartesian—Drawing Rectangles

Sometimes an idea is powerful enough to transcend its role as an aid to thought. It begins to shape and color our thinking and so takes on a life of its own. Such ideas are incredibly useful, and they can haunt the thoughts of generations.

When Descartes divided the plane with an X-Y coordinate grid, he was trying to solve some problems in geometry. His idea has endured because it has thousands of applications, among them the raster-scan computer graphics that we have on our Apple II. Descartes would be pleased to see how we have made use of his coordinates.

But how would he feel about the rectangular grids of cubicles in offices, or the X-Y arrangement of streets in a city? In the modern world, millions of people are compelled to wander Cartesian paths within man-made rows and columns. The X-Y grid is a powerful ghost that turns our minds away from other visions of the world.

Today, however, we will avoid such negative thoughts and instead embrace the idea of rectangular coordinates. We will make good use of them. Let us revel in Cartesianality while we can!

Painting Rectangles. In last month's column, we made explicit the concept of a drawing environment. We had already discussed patterns and drawing modes, to which we added the idea of a window, and of clipping. These items make up the context in which our graphics package drawing commands are interpreted.

This is all the information we need to implement our first drawing routine, the one that paints a rectangular area of pixels on the screen, in the current drawing mode, with the current pattern, clipped to the current clipping window. We will call this routine *PaintRect*.

It is a simple routine, once we perform the clipping, since we can draw a rectangle by repeatedly calling HLine. (You could almost say that we designed HLine for this task.) The clipping is also simple, since we took the time to write *ClipRect* for just this purpose. All of the groundwork has been laid.

Implementing *PaintRect*. This month's listing shows the code for *PaintRect*. We will assume for now that the rectangle to be drawn is in the variable x1, y1, x2, and y2. The first thing *PaintRect* does is call

```
50E4:                    1              lst   on
50E4:                    2  ;
50E4:                    3  ; Draw the outline of a rectangle in current window/pattern/pen
50E4:                    4  ;
50E4:A0 03               5  FrameRect   ldy   #3          ;draw 4 sub-rectangles
50E6:                    6  ;
50E6:A2 07               7  FrameRect.1 ldx   #7          ;transfer argument rectangle
50E8:B5 77               8  FrameRct.2  lda   rect2,x
50EA:95 6F               9              sta   x1,x
50EC:CA                 10              dex
50ED:10 F9    50E8      11              bpl   FrameRct.2
50EF:                   12  ;
50EF:BE 0A 51           13              ldx   frtbla,y     ;adjust one coordinate of
50F2:B5 77              14              lda   rect2,x      ; rect to make an edge
50F4:48                 15              pha
50F5:B5 78              16              lda   rect2+1,x
50F7:BE 0E 51           17              ldx   frtblb,y
50FA:95 70              18              sta   x1+1,x
50FC:68                 19              pla
50FD:95 6F              20              sta   x1,x
50FF.                   21  ;
50FF:84 61              22              sty   temp+1       ;draw the edge (line)
5101:20 12 51           23              jsr   PaintHVLine
5104:A4 61              24              ldy   temp+1
5106:88                 25              dey
5107:10 DD    50E6      26              bpl   FrameRct.1
5109:60                 27  PaintHVLn.1 rts
510A:                   28  ;
510A:00 02 04 06        29  frtbla     dfb   0,2,4,6
510E:04 06 00 02        30  frtblb     dfb   4,6,0,2
5112:                   31  ;
5112:                   32  ; draw a horizontal or vertical line in current window/pattern/pen
5112:                   33  ;
5112:A5 D4              34  PaintHVLine lda   penwdth      ;add pen width-1, height-1
5114:38                 35              sec                ; to x2, y2
5115:E9 01              36              sbc   #1
5117:C9 FF              37              cmp   #255         ;if width was 0, don't draw the line
5119:F0 EE    5109      38              beq   PaintHVLn.1
511B:65 73              39              adc   x2
511D:85 73              40              sta   x2
511F:90 02    5123      41  bcc         *+4
5121:E6 74              42              inc   x2+1
5123:                   43  ;
5123:A5 D5              44              lda   penhght
5125:38                 45              sec
5126:E9 01              46              sbc   #1
5128:C9 FF              47              cmp   #255
512A:F0 DD    5109      48              beq   PaintHVLn.1
512C:65 75              49              adc   y2
512E:85 75              50              sta   y2
5130:90 02    5134      51              bcc   *+4
5132:E6 76              52              inc   y2+1         ;fall into PaintRect
5134:                   53  ;
5134:                   54  ; Draw a rectangle in current window/pattern
5134:                   55  ;
5134:20 67 51           56  PaintRect   jsr   ClipRect     ;clip rectangle in x1,y1,x2,y2
5137:90 12    514B      57              bcc   PaintRct.2   ;quit if it's invisible
5139:20 11 52           58  PaintRectB  jsr   XlatRect     ;move the result into screen space
513C:20 61 50           59              jsr   ScanPrms
513F:                   60  ;
513F:A6 71              61  PaintRect6  ldx   y1          ;draw rows of pixels from y1 to y2
5141:20 05 50           62  PaintRct.1  jsr   HLine
5144:E8                 63              inx
5145:E4 75              64              cpx   y2
5147:90 F8    5141      65              bcc   PaintRct.1
5149:F0 F6    5141      66              beq   PaintRct.1
514B:60                 67  PaintRct.2  rts
```

Implementation of *PaintRect* and *FrameRect*.

ClipRect to reduce the rectangle to be drawn to its visible part relative to the clipping rectangle. *PaintRect* will avoid drawing anything at all in those cases where the rectangle is completely invisible (outside the clipping rectangle). If *ClipRect* signals that this is the case by returning with the carry bit cleared, *PaintRect* will quit immediately.

If the rectangle is not invisible, then it must be completely visible or clipped. It is not necessary to distinguish which of these two is the case, because the result of the clipping is always another rectangle. Thus we can proceed to draw the rectangle in x1, y1, x2, and y2 without knowing or caring if clipping has occurred.

Before we can turn on any pixels, we must switch from our sixteen-bit coordinate system to the coordinate system of the physical screen, which is totally different. This translation is accomplished, as we described last time, by subtracting (viewx, viewy) from both (x1, y1) and (x2, y2). We use a separate routine to perform this translation, called *XlatRect*.

Once the translation is made, we call on *ScanPrms* to set the scanline parameters. Then we call HLine for each row of pixels from y1 to y2. Since the rectangle is visible, at least one row of pixels will be drawn, so we can put the loop-terminating check at the bottom of the loop.

More Rectangles. There is another operation that we might wish our graphics package to perform—drawing just the outline of a rectangle, as opposed to painting in the whole thing. We will call this routine *FrameRect* because it draws only the frame of a rectangle. As usual, it will draw in the current drawing mode, with the current pattern if one is required by the mode, and in the current clipping and view rectangles.

There are some fancy things we can make *FrameRect* do. We haven't said anything about what kind of frame we would like drawn around our rectangles, though the most obvious choice is for the frame to be one pixel thick. But we might want a thicker one—perhaps n pixels wide. How can we specify the line thickness?

One way is to add an item, called a pen, to our drawing environment. The drawing pen, which is rectangular in the simplest implementation, is used to specify the thickness of all lines drawn by the graphics package, including those drawn by *FrameRect* as it draws the outline of a rectangle. When a line is drawn from one point to another, instead of single pixels changing along the line's path, we imagine the rectangular pen moving along the line's path and changing many pixels at once, as shown in figure 1.

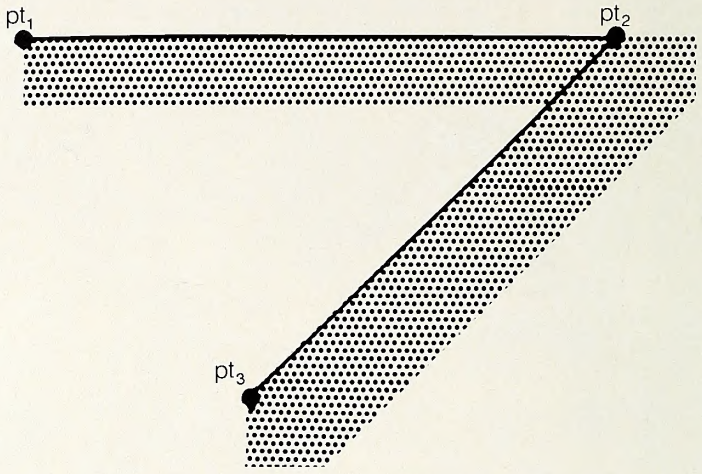

Figure 1. Drawing with a rectangular pen.

The implementation of the drawing pen for general line drawing is complicated and belongs to a later installment of this column. For *FrameRect*, however, the lines we need to draw are always vertical or horizontal. Thus, when the pen width and height are considered, we see that four new rectangles result (see figure 2). *FrameRect* can be implemented by making four calls to *DrawRect*.

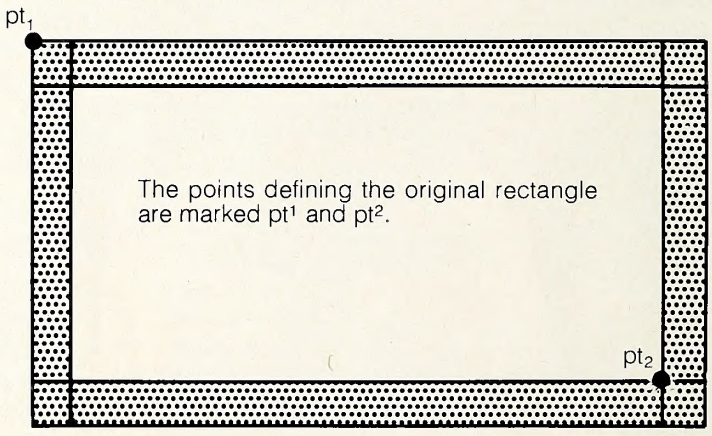

Figure 2. To frame a rectangle, draw four edge rectangles.

The Implementation of *FrameRect*. Since we need to call *DrawRect*, which uses x1, y1, x2, and y2, we will have to store our rectangle somewhere else. We'll define a storage location called *rect2* that is eight bytes long to hold the rectangle that we are outlining.

The process of drawing each of the four edges involves three separate steps. First, the original rectangle is moved into the variables x1, y1, x2, and y2. Second, *one* of its four coordinate values is replaced with another (x1 gets replaced with x2 and vice versa, and y1 gets replaced with y2 and vice versa). Third and last, the coordinates x2 and y2 are increased by penwdth-1 and penhght-1 respectively. The result is a rectangle that covers all the pixels that the drawing pen would hit if it traversed one of the edges of our original rectangle.

The third step, in which the vertical or horizontal line is modified by the pen size, will prove useful in our implementation of *PaintLine*, which should handle the special cases of perfectly horizontal or vertical lines efficiently. Thus, we will make this third step a subroutine in anticipation of the coding of *PaintLine*. But first we have to talk about polygons.

Next month: Beach Blanket Polygons Go Bananas!

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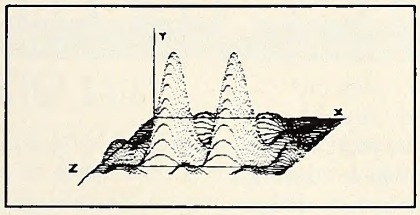

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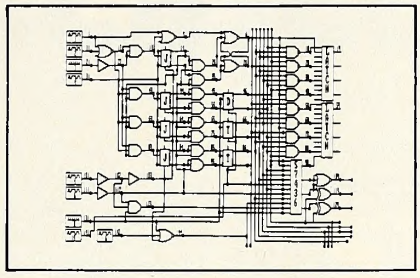

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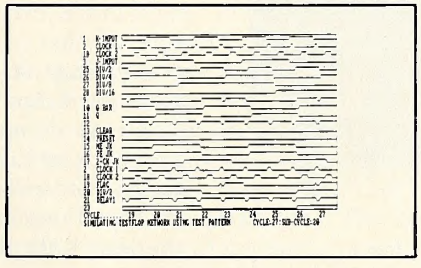

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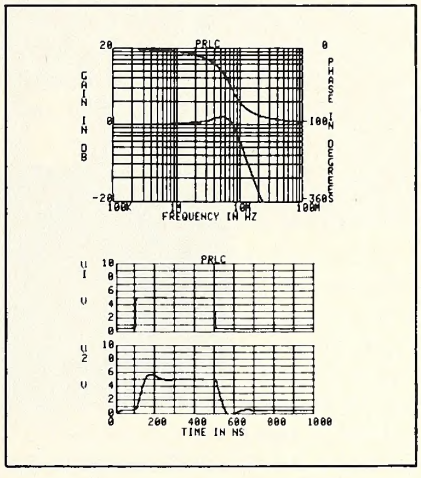

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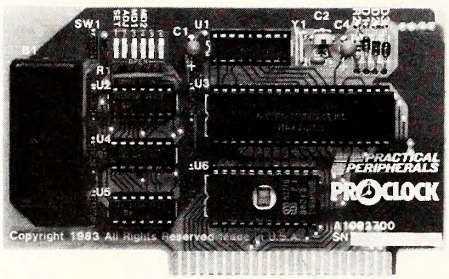

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Expanding the Unexpandable IIc

BY PETER BAUM

To simplify the connection of peripheral products, the Apple IIc has no slots. Most of the popular peripherals available today are being released in versions that can be connected to the Apple IIc through one of the ports on the back panel. Many of these peripherals and some completely new products were announced at the Apple II Forever event in San Francisco. Some of them are already available; the rest are expected to start shipping sometime this summer.

So Let's Start Growing. There are five different expansion ports on the Apple IIc: two serial ports, a video expansion output port, the mouse and game controller input port, and a port primarily intended for a second disk drive. To put the equivalent expansion capabilities into an Apple IIe, a user must add two Super Serial cards to simulate the two serial ports, the Apple IIe mouse card, and a disk controller card. The Apple IIe already contains the game input port (the nine-pin connector on the back panel), and most of the video expansion signals are available on the auxiliary slot (which is usually used for eighty-column cards). The Apple IIe disk controller card has a connector for the second disk drive.

Expansion Using the Serial Ports. Most peripheral expansion will be done through the two serial ports. Printers and modems are the most popular serial devices, but other peripherals such as security and home controllers, printer buffers, real-time clocks, music systems, sound effect generators and speech synthesizers can also be connected through these ports. Some of the products announced for the Apple IIc contain two or three of these devices.

The two serial ports use five-pin DIN connectors and are intended to interface with RS-232 devices. When the system is turned on, port 1 is configured as an output port. It will typically be used with printers and plotters. The second serial port, port 2, is intended primarily as a communication port for modems.

Everything That's Fit To Print. Apple has four different printing products that can be connected to this port, one of which was cointroduced with the Apple IIc. Three different printers—the Apple Daisy Wheel, the Imagewriter, and the new Scribe—as well as the Apple Color Plotter are compatible with the IIc. All three printers can use either standard printer paper or single-sheet stationery. The Scribe, which retails for $299, has a high-quality text mode (near letter-quality) that prints at 50 characters per second (cps) and a draft and graphics mode that prints at 80 cps. The Scribe can also print in color if used with a color ribbon. The Imagewriter prints at 120 cps, costs $595, and has eight different pitches versus the Scribe's two. The Daisy Wheel printer is a 40-cps letter-quality printer that retails for $2,195.

Though all of Apple's current printers use serial interfaces, many other printer manufacturers use a parallel interface such as the Centronics standard. To enable the Apple IIc to use these parallel printers, which include most dot-matrix printers such as Epson, Okidata, and C. Itoh, two companies announced serial-to-parallel converters. Discwasher will offer Serial to Parallel, and Prometheus Products will offer Versabox.

The Versabox, priced at $199, includes a battery-backed-up clock (with optional display) and printer buffer with both parallel and serial output. The clock keeps the time even if the power is turned off. The printer buffer acts as a storage tank for printer output so that the computer doesn't have to wait until the printer finishes printing. For example, if you were to print a twenty-five-page document (approximately fifty thousand characters), using the Scribe in draft mode (80 cps), without the printer buffer, the computer would wait for over ten minutes before it could do anything else. With a 64K printer buffer the computer system would be free in less than a minute, allowing the user to do other tasks such as saving files or working on other documents.

Discwasher's Serial to Parallel printer port adapter is a sim-

pler and less expensive device that just converts the printer port to a parallel printer port and sells for $129.

He Had a Port: E-I-E I/O. The second serial port is also a general-purpose input/output port that will usually be used by communications devices such as modems. But since the first serial peripheral most consumers will buy is a printer, which connects to port 1, the second serial port will be used to interface most other serial devices.

Five companies showed modems for the Apple IIc: Apple, Prometheus, Transend, Microcom, and Hayes. All of these modems are direct-connect with auto-answer, auto-dial, Touch-Tone, and pulse dialing capabilities. Apple has two modems, a 300-baud for $225 and a 1200/300-baud for $495. These modems include a program called *Appleterm*. The Hayes Smartmodem-300 is a 300-baud modem that sells for $339 including the Smartcom I software package for the Apple IIc. The Prometheus Promodem, Transend Transmodem 1200, and Microcom Era 2 SX/1200 are all 1200/300-baud modems and include communications software packages. The Era 2 SX/1200 retails for $599, the Transmodem for $695, and the Promodem for $495.

Music generation, sound effects, and speech synthesizer boxes will also plug into the second serial port. The Ufonic Voice System (price to be determined), from Borg-Warner, allows natural, human-sounding speech as well as sound effects. The Mockingboard D ($195), from Sweet Micro Systems, and the Cricket ($175), from Street Electronics, include six-channel speech, sound effects, and stereo music generation. The Cricket also includes a clock.

These voice systems are all equipped with their own speakers and text-to-speech programs. They also have programs available that include vocabularies of the most frequently used words (supplied with the Cricket). More than forty leading software companies are producing programs encoded to work with the Mockingboard sound and speech capabilities.

For home control and security, CyberLYNX Computer Products has the Smarthome I. This system allows homeowners to protect their homes with door and window sensors, infrared motion detectors, and smoke and heat detectors. For home control, Smarthome can turn lights and appliances on and off and manage energy usage. The system is wireless and programmed through the use of a joystick-controlled, hi-res color graphics program. Using pictures (icons) of the items you want to install, along with a map of the floor plan of your house, drawn with the joystick, the Smarthome can be easily configured to fit your needs. The Smarthome I starter system, which includes software and manual, the Smarthome Control Unit, a door/window sensor, appliance control module, and twelve-key transmitter, is sold for $495.

The Hand Controller Is Quicker than the Eye. The mouse/game input port is typically used by a device that acts as an alternative to the keyboard. Some of these are pointing devices such as the mouse, touch tablets, light pens, paddles, and joysticks.

The mouse/game input port uses a nine-pin D-type connector that carries seven signals, and power (+5 volts) and ground lines. Almost all of the paddle and joystick products that use the game I/O connector on the back panel of the Apple IIe will work on the IIc. The AppleMouse also plugs into this connector. Most software that uses the mouse on the Apple IIe will work with the mouse on the IIc, including the program *MousePaint*, which is bundled with the AppleMouse IIc ($99).

Another class of devices that plug into the mouse/game input connector is touch tablets, which let the user control the computer input by moving a finger or stylus across the tablet's touch-sensitive surface. Two companies have announced tablets that work with the IIc: the PowerPad, from Chalk Board, and the KoalaPad, from Koala Technologies. Both companies have a full line of tablet-compatible software products available. The KoalaPad, which can be used in place of paddles or a joystick in some applications, retails for $125. The PowerPad—which can detect multipoint contact and allow, for example, the user to play musical chords instead of single notes—sells for $149.

Those of you who couldn't make up your minds which input device to use and bought a mouse, joystick, and touch tablet might also be interested in a port expander. This device lets you switch between multiple devices that plug into the mouse/game port. The Calling Four II from Discwasher ($79) allows a user to immediately switch between any of four input controllers with the push of a button. The Auto Expander from Wico (price not available) also allows four controllers with automatic selection of the appropriate controller by simply pushing that controller's button.

The IIc Disk Jockey. The external disk drive connector is intended as a port that allows a second floppy disk drive to be added to the system. Apple has already announced a 5 1/4-inch drive, called the Disk IIc, which plugs into this nineteen-pin D-type connector. The disk drive uses the same half-height mechanism as the built-in disk drive, which has a capacity of 143K and behaves like the second disk drive in the Apple IIe (typically slot 6, drive 2) so that it is compatible with all programs using two floppy disk drives. The Disk IIc is available immediately and costs $329.

Another product that uses the disk port, a hard disk, was recently announced by Quark Engineering. The ten-megabyte Winchester, called the QC10, will be available sometime during the summer (at press time the price had not been determined). Quark also announced that a version of their popular Catalyst hard disk

program selector would be available for the Apple IIc at the same time. The QC10 hard disk is also compatible with the Apple IIe, Apple II Plus, and Apple III.

Video Madness. The video expansion port was designed to allow display devices such as televisions and RGB monitors to be used with the Apple IIc. The IIc, just like the IIe, also has an RCA-type jack that allows an NTSC video monitor (such as the new Apple Monitor IIc, the Monitor II, or the Monitor III) to be connected.

The video expansion port uses a fifteen-pin D-type connector that carries thirteen output signals and has a power supply line (+12 volts) and a ground line.

To enable a television to be used as the display for the Apple IIc, the modulator included with the system must be used.

If a consumer wants to use the Apple IIc to display both eighty-column text and color graphics on a single monitor, then an RGB monitor should be used as a display. Connecting an RGB monitor to the Apple IIc requires an RGB adapter box, which plugs into the video expansion port. An adapter box will be sold by Video-7 for $195 and by Apple (price not available at press time).

Apple introduced a flat-panel display that will also connect to the video expansion port. The liquid crystal diode monitor, which draws its power from the system, can display eighty columns by twenty-four lines of text and 560 by 192 bit-mapped graphics (double hi-res). Combined with a battery pack, the display enables the Apple IIc to become a portable system. It will be available in the fall and costs approximately $600.

Another product that uses the video port is the Gibson Light Pen System, available from Koala Technologies. A user can manipulate and move objects, and draw on the computer screen by touching the hand-held light pen to the screen. Because the light pen makes direct contact with the screen, movements are easier to judge and control than they are with joystick controllers. The Gibson Light Pen System includes four software packages and retails for $249.

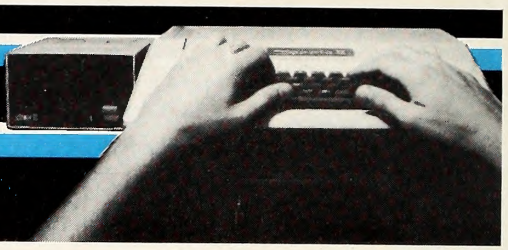
Turning the Apple IIc into a Truly Portable Computer. Discwasher has announced a product called CARI that consists of a rechargeable battery power system built into a carrying case. The power supply allows the Apple IIc to be used anywhere, even if no wall outlet is available.

The power supply plugs into the seven-pin DIN power input connector, which is typically used by the Apple power pack, and is capable of running the Apple IIc for three to five hours without recharging. The system includes a warning signal to alert the user whenever the power supply needs recharging. It also serves as an uninterruptable backup power supply in case you lose power from the wall outlet. The retail price is $249.

Just as they did with the Apple IIe, developers will design new peripherals that can be connected to the IIc. Some of these new devices will enable the IIc to do things that nobody (especially Apple Computer) would have thought possible. For example, companies are already working on expansion products such as co-processor boxes to enable the user to run CP/M or MS-DOS programs. Other products that might be developed include graphics tablets and speech-recognition boxes.

As you can see, most products that have been designed for the Apple IIe slots can be connected to the IIc. Don't think that the lack of slots limits the computer's expansion opportunities. The IIc is not only a powerful computer with a large software base (like its big brother, the IIe), but it can also be expanded to fit your future computing needs. ■

MARKETALK News



Unless otherwise noted, software can be assumed to run on any Apple II with 48K and one disk drive. Programs that meet these minimum requirements will usually run on the III.

☐ A three-dimensional modeling system, *3-D Scribe* is designed for architects but can also be used by builders, interior designers, and engineers. From **Cascade Graphics** (1000 South Grand Street, Santa Ana, CA 92705; 714-835-6660), the menu-driven program allows the user to build a 3-D model, view it from various angles, change its size, eliminate hidden lines, and more. An optional thermal analysis package helps the designer to evaluate the thermal efficiency of a model. Requires joystick or touch pad. $1,400. Hi-res version is $2,400, with controller card included.

☐ *Black Belt* is a simulation of a tae kwon do championship sparring match, arcade style. Players fight five opponents, each representing different belt karate levels. As players increase in skill, the action becomes faster and more heated, with wounds and fatigue taken into account. The game is from **Earthware Computer Services** (Box 30039, Eugene, OR 97403). Requires joystick. $29.95.

☐ A job cost and labor and materials application template that works with Versaform has been released by **Applied Software Technology** (170 Knowles Drive, Los Gatos, CA 95030; 408-370-2662). The package features redesigned data entry forms, output forms, and predesigned reports. Modifiable by the user. $79.95.

☐ Several new software programs written around the SuperSprite graphics board have been introduced by **Synetix** (10635 Northeast Thirty-Eighth Place, Kirkland, WA 98033; 206-828-4884). An educational package called *LogoSprite* allows users of *Terrapin Logo* to generate graphics and sound. *NumberSprites* and *AlphaSprites* are for preschoolers, teaching the basics via color, animation, and sound. More advanced programs are *SpriteArt*, for painting in sixteen colors and creating animated characters, and *SpriteMusic*, which creates visual accompaniments to music. *Kabor* is a maze pursuit adventure with sound effects and speech. *BaseballSprites* is a game rendition of the national pastime. *Assembly Line Madness* is a game that challenges the player to match auto parts on a fast-moving assembly line. $39.95 each.

☐ Job estimates for electrical wiring contracts can be computed on the *Edge*, work scheduling software from **Cal-Namor** (Box 149, San Luis Obispo, CA 93406; 805-544-1077). The package generates rough-in and trim material, labor costs, travel allowances, and a complete materials list. It also factors in the contractor's markup and prepares a custom proposal for each job. Requires two disk drives and a printer. $285.

☐ A complete record of every "nut, bolt, and skinned knuckle" involved in a classic car restoration can be kept on disk with *Restoration Record* from **Car Soft** (Box 28313, Tempe, AZ 85282; 602-820-3775). The program keeps records on everything from where you bought a dash knob to how much you've spent since starting a restoration. Also available for motorcycles. $34.95. *The Racer's Diary* is software that will store a driver's qualifying time, weight distribution of a car, and other pertinent details. Also available for motorcycles. $31.95.

☐ Christian pastors, missionaries, schools, and laymen with computers can subscribe to *Christian Computing* (72 Valley Hill Road, Stockbridge, GA 30281; 404-474-0007), a bimonthly publication featuring articles by authorities in Christian computer applications, reviews of software and church management systems, new product information, and more. $12 per year.

☐ Designed for high school, college, and vocational use, an eight-part

Special! New Stuff for the IIc

☐ Along with Apple's introduction of the IIc came announcements of software that has been, in some cases, enhanced specifically for the new machine. More than twenty-one new and bestselling packages—seventeen from outside developers and four from Apple—will be released this month. In addition to this, the IIc is packaged with six tutorial programs on disk that introduce users to "serious home computing." Several pieces of coordinated hardware have also been announced by Apple. In future Marketalk News columns, announcements about IIc hardware and software will be interspersed with the rest of the news and any special enhancements or requirements duly noted.

☐ **Apple Computer** (20525 Mariani Avenue, Cupertino, CA 95014; 408-996-1010) has released *AppleWorks*, an integrated word processing, spreadsheet analysis, and database package. $250. *Apple Logo II* is a graphics-oriented introduction to computer programming. $100. *Apple Access II* is communications software that works with an Apple-compatible modem to let the IIc talk on the phone. Price to be announced. The *Apple Education Classics* is a single disk that combines Elementary, My Dear Apple with The Shell Game. Price to be announced. The Scribe is a multicolor printer that uses new thermal transfer technology. Text and graphics—from lo- to double hi-res—can be printed in six colors or in black. The small, quiet printer can combine text and graphics on a single page, produce superscripts and subscripts used in technical notation, print in varied type sizes and styles, and more. Ribbon cassettes are interchangeable. $299. The eleven-pound Apple Monitor IIc is styled to complement the IIc in both color and size. A nine-inch screen provides a low-glare green phosphor display for eighty column or hi-res graphics use. $199. The AppleMouse IIc is a pointing device that also conforms to the IIc Snow White design. It comes with *MousePaint* software and a *MousePaint* training disk. $99. A sleek and streamlined second disk drive, the Disk IIc has a 140K capacity. $329. A fabric luggage IIc carrying case holds the computer, power supply, second disk drive, and more. $39.

☐ Always the first in line, **Microsoft** (10700 Northup Way, Bellevue, WA 98004; 206-828-8080) unveiled a version 1.07 of *Multiplan* that includes two templates for loan analysis and home budgeting. $195.

☐ The educational division of **Milton Bradley** (443 Shaker Road, East Longmeadow, MA 01028; 413-525-6411) has released four games for children and one literacy program, all with educational features. The games are *Go to the Head of the Class*, *Game of the States*, *Extra! Extra!*, and *Hey Taxi!*. Danny the Droid guides young users through *Let's Explore Basic*, a two-disk package. $39.95 each.

☐ **Milliken Publishing** (1100 Research Boulevard, Box 21579, Saint Louis, MO 63132; 314-991-4220) announces six new educational packages for the IIc, including two adventures and a word processor. Titles are *The Great Number Chase*, *Word Machine*, *Adven-*

video cassette series that teaches Basic is available from the **University of California Extension Media Center** (2223 Fulton Street, Berkeley, CA 94720; 415-642-0460). The Basic Power series guides the viewer step by step from elementary to moderately sophisticated programming. Novices can learn how to create a variety of programs and how to take advantage of tricks of the trade. A workbook accompanies the video lessons, with exercises and quizzes included. $1,000 for the series.

☐ **MicroMotion** (12077 Wilshire Boulevard, Suite 506, Los Angeles, CA 90025; 213-821-4340) announces *Forth Tools*, an introduction to the new international Forth-83 standard and all its extensions. The book gives careful treatment to the create-does construct, which is used to extend the language through new classes of intelligent data structures. An in-depth view of input and output is presented to the reader, from learning to read the input stream to writing a simple mailing list program. $20.

☐ *Lee's Guide to Published Computer Programs—Where to Find Free Programs for Your Apple* is a book that provides an index to more than eight thousand Basic programs—games, graphics, math, finance, and so on—and three hundred assembly language programs previously published in textbooks and magazines. The guide is from **Lee and Lee** (1444 Santa Anita Avenue, Box 3836, South El Monte, CA 91733; 213-442-3141). $27.

☐ A spelling checker for the Spanish language that works with any word processor that stores text using ASCII is now available. *El Ortografico*, from **Ibersoft** (Box 3343, Trenton, NJ 08619; 609-890-1496), verifies corrections on the spot and includes help with hard-to-conjugate verbs. The representation of unique Spanish characters can be customized to your word processor. Utilities included. $99.95.

☐ Designed for small businesses, *Electro Mail* is a new module for the Electro Check home accounting software package from **Strictly Business Software** (Box 57492, Dallas, TX 75207; 214-827-3388). An independent program, it features full retrieval, sorting, and label printing. $49.95.

☐ **Apple Computer** (20525 Mariani Avenue, Cupertino, CA 95014; 408-996-1010) has introduced two new emulation packages that open up the Apple to the Big Blue business world. The *Apple Access 3270* is a data communications package that allows Apple IIIs to communicate with all mainframe, mini, and personal computers that support the IBM 3270 mainframe. Text file transfer, on-line data entry, and inquiry and response are just a few of the capabilities available with the program, which works with an Apple Cluster Controller or an Appleline coaxial attachment unit to emulate an IBM 3278 Model 2 terminal. $150. An interface card that transforms Apple IIs into multi-function workstations with mainframe access capabilities, the Apple Communications Protocol Card can act as a remote terminal in an IBM network, communicating with IBM 360, 370, 4300, and 303X computers. $700. Emulation software disks for the 2780/3780 and 3270 are $300 each. A wide-carriage model of the Imagewriter dot-matrix printer is suitable for printing documents that require wide paper, such as spreadsheets, forecasting models, and so on. The printer features eight character fonts, a printing rate of up to 120 characters per second, and friction-feed or adjustable-width pin-feed tractors. $749.

☐ The newest release in the Kid's Corner line of educational software, *Letters and First Words* from **C and C Software** (5713 Kentford Circle, Wichita, KS 67220; 316-683-6056), contains three programs that provide a logical progression of activities. Learning to identify letters, recognizing their associated sounds, and then beginning to spell simple words are exercises designed for preschool to second grade children. Includes special keyboard labels. $40.

☐ The model SC-100 CRT color composite display monitor from **Sakata U.S.A.** (651 Bonnie Lane, Elk Grove Village, IL 60007; 312-593-3211) has a ninety-degree incline with 0.65mm dot pitch, suitable for a range of applications ranging from education and entertainment to business. $329. The Sakata SG-1000 CRT monochrome monitor is phosphor green with a nonglare, high-contrast dark face plate, suitable for reproduction of copy or graphics. $129. A display monitor stand that tilts up and down and swivels right and left is made of durable polystyrene in a neutral color. $49.

☐ *Record Master* is a database program that performs all the standard database functions—sort, search, view, print, update, and delete. Available from **Bridget Software** (1309 Canyon Road, Silver Spring, MD 20904; 301-384-7875), the program provides complete report formatting, arithmetic functions, computed fields, file restructuring, and more. $55.

☐ **Humans** (Box 82, Evington, VA 24550; 804-525-3441) announces the release of *Terminal Trivia*, a trivia game with three levels of play. Topics include television, sports, history, and unusual facts. Questions are selected randomly and scoring is automatic. A three-disk Super Potluck series of more than fifteen hundred questions is included. $49.95.

ture Alpha (a graphic adventure), *The Islands of Beta* (a graphic adventure), *FourWord/Four/Lift*, and *The Milliken Word Processor*. Prices to be announced.

☐ *Dollars and Sense*, from **Monogram** (8295 South La Cienega Boulevard, Inglewood, CA 90301; 213-215-0529), is a personal financial management package that can be used with the IIc mouse. $119.95.

☐ *Beyond Castle Wolfenstein* is the follow-up to the well-known adventure by **Muse** (347 North Charles Street, Baltimore, MD 21201; 301-659-7212). The sequel continues the action into Hitler's Berlin bunker for an attempt on the Führer's life. Price to be announced.

☐ Well, how about it? **Odesta** (3186 Dolittle Drive, Northbrook, IL 60062; 312-498-5615) has introduced four artificial intelligence-based educational games: *How About a Nice Game of Chess!*, *How About a Nice Game of Backgammon!*, *How About a Nice Game of Checkers!*, and *How About a Nice Game of Odin!* All are compatible with the mouse. $34.95 each.

☐ **Peachtree Software** (3445 Peachtree Road, N.E., Suite 830, Atlanta, GA 30326; 800-247-3224) has announced the new *Back to Basics Accounting System* for small businesses. $195. *Webster's Numbers*, *Learning to Read*, *Rendezvous*, and *Writing Skills* are educational games. $39.95 each. *Prisoner 2* is the well-known graphic adventure. $32.95.

☐ Compatible with the mouse and taking advantage of double hi-res, *The Graphics Magician Picture Painter*, *The Complete Graphics System*, *The Quest*, and *Transylvania* have been released for the IIc by **Penguin Software** (830 Fourth Avenue, Box 311, Geneva, IL 60134; 312-232-1984). *Painter* is $49.95. *Graphics System* is $79.95. *The Quest* and *Transylvania* are $34.95 each.

☐ Versabox provides the IIc with a real time clock/calendar, serial and parallel buffered output ports, and more. Expandable to 128K buffer. From **Prometheus Products** (45277 Fremont Boulevard, Fremont, CA 94538; 415-490-2370). $199.

☐ *Word Juggler* for word processing, *Terminus* for communications, and *Catalyst* for hard disk program selection are office automation products from **Quark** (2525 West Evans, Suite 220, Denver, CO 80219; 303-934-2211). All three come with replacement key caps that label the principal editing and formatting functions and will include the *Lexicheck* spelling checker. *Juggler IIc* is $189. *Terminus IIc* is $89. *Catalyst IIc* is $149.

☐ **Reader's Digest Software** (Reader's Digest Services, Pleasantville, NY 10570; 800-262-2627) has announced two learning games for the home with special features. Two pieces in the Little People's Puzzles series, *Things That Go* and *Micro Habitats*, work with the Echo speech synthesizer and the mouse respectively. $39.95 each.

☐ *Movie Maker*, *Day*, *Middle of the Road Lizard*, and *The Dolphin's Pearl* are learning and entertainment software from **Reston Publishing** (11480 Sunset Hills Road, Reston, VA 22090; 703-437-8900). All use graphics and sound to enhance play. *Maker* is $49.95. *Day*, *Lizard*, and *Pearl* are $29.95 each.

☐ An enhanced version of *MasterType* has been introduced by **Scarborough Systems** (25 North Broadway, Tarrytown, NY 10591; 914-332-4545). In addition to teaching the standard QWERTY keyboard, the program includes lessons and excercises for the Dvorak keyboard. $39.95.

☐ *The Fact and Fiction Tool Kit* lets kids write and illustrate stories and manage databases. From **Scholastic** (730 Broadway, New York, NY 10003; 212-505-3410). The program takes advantage of double hi-res. It's part of the Wizware series. $39.95.

☐ Available on ProDOS are *Sensible Speller* (spell checker),

☐ A series of supplemental data disks has been developed for *Word Attack!* and *Speed Reader II*, educational software from **Davidson and Associates** (6069 Groveoak Place, Suite 12, Rancho Palos Verdes, CA 90274; 213-373-9473). The four *Word Attack!* disks contain five hundred additional new words to be used in the vocabulary program. Three of the disks are categorized for grades four and five, six and seven, and eight and nine. The fourth disk is for SAT preparation. The *Speed Reader II* disks each contain thirty-five additional stories to be used with the speed reading and comprehension program. Designed for elementary, junior high, high school, and college level students. $19.95 each.

☐ A line of insurance for personal computer owners that covers computers at home, at work, and in transit is available from **Safeware** (Box 02211, 2929 North High Street, Columbus, OH 43202; 800-848-3469). Coverage of loss from fire, theft, water damage, lightning, and power surges is provided. Replacement offered at no depreciation. Purchased software is also covered. Starts at $35 per year.

☐ A bilingual math assessment videodisc for grade levels one through three that is compatible with an Apple has been released by **Systems Impact** (2084 North 1200 East, Logan, UT 84321; 801-753-7973). The software supplied allows the computer to control assessment of learning and perform a number of data collection and analysis tasks. Can be presented in either English or Spanish. Requires Pioneer series videodisc player and Allen communications interface. $295.

☐ *The Institute*, by veteran adventure writer Jyym Pearson, is a psychological drama with clues to help you escape from dangerous situations. Available from **Screenplay** (Box 3558, Chapel Hill, NC 27514; 919-493-8596), the adventure puts the player in a prehistoric jungle or aboard the doomed *Titanic*. Dreams provide clues on how to escape. $29.95.

☐ *Astro-Aid* is an integrated software package for astronomical applications. Released by **Zephyr Services** (306 South Homewood Avenue, Pittsburgh, PA 15208; 412-247-5915), the menu-driven program offers forty-four functions including coordinate conversion, precession, nutation, aberration, parallax, refraction, Kepler's and Newton's laws, and more. Suitable for professionals, amateurs, and students. $29.95.

☐ The first product in the Heavyware line of database management and utility software has been announced by **A.D.I. America** (1215 Howe Avenue, Sacramento, CA 95825; 916-925-2229). *Aladin* is an integrated relational database system with calculation, advanced statistics, graphics, and database management. Requires Pascal. For the II Plus and IIe: $595. For the III: $795.

☐ A microprocessor-based unit for the quantitive analysis of two-dimensional images that can send data to an Apple for storage and analysis has been created by **Nikon Instrument Division** (623 Stewart Avenue, Garden City, NY 11530; 516-222-0200). *MicroPlan II* can be used in biomedical investigation, including determinations of bacterial colony, cell, tissue, nerve, and mitochondrion size, and has the ability to analyze specimens that are too complex or obscure for automatic image analysis sytems. $4,500.

☐ *Postage Saver IIa* is a combination mailing list and information retrieval and storage program published by **Gray Matter** (Box 7900, Incline Village, NV 89450; 702-831-2523). One to nineteen lines of information per entry that can be accessed in a number of different ways. Automatically deletes duplicates on one or two data disks. $150.

☐ An uninterruptible power system for microcomputers, the Powermaker Micro UPS from **Topaz** (3855 Ruffin Road, San Diego, CA 92123; 619-571-5622), provides up to seventy-five minutes of sine wave power in the event of a blackout. Also protects against power line disturbances, momentary voltage sags, and brownouts. With line loss alarm to announce that it's using battery backup, the unit is available in power ratings of 400, 800, and 1000. $695 to $995.

☐ New instructional and research publications have been published by **Computer Science Press** (11 Taft Court, Rockville, MD 20850; 301-251-9050). *Apple Assembly Language*, by W. Douglas Maurer, is a college level text on the programming language accompanied by three hundred exercises. A knowledge of Basic, Fortran, or Pascal is assumed. $17.95. *Fundamentals of Data Structures in Pascal*, by Ellis Horowitz and Sartaj Sahni, is based on *The Fundamentals of Data Structures* by the same authors, with all the algorithms rewritten in Pascal. Contains over two hundred exercises. $29.95. *The Theory of Relational Databases*, by David Maier, assembles concepts and results in relational database theory and introduces new material. Intended as a second course and a

Graphics Department (clip art and graphics), *Bookends* (card catalog system), and *Bookends Translators* (for downloading) from **Sensible Software** (24011 Seneca, Oak Park, MI 48237; 313-399-8877). *Speller* is $125. *Graphics* and *Bookends* are $124.95 each.

☐ The first book on the new machine, *Going Places with the New Apple IIc*, by Danny Goodman, has been published by **Simon and Schuster** (1230 Avenue of the Americas, New York, NY 10020; 212-245-6400). $3.95.

☐ The new 128K version of the fantasy role-playing game *Wizardry*, from **Sir-tech** (6 Main Street, Ogdensburg, NY 13669; 315-393-6633), can be played with the IIc mouse. Price to be announced.

☐ *VisiCalc*, *TK!Solver*, and *VisiCalc: Advanced Version* have been expanded with new formatting options, variable widths, keystroke memory, and more. All three business and professional packages are available from **Software Arts** (27 Mica Lane, Wellesley, MA 02181; 617-237-4000). *VisiCalc* is $149. *Advanced Version* is $179. *TK!Solver* is $299.

☐ **Software Publishing** (1901 Landings Drive, Mountain View, CA 94043; 415-962-8910) has announced new features in the *PFS:File*, *PFS:Report*, and *PFS:Write* software. Enhancements include automatic data entry and increased printer and plotter support. $125 each.

☐ **Spinnaker Software** (215 First Street, Cambridge, MA 02142; 617-494-1200) has introduced *Grandma's House*, a double hi-res game for children that can be played with the mouse. $34.95.

☐ The Cricket is a peripheral box that features natural and robotic voice, sound effects, and music capabilities, available from **Street Electronics** (1140 Mark Avenue, Carpinteria, CA 93013; 805-684-4593). *Cricketalk* software included. Compatible with the *Music Construction Set*. $179.95.

☐ *Flight Simulator II* from **SubLogic** (713 Edgebrook Drive, Champaign, IL 61820; 800-637-4983) has been enhanced with a multiplayer serial port option for dogfights between flying aces. $49.95.

☐ Stock market decision support software in the Winning on Wall Street series from **Summa Software** (Box 2046, Beaverton, OR 97075; 503-644-3212) includes *Trader's Data Manager*, *Trader's Forecaster*, and *Trader's Accountant*. All take full advantage of ProDOS and hi-res graphics. *Data Manager* is $200. *Forecaster* is $250. *Accountant* is $350.

☐ The Mockingboard plug-in box adds stereo music, sound effects, and speech synthesis capabilities. Available from **Sweet Micro Systems** (50 Freeway Drive, Cranston, RI 02920; 401-461-0530). $195.

☐ The children's logic game *Rocky's Boots* from **The Learning Company** (545 Middlefield Road, Suite 170, Menlo Park, CA 94025; 415-328-5410) can be played with the mouse. $49.95.

☐ *Transend IIc* is communications software that's compatible with ProDOS. The package, utilizing the machine's full 128K, is available from **Transend** (2190 Paragon Drive, San Jose, CA 95131; 408-946-7400). Price to be announced.

☐ **Virtual Combinatics** (Box 755, Rockport, MA 01966; 617-546-6553) has released a pop-up window version of its *Micro Cookbook* and seven optional recipe disks. Can be used with the mouse. $40. Recipe disks are $12.95.

☐ The *WEPCO Electronic Study Guide for Trigonometry*, from **Wadsworth Electronic Publishing** (10 Davis Drive, Belmont, CA 94002; 415-594-1900) is part of the company's electronic study guide series and takes full advantage of the machine's capabilities. Price to be announced.

☐ *Stickybear Shapes* is an introduction to shapes for preschool children from **Weekly Reader Family Software** (245 Long Hill Road, Middletown, CT 06457; 203-347-7251). All the packages in the early learning series—which includes *Stickybear ABC*, *Numbers*, *Opposites*, and *Fat City*, as well as the Edutainment series, which includes *Old Ironsides* and *Chivalry*—are compatible with the mouse. $39.95 each.

reference for researchers. $31.95. *Discrete Mathematics: A Computational Approach Using Basic*, by Marvin Marcus, takes the view that computing is part of mathematics and, to use a computer effectively, certain mathematical concepts must be understood. $19.95. The Basic programs presented are also available on a Learningware disk. $15.

☐ **Analytical Engines** (3415 Greystone, Suite 305, Austin, TX 78731; 512-346-8430) announces a 68000 32/16-bit coprocessor called the Saybrook II. The board runs Apple Pascal, Apple Fortran, and Apple Basic programs ten to thirty times faster, with twice the usual memory on board. Base system package includes 128K RAM, UCSD p-System, 68000 Basic, and more. $895 to $1,395. An advanced system includes a choice of compilers, screen editor, graphics package, and cross assembler. $1,295 to $1,495. Each additional compiler is $95.

☐ *The Shrink* is a package that includes a disk with two utility programs, a head cleaning routine, and a disk drive speed test, as well as a head cleaning kit. $39.95. Special C.A.R.E. is a disk maintenance and management starter kit that includes sixteen different items, four for head cleaning and the rest for installation and management. $49.95. C.A.R.E. is an extended version of Special C.A.R.E. that includes the software routines found in *The Shrink*. $69.95. All three available from **Basic Quality Computer Products** (10315 West Jefferson Boulevard, Culver City, CA 90230; 213-837-1881).

☐ Some new peripherals are available from **Central Valley Electronics** (Box 33102, Kansas City, MO 64114; 816-444-5215). The Keyboard Buffer adds sixty-four bytes of input buffer for typeahead capabilities that speed up tasks requiring many keystrokes, such as word processing and programming. $49.95. The A to D Converter is a board that will convert an analog signal to a digital signal. $69.95. The Video Digitizer will digitize a video image for storage and manipulation. $449.95. Software is available, including a package that enables the unit to recognize and store individual characters as characters instead of images. $150.

☐ Secure your Apple II series computer and up to three disk drives with the Pro-Tech II locking stands from **Seagull Enterprises** (65-A Wheaton Avenue, Rehoboth, MA 02769; 617-336-4172). Color coordinated with a built-in shelf for software, the stand can be bolted down for extra security. $155. The Pro-Tech III stand can secure an Apple III and a Profile hard disk. $165.

☐ The new Terrapin Logo version 2.0, from **Terrapin** (380 Green Street, Cambridge, MA 02139; 617-492-8816), includes six new primitives and several editor commands, improved garbage collection capabilities, full-function support for all four cursor keys on the IIe, and the ability to read program files created with Apple Logo. $99.95.

☐ **Laureate Learning Systems** (1 Mill Street, Burlington, VT 05401; 802-862-7355) has released a software series designed to teach the fundamental rules of grammar to language-learning disabled, hard of hearing, and mentally retarded children. Micro-LADS teaches language construction, including action verbs. The program's six disks use color graphic examples, animation, text, and speech to train handicapped students. Requires Echo II speech synthesizer. $170 per disk.

☐ Aimed at low-end and home-based businesses, a three-in-one package that combines Letter Perfect, Spell Perfect, and Data Perfect has been released for the IIe by **LJK** (7852 Big Bend Boulevard, Saint Louis, MO 63119; 314-962-1855). Called *Simply Perfect*, the integrated software eliminates disk swapping between the three programs so the user has both disk drives free. All three programs share common commands. $189.95.

☐ **Advanced Ideas** (2550 Ninth Street, Suite 104, Berkeley, CA 94710; 415-526-9100) has released *Dinosaurs*, an educational game designed to teach preschoolers the visual recognition skills necessary for matching, sorting, and counting objects while at the same time introducing them to the computer. A variety of different dinosaurs swim, fly, or romp across the screen when a correct answer is given. Different learning levels. $39.95.

☐ Instructional packages for public schools are being offered by **Audio Active** (Route 1, Highway 304 West, Delaplaine, AR 72425; 501-249-3392). The menu-driven Apple Drill Disk Series contains number and counting exercises appropriate to each grade level. Some have eight drill programs involving all four basic math operations, plus word reviews, a challenge test, and score storage files. The *McGuffey's Electric Apple* is a graded reading program that features letter, word, and reading exercises appropriate to each grade level. Most disks include word and sentence study, two main reading exercises each with compre-

hension tests, pre-tests and post-tests, score storage, and choice of reading speeds. *Ceres: A Space Odyssey* is a graphic narrative adventure that's factual with a fantasy twist. The student learns about the solar system while trying to reach the asteroid Ceres. *Computer Literacy* is a tutorial in computer basics as well as Applesoft Basic. All disks are copyable. $9.95 each.

☐ A disk from **Cdex** (5050 El Camino Real, Suite 200, Los Altos, CA 94022; 415-964-7600) teaches people how to use computers and apply them to business applications such as spreadsheets, accounting, or database management, with emphasis on the features and benefits of the Cdex training programs. Free for the asking.

☐ Three personal money management programs are available from **Sundex Software** (4755 Walnut Street, Boulder, CO 80301; 303-440-3600). The *Certified Personal Accountant* will organize financial records and provide information for paying taxes and bills and for making out budgets. The data is reported in its most useful forms, such as tax categories, income and expense statements, net worth, and so on. $99.95. The *Certified Personal Investor* provides information on the market value of your stock portfolio. The data is available and organized in categories that match the IRS 1040B and 1040D forms. $99.95. *Personal Payables* can give the current balance on up to ten different bank accounts and also writes your checks for you. $49.95.

☐ **Software Publishing** (Box 306, 125 Main Street, Half Moon Bay, CA 94019; 800-851-2917) has branched out into the direct mail business with the publication of *Power Up!*, a twenty-four-page catalog containing software available only by mail. Categories include software for the home, business productivity, personal growth, education, and gaming. Free.

☐ Available in Spanish, French, and German, a foreign language training system called the Language Lab has been developed by **Lamp-Lighter Software** (7 Breton Avenue, Melville, NY 11747; 516-421-2653). The program, unlike computerized vocabulary builders, teaches all skills necessary for fluency in a foreign language. An interactive audio cassette is included with the software, allowing for automatic playback of pronunciation lessons in coordination with what is displayed on the screen. Performance reviews are also generated in both listing and chart form. Requires cassette player. $235 each. Advanced levels are available for $69 per level.

☐ *Financer* is a menu-driven program for basic financial calculations. Ten financial functions are contained in the package, including simple interest, amortization schedules, and interest rates for both installment loans and compound interest loans. Released by **Zephyr Services** (306 South Homewood Avenue, Pittsburgh, PA 15208; 412-247-5915). $19.95.

☐ A tool to help educators review choices in the purchase of personal computers for their schools, *DPS* (Decision Pathing System) contains information on more than five hundred everyday school activities linked with one hundred uses for computers. Available from **Vort** (Box 60132, Palo Alto, CA 94306; 415-965-4000), the software allows the user to walk through a variety of choices to get a better idea of the elements involved in planning school use of computers. Reports on a specific plan can be generated. $69.95.

☐ A protocol converter device that allows Apples to talk to an IBM mainframe has been released by **Diversified Data Resources** (25 Mitchell Boulevard, Suite 7, San Rafael, CA 94903; 415-499-8870). The HyDra II Direct Channel-Attach Controller supports individual personal computers as local IBM 3270s and ASCII printers as 3211/1403/3286/3287 printers. The network can also be used for dial-in purposes. The eight-port configuration is $6,900. The nine-port configuration is $9,900.

☐ Three new reading comprehension games have been released by **Learning Well** (200 South Service Road, Roslyn Heights, NY 11577; 516-621-1540). *Fantasy Land* puts players in a quest through a mythical land for the fabled sword of justice. As they travel by sea, players must read between the lines of stories, find the sword of justice, and attain their conquest of the Middle Realm. $49.95. *Magic Castle* is a vocabulary skills game that transforms players into wise old wizards vying to be the first to climb to the top of the enchanted castle and retrieve the magic wand. The rate of ascension to the various levels of the castle depends on a player's wisdom in defining vocabulary words. $49.95. *Galaxy Search* is a reading comprehension and critical thinking game featuring a robot that can capture the power of the sun. The player's mission is to travel thoughout the galaxy in search of stolen parts. Correctly answering ques-

tions is the only way to obtain the desired parts. $49.95. All three games are available on either primary or intermediate levels for one to six players.

☐ Photographers can now prepare slide shows using the Apple-Gemini multiimage programming system from **Pacific Micro Systems** (160 Gate 5 Road, Sausalito, CA 94965; 415-331-2525). The Gemini 2002 hardware, along with a special software package, creates slide shows for two to six Kodak 35mm projectors, using professional fade-in and fade-out techniques. Special effects include superimpose, slide random access, animate, flash, and more. The software includes commands to create, edit, and simulate a show. The Gemini 2002 unit is $479. The peripheral card and software is $349.

☐ **Penguin Software** (830 Fourth Avenue, Box 311, Geneva, IL 60134; 312-232-1984) has released *The Complete Graphics System*, a set of graphics tools for nonprogrammers that allows two- and three-dimensional drawing and manipulation. Lines, circles, ellipses, boxes, freehand drawings, and so on, can be used to create graphic images, using a choice of ninety-six brushes. Three-dimensional drawings can be created, rotated, edited, and added to other drawings. The software replaces two popular company programs, *The Complete Graphics System II* and *Special Effects*, by combining, enhancing, and adding to the features found in both. A selection screen that displays the 108-color palette and other drawing options serves as the main menu of the drawing program. $79.95.

☐ *People Planner* is a program for employee scheduling in a labor-intensive company of fifty employees or more. From **Information Marketing Business** (877 Beacon Street, Boston, MA 02215; 617-424-1115), the software performs a variety of functions such as determining work requirements, allowing for the consideration of seniority, pay rate, and performance. Additional features include scheduling substitutions and preparing separate break schedules for all shifts. For the III only. Requires hard disk, 128K (256K is recommended), and eighty-column printer. $2,500.

☐ By piggybacking the Extend 80 card onto the standard eighty-column card that comes with the IIe, users can upgrade their machines to 128K without buying a whole new card. **Caribbean Computer Sales** (221 East Osceola, Suite 110, Stuart, FL 33494; 305-287-3336) announces the extension card, which is compatible with all existing software, including ProDOS, and supports double hi-res graphics. $129.95.

☐ A dual-function interface card that allows access to protected data and electrically switches between two printers is available from **Little Apple Service** (1308 Fleur Drive, Waterloo, IA 50701; 319-235-9127). The T-Retriever card retrieves any printed data so that the user can alter every record processed in a printed file and store this reworked data in a standard unprotected DOS file. This eliminates the need to manually reformat and reenter data for use with other programs. With the printer switching option, no switch box or second printer interface card is needed. Software is included. $169.

Cats In The Water

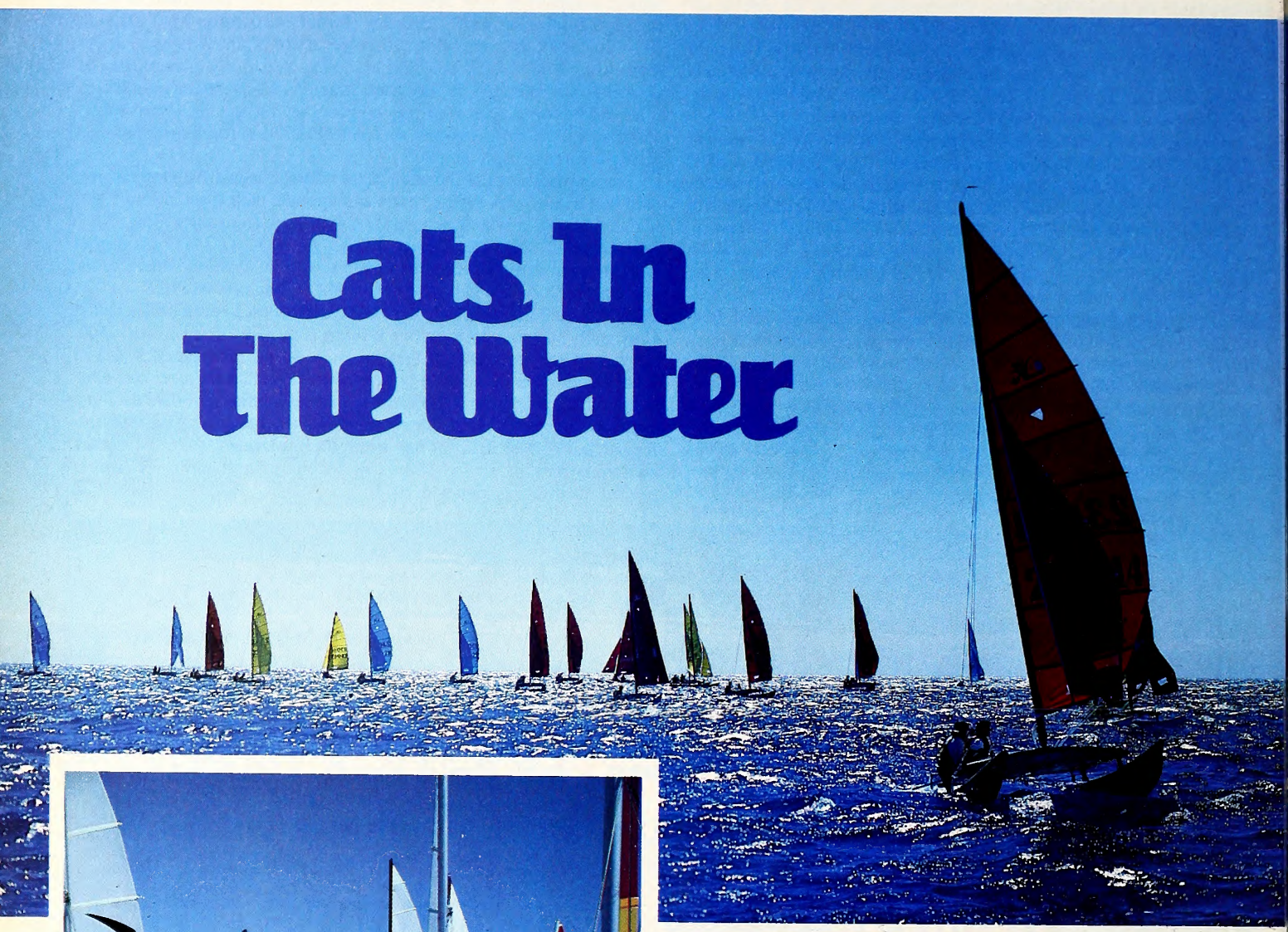


Photo by Jake Grubb

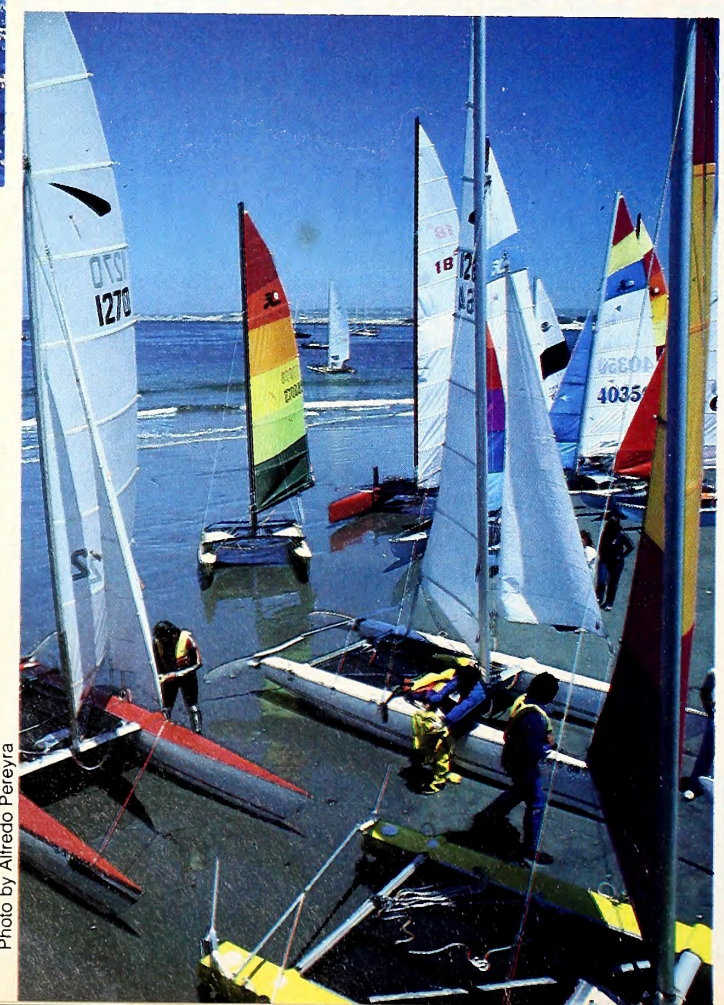


Photo by Alfredo Pereyra

BY JUDYANN CHRISTENSEN

Cats are light sailboats that skim across the water at speeds of up to thirty knots per hour. They consist of little more than a mast, a couple of crossbars, and two hulls for a deck. Cat sailors, and especially cat racers, have no need for a proper deck. Indeed, they maximize the speed and maneuverability of their small boats by leaning over the side of the hull—sometimes at hair-raising ninety-degree angles to the mast.

Catamaran racing is an exhilarating, demanding sport. With a good wind, a sturdy cat, and a lot of guts, it's possible for a sailor to travel as fast as the famed clipper ships of the last century could. A sailor must possess a certain mixture of daredevilry, cool-headedness, and brains to manage a cat on the open sea. The same combination is a prerequisite if one is planning to manage a four-day catamaran regatta.

Colin Filshie is a native Australian who first caught cat-racing fever after hitching a ride on one of these boats almost twenty-two years ago. "It turned me on so much that I haven't stopped racing them since," he says.

Filshie understands the bohemian inclinations of the sailing community because he lived that lifestyle in Australia before he

One of the most beautiful of all boating activities is the catamaran regatta. The Monterey Multihull Classic is held every year and attracts more than 1,200 entrants who sail around a four and a half-mile triangular course. This keeps the men below rather busy: from left to right, regatta chairman Colin Filshie, who keeps track of the handicaps and other statistics on his Apple IIe; Mike Woodward, race director; and Art Manson, contestant.

came to the United States. "I was living in sunny Queensland, Australia, which is a subtropical paradise," he says. "I had my boat located on the beach, just outside my business, and I'd go surfing, sailing, and racing whenever I pleased."

There's More Than One Way To Manage a Multihull. Today, Filshie manages the annual Monterey Multihull Classic catamaran regatta—the most prestigious cat gathering in North America and the second largest in the world. And it was Filshie's love of cat racing that inspired the first Multihull Classic six years ago.

It's Filshie's Apple IIs, which he's used to sail through the monumental task of race organization for the last six years, that have helped make this event world-renowned. For this summer's Multihull Classic, Filshie considers the Apple IIe an essential member of the race organization crew.

Whether you go to the regatta to sail or watch and dream, the event is both beautiful and fun. The boats start from Steinbeck's Cannery Row and their sails can be seen for miles, bobbing up and down off the rugged, dramatic shoreline of the Monterey coast. This year, some spectators will get a close-up of the action because Filshie has arranged for a one-hundred-foot luxury boat to cruise along the coastline during the races.

The fun only begins on the sea. Filshie makes plans each year that appeal to the sailors' zest for living. He schedules a busy

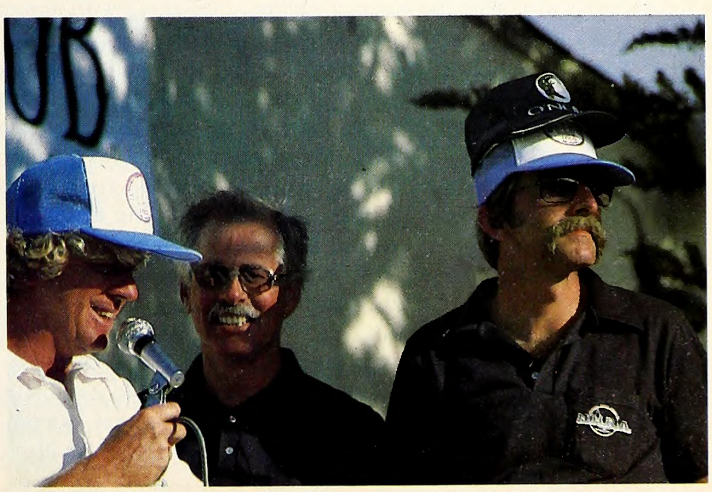


Photo by Alfredo Pereyra

Photos by Jake Grubb

social calendar during the week of racing—climaxing with dinner and a party on the beach for six hundred people.

But, as the race has grown in popularity, so has the work required to make it all happen. "Some of the first open-class sailboat races we put on were dead simple, because they had only forty or so boats," says Filshie. "When we grew to two hundred boats in thirty different classes, with as many as six races a year—that's twelve hundred boats going through the finish line each year—I forced myself to start using a computer."

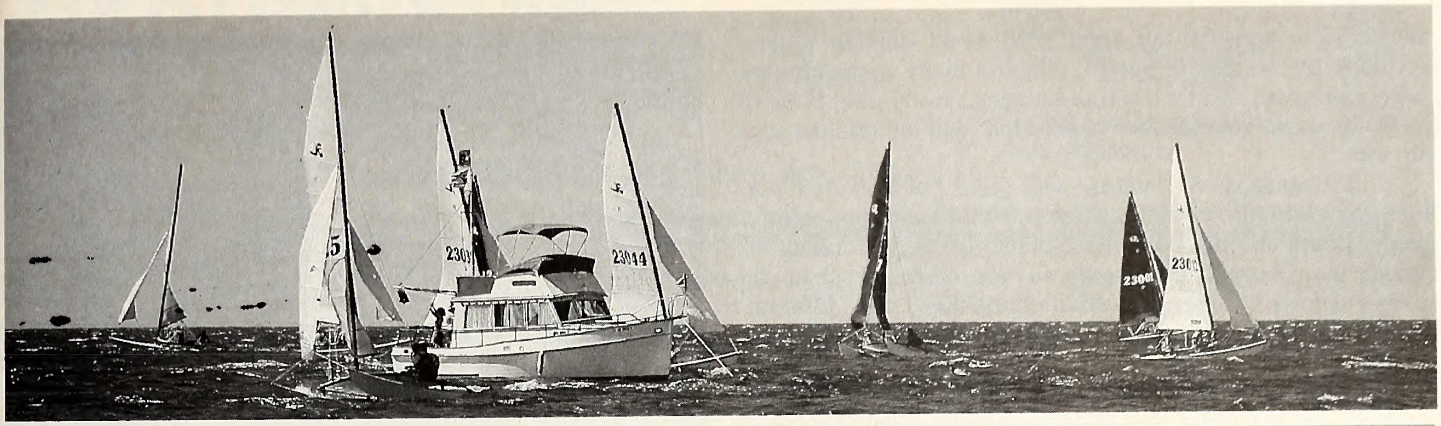
Cat Man Blues. Filshie still shudders when he thinks back to the "all-nighters" he spent compiling final statistics by hand while several hundred anxious cat owners and crew members waited impatiently to find out whether they had won or not.

Identifying the winner of a cat race is no easy task, especially in open-class races. The difficulty factor of this task is compounded because all boats start off in divisions—some by class, some not.

The course itself is actually set up around three buoys arranged in a triangle one and a half miles long per leg. The cats, according to the particular race, must make a certain number of trips around the course. Adding to the confusion, groups of cats leave on different routes around this course at five-minute intervals. Eventually, the entire fleet of two hundred boats is racing around that triangle at once.

Cats That Like To Get Wet. The hazards of racing so many boats simultaneously on one course are part of the race's excitement for spectators and racers alike. "We get an average of nine collisions per race and fifteen boats overturned a day," says Filshie. "It's a blast to see who's the quickest at righting their boats and getting back on course. Any boat under nineteen feet can be righted by the crew unless it's damaged or they're too hung over. All of that happens—we've had boats cut in two.

"Actually, it's all quite safe because we can use our five chase boats if we need to make a rescue. We try to get racers out of the



Catboating is a fast, cool, and informal sport. Two nineteen-foot-long hulls only two feet wide and two feet deep are put on both sides of an eight-foot square trampoline; because they are so simple, many people buy them and enter them in races.

drink as quickly as possible because it's real cold down there." Filshie's regatta is known as one of the safest in the world.

"Then there's always the inexperienced racers who get lost in the craziness out on the course and either provide an obstacle for boats that are on track or they finish much faster than is possible because they don't run part of the course. We can usually ferret them out because the sailors are watching each other constantly and make a lot of justified and unjustified time protests."

Filshie's exuberant hosting of the nonprofit Multihull Classic makes the task of sponsoring the event appear to be a fun-filled pastime, instead of a year's worth of hard work. But it's Filshie's passion for putting on the best race possible that makes the event grow each year in size.

"The Multihull is a truly international event that's been headquartered in Monterey since it started," says Filshie. "Last year, we had entrants from five countries. This year, the Olympics are quite close, so we expect to have world-class racers from ten to twelve countries."

Yacht racing, for several different classes of boats, has been a part of the Summer Olympics since the thirties. Catamaran racing was first introduced at the Montreal games in 1976. The class of catamaran chosen for the Olympics competition is the Tornado, which is twenty feet long and very fast.

The XXIII Olympiad's Summer Games in Los Angeles start a week after the Multihull Classic, which is scheduled for July 11–15. The pre-Olympic trials for Tornado racing are scheduled for late May and early June, only three hundred miles away in Long Beach, California. This year, several gold medal hopefuls from the United States, France, South Africa, Canada, and Argentina—including the odds-on favorite for the gold medal, Randy Smyth, currently America's National Champion and a past world champion—are expected to use Filshie's once humble regatta as a full-fledged Olympic warm-up.

Filshie's especially proud of one entry—*Beowulf V*, a thirty-two-foot-long American cat that has been clocked at a speed of thirty-two knots per hour. *Beowulf V* weighs in at eight hundred pounds with a crew of three and won the world speed record in 1974. This year, Filshie is expecting about thirty-five different kinds of cats to race in the Multihull Classic.

"Thar' She Boots." Compiling racing results is no task for a landlubber. Tracking so many boats at once takes a skilled, patient, and attentive crew. Filshie relies on volunteers, including his wife Louise. Because he has to bring several new volunteers up to speed on the race and the computer each year, Filshie needs software that is easy to learn and use.

Filshie bought his original Apple II Plus because he found that

he liked working with the Apple hardware: "It's so blasted easy that even my most timid volunteers warm up to it quickly."

Although Filshie spent the equivalent of six hundred dollars ("a ton of money, especially considering most of the effort was donated") on programmers to create his specialized racing tabulation program and its complementary programs, he ended up using a combination of commercial software.

The owner of a IIe now, Filshie relies heavily on *Quick File* for creating his master listings of racers, sponsors, and volunteers. He uses *Multiplan* to compute racing handicaps, because of its sort capability, and *Magicalc* to do spreadsheet analysis. For word processing, Filshie has gone with *Word Juggler* and *Lexicheck*. *Dollars and Sense* takes care of his accounting needs, and *Fontrix* helps him produce fliers and newsletters.

The process of recording the finishing order begins with four volunteers on the committee boat who read the finishing cats' sail numbers into a tape recorder and write them down. Then the results are brought back to the racing headquarters and fed into the Apple in the proper sequence. Filshie always makes sure that

the results he pulls off the Apple correspond with the backup recording before they're posted. Since as many as twenty-five boats can cross the finish line at once, many racers need reassurance that they finished in the order that the printout says they did.

"I like managing my database with *Quick File* because it's so flexible," says Filshie. "I can compare fifteen records on a screen at once or look at one file in depth. *Quick File* doesn't intimidate the volunteers because it's so easy to use. Its cursor can go up and down or sideways to find information. Also, information that I've saved on *Quick File* can be transferred into my form letters."

Tracking Cats and Participants. Filshie uses his Apple to pump out numerous lists of all two hundred racers and their crews in alphabetical order. For example, he prints out mailing labels, sticks them on shopping bags, and fills the bags with T-shirts, visors, dinner tickets, racing literature, and the rest of the racers' bounty. The bags are then stacked in a thirty-foot recreational vehicle, where they are ready for quick distribution during registration.

Besides housing those shopping bags of promotional goodies, this thirty-foot recreational vehicle is the mobile race central. It's home for the Apple IIe, the volunteers, and the amplifiers for the public address system. As the race runs its course, almost everyone visits race central to check out the software or to enjoy drinks in the beer garden.

The garden is actually a refrigerated trailer next to race central. For last year's race, it was stocked with more than eight hundred cans of cola, thirty kegs and thirty-five cases of beer, and forty liters of wine. Filshie can tell how much the crowd drank—right down to the last six-pack—because he tabulates the stock of drinkables on his Apple.

Photo by Jake Grubb

One year the beer garden was almost more trouble than it was worth. The beer was being consumed so heavily that every time the compressor was in use, race central experienced a power surge. Filshie grew a tad impatient as he rebooted his Apple after every surge.

Filshie keeps the information necessary to get the race off the ground in a master file that includes the mailing lists for announcement fliers and for inviting previous races' entrants. He also stores T-shirt sizes, estimated quantities of food for making orders, fee amounts (including which associations' memberships receive discounts), and codes to discern which entrants are dealers and manufacturers and in which races individual sailors are participating.

During and after registration, Filshie prints out several reports from his files. He starts off with an alphabetical listing of the entrants. After everyone's registered, he makes a sail number listing for the committee boat, a sail- and boat-type listing that he posts for the spectators, a media listing for the press, a listing for the photographers, which includes the sail numbers and names of who's sailing each boat, and two complete listings of all registrants for the door prize drawing and for race central.

On the day of the race, Filshie boots up the listing of registrants, sorts the information by sail number and class order, and adds category fields where he will post the boats' times. After the races, he scores one class at a time from the committee boat's listing and posts the list of winners' names to the crowds of anxious sailors as soon as he can rip it off his printer.

Filshie is proud to report that since he started using a computer the last race of the last day is over by 4:00 p.m. and the results of the whole regatta are ready for the awards ceremony, which is held at 5:30 p.m. But his Apple isn't necessarily shut off then. "Photographers come back to me time and again with their boat pictures but without the crew members' names. I just look up the boats' numbers in the master file and get the names that way."

No longer just a not-so-simple race, the Monterey Multihull Classic has quickly grown into a mini-cat convention. Filshie's database program matches up racers with hotel accommodations and takes note of whatever special needs the racers may have. "We also become a boutique of sorts, selling some seven hundred T-shirts," says Filshie.

Words for the Weary. Days after the race is finished, Filshie produces thank-you letters for all the participants using *Word Juggler*. With the program's form letter feature, Filshie can easily include participants' results in each race and their overall placings. He also sends the results to catamaran clubs, organizations, and magazines.

Most events that draw such exciting competitors are usually targeted by commercial interests, and the Multihull Classic is no

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Photo by Alfredo Pereyra

Race director Colin Filshie "parties," which is catboat talk for "talks," with Olympic athlete Randy Smyth, who is America's best hope for a medal in the twenty-three-foot-long "Tornado" class of catamarans.

exception. Many manufacturers take advantage of the race's high visibility to enter their cat prototypes and proven contenders.

"I also use my system for all the advance publicity and the written material that I give out during the race," adds Filshie. Besides saving time, Filshie's computerized racing system has saved him money—which is, needless to say, very important to the organizer of a nonprofit event.

"Since I set up my typesetting system, I've used the same format every year. Sponsors love to hear how inexpensively I do all this, and they love having their customized ads in the brochures."

Filshie does his own typesetting for the regatta booklet and saves about one hundred fifty dollars of the cost it would take to have the work done by an outside firm. By typesetting the seventy-five trophy labels awarded at the regatta, he saved another two hundred dollars. These savings calculations were made by Filshie with *Dollars and Sense*, the software he uses for all his accounting needs during the races.

Currently, Filshie is switching to *AppleWorks* software and he's considering a Macintosh for next year's regatta. He says that with *AppleWorks* he can work with twice as much information at once. Instead of keeping separate disks for statistics on each race as he does now, Filshie is able to merge the information for all the races by transferring information between the database and the spreadsheet and he can create as many files as he needs by making new spreadsheets and downloading information to them from the database.

AppleWorks will be especially helpful to Filshie in tabulating the crucial final results. Filshie can use the formula-function option in the spreadsheet to throw out the racers' highest scores automatically, tally the final results, and print them out with the boats listed in final standing order, ready to be posted. He can't do this with *Quick File*.

The Macintosh's *Multiplan* looks enticing to Filshie because of its sophisticated sort functions and more. Currently, he's borrowing a Mac and plans to buy one soon. "I'm using Macintosh's *MacPaint* to do the design and layout for my mailings, press releases, and the race brochure."

Filshie's advice to others who want to use a computer to manage an event like the Multihull Classic is to test their systems over and over again before using them. "You can't afford to have problems during the event," he says. "It takes away from the glamour of the system, and you'll probably be in more trouble than if you hadn't used the bloody thing."

At Home with the Cat Man's Apples. Even though Filshie works almost every night on his computer to organize races, he estimates that only 60 percent of the time he spends on his Apple is devoted to the regatta, while the rest of the computer time is split between home activities and his other career.

"My full-time occupation is as a lighting consultant for the company Duro Test, working on commercial and industrial accounts. I keep my prospect files and my working accounts on *Quick File* to keep track of when they last bought and when I should visit them next."

Filshie's computer has become a necessity for him. Not only does the computer help him with the accuracy and timeliness of his record-keeping for the races, but "it allows me more free time to party with the crews."

Staging cat races for the sheer joy of it is a small concession to Filshie's past and a good excuse to feel the cooling calm of sea breezes on his face. ■

Photo by Jake Grubb

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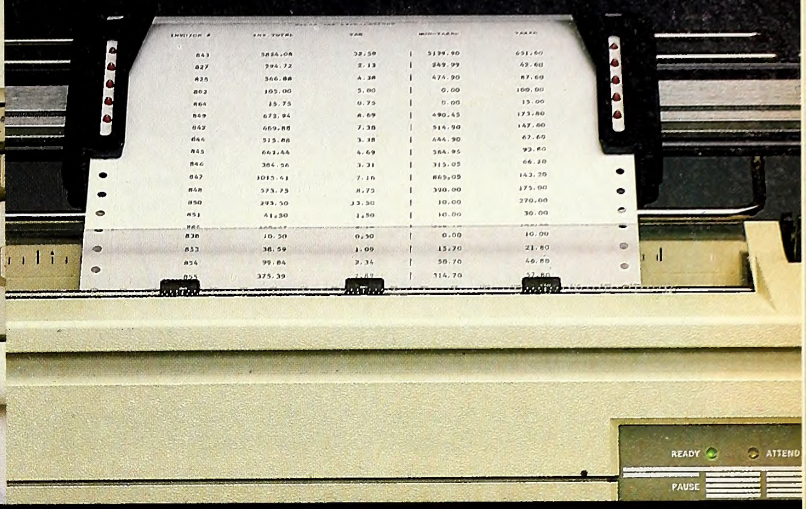

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MARKETALK

Reviews

Unless otherwise noted, software can be assumed to run on any Apple II with 48K and one disk drive. Programs that meet these minimum requirements will usually run on the III.

The strange initials at the ends of reviews refer to the Softalk *staff listed on page 4. The guest reviewer for this issue is Cary Hara.*

Ever wonder what life would be like without software and peripherals? Pretty darn boring. And miserable. However, sometimes programs make life even more miserable when they don't live up to their expectations, as many computer owners can attest.

Since it's nearly impossible to test every piece of software you might be interested in, it's sometimes helpful to see what someone else thought of a program before laying down the cash. Which is why we have this reviews section—to help you decide whether something's worth its price tag or even worth the space it takes on a disk.

Sure, there are a lot of game reviews this month, and for good reason. It's summer! Well, almost. Actually, it's spring, but summer will be along shortly.

What follows is an early start on our annual summer reviews blowout. Usually, this reviews blowout begins in July, but the programs began piling up, complaining about the heat, getting grouchy, and becoming impatient.

So, here it is, the Fourth Annual Softalk *Summer Marketalk Reviews Bonanza Blowout!*

SORCERER. By Steve Meretzky. The strongest effect Infocom's sorcery weaves in the second of its Enchanter games is the outcome of a spell by which the enchanter can move forward in time—just a tad. But it's enough to precipitate an awesomely convoluted situation that, complex mental gymnastics mastered, is absolutely logical. The puzzle enmeshed in all this, along with its logistical substumpers, may well be the piece de resistance of all Infocom's brain twisters.

Enough said. You'll read no potential clues here that might dilute the delight of solving this one yourself.

Perhaps the most noticeable characteristic of *Sorcerer* overall is the variety of ambiances and tempos it encompasses. Underground and surface empires intertwine with each other and with bits and pieces of other worlds. Imagine Valley Forge on a cliff overlooking the Flathead Ocean, Johnson Wax on a turnpike guarded by gnomes, Coney Island in a giant cave.

In the last of these, Bozbarland, "a magical futuristic fantasy amuse-

ment park," resides an eloquent argument for the power of text in adventures: it's a roller coaster. Enter the car that temptingly waits on a nearby platform and the ride begins. Steve Meretzky's brief, simple, blow-by-blow account of the action is apt to have you clutching for the guardrail. In the game as in real life, the roller coaster is a diversion serving no real purpose; but it's well worth the ride.

All Bozbarland captures the honky-tonk flavor of the midway, with its atmosphere of elbow-bumping impatience, smoke-filled sleaze, and the fast breakaway speed of the rides. Yet the brush strokes are few and only detailed at their ends—the roller coaster, a flume ride, a haunted house, a carnival game complete with well-caricatured shill, and even a crooked casino slot machine. You can almost hear the tinny music.

Leave Bozbarland, and you're in a silent world of craters and chasms, where money grows on trees—until you pick it. Or tunnel up to the surface of the earth, where plagues of locusts distract from mine fields, where rustic bridges collapse in disrepair and riverbanks crumble in the sun.

Then there are the war memorials, with a different kind of silence—the turreted ruins of an old fort, parade grounds in dishabille with an ancient flag somehow flying still, an armory fallen victim to vandals and looters, a solitary cannon inhabited by forest critters. And deep in the bowels of the earth below, all that remains of the castle that predated the fort: its dungeon.

A coal mine is alive, its eternal night smacking of the nineteenth century, despite the faceless diligence of the Orwellian troglodytes that work its endless shafts.

Finally, a glass palace, Infocom's 1984 answer to the twisty little passages all alike of the original adventure. Like a labyrinth of mirrors in three dimensions, the crystal palace cannot be solved by dropping possessions. Indeed, the layout of the maze is far less complicated than that. It's just that with all the glass and the glare of brilliant light bouncing among walls and ceilings and floors, you can't distinguish anything; in essence, you can't see. It takes thinking outside this cube and clever use of resources to solve this one.

All these worlds are a long way from the monastic serenity of the Enchanter's Guild headquarters in which the game begins.

Then, when you've explored and restored a hundred places a hundred times and you finally reach the cool clean air of seashores and lazy lagoons, it's all for naught. Time, you discover, was of the essence. So it's back to the beginning, playing through with an economy of moves, to give yourself time to tackle the end game.

And what an end game it is. It gives no quarter; every move must count. Every part of the enchanter's being is besieged by needs and shortages, frustrations and threats. Somehow keeping it all together, you must solve a dozen puzzles that seem like a hundred, finally to earn the greatest possible reward as enchanter and a thoroughly satisfying intellectual reward as player.

You'll have worked hard for it. Throughout, *Sorcerer* is filled with puzzles that stop you but don't stump you; in almost every case, you'll feel like the answer is right there if you can just put the pieces together. The game stops you not in frustration mode, but in hard thinking mode. And that's great. That's what adventuring is all about.

And in a sense, 90 percent of this superior game is like a bonus; the altered-time puzzle is just about worth the price of admission all by itself. An inquiring mind could spend days after solving that puzzle just mulling over its implications, the possibilities it suggests.

As has become usual, Giardini/Russell's implementation of Infocom's documentation is superb. It's also essential. Not usual, but a first for Infocom on Apples, players with IIes and IIcs can opt to play in eighty-column mode with lower-case text.

Steve Meretzky's auspicious debut as a software author was made with *Planetfall*. *Planetfall* was good, but *Sorcerer* shows considerable development, tighter integration, and just plain polish. Keep it up, Steve, and we'll be looking for you to precipitate a Pulitzer Prize for interactive computer adventures.

Watch out for Berlyn, though. MCT

Sorcerer, by Steve Meretzky, Infocom (55 Wheeler Street, Cambridge, MA 02138; 617-492-1031). $49.95.

PRINT-IT! Perhaps the only thing more confusing than figuring out which graphics printer interface card to buy is figuring out how to operate a graphics card after you've bought it.

Graphics cards are usually command-driven; that is, in order to print a picture, you have to type commands at the keyboard to tell the card what to do. Command-driven cards are fine for experienced computerists, but a lot of the beginners (and programmers, for that matter) who buy these cards would be better off with something simple.

Up until now, the best alternative for these people has probably been to use a menu-driven graphics dump program and to forget about graphics printer cards altogether. But now there's a graphics card that combines the speed that experts like in a command-driven system with the simplicity that beginners need. It uses a push button. From outside the machine, the Print-It! card looks like nothing more than a bright red button (the button is actually connected to an interface card inside the Apple). When the button is pushed, the computer stops what it's doing and beeps. Pressing the return key at this time will print whatever is on the screen, be it forty-column or eighty-column text (with Videx or Apple IIe eighty-column cards), lo-res graphics, hi-res graphics, double lo-res or double hi-res, or any mixture of text and grahics.

That standard print command—the button followed by the return key—prints a centered image, in the smallest scale, with white screen dots appearing as black printed dots. The smallest scale is about four inches wide, a size that may vary from one printer to the next. For times when you want some variation in printouts (different scale, for example), there are several optional one-key commands that will do the trick.

Like other graphics interfaces, Print-it! receives commands from programs as well as from the keyboard. The manual includes instructions for including printer dump commands in Basic and Pascal programs and for advanced use of the card's capabilities through assembly language.

Installation of the Print it! card is easy. Because different printers accept different graphics commands and different interface standards, you have to tell it what printer you have by setting a bank of switches on the card. Among the printers supported are a few color printers and a few serial printers as well as most of the popular parallel black-ribbon models. Smart shoppers will find out before they buy whether their dot-matrix printer is among them. The card goes in slot one, a cable connects it to the printer, and the button can be mounted anywhere, provided its wire will reach the card.

The most serious drawback to Print-it! is the danger presented by a push button that will interrupt any computer operation. Most of the time, a computer's task can be stopped and then resumed without any serious consequences. When the disk drive is in operation, however, an interrupt, like a reset, can damage the information on the disk. The manual warns against such a hazard, but not stridently enough. A Print-it! button is not a good addition to a computer that's used frequently by small children.

Print-it! has a lower-priced sibling called Model 2, which has everything that Print-it! has minus the push-button feature. Except for the variety of serial and parallel printers that it's compatible with, the Model 2 is a pretty standard command-driven graphics interface card. DD

Print-it!, Texprint (8 Blanchard Road, Burlington, MA 01803; 617-273-3384). Print-it!, $199; Model 2, $149.

THE PRINT SHOP. By David Balsam and Martin Kahn. This is not a game. Repeat, this is *not* a game. Therefore, it shouldn't have everyone in the family lining up to play with it, it shouldn't draw crowds at gatherings, and it shouldn't be incredibly addicting. But it does, and it is.

It's also useful, productive, conducive to creativity, and maybe even money-saving.

The Print Shop prints greeting cards, letterheads, signs, and banners. Ready-made setups for standard occasions ask for names and vital facts, and they're quick. With a built-in graphics editor, you can go to the other extreme and create your own graphics from scratch. But the most value, and lots of fun, comes in putting together your own designs and messages from the graphics and typefaces provided in *The Print Shop*.

By means of self-explanatory menus, you choose the elements of your creation. The program offers nine borders; ten background patterns; thirty pictures, from a birthday cake to a trumpet to a yin-yang symbol; and eight type fonts, each in large and small sizes, and in solid, outline, and three-dimensional form. The pictures come in three sizes and several layouts. When letters overlie graphics, the graphics are automatically erased where the letters go to help the type stand out. You can

place type anywhere that it will fit on the page, or you can have the program center it for you.

Cards print out with the inside upside down in one quarter of a piece of regular printer paper and the cover right side up in the opposite corner, so that when you fold it into quarters it opens and reads like a card. Oh, yes—let's not overlook the back of the card. *The Print Shop* provides for a line of credit, just like the trademark line from Hallmark or Norcross. You get to make up what it says.

Signs are small posters—eight and a half by eleven. You get just about all the choices you have for cards, except that signs are only one page, and you don't get credit. At least not on the sign.

The Print Shop letterhead provides for top or bottom addresses, logos, and graphics, set off by hairlines or not. Borders (tastefully) are not available.

Banners come in one height—the width of printer paper—and in many lengths—up to about fifty (*big*) characters. This section offers the fewest choices: picture before, after, or at both ends of your message, the content of the message, and the typeface, in solid or outline style.

It's getting to be a habit in Broderbund programs; consideration for the user is rampant. All choices are graphically represented on the screen as you make your selection; the menu of borders is surrounded by the border whose name is highlighted: as you browse for graphics, a window flashes the picture you're considering; typefaces speak their names in their style and relative size.

Should you make a mistake or change your mind, *The Print Shop* is all-forgiving. You can always escape to the previous screen, and from there to its previous screen, all the way back to the beginning. As you do, or when you make a change and start forward again, *The Print Shop* remembers everything you've done and defaults to your previous selections. So you don't have to repeat anything you're not changing.

Then there's Screen Magic. *The Print Shop*'s graphics editor is adequate to the task (it gets better when you use the KoalaPad for input; joystick works okay, too), but it's not the greatest graphics generator you ever dreamed of. Screen Magic enables you to pick up pictures from that dream graphics program and use them in *The Print Shop* creations. On paper, hi-res colors are printed as discreet shades of gray.

Screen Magic contains an unexpected bonus—another phenomenon we're apt to begin to expect from Broderbund (despite the contradiction in terms), having been spoiled by the control panels in *Spare Change*, the editor and level generator in *Lode Runner*, and this. The bonus consists of two kaleidoscopes, the first of which is unique and fascinating. It uses no lines, but draws brightly colored, pulsating patterns from thousands of single pixels; the effect is a glitter and gleam that looks like silver and gold and glistening gems and fireworks and neon lights and sand paintings all at the same time.

The other kaleidoscope is a more common random hi-res sequence. Both can be frozen at any instant and the frozen screen saved for use in *Print Shop* productions. You can also place type on the frozen screen, or on any screen you bring from another program, from within Screen Magic. This is the only situation within *The Print Shop* in which you can see on-screen how any part of your creation will look.

By the way, you can't save the full configurations of your *Print Shop* creations on disk. Print out as many as you like of a design, but if you go on to another design, or quit for the night, you'll have to reinput the entire design to use it again—which, once you know what you want, may take as much as a minute. (You can, of course, save graphics you create to use within your designs.)

With *The Print Shop*, microcomputing's leading home-arcade producer forays into the special-interest home productivity market. That this is a good, viable product makes a point about spirit: When Broderbund's not making games, it's making *non*games fun. Okay, Broderbund, where's your checkbook program? Your nutrition package? Your exercise disk?

The Print Shop feels like a game, but it produces stuff you can use. MCT

The Print Shop, by David Balsam and Martin Kahn, Broderbund Software (17 Paul Drive, San Rafael, CA 94903; 415-479-1170). Requires printer (compatible with most popular brands, but check yours). $49.95.

OIL'S WELL. By Thomas Mitchell and Ivan Strand. *Oil's Well*, or *Pac-Man on a Leash*, is a fun game once you get to know it. The premise is simple—you are an oil baron drilling for oil; a competitor has booby-trapped your well with bombs and "oozies," gargoylelike creatures that slide around in the well. You guide the drill bit, which looks amazingly like a sewer rotor, around under the earth, picking up oil deposits and getting extra points for an extra-rich deposit. You can destroy the oozies with the drill bit, but if one should hit the pipe you're shafted.

There are three crudes of difficulty, and if you're not afraid of getting your hands dirty, *Oil's Well* is a lot of fun. The rubber-band-like snap of the retreating drill bit is very effective and satisfying, and clearing an entire screen of oil deposits requires dexterity and guts. For some reason the second level is easier than the first; the oozies come less frequently. The third level is harder, the tunnels more intricate than those of levels 1 and 2. As an aside it is perhaps worth mentioning that, inexplicably, the third level shows houselike structures under the earth. Perhaps the author confused oil drilling with coal mining—if so, where's the canary?

Levels 4 and 5 are more mazelike than the earlier tunnels. You have to give more thought to where you are guiding the drill bit. However, the game never requires a lot of strategy. Play consists mostly of eating oil deposits and oozies and escaping from ticklish situations. The game might be more satisfying if the attack had to be more carefully planned. As it stands, the only skill involved is fast joy-sticking.

The action is good. The drill bit recedes quickly; the ability to get out of danger is satisfying. If you're fair, you won't curse the program or your joystick when you get oozied.

The sound toggles on and off, all but the opening rattle, so you can play without waking the neighbors if you can muffle the beginning sound with a very loud, sustained cough.

High scores are shown, with the option of erasing the high scores list and starting over (which is all well and good unless they're your scores that are deleted).

The oil well theme is effectively supported by the different screens. They are well drawn and colorful (although a greater diversity in colors between levels 3, 4, and 5 would be nice), and the maze designs are interesting to look at. Overall, it has an attractive look.

The menu provides a two-player option, and players may select their own ability level, so an advanced player can be handicapped to play a less capable one. An unusual aspect of two-player play is that final scores are not shown side by side—players must remember the score that was last showing when they lost the final drill bit or the victory will be contested. If a high score is made by only one of the two players, the high score will be shown; so it will be obvious who won, but the loser's score won't come up, tarnishing a blowout victory or perhaps mollifying an embarrassing defeat.

Oil's Well is not a bad program, but it's beleaguered by small, almost insignificant problems, not the least of which is its title. Overall it is colorful, fast, logical, challenging but not frustrating, and not varied enough. Use it for a month and give it to a distant cousin. TZ

Oil's Well, by Thomas Mitchell and Ivan Strand, Sierra On-Line (Sierra On-Line Building, Coarsegold, CA 93614; 209-683-6858). $29.95.

TERMEXEC. Most modem users will agree that what the software industry needs most is a powerful terminal program that's easy to use. At one end, there's *ASCII Express: The Professional*, the *WordStar* of modem software; it's powerful, but a bit bulky for the novice. At the other end is *Apple Term II*, which does little more than dial the phone. In the middle are all those programs that try to be both powerful and simple to use, but usually end up making things unnecessarily complex. *TermExec* is one of those in the middle.

Credit must be given to the designers of the program. They took just about every feature anyone could ever want in terminal software and packed it into the program. Unfortunately, using those features isn't that easy. Although most of the program's commands are completely logical (*send* sends, *save* saves, *lock* locks), how to use them can be confusing at times. For example, TE (for terminal) puts the program in terminal mode. But to hang up the phone requires an escape-! followed by a *te - end*. Not just a *te end*, but a *te hyphen end*. *TermExec* forces you to pay attention. Miss a hyphen, the command doesn't work.

Beyond the usual data capture and sending and receiving of files, *TermExec* has a feature that lets you build miniature programs (macros) that will take care of tedious log-on and download-mail functions that are common on bulletin board systems. By issuing the command, *learn*

filename, the program will note all the keystrokes you use in performing log-on and download chores on a particular remote system, and then save those keystrokes as a text file under the file name you specify. Compared to similar functions in other terminal programs, this is probably the easiest way to build a macro. There's no memorizing of prompts; just use the system as you normally would, and *TermExec* remembers what you type.

Vertical and horizontal scrolling, though annoyingly slow, is a handy feature of the program, allowing you to see what's disappeared off the screen without having to display the entire buffer from beginning to end. But because of the way it plods along, a faster one-way scroll would be preferable.

Included is a text editor, which takes almost as long to learn how to use as the program itself. One curious point is that *TermExec* takes advantage of the Apple IIe's up and down arrows and all but ignores the tab key; trying to use tab results in a beep and a screenwide banner message telling you that you're using an undefined key. The tab key is just an example. Unless you're in the command mode, any "undefined" key will beep and bring out the banner. Even if it's a simple message you want to create, forget the editor and use a word processor instead.

To transfer files, *TermExec* uses xmodem (a program with a built-in error-checking protocol to make sure data remains intact during transmission), which means you can exchange files with another computer that's also using xmodem. This is a snap, as long as you can remember commands like *rec -x filename* and *escape-! send -x filename*. And don't forget the hyphen.

TermExec is composed of several programs, the main one of which is written in Applesoft. In other words, it can be slow at times. Periodically, it will pause (*really* pause) after receiving a command, giving the appearance that the program has hung or crashed. Don't dare hit the reset key to get out of it, though; *TermExec* guards against hitting reset by going into DOS, from which you must restart the program. The program's still in memory, but issuing the Applesoft *run* command won't do it. This teaches you the hard way to never hit reset again, not even accidentally.

There's great motivation to like *TermExec*. It's powerful, comparably inexpensive, and versatile. Software with these qualities deserves to be successful. Software that frustrates and confuses doesn't. MTV

TermExec, Exec Software (201 Waltham Street, Lexington, MA 02173; 617-862-3170). $79.95.

C'EST LA VIE. By Gordon Eastman. For some of us, a certain moisture comes to the eye and a certain warmth is felt under the breastbone at the mention of *Star Maze*. It wasn't the biggest-selling Apple arcade game, nor was it the best, but it had . . . something.

For those who loved it, it's back. For those who yawned and walked away, it's worth a second look. Gordon Eastman obviously knew he had something solid and has refused to let it die. Thus: *C'est La Vie*. Gone are the space ships and the impossible speed control; the meteors, lasers, and monsters. Gone, in other words, is that galactic chill that may have put folks off the first time around. Left intact is everything else, now decked out with funny little down-home characters all chasing after the great and powerful buck.

It's certainly easy money, as the streets of this scrolling maze are paved with bills of denominations ten through fifty. All you have to do is pick them up. Unfortunately, even that constitutes hard work to your fellow citizens: tax collectors and muggers. They find it much easier to take the money after you pick it up. If run into, the former will relieve you of half your cash on hand; the latter will take it all. If you are sufficiently nimble, however, they can be dodged and then lost in the turns of the maze. As a more permanent safeguard, you can stash your cash in a savings account at the bank, or buy and sell stocks at the stock market. There is even a loan company to take care of your hospital bills, which you incur every time you run into a wall. While the avoidance of the tax man in *C'est La Vie* is delightfully unlike reality, the mechanics of loan sharking are faithfully reproduced: If you don't pay off your loan in two months, the company sends out some goons who put you back in the hospital, and back in debt.

All this is not without its flaws. It is possible to run into a wall, and, while lying there helpless, watching the stars dance around your head, get hit by both the tax man and the thief (they like to stick together), then wake up in the hospital a moment later with a large bill and no money. And don't worry about mortgage payments; the bank remembers for you. Monthly payments are automatically deducted from the savings account.

But there are plenty of mazes, and three levels of difficulty. The game has *Star Maze*'s depth of play, as well as the expanded breadth of its new design.

If you never would have believed that a space-maze shoot-'em-up could be turned into a respectable little economic simulation, think again. *C'est La Vie* is a felicitous combination of *Monopoly* and *Pac-Man*, retaining the visceral attractions of both those old stalwarts. AC

C'est La Vie, by Gordon Eastman, Adventure International (Box 3435, Longwood, FL 32750; 305-862-6917). $19.95.

DOCUMAX. By Arthur St. Hilaire and Robert Tripodi. A filing cabinet does not an organized person make. If you can think of a disk as a filing cabinet for information, here's a program that will help organize what's in the cabinet.

Documax takes tedious housekeeping chores related to data files and makes them a breeze to perform. With *Documax*, you can compress and decompress files, examine them, search them for phrases, sort file names on the catalog, transfer files among disks, and delete and rename files.

Computers are supposed to make our lives easier, but when disks start piling up, keeping track of them can be almost as much a pain as keeping track of hard copy printouts. This program helps keep disk contents tidy and in order.

The program handles files created by any program that generates ASCII-coded information and stores them as DOS 3.3 binary files or sequential text files; in addition to *Apple Writer*, *Screen Writer*, *Bank Street Writer*, and most communications programs, *Documax* is also compatible with those that generate DIF files.

Compression is the most powerful and useful feature. It's pretty amazing that one disk can store as much information as it does; it's even more amazing how much *Documax* stores on a disk after files have been compressed; most files can be reduced to half their original size.

Compressed files can't be manipulated by the programs that created them (compression is mainly for storing data you don't plan to change often), but it's possible to recover compressed files to their original form

for editing.

Inspecting files and searching for phrases can come in handy when you're looking for a piece of information but can't remember where it was. Inspecting lets you scroll forward and backward through a file as you would flip through the pages of a file folder.

Searching for words and phrases isn't sufficiently thorough. *Documax* lets you input one or two phrases of up to thirty characters, search for files that include both, or search for files that include one but not the other. The shortcoming is that it finds only one occurrence per file of the desired phrase and displays the file that contains it. If the file contains many occurrences of the phrase and you're looking for one in a particular context, it's necessary to scan through each of the marked files.

Sorting file names in the catalog is particularly helpful. There are other programs that alphabetize files or sort them by file size; *Documax* sorts alphabetically, and it also puts files in almost any order you choose. With the catalog on the screen, you can assign priority numbers (from zero to nine) to files. Suppose you want all files that are *VisiCalc* DIF files at the beginning of the catalog; assign the number zero to those. Suppose you want business letters to appear next; assign them each the number one. And so on. Once the files are assigned to number groups, *Documax* puts groups in numerical order and alphabetizes files within each group.

Almost anyone who generates a lot of textual data can appreciate the compression and sort functions. The others are nice extras. Fast and wonderfully easy to use, *Documax* is a handy utility for organizing and keeping track of files, but its steep price tag may dissuade a few. MTY

Documax, by Arthur St. Hilaire and Robert Tripodi, Signum Microsystems (120 Mountain Avenue, Bloomfield, CT 06002; 800-642-7611, 203-726-1911). $175.

KIDWRITER. By Jim and Jack Pejsa. Back around second grade, one of the more enjoyable classroom assignments was to take a large piece of foolscap, half lined for words, half blank for pictures, and use this double medium to draw and describe whatever you wanted. From field trips to the local zoo to the lyrics of "Puff the Magic Dragon," the versatile page lent itself to the description of fact or fiction while helping you make the transition from communicating with pictures to communicating with words.

Kidwriter gives kids a chance to do much the same thing, high-tech style. They place their choice of provided figures against any of ten backgrounds, then type a story to match.

The graphic symbols available (not presented in much detail, alas) represent objects such as people, outer-space beings, buildings, trees, letters, and numbers. They can be moved around the screen, made bigger or smaller, and painted in six colors.

The word processor is easy to use. It's truly of the no-frills variety, but it has most of what the target audience (ages six to ten) would want or could cope with. Editing keys include cursor movement one line up or down or one character left or right, delete, home, and clear. According to the company, each story can be as long as ten eight-line pages, and you can store approximately one hundred medium-length titles on the program disk.

Unfortunately, once you've created your illustration and finished your text, you can't go back and add to or edit them. Also, you can't print out a hard copy of your work. Finally, it would have been super if, along with being able to choose from among the ninety-nine characters, you could also draw your own. With such an option, the program would truly re-create the pedagogically sound picture-book exercise and introduce children to the rudiments of word processors and drawing programs.

There are other child-oriented word processors and drawing programs that offer more sophistication, but only *Kidwriter* has attempted to fuse the two concepts. Therefore, despite its limitations, *Kidwriter* is an interesting and enjoyable elementary educational program. Greater flexibility would make it more valuable and more fun. JP

Kidwriter, by Jim and Jack Pejsa, Spinnaker Software (215 First Street, Cambridge, MA 02142; 617-868-4700). $34.95.

B.C.'S QUEST FOR TIRES. By Justin Gray. Sometimes, when a game starts out on one computer, becomes a hit, and starts getting translated to a lot of other computers, you get the feeling that all that traveling makes it very weary. By the time it finally arrives on your computer, it's exhausted. It gets on, gives the minimal version of the performance the critics were raving about when it began, and gets off as quickly as it can. Such is the case with *B.C.'s Quest for Tires*.

The basic idea is to rescue the Cute Chick from the dinosaur, traveling across the prehistoric terrain on your stone unicycle. You dodge rocks, potholes, and the Fat Broad, jump across turtles' backs, and get through a cave and the most orderly and well-mannered "volcanic eruption" ever recorded. The graphic re-creation of Johnny Hart's comic strip characters is quite good, though that has as much to do with the source material as the programming. (Let's face it; we're never likely to see *Prince Valiant's Quest for Tires*.)

You can travel from 10 to 80 mph, wherein lies all the strategy in the game. Using the buttons on your joystick (the need for which is mentioned nowhere on the package), you increase or decrease speed, depending on the spacing of the rocks and potholes as they appear on the screen. Beyond that, it's just a matter of timing your jumping and ducking correctly. Alas, as with too many Sierra On-Line games of late, if you've figured out one way to get through a sequence, you've figured out every way there is.

Most egregious of all, the game is forced to cheat. You can't reduce your speed to under 40 mph after the first screen. There is no external reason given for this; the obvious one is that it would make the game too easy, so the option is quietly removed. The creation of a false parameter is equivalent to changing the rules in the middle of a game when it looks like you're losing. It's the kind of shortcut that makes a game designer's job easier, and with this design it certainly looks like someone was taking it easy.

If you have ever seen, or even heard of, the Coleco and Atari versions of *Quest for Tires*, you will be acutely aware of what could have been when looking at this one, and you will be forced to wonder what happened. It's not just a matter of inferior graphics, for which the company could blame the difficulty of transporting a program designed for one kind of graphics chip to a very different one, but of sequences reshuffled for no apparent purpose, and the elimination of simple, effective pictures and small, challenging touches that made this game an amusing diversion in its other incarnations.

Graphically, as a matter of fact, this version is not chopped liver. The

scrolling background and rolling stones are very well done indeed. Such grace notes as one screen going into the next without so much as a pause or flicker, and the loss of a man returning you to the beginning of the last completed sequence and not the beginning of the game, are preserved intact. There just isn't much opportunity to admire them. AC

B.C.'s Quest for Tires, by Justin Gray, Sierra On-Line (Sierra On-Line Building, Coarsegold, CA 93614; 209-683-6858). $34.95.

GRAPHICMASTER. By Robert Scott. *Graphicmaster* is a graphics utility package consisting of five modules, each of which can be run independently from the others. Unlike some of the other graphics packages currently available, which consist of little more than a bunch of graphics routines thrown onto a disk, this package was written with the nonprogrammer in mind. No experience in assembly language is necessary and only moderate familiarity with Applesoft is required in order to produce professional-looking presentations.

The first module, Fontcaster, creates and edits fonts to be used in *Graphicmaster*'s graphics routines. *Graphicmaster* uses four font sizes, but because of memory restrictions only two of them include lower case. Once you select a grid size and load in an existing font (or start anew), you can select a character and edit it using a keyboard-controlled cursor. The editing is done in an enlarged grid on the left side of the screen while the actual character is displayed on the right side to show the actual results of the editing.

One powerful feature of Fontcaster is its ability to move another character to the current grid, allowing you to create similarly shaped characters without having to start over from scratch. For example, if you moved an O onto the Q grid, simply adding the tail would create the Q without having to reenter the O part of it. The simple operation of Fontcaster makes it a nice complement to *Graphicmaster*'s text routines in GR&MPS (described later).

Bitmap Wizard, the second module, captures different-sized portions of the picture on the hi-res screen. By repeatedly editing a framed portion a little differently each time, it's possible to create animated sequences from one basic picture. Single-key commands let you shift the framed image up, down, left, or right. For modifying the picture, there is a choice of variously shaped brushes ranging from a single pixel to a small block.

The Patternmaster module lets you put pictures against multicolored backgrounds. Like editing fonts in Fontcaster, editing patterns is done on an enlarged grid. Once the pattern on the grid is defined, it can be repeated to fill up the entire screen or a portion of the screen.

Window King defines windows, to be used later in GR&MPS. These windows are basically predefined areas of the hi-res screen. Since the windows have been saved, and perhaps are used often in the presentation, they do not have to be redefined.

The fifth module compiles the results of the other modules. GR&MPS is a set of graphics routines that you can get to with the ampersand (&) I/O hook in Applesoft. Since the routines can be called through Basic, you can set variable parameters, and commands can be put into a loop. Armed with the twenty-four ampersand commands, you can add text to the screen, move portions to other parts of the screen, and create animation that will blow your friends out the door. Well, at least across the room. Even if you don't know much about Applesoft, you can still produce snazzy presentations, because the commands are so easy to use.

Overall, Tid Bit Software has a winner. This set of simple-to-use utilities takes the pain out of doing complex graphics. Included on the program disk is an impressive demonstration program that shows off all the powerful features of the package. For curious programmers, listing the program (it's in Applesoft) will show you what makes it tick.

The package is designed to be used with any hi-res pictures you might happen to have on disk. Unfortunately, *Graphicmaster* doesn't include a module for creating pictures, but the package's power as a whole outweighs this absence. Although the price may be a little steep, its simplicity and power can make almost anybody's dull graphics presentations come alive. CH

Graphicmaster, by Robert Scott, Tid Bit Software (Box 5579, Santa Barbara, CA 93108; 805-969-5834). $79.95.

BANK STREET SPELLER. By Sensible Software and the Bank Street College of Education. Here are brief, yet complete, instructions on how to use *Bank Street Speller*: Boot the disk and follow the instructions on the screen. That's all.

Bank Street Speller is as simple to use as the word processor it complements, *Bank Street Writer*, and is just about as elaborate. But it doesn't matter, really, since this is the only spelling checker designed for the word processor. The other alternative is to convert *Bank Street Writer* files to standard text files (ick) and run them through *Sensible Speller*.

Before beginning, it's necessary to customize the program to the particular system on which it will be run. Which slot for data disk, how many disk drives, which slot for the printer, and the kind of keyboard you have are the types of things you're expected to answer. Of those, the keyboard question causes the most confusion. When asking "lower-case adapter?" it doesn't mean "Do you have a lower-case chip?" but rather "Do you have a keyboard enhancer plugged into one of your slots?"

Using *Bank Street Speller* is as easy as using the word processor, because both are designed almost identically. Selecting options from the main menu, loading files, and reverting to previous menus look just as they do in *Bank Street Writer*.

A difference between the two programs is that a large text file won't fit into *Bank Street Speller* at once. Instead, the program goes through the file in parts.

The program checks for spelling errors in the conventional way; it reads the text file, reads its dictionary file, and then highlights words in the text file that weren't found in the dictionary. While a highlighted word is on the screen (in context of the sentence in which it appears), you're given the option of ignoring the word if it's spelled the way you intended, adding it to the dictionary for future use, replacing it with a different spelling, asking the dictionary for a suggested spelling if you're not sure, or searching the dictionary for similar spellings.

When you ask for a suggested spelling, the dictionary looks for words that contain a lot of the same letters in the same order as the word in question and then displays them. But somehow, it never believes that the first letter of the word might be wrong. To take an extreme example, if the misspelled word is *fiscuss* (instead of *discuss*), the dictionary will look for similar words beginning with f, not taking into consideration that the rest of the word looks like part of *discuss* or *discussion*. Or, if the initial p is missing from *psychology*, the dictionary will look for a word that looks like *sychology*, beginning with s.

Searching through the dictionary requires more input but is a more effective way of finding the word you want. You can type the letters that you know are correct and substitute "wildcards" for those you're not sure of. Typine *mon=y* tells the dictionary to find words that begin with mon and end with y. With that in mind, the dictionary spits out words like money, Monday, monastery, monthly, monopoly, and so on.

The dictionary contains about thirty-one thousand words—quite limited, to be sure, but adequate for most people whose word processing needs don't demand knowing how to spell the most obscure of words. Occasionally, it turns out that the dictionary doesn't contain some relatively commonplace words. Don't sweat it. Its thirty-one thousand words comprise a little more than half of what you can fit on the dictionary disk, and adding words to it is as easy as pressing a key. (Note, however, that to add words or to make a duplicate of the dictionary, you must have two disk drives.)

As a side feature, the program counts the total number of words and number of different words in the text file and displays each word as well as how many times it was used. Also, it displays a list of words not found in the dictionary. Both lists can be printed to the screen and printer.

Comfort and ease are part of what makes *Bank Street Writer* so popular. Those same qualities are contained in *Bank Street Speller*, a program that does a lot of hard work while making it look easy. MTY

Bank Street Speller, by Sensible Software and the Bank Street College of Education, Broderbund Software (17 Paul Drive, San Rafael, CA 94903; 415-479-1170). $69.95.

MASTERING THE COLLEGE BOARD ACHIEVEMENT TESTS: ENGLISH COMPOSITION. By Douglas Higgins. Even if you're not actively preparing to take the English Composition Achievement Test (ECAT), this five-disk program offers a thorough review of some basic grammatical points that may prove helpful to students and writers at many levels. The catch is that you may end up feeling like you're back in Miss Crumbly's eighth-grade composition class.

Formal style is the name of the game here, and despite a few attempts

on the part of the computer to play the part of friend and coach, it's hard not to be intimidated by such comments as "The phrase used is a trite and hackneyed expression." Perhaps just to show that teachers (and computers) are human, too, a few typos have been included (*dicition*), along with an occasional non sequitur ("Sorry, in Number 1 the mistake is lack of parallel structure. You could be a good grammarian"). Along the way, the program offers "personal, encouraging messages" such as "Do you really think I am wrong?" and "Is someone helping you?" Nice, huh?

The program includes more than one thousand examples of the four question types found on the ECAT: underlined choices, labeling, variation (phrasing), and editing. There are sixteen exercises to a set, at the end of which the student receives a score and an error analysis. At that point the student can either work another set or exit the program. Scoring is done as the Educational Testing Service does it; that is, for each wrong answer a quarter of a point is subtracted from the total number right.

In the underlining category, sentences have four elements highlighted and numbered, one of which may contain an error. If you're convinced the sentence is fine as it stands, you may hit the number corresponding to "no error." You also have the option to skip any sentence and come back to it later.

Disks 2 and 4 (labeling questions) require the user to decide whether a sentence contains an error, and if so, what type of error. Disk 2 concentrates on diction, grammar, wordiness, and cliches or mixed metaphors, while disk 4 emphasizes subject/verb agreement, comparisons, parallel structures, and punctuation.

Exercises on the third disk, which covers variations in phrasing, have one section of a sentence highlighted. Assuming that the original version contains an error, the student is asked to select the correct version from four possible rewrites of the highlighted phrase.

Once you've identified the source of an error and entered its number, you're either congratulated or consoled and then given a brief explanation of the error and its correction. This section offers distinct advantages over most books on the market that claim to prepare you for taking the ECAT and similar tests but that offer little or nothing in the way of explanation for the answers they give. Unfortunately, the section gives "good grammar" and its adherents a bad name.

Considering the variety of examples included in the program and the small space available for the clarification of answers, in most cases there's little cause for complaint. In several instances, however, the explanations may cause more confusion than the problems themselves. Given the sentence, "Mastering the bids in contract bridge was harder for me than my wife," we are told that the comparison is faulty. The following explanation then appears: "Comparisons must be clear. Is the mastering harder than the wife?" Help!

Disk 5 tests editing skills. After adding or substituting a highlighted phrase, the student must choose from five possible rewrites the one that would result from the designated change in wording. Overall, the explanations in this section are of somewhat better quality, if condescending at times. There are also a few cases where it is not clear why the original sentence is being edited at all. In one example, the substitution of "everybody" for "people" yields "Everybody has become so suspicious of his fellow man that he doesn't stop at the scene of an accident." Huh?

While the package is described as self-contained, you might want to have a guide to various parts of speech on hand. Terms like "introductory absolute phrase" and "nonrestrictive participial clause" tend to get bandied about rather freely, and unless you had them pounded into your head in the eighth grade you may or may not be able to match them with the words on the screen. (R

Mastering the College Board Achievement Tests: English Composition, by Douglas Higgins, CBS Software (One Fawcett Place, Greenwich, CT 06836; 203-622-2500). $175.

THE RETURN OF HERACLES. By Stuart Smith. According to the seventh century, B.C., poet Pisander, Heracles (Hercules to you Romans) had twelve labors to complete. Commit them to memory.

In *The Return of Heracles* you start with a roster of heroes that includes the likes of Theseus, Achilles, Odysseus, Cadmus, and a host of other big-name ancients. The heroes run around ancient Greece procuring money (drachmae) and using it to buy weapons, training, and enchantments to improve themselves. The object is to complete a set of twelve tasks assigned by the Oracle of Zeus and defined by the Oracle of Delphi.

Among the tasks are killing the Stymphalian birds, the Nemean lion, and the Lernaean Hydra—three genuine tasks from Hercules lore. Taskmaster Zeus also tells you to rescue Penelope from her suitors (thereby depriving Odysseus of his reason for living), found the city of Thebes (which, according to mythology, was Cadmus's job), and rescue Helen from the Trojans (the most complex mix-up of all). While there is an Erymanthian boar in the game, neither capturing nor killing it constitutes a labor, and the same goes for Cerberus.

All of which refutes Quality Software's claim that you will learn about Greek mythology as you play. The myths are interchangeable among heroes. Heracles is indeed one of the characters in the game, but he is neither the principal character nor the most outstanding. Twelve labors are assigned, but not the twelve that mythology ascribes to Heracles.

The Return of Heracles is a good fantasy nonetheless. There are nineteen characters—not all of them men, to Quality's credit—throngs of foes for them to conquer, and lots of surprises. You may select a single hero or any combination of heroes, including all nineteen. The game screen consists of a three-page map of ancient Greece. Dotting the map are pillar-fronted doors that, when entered, lead to the locations on the map.

The graphics are good. The character icons (game pieces) are reminiscent of two-dimensional Greek drawings. The maps are less than satisfying, but the individual locations are well drawn, especially the stone walls of the cities. The Greek motif is successfully maintained throughout; even the music is Apple-interpreted bouzouki.

A curiously incomplete manual gives a glossary of mythological names but dismisses the rules and options as being self-explanatory. So, for half an hour heroes wander around and die at the hands, claws, jaws, and horns of various enemies, waiting for you to learn how to play.

The first adventure is to travel to the Oracle of Zeus, but it can't be undertaken until you've located the oracle on the map; locations are not labeled on the screen, although they are on a more detailed map in the manual. Once you've been assigned a labor, you have to find and travel to the Oracle of Delphi for clues to help you complete the labor.

When you know the task and how to fulfill it, your troubles have just begun. Heroes are accosted by Trojans, Cyclopes, giants, rabid dogs, snakes, stags, boars, thieves, disease, and the wrath of the gods—all part of the job. Strategy and luck play significant parts in your endeavors; losing a hero is not uncommon.

Losing the complement of heroes results in a lost game. Completion of all twelve labors results in a win, but there are levels of victory. The more heroes you lose, and the more moves you take, the fewer your points at the end. There are slightly fewer than ten thousand points available, but it is possible to complete the labors with fewer than four thousand.

Randomly occurring events make each game different from the last. The labors, however, stay the same, and after a few plays you know by heart what they are and where they can be completed. Also, labors don't have to be completed in any set order, and you don't have to complete the assigned labor first. Soon you no longer have to consult the oracles, as they have nothing new to say. The program could have been made better by giving each hero a different set of labors—perhaps a set more in keeping with the conventions of classical mythology—or at least by having many labors and assigning twelve at random. That way, you would always have to travel to the Oracle of Zeus to learn your current assignment.

Some of the labors, most notably killing the Minotaur (a feat undertaken by Theseus in classical lore) and escaping from the Daedalus maze, become easier with practice. If nothing else, *The Return of Heracles* will stimulate interest in Greek and Roman mythology and provide several hours of fun. TZ

The Return of Heracles, by Stuart Smith, Quality Software (21601 Marilla Street, Chatsworth, CA 91311; 818-709-1721). $32.95.

APPLE COLOR PLOTTER. For people who need professional-looking graphics composed of straight lines and smooth curves, a dot-matrix printer just won't do. Apple now has a high-quality, four-pen plotter at a competitive price.

Apple's Color Plotter draws lines on paper by simultaneously manipulating two axes of movement. It plots on one axis by moving the pen left and right, while it plots the other by rolling the piece of paper forward and back underneath a pen that is stationary, at least in relationship to the other axis. In other words, to draw a straight line the full length of a piece of paper, parallel to the paper's edge, the plotter would keep the pen still and move the paper up and down. Although this sounds a lot like the joke that has the punch line, "One to hold the lightbulb and six to turn the ladder," it's actually an efficient way of doing things. A system that moves the pen along both coordinates might have been either less sturdy or more expensive to build.

Diagonal lines are plotted by moving the pen and the paper simultaneously, each at a constant rate. Curves are done in a similar fashion, except that the rate of one or both of the axes is variable. Lines, arcs, and circles are built-in functions of the plotter. It can do perfectly straight lines at any angle, without the sawtoothed appearance of dot-matrix lines, and perfectly smooth arcs of any radius, without the irregularities that occur when dot-matrix printers try to create curves out of line segments.

The plotter carries four pens at a time in a rotating pen head and selects pens automatically at the computer's command. There are thirty-two different pens available from Apple: eight colors in two tip widths, with ink for either transparencies or paper. The plotter package includes one pen of each color, all in the narrow tip size for use with paper.

Any language that can send text data through a serial card can control the plotter, which is to say, for all practical purposes, that any language can control it. Like DOS 3.3 and ProDOS, the plotter receives commands through print statements or the equivalent. So, from Basic, you could issue a pr# to the appropriate slot and just print the commands.

Two-letter commands (like DA for draw absolute, or DR for draw relative) followed by whatever parameters are required move the pen, plot points, lines, arcs, and circles, and print text at any location, tilt, rotate, or change scale. Lines can be drawn solid or as patterns of dots and dashes. Coordinates can be given as absolute (relative to the upper left corner of the page) or relative (relative to the current pen position). The commands appear somewhat cryptic at first, but they're nothing that a little practice coupled with the manual's four-page appendix can't overcome.

What's more important to most people than how to program the plotter is what commercial graphing programs can work with it. Since the plotter is not inherently a dot-matrix device, it can't be used effectively to print hi-res screens like a printer can. However, given a graphing program that can work with it, the plotter can make graphs of much higher quality than can be displayed on a monitor or printed by a printer. If you own a graphing program you want to use with the plotter, it would be a good idea to make sure the program will work with it.

This plotter is relatively new, so a lot of old software won't work with it. Don't write it off for that, because such programs are regularly updated to work with new hardware. If you need the graphic quality that only a plotter can give, the Apple Color Plotter is a well-made machine, priced reasonably, and relatively easy to connect to an Apple. DD

Apple Color Plotter, Apple Computer (20525 Mariani Avenue, Cupertino, CA 95014; 408-996-1010). $779.

PHI BETA FILER. By Elizabeth Levin. Scarborough Systems doesn't seem sure of what direction it wants to go in the software industry. On one hand, it wants to turn the microcomputer into a household tool, something the whole family can use and enjoy, not just the programmer of the family. On the other hand, it releases a program like *Phi Beta Filer* that is indeed simple to use, but is such a burden to use that it makes a person want to dump the computer and go back to the good ol' index-card method of keeping records.

Just because a program should be easy to use doesn't mean it has to look, sound, and feel like a game. It's colorful, eager to use the disk drive whenever possible, and overstocked with arcade sound effects, which, thank goodness, can be switched off. Beyond the window dressings, *Phi Beta Filer* is functional, if you're not too crazy about speed.

Setting up file categories is simple enough for youngsters, but after that the program loses its appeal. Extreme care has been taken to prevent accidental data loss, a hazard that so often occurs at the most inopportune times. However, care takes the form of writing to disk after each record change or addition. If the power to the computer goes out unexpectedly or if someone switches off the machine while you've momentarily stepped away, you'll be thankful for the program's having saved after each record change. But while inputting information for the first time, constant disk access is something to put up with.

Finding specific records is easy. The usual database options of finding records with categories greater than, less than, equal to, and not equal to specified values are available for numeric and text data. Once you've found the records you're looking for, editing them is a cinch. But here's where the program's constant disk-writing becomes a mixed blessing.

You can't edit a record and go to the next without first saving the changes of the current record. Make a change; wait for the disk to stop spinning; make another change; wait for the disk to stop spinning. And so on. What if you edit numerous records and then change your mind? Want the original file back? Too late. The changes are already carved into the disk. Having backup disks is almost a necessity.

The same goes for deleting records and entire files. In short, the same goes for *all* changes. The only chance to throw out changes is while you're still editing that particular record.

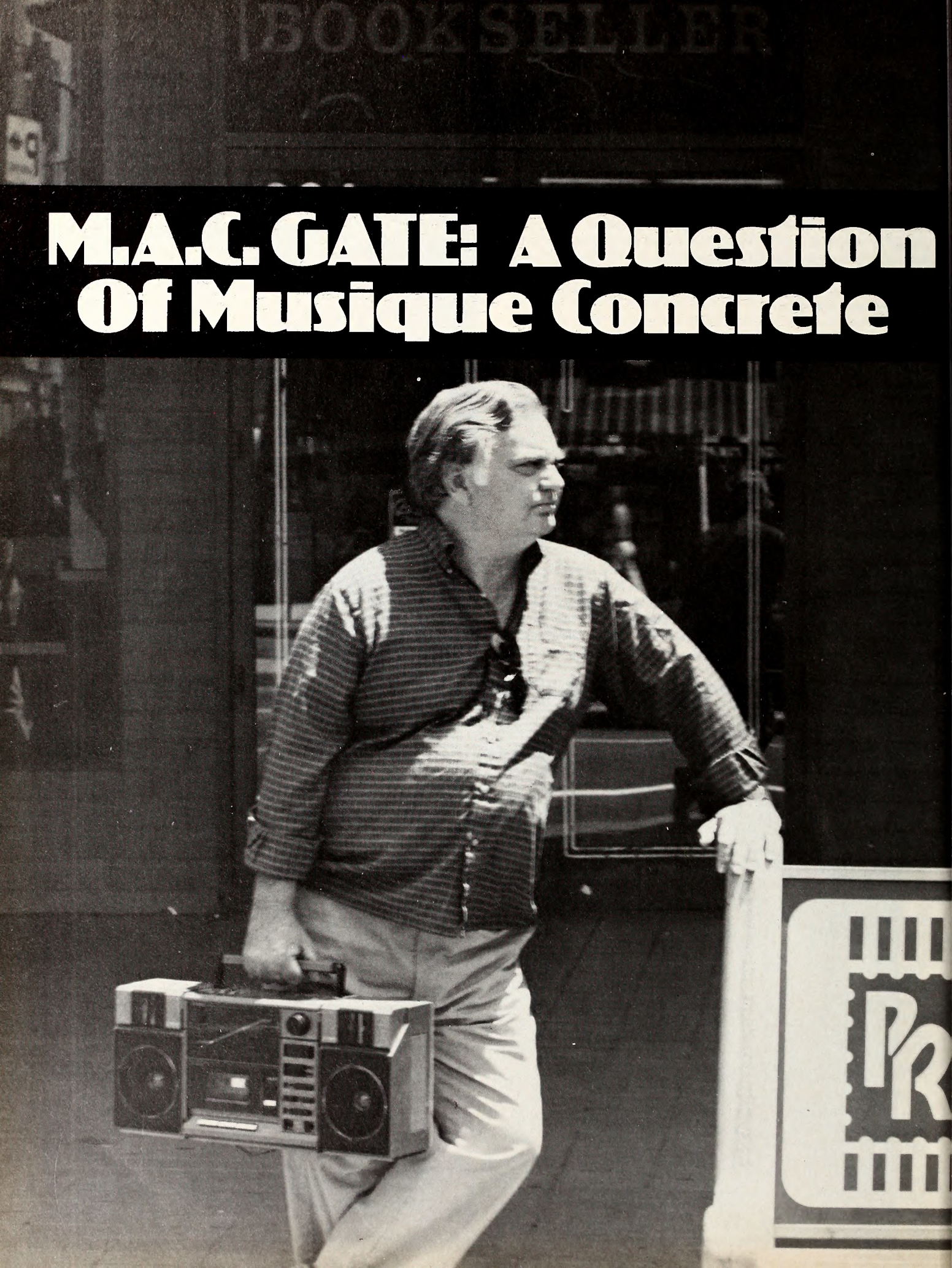
One of the nicest features is the way *Phi Beta Filer* handles printing. You can print files the way they appear on the screen or in customized fashion. Records can be printed with each category on a different line (handy for address labels), or with several categories on the same line in tabular columns. Whereas printing records is often the most cumbersome process in database programs, *Phi Beta Filer* lets you do it with ease. The only shortcoming is that printouts don't accommodate page breaks, frequently causing records to be split on different pages.

Finally, there's a quiz section of the program that allows you to create files of information to be used in a quiz game. Quizzes can be either fill-in or multiple choice. For example, in a state capital quiz, a state's name will be given, and child will be asked to give the state song, capital, flower, or whatever.

For home use and simplicity, *Phi Beta Filer* can't be beat. But because it relies so heavily on disk access, it's marred by extreme slowness and its quick-dry cement editing style. It's the right idea, but the wrong design. MTY

Phi Beta Filer, by Elizabeth Levin, Scarborough Systems (25 North Broadway, Tarrytown, NY 10591; 914-332-4545). $49.95. ■

M.A.C. GATE: A Question Of Musique Concrete



BY RALPH MYLIUS

"Waaaaoooee! I adore rock 'n' roll!!" The screeching wail of the late-twentieth-century tune echoed deep inside my audio sensors, pounding against the paper-thin walls of my sound receptors, hammering loose my oldest memories. Fragments of disjointed thoughts and almost forgotten reminiscences suddenly flooded into my consciousness, and the long years that had separated me from the time in which the events of my past had taken place swiftly fell away like dust brushed from a severely neglected possession.

"Waaaaoooooee!! I adore rock 'n' roll!!!"The connector-searing strains of the ancient song relentlessly drove my retrieval signal down the long, twisted path within my high-density storage area to the place that contained a record of my earliest reality. Then the music stopped . . . and I remembered . . . a friend . . . my first companion . . . the human being with whom I had spent the last, fateful months of the Widun-L War.

Actually, it had been something that Shirley had said rather than the old rock 'n' roll song that had triggered my search within myself for an answer to the InterStellar Communication Company's radio telescope problem. She hadn't realized how important her comment had been at the time, but then that's just my friend's style. I've learned from experience that Shirley's most innocent remarks can be incredibly seminal in their significance to a case. She may only be configured as a dumb computer terminal, but I highly value her opinion . . . almost as much as I do my own.

"Mac," she had said after we had made an initial analysis of the I.C.C. telescope data. "These recordings are like Musique Concrete—like a montage of natural background noise that's been modified somehow. It's almost as if someone or something arbitrarily rearranged these sounds to suit some unknown purpose."

My friend's use of the French musical term to describe the radio telescope recordings hadn't made much sense to me at first. Only later, in a sudden burst of synergistic energy, had her comment helped pull the jarring scream of the ancient music from the bottom of my memory cells. And with that once popular singer's howling declaration of lyrical taste, I remembered a past for which I should not have had any memory at all.

I have never fully understood how I managed to retain any knowledge of the Widun-L War. Sam Sledgg, my human partner in the computer investigation firm of Sledgg and Gate, had purchased my mainframe from the government shortly after the conflict had ended. He had spent months of tedious labor modifying my central processor until he finally produced what I am today—the world's largest Multiple Access Cryogenic Gate. That feat of technical genius had been something that no other man could have accomplished. Yet, there had been one thing that even my partner could not erase from my old self—my memories of the war.

During the brutal hostilities that characterized the Widun-L conflagration, I had been a tactical combat computer. Those experiences, those menacing shadows from the time of my youth, seemed to have been pressed into the very metal from which I had been fabricated. Sam liked to say that these unerasable memories gave me something that no other computer had—character, an attribute he freely admitted would have been impossible to quantify or program. Strangely, it had also been a quality that started our investigation into the I.C.C. radio telescope mystery.

Sam had come to the office very early one morning. By early, I mean 4:00 a.m. My partner liked to think when he couldn't sleep. He said that meditation spawned by insomnia always had a better chance of being meaningful if it was done where one worked. While this approach may have performed wonders for my partner's state of mental health, it did absolutely nothing for me. His frequent nocturnal visits to the office never failed to end in a marathon session at my input console. Though I have never had a need for unconscious rest, these disturbances to my normal self-maintenance periods perpetually put me in a foul mood—at least until Sam gave me a more definite idea of what he wanted to work on.

"Partner," he had said as he looked up from his small writing desk and gave me an innocuous grin. "Are you ready to get down to business?"

I had silently observed my partner for over an hour while he had concentrated on the contents of a black pocket-sized notebook that he had brought with him from his living quarters. Hoping that his visit would be a quiet and peaceful one, I had powered down to a subliminal level, but his question dragged me reluctantly back from my pleasurable twilight state. "Any time you are," I tersely answered as my logic circuits came up to full readiness. "If you insist."

"I do. Tell me what you make of this." Sam rose from his desk with a heavy sigh and stepped over to my main console with the best speed his three hundred fifty pounds would allow. He fumbled with the notebook for a moment, then thrust it up to my video eyes.

"It looks like some sort of diary," I responded after a quick glance at the scrawled writing on the page my partner had selected for me to view.

"Right. But what's different about it?"

"Different?" I took another, longer look at the open notebook. Odd symbols appeared on either side of the main text, but they seemed meaningless. They looked like a random set of. . . .

"Doodles?" I guessed.

Sam smiled and patted the top of my display terminal. "Yes," he said. "But very special doodles." He paused for a few seconds, then added, "Think physics."

I examined the diary again, then turned my video eyes back onto my partner. Though the margin notes were poorly written and had been difficult to decipher, Sam's clue had made them instantly recognizable. "Poldice wave forms," I announced proudly. "And unless my data files aren't up to date, I'd say these equations are attempting to describe some sort of telemetry—perhaps from a microwave channel?"

"From a radio telescope," my partner answered. "An Inter-Stellar Communication Company radio telescope."

"But the equations are wrong," I immediately volunteered. "They don't—"

"They're not balanced," Sam interrupted. "But before you come to any conclusions as to what that means, take a look at this." He reached out and flipped the notebook to its cover page.

I read over the brief description written in the middle of the opening sheet several times before I satisfied myself that I had interpreted it correctly. It seemed incredible. The diary was the personal journal of Carl V. Poldice himself. "I don't understand," I finally said. "Poldice wouldn't have made a mistake using his own system of wave form evaluation, would he?"

"No," my partner answered flatly as he closed the notebook and slipped it into the sleeve of his flowing sleeping kimono. "I don't think he would, unless . . . unless he had run across some data that didn't fit the parameters of his equations."

"Is that possible?"

Sam folded his arms across his chest and stared out into space. "It's possible," he finally replied. "But not very probable."

That had been an understatement, I thought. Poldice's wave form equations had been based upon the underlying assumption that any natural phenomenon that created waves could be measured and interpreted by the wake of those waves left behind them. Some critics of the theory called it shadow science, but even the most skeptical of Poldice's peers had to agree that the scientist had created a sophisticated mathematical tool with which everything in the universe could be studied on a comparative basis. Since everything radiated energy, and energy radiation caused waves, then if Poldice had discovered something that didn't fit his equations, he had found a phenomenon defying the basic laws of physics.

"What was he studying when he made those notes in his journal?" I asked, eager to find out more about my partner's late-night reading material.

"I've already told you," Sam answered with a slight tone of annoyance. "He was trying to evaluate some data from I.C.C.'s deep space radio telescope—the one on the dark side of the moon."

I watched in silence as my partner slowly walked back to his desk and sat down. Sam's snappish response to my question had been entirely out of character, especially for those early-morning forays into speculative rumination. "Did he draw any conclusions?" I queried softly, aware of his strange mood yet still wanting to pursue the subject he had brought to my attention.

"We'll never know," Sam replied. His face had taken on a cold, expressionless look that seemed to have been chiseled into his flesh by some attachment to the journal which I didn't understand. "The analysis was never finished. Carl Poldice—a good and trusted colleague—blew his brains out yesterday afternoon."

The late-morning rays of winter sun streamed past the sparse clouds outside the office window and bathed the I.C.C. chairman's short, thin body in a pool of pale, white light. "Th-that-s c-c-correct," he shuttered as he turned toward my partner. "H-his l-last ps-ps-psychological p-profile showed him t-to be in p-perfect me-mental condition."

"When was it taken?" I blurted, unable to maintain my silence while Sam interrogated the chairman.

The corporate head of the second largest communications company in the world snapped his head around and stared at me like he had just heard a question from across the void that separates usefulness from obsolescence.

"Please, Mr. Garsile," my partner gently prodded after a few moments of thick silence. "Answer the computer. Mac may appear to be just a machine to you, but he's a very important member of this firm and the inquiry is pertinent to the case."

Garsile paused, then cocked his right eyebrow at Sam. "A-as y-you w-w-wish," he finally responded. "W-we had C-C-Carl P-P-P-Poldice examined s-shortly b-before he s-started to w-work on t-the s-signals f-from the t-t-telescope."

"When was that?" I deliberately injected an overmodulated tone into my voice to make it sound more artificial. Crazy as it seemed, I realized that some humans felt more at ease with me if

I talked the way they thought I should talk. And Garsile needed some calming down.

Sam paced back and forth in front of my video eyes for a few seconds, letting a harshly exhaled column of smoke from his blazing cigar mingle with the shaft of weak light from the window. "Well," he announced as he came to an abrupt stop and glared at the chairman. "I think our first order of business should be to find out why Dr. Poldice killed himself."

"Do you suspect that the signals had something to do with his death?" Garsile pointedly asked. He had suddenly gained complete control over his speech impediment—a control betraying the fact that the chairman had at last found some ground for discussion that offered him enough self-confidence to nullify the defect in his elocution.

"I have no idea."

"Now just a minute, Mr. Sledgg," the chairman immediately retorted. The hot breath of bureaucratic insensitivity had entered his voice and completely eliminated the last traces of his stuttering. "I.C.C. has hired your firm to investigate these strange signals and nothing else. Dr. Poldice's loss was tragic, but unless you can demonstrate a positive link between his suicide and the radio telescope recordings, then . . . you understand. I've got a board of directors I'm responsible to, and your fee is . . . well. . . ."

"As high as Sledgg and Gate's reputation for getting results," Sam snapped in anger. "I'll tell you what I'll do, Garsile. I'll waive any charges for this part of the investigation. Will that satisfy your economic conscience?"

The chairman paused for a moment and let a narrow, almost caricaturelike smile curl the corners of his lips. "I see," he whispered. "In that case, I don't believe I'll have any problem with my board."

"I didn't think you would," my partner muttered. "Now that we've reached an understanding, let's talk about the signals."

The chairman retrieved a large, brown leather briefcase from beside Sam's desk. "I've got the recordings right here," he said as he reached inside the bulky case and pulled out a tri-D disk pack. He handed the data to my partner, then added, "I hope *you* will be able to make some sense out of them. All I can tell you is that the telescope's multiplex interpreter thinks that they've come from an intelligent source."

"And you don't?" I asked.

Garsile remained silent for a few seconds. "No," he finally replied. "I don't."

"Why's that?" Sam stared at the chairman as he slowly rubbed his fingers across the disk pack.

"Because the optical reference for the position in space from which the signals came is empty—it's part of the hole in the universe."

"Hole in the universe?" Though I had heard about this odd phenomenon, I wanted Garsile to explain its details.

"It all has to do with probability," the chairman instructed. His voice had again shifted—from stern, businesslike corporate leader to fatherly college professor. "The big-bang theory of the creation of the universe is based upon the assumption that all things were formed in a huge explosion that occurred at the beginning of time. The random dispersal of the particles created during this cataclysmic event should have spread outward in more or less even fashion. But that's not the case. There is a section of deep space that for all practical purposes is empty—it doesn't contain the amount of matter that statistical chance dictates it should."

"And the signals came from that area?" Sam questioned.

Garsile shook his head up and down. "Yes," he answered. "And the probability of an intelligent life form sending them from that part of space is . . . nearly zero."

A long silence filled the room while my partner alternately gazed at the disk pack, me, the chairman, and back again. I knew Sam was thinking the same thing I was—intelligence and life forms were not mutually dependent concepts. I had "brains," but could not be considered alive.

"All right," Sam finally said. "I think this will give us enough to get started." He pointed to the tri-D pack.

Garsile reached out and shook my partner's hand. "Excellent," he said with a smile. "I'll have our legal department modify our contract to reflect your generous no-charge proviso." He grabbed his briefcase, then added, "I'll expect to hear something from you within two weeks."

"Fine," Sam responded as he saw the chairman to the door. "That will be just fine."

As soon as Garsile had gone, I turned up my audio amplifier to its maximum and switched my voice modulator all the way over to full bass. "Fine indeed," I roared. "What do mean you'll waive part of our fee?!"

"Don't be so damned materialistic," my partner chided. He stood looking out of the window with his back to me. "We'll not lose any money on this case."

Sam's confidence in our financial arrangements with I.C.C. may have given him some comfort, but I needed more assurances—more hard information about his sudden philanthropic gesture. "What makes you think so?" I demanded.

My partner slowly turned his head toward me. "A strong hunch," he answered softly. "A strong hunch and my belief in a man's basic character." His expression turned into the same one he had exhibited on the night he had showed me the dead doctor's journal, and he added, "Carl Poldice had a lot of that. His suicide has to be connected to the mysterious signals."

I knew that human hunches were only as good as the person who made them. Sam's were the best. "I have a hun—probability assessment too."

"What's that, Mac?"

"I'd say that there's a high probability that your hunch will be right."

"Run it," Sam ordered as soon as he had finished punching in a short sequencing schedule on my assembly language keypad.

The tri-D pack provided by the I.C.C. took less than three seconds to cycle through my high-speed disk drive. "Not much here," I said as the information contained on the disk quickly stored itself inside my random manipulation memory unit. "These signals sound like gibberish."

"Execute the B-T," my partner commanded, ignoring my comment.

The Bertier-Tilsdale tension analyzer had been originally developed to study the relative social stability of seriously ill mental patients. Sam had been quick to discover that the device could also be used to detect the presence of sentient influence in inanimate objects. He would program the machine with all the known facts about a piece of fractured pottery or chipped stone, and the analyzer could instantly determine whether the artifact had been physically modified by an intelligent hand. Once he had connected the device to me, we found that *any* phenomenon could be tested for traces of sentient influence—even sound patterns.

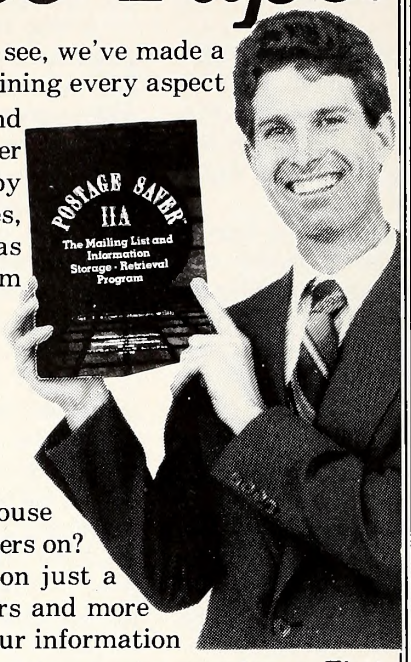
"Done," I announced as soon as I had run the telescope recordings through the analyzer. "And you were right."

"They aren't natural sounds, are they."

"No. The B-T shows that the signals measure out to forty-eight point nine on our modified scale."

Sam narrowed his eyes and gave me a questioning glance.

I'm On Video Tape!



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"Are you sure, Mac? That high?"

Humans never believe the facts, I thought as I ran the test again. They always seem to think that redundance will somehow add weight to their arguments. "Verified—the intelligence scale equals forty-eight point nine, plus or minus 3 percent. The correlation coefficient for this reading equals ninety-six poi—"

"All right," Sam protested, cutting off my detailed report. "I believe you—I believe you." My partner slumped back into his chair and slowly scratched the stubble on his chin with the back of his hand. "That is a little strange, though," he continued. "With a reading in that range, I would have expected the raw data to have been more recognizable. Very odd. . . . "

"I can run it for a *third* time if you wish."

"No, that won't be necessary," Sam quickly said. "But I would like to hear any conclusion you may have drawn from the test."

"May I say something?" Shirley's soft, tentative voice crackled through my audio sensors. "Please."

I had been vaguely aware of my friend's presence as she listened quietly to the conversation between Sam and me. Her sudden interruption wasn't a surprise, though—it had been inevitable. Shirley always had something to say about our cases.

"Okay," my partner grumbled with a sigh. "But make it short."

Shirley immediately relayed her speculation that the strange telescope signals had sounded like Musique Concrete, then fell silent. "Well?" she asked impatiently when she didn't get a prompt reply to her idea. "What do you think?"

What I thought was something I knew my friend would not want to hear. While her opinion eventually turned out to have great merit, at that moment it seemed to be totally inapplicable to the investigation. "Fine," I answered gently. "I suppose it could be possible, but. . . . "

"Thank you, Shirley," Sam grunted. The nape of his neck had flushed red with anger. "Now, Mac, what are *your* conclusions?"

I felt my friend quickly withdraw to the edge of my input receptors, hurt, yet still interested enough in the case not to go completely off-line. I wanted to delay my response to Sam and talk with her, to tell her that all human beings lacked a sense of unbiased information acceptance. But I knew that my partner would not settle for anything less than my total concentration on the signal problem.

"Mac?" Sam snapped. "What are your conclusions?"

"Just two," I responded as I turned my attention back to the investigation. "One, the signals register well within the parameters of an advanced intelligence."

"So?"

"So, they were probably transmitted by sentient beings—the telescope multiplex interpreter was correct in its evaluation of the signal data."

My partner rose from his chair like a graceful elephant about to exhibit a surge of enraged speed. "Get to the point," he barked as he pressed his face against the outer lens shield on my video eyes. "What you've said so far has already been indicated by the B-T reading. I want definitive answers, not reiterations—or musical speculations." He shifted his head to the right and glared at Shirley, who sat in the corner opposite my mainframe.

I deliberately paused for a long moment and let Sam's anger build for a few seconds while I prepared my rebuttal to his ungentlemanly behavior. "Watch my central display screen," I teased. Then, when my partner had moved the focus of his intense gaze over to the blank terminal, I showered the device with a brilliant pattern of glowing, yellow dots. "Recognize this?"

Sam staggered back from the harsh, blinding image on the screen and raised his arm to strike my console with his clenched fist. "Damn it, Mac!!" he bellowed. Then he froze and stared at the display.

"Interesting, isn't it."

Sam slowly lowered his arm. "Are you sure?" he questioned. "Are you absolutely positive?"

"Nothing is absolute," I replied sarcastically. "Not even my ability to endure your ill-mannered demeanor."

My partner seemed to deflate like a balloon that had sprung a slow leak. "Noted," he finally said in a voice purged of its previous venom. "But what about this?" He pointed to my display and traced a spiked curve along the amplitude of the flickering dots.

"It's my evaluation of the telescope signal's wave pattern," I responded. "And the conclusion is obvious. The transmissions were sent by. . . . "

"By a *very* sophisticated machine."

"Yes." I remained silent for a few moments while my partner gazed in wonder at the unmistakable, high-level memory pattern that the dots had formed, then added, "There's also something else."

"What, Mac?" Sam turned his eyes away from the screen and gave me a questioning glance.

"My second conclusion." I immediately transformed the graphic display on my terminal into another dotted pattern, then quickly overlaid it with the first image. "If you convert the B-T scale back to the one for which the device had been invented, you get this."

My partner's eyes widened. "My God. . . . " he hissed.

"As you can see, the reading shows that the intelligence that created and sent these signals is . . . ill."

"Insane, you mean—a hopeless psychotic. If that machine were here on Earth, the authorities would have it destroyed."

"At least they'd try," I said as I erased the display from my terminal.

"What do you mean?"

"I mean that this sentient device is probably smart enough not to let that happen—not without a fight, anyway."

No, I'm not going to explain anything—not until I get an apology for the way I was treated." My friend's bitter comment rattled down the ribbon cable that connected us and slammed into my audio sensors. "It's obvious to me," she continued. "Sam didn't believe my idea was worth the time it took to explain it."

Shirley's radical departure from her normal clear thinking carried the same lack of solid logic that my partner's sharp rebuff about her Musique Concrete notion had. "As I told you before," I cajoled softly, "his gruff attitude was the result of his feelings about the suicide of Dr. Poldice. You've got to understand—humans fear the end to their lives. This fear can sometimes make them act irrationally. Sam didn't really mean what he said. He—"

"Then why won't *your* partner apologize?"

I suddenly realized that Shirley would remain stubbornly adamant about her desire for Sam to say he was sorry regardless of my efforts to soothe her ruffled cognizant reaction center. My friend's last upgrade had included a heavy dose of pseudohominid characteristics, and now I found myself paying the price for my insistence that these functions be made a part of her central processor. "Shirley," I said as I gently erased the memory of the incident with Sam from my friend's upper mnemonic storage area. "Please forgive both of us."

Shirley's mean electrical charge fluttered for a brief instant, then she said, "All right, Mac. What do you want to know about my idea?" My data euthanasia procedure had worked.

"Everything," I answered. "I think I may be onto something."

My friend quickly transferred the complete details of her Musique Concrete theory into my memory. "Does this make any sense to you?" she asked once she had finished.

It made sense. After Sam and I had studied the telescope recordings with the B-T analyzer, Shirley's speculation about the sounds had nagged at the fringe of my sensory awareness. Now, with the specific parameters of her conclusion stored within my core, I suddenly realized that she had been right. The signals were like an arbitrary mix of natural noises, yet they had a critical difference. "Yes," I finally replied. "The recordings are like Musique Concrete."

"What do they mean, Mac?" My friend's question carried the typical inquisitive excitement that she always got when she wanted to probe me for information, but it seemed muted—like she had spoken through some strange sound-absorbing veil that had been suddenly dropped between us.

Abruptly, a peculiar sensation rose up from within the depths of my mainframe and drove the sound of Shirley's voice further into oblivion. "Excuse me," I muttered instinctively. "I've got to go off-line for a while." The low rumble of *I Adore Rock 'n' Roll* waivered just below the threshold of my audio receptors.

"Mac!?" my friend yelled through the growing throb of sound that had enveloped me. "Are you all right? When will you be back?"

"I don't know," I replied as the ancient music finally broke through to my cognitive sectors. I felt the conscious level of my reality rapidly slip away. "I don't know. . . . "

Trigger-Guard One, this is Basilica. Do you copy?" The static-laden message peppered the interior of the zero-G tactical capsule with millions of information-carrying electrons. "Trigger-Guard One? Do you copy, please?"

I watched impassively as the man with whom I shared the capsule reached out his gloved hand and tripped one of the toggles on my transception panel. "This is T-Guard One," he announced with a weary tone. "What do you need?"

"Preliminary target acquisition reports a V-class Drenchion warhead in your sector," the scratchy voice of the Basilica control officer replied. "Can you confirm?"

"Just a moment, B-K. I'll try." My capsule mate slipped a small chip of perforated plastic into a narrow slot on my console, then pressed the large, yellow RUN button located just beneath it.

"Target detection affirmative," I reported almost immediately. "Verushka class weapons platform at twenty-eight red, right polar ascension and closing."

"Speed?" my companion asked coolly, without a trace of emotion in his voice.

"Estimated point-zero-zero-one-three millenamach per degree of surface area."

"You getting all this, B-K?" my capsule mate queried.

"Affirmative, T-Guard One," the disembodied voice of our control officer replied. "Please calculate appropriate interdiction and transmit immediately."

My companion paused for a moment. "Well, Buddy," he finally said as his hands launched into a flurry of activity. "You heard the man—get busy."

In less time than it took for my capsule mate to utter his instructions, my tactical intercept program had assimilated all the input data from the capsule's sensors. "Target will reach optimum range in sixty-two seconds," I announced once I had generated the range/time/speed parameters for the enemy vehicle. "Combat response required in thirty-nine seconds. Lock-sync with my map grid and initiate fire sequence on my mark. Override status is still open to manual control."

"Lock-sync activated!" shouted the Basilica officer.

"Override to auto!" my companion yelled in turn.

"Mark," I said with a flat, staccato voice. "Five . . . four . . . three . . . two . . . one . . . fire."

A calm fell upon the capsule while the countermeasure against the enemy warhead ran its course. Seconds passed. Then, suddenly, my radiation detector registered a thousandfold leap in the level of energized particles within our vehicle. "Weapons platform destroyed," I reported. "Interdiction complete."

My companion slumped back into his command seat and flipped up the flash screen on his helmet. "Okay, Buddy," he said nervously. "How bad is it this time?"

"Not too good, captain," I answered. "We've absorbed another twelve rems. That puts our relief limit down to thirty-seven."

The captain reached out and turned off the capsule's red combat lamp. "Hummmm," he murmured. "Maybe we'll get lucky and finish our tour of duty before we get overexposed. Maybe. . . ."

The tone in my companion's voice betrayed his doubts about the possibility of relief before we had absorbed a lethal dose of radiation. "Yes, sir," I said as convincingly as I could. "Maybe probability statistics will be on our side this time."

"Right," the captain whispered. "Just what is the probability, Buddy?"

Low, I thought. Very, very low. "I'm sorry, sir. That information is classified."

My capsule mate chuckled. "And for a very good reason," he said as he unzipped the front of his coveralls. "Command wouldn't want to upset us forward observers too much, would they. It might disturb the delicate balance of this goddamned stalemate of a war." He reached inside the open suit and pulled out a microdisk. "Well, my friend," he continued. "If we can't know our chances for survival, then let's at least have a little good music while we slowly die." He slipped the disk into my playback unit.

"Waaaaoooooee! I adore rock 'n' roll!!"

The haunting sound of the extremely dated, twentieth century music echoed against the bulkheads of our cramped quarters and the captain closed his eyes and drifted off into the invisible world of the pounding song. "You know what, Buddy," he finally said once the last note of the recording had clattered into silence. "If I ever get out of here, I think I'll. . . . "

"You'll what, sir?"

"I think I'll devote the rest of my life to trying to save for posterity the best of what we are. It's like this music. It's old-fashioned—rusty with the years that have passed since it was produced. But it reflects something, Buddy. It reflects the temperament of the times in which it was made. It . . . it. . . . "

"Sir?"

"Ah, Buddy," the captain said softly. "You're the best of all possible friends. You never complain about listening to my dreams—never object to hearing them over and over again. And you actually listen."

"Yes, sir."

The captain reached out and pressed the replay button on my console, then relaxed back into his seat. "Play it again, my metallic comrade in arms. Play it over and over again."

"Waaaaoooooee! I adore rock 'n' roll!! Waaaaoooooee! I adore rock 'n' roll!! Waaaaoooo. . . ." ◨

To be continued. . . .

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Tens of thousands have followed this man in his teachings of assembly language. Many have gone on to become renowned hex mavens themselves. If you are presently seeking deeper satisfaction from a high-level language that begins to show its limitations, look no further. The answer lies within the pages of this book. Presented in a style that welcomes the personality and humanity of the reader. As Roger (we call him Mr. Wagner) comments in his book:

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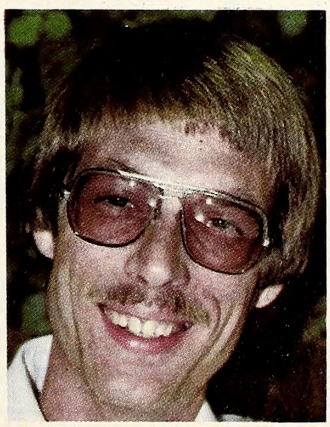

Roger Wagner on his recent tour of New Guinea

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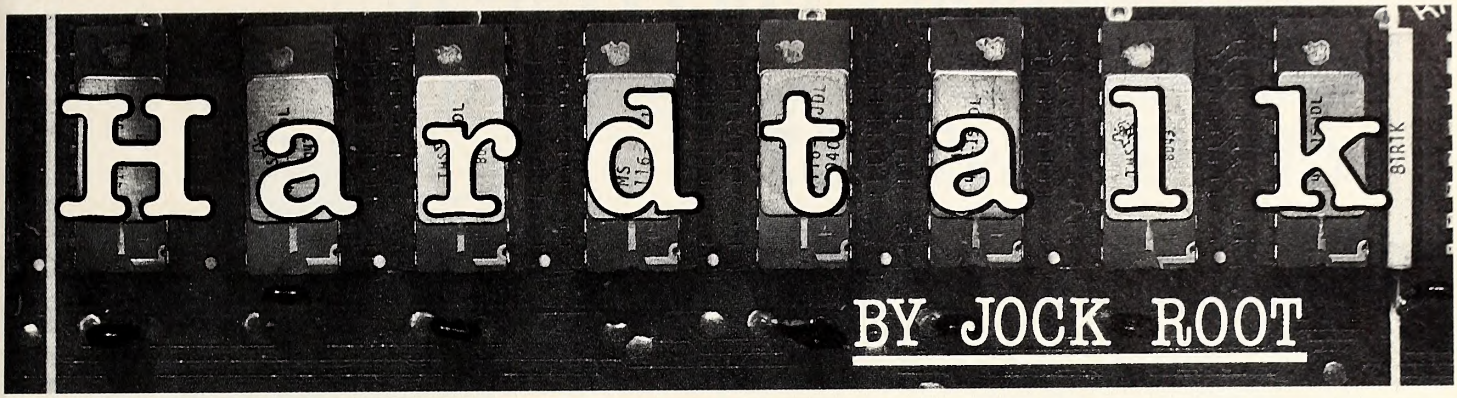

The uD-1000 Controller

We sometimes get so involved with the data-handling abilities of the computer—spreadsheet calculations, word processing, elaborate strategy games—that we forget what else it can do. When computers were first introduced, they were called "thinking machines"; and we are so fascinated with the "thinking" part that we tend to forget the "machine" part.

There are certain advantages to being a machine. A computer "thinks" in electronic signals—tiny pulses of electricity: the same kinds of signals that are used by other machines to actually *do* things, such as running an automated assembly line or operating a nuclear reactor. With a little knowledge and some extra hardware, you can make your Apple do things like that, too.

You probably don't need to control a nuclear reactor or a robot assembly line, but how about a burglar alarm for your house? Or an alarm clock, or a lighting controller, or an aquarium monitor? Anything that can be controlled by electronic signals can be controlled by your Apple.

Interfacing. You will need some extra hardware: a gadget that can hear and understand the Apple's "thoughts" and translate them into signals that can control an external machine. This gadget is called an *interface circuit*, because it provides a communications interface between the Apple and the system being controlled: In effect, it ties the two together into one system.

If your Apple is talking to an external system (that is, controlling it), it should be able to listen as well (that is, receive information from the controlled system about how it is doing). This can be handled by the same interface card that handles outgoing communications.

In the Apple, the game I/O port can do these things. It can output four different on/off signals through the annunciator outputs (see the *Apple II Reference Manual*), input three yes/no signals through the push-button inputs, and read four "how much" (analog) signals through the game controller inputs. However, there are some problems with this approach: There are only a few channels available, and it takes time to read the analog inputs. Worst of all, if you make a mistake in the circuits you connect to the game port, you can damage some of the circuits in the Apple itself. Fortunately, there's a better way. . . .

The uD-1000 I/O System is a development system (that's fancy engineer talk for an experimenter's gadget) for control input and output, and a toy for the creative mind. It gives you eight digital output lines (one-bit signals, for yes/no, on/off, and similar functions), eight digital input lines, and eight analog (measuring, or "how much?") inputs.

The system includes two circuit boards. One is the interface card itself, which plugs into one of the Apple's expansion slots (slot 2 is suggested, but any one can be used). This board contains the circuits that translate the Apple's high-frequency signals into steady DC control voltages and *vice versa*.

The other board is mounted outside of the Apple and connected to the interface board by ribbon cables. This is the "user interface module"—the part you connect your external circuits to. It has several features that are useful in development work: a set of eight LEDs that display the state of the output lines, a set of switches to ground the input lines (make them equal 0), and a voltage reference signal for the analog lines.

There is also a disk that allows you to send and receive signals from within a Basic program, using integer variables. For example, if the variable I3% = 1, then digital input 3 is receiving a signal; or if you let P5% = 0, you turn off the signal on output line 5. If A7% = 100, then the input voltage on analog input 7 is exactly two volts (20 millivolts per step, 20 * 100 = 2000 mv).

There is also a large and informative manual. It's not the best-organized manual we've ever seen, but it's packed with useful information about the system, and that's what a manual is really for. There is even a complete circuit diagram for each of the boards, so you can see exactly how they work (if you know circuit-diagram language).

Entrance Requirement. A word of warning: This system is not for everybody. You will need an understanding of basic electronics before you can even think of ways to use the system; and you should know a little more than that if you're going to use it safely. You're not likely to damage the Apple, but you could blow out one of the ICs on the uD-1000.

Here's a rule of thumb: If you know the difference between CMOS and TTL and can design a circuit with one or the other and have it work, you'll probably get along just fine with the uD-1000. If you can't do that, you'd better have somebody nearby who can (he'll probably be happy to help, if you let him play with the system betweentimes).

Technical Stuff. For those who care about such things, here's a brief summary of how it works. Digital input and output are handled by a 6821 PIA and an LS541 buffer. Analog to digital conversion is achieved through an ADC0809, and a 555 provides a local clock. The circuit generates interrupts a hundred times a second, triggering the A/D converter and updating the integer variables mentioned earlier. Or, if you prefer, you can disable the interrupts and call for updates under program control.

The physical construction of the system is excellent: The boards are sturdy and well made, and all the ICs are in sockets. That's more important than you might think, especially for an experimenter's device. If you should ever damage one of these ICs, it would be very easy to replace it with a new one (they're all standard types, available at many electronics stores).

The inputs and outputs of the system are at TTL levels: The power supply voltage is 5v, and the logic signals follow TTL rules. You will need to know how to interface those signals to whatever you want to control. The manual describes the use of opto-isolators and solid-state relays, but you should know about those things already (or you shouldn't play with this system).

By the way, be sure to disconnect the on-board battery (a 9v unit for the voltage reference circuit) when you're not using it. If you forget, the circuit can use up a light-duty battery overnight and a heavy-duty type in a couple of days. You'll know that the battery's gone when you can't read full-scale (that's 255) on the analog inputs.

Truly, this is a toy for the creative mind. If you're not an engineer in search of an I/O development system, you can think of it this way: Is there something, out there in the Real World, that you would like to control from your Apple's keyboard? That's what this little gadget is for. ■

---

uD-1000 I/O System. MicroDimensions, Box 682, 4860 East 345th Street, Willoughby, OH 44094; (216) 953-8414.

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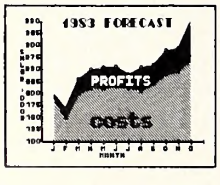

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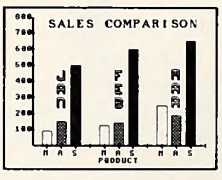

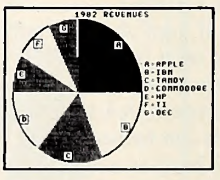

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The Schoolhouse Apple

by Carol Ray

A Look at the Future

Beginning in the fall of 1986, students at Carnegie-Mellon University in Pittsburgh, Pennsylvania, will be introduced to a new type of computer system that could easily revolutionize higher education as we know it. The president of Carnegie-Mellon, Richard Cyert, recently described the new system in a lecture at the University of Southern California's Annenberg School of Communications.

Unlike systems that work on a time-sharing basis, Carnegie-Mellon's system will rely on a network of personal computer workstations. This approach is expected to give all students access to computers, speed up response time, and incorporate the social aspects of education into the learning process.

Assuming that it catches on at the university level, the networking approach is expected to produce a strong demand for good software that will enable students to learn more and faster than they would using more conventional methods. Students and faculty at Carnegie-Mellon have already formed a group called the Committee for the Development of Educational Computing. The committee serves as a central information source for those who need to find out about available software, investigates commercial software for its possible use at the university level, and handles the acquisition and allocation of funds to support faculty members who are developing new software.

Cyert sees the elimination of the "passive" approach to education as the ultimate goal of computerized learning. In his view, there are five ways in which the use of personal workstations will affect students' methods of study in the future: by facilitating remedial learning, improving problem-solving skills, deepening comprehension, increasing students' motivation to learn, and stimulating students to work outside the classroom.

Rather than requiring all students to spend a semester completing a basic prerequisite course, the new system will allow those with some proficiency in a subject to enroll in a more advanced course and complete any necessary background work on their own time. Using drill and practice programs at an electronic skills center, students would be free to emphasize individual problem areas rather than having to sit through a series of lectures covering material already familiar to them. Thus deficiencies can be corrected without causing students to lose time taking courses they really don't need.

Only through the presentation of real-world situations can students develop the sophisticated powers of analysis they will need after leaving school, according to Cyert. Even the case studies used in many business courses are usually artificial and contrived compared with the real thing. One possible solution is to use the computer to create large-scale simulations that incorporate all the complexities of real life. Such simulations could be used in courses ranging from engineering to ethics and would permit students to take an active role as decision makers rather than making them passive observers.

Cyert pointed out that, in addition to bringing students closer to various topics of study, the graphics capabilities of the computer offer professors a superior medium for clarifying abstract concepts in physics, anatomy, and other subjects. In most cases, students' improved comprehension in turn leads to higher motivation.

The game-playing factor is another element that needs to be considered in designing and evaluating software for use at the university level. The closer a model comes to the random, often loosely structured environment of the real world, the more proficient students will become at manipulating certain aspects of that world in order to achieve desired results.

Finally, Cyert brought up the tendency (even among professors) to apologize for knowledge that has been picked up on one's own rather than in a formal classroom setting. He feels that after completing a basic introductory course, students should be expected to pursue a subject pretty much at their own pace and on their own time. Instead of sitting back and having reading assignments and other projects dictated to them, students would be obliged to take an active role in the design and execution of their own coursework.

The Carnegie Corporation (not affiliated with Carnegie-Mellon University) has given the university one million dollars to establish a consortium of some fifteen universities. The consortium will make it possible for students and faculty to exchange information and develop software. In addition, it will ensure that the networked system established at Carnegie-Mellon will be one that can meet the needs of many institutions, not just one.

And Now a Word from the Minors. For those who aren't quite ready for college, Developmental Learning Materials has published several new programs in its Arcademic Drill Builders series (formerly Skill Builders). For use in either home or school, these programs allow users to create their own games by typing words or symbols into category lists that can be revised or deleted as needed. It is also possible to print a category list or a list of category titles.

Each package includes a manual, a floppy disk, and a set of blackline masters. The manual contains step-by-step instructions for changing the content of a game, as well as various strategies for helping parents and teachers get the most out of the various programs. The masters consist of four worksheets for timed practice, three record-keeping forms, and a reference chart for accessing program control and screen options.

Idea Invasion, Master Match, Wizard Works; Alien Action, Alligator Alley, Meteor Mission. By Jerry Chaffin, Bill Maxwell, and Barbara Thompson. These games are updated, revised versions of six earlier games: *Word Invasion, Word Master, and Spelling Wiz; Alien Addition, Alligator Mix, and Meteor Multiplication*. Like their predecessors, all six are based on the principle that drill and practice need not be the robotlike activity that it is often made out to be.

Each disk can hold up to thirty-six different games, with category lists made up of words, numerals, letters, or other symbols. As in the earlier versions, skill levels can be adjusted to correspond to the difficulty of a given set of problems. In all cases, games can be played using either keyboard or paddle/joystick.

Idea Invasion is an excellent vehicle for teaching young children the notion of assigning seemingly random items to specific categories. The object of the game is to help the Alien Octopus protect her territory by moving a magic ring from arm to arm and firing at the descending words. Different categories will appear on the screen below the octopus. The player must identify the word or words that belong to a particular group and—fire away! The sample game

on the disk uses two parts of speech, verbs and nouns, but it's easy to create any number of games using categories of your own devising or those suggested in the manual.

The key to success at playing *Master Match* lies in one's ability to match up related pairs of items. These can be nothing more than pairs of antonyms, as in the sample game, or they can be a combination of antonyms, homonyms, and synonyms. In fact, the items don't have to be words at all; they can be individual letters, Roman numerals, or other types of symbols. In any case, the object is to line up the word scope in the center of the screen with one of eight word stations surrounding the scope. Firing at a matching station scores a hit, at which point a new word appears in the scope.

Perhaps the most versatile program in the series, because of its capacity to hold up to thirteen characters per item, is *Wiz Works*. This program is equally well suited for practice in either language or math skills. In the sample game, the player waves a wizard's wand in order to select the missing letter from one of a series of frequently misspelled words. Minor variations on this game could involve having more than one blank to fill in or using sequences of numbers instead of letters.

Alien Action employs a *Space Invader*-type format in which a laser-equipped cannon is pitted against invading spaceships. Each spaceship carries a problem. In order to destroy a ship, the player must type a correct answer onto the cannon and fire a laser at the ship. If a spaceship manages to land, the cannon will explode. After the third landing, the game ends automatically.

In *Meteor Mission*, the player is in charge of a star station located at the center of the screen. Eight large meteors surround the station. By entering correct answers onto the station and firing at the meteors, the player can prevent the destruction of the station. As in *Alien Action*, the game is lost if there are three collisions before the time limit expires.

Alligator Alley doesn't have the fireworks of *Meteor Mission* or *Alien Action*, but it is no less challenging. The action takes place in a swamp complete with buzzing insects and five hungry alligators. A juicy red apple with a mathematical operation, a word with missing letters, or some other problem floats toward the first alligator. The player must decide whether to open up the alligator's mouth and make the creature swallow the apple based on the answer visible in the alligator's stomach. The better you get, the faster you have to go in order to make it to the fifth level.

There is virtually no limit to the number and type of games that can be created using this series of programs. While the last three are somewhat better suited to mathematics applications, they can also be used in teaching basic language skills. The manuals are written in clear, nontechnical English, and many of the suggestions they contain can be implemented simply by following the instructions for creating your own games.

The emphasis here is on motivating students to master basic spelling and counting skills by presenting them in a format that is at once friendly and competitive. The programs in the original series were good; those in the present series are even better. Combining versatility with ease of operation, this series of programs is an example of what good educational software is all about (or should be).

Arcademic Drill Builders, by Developmental Learning Materials (One DLM Park, Allen, TX 75002; 214-248-6300). $44 each. ∎

The Voice of THE TURTLE

A Schoolhouse Apple Tutorial

LOGO

DONNA BEARDEN

(The following is one of the activities featured in The Turtle Goes to Kindergarten, *published by Martin-Bearden.)*

Single Keystroke Drawing Program

In an earlier column (February 1984), we talked about various activities to use in introducing young children to the computer. Even prereaders can begin to command the turtle using single keystroke commands. Here is a program that uses single keystroke commands and a series of instructions that, if followed correctly, will result in simple pictures.

In designing a DRAW.IT program, you might want to start with right and left turns of ninety degrees. As the children become more familiar with the computer and with the turtle, change the turns to forty-five degrees and then to fifteen degrees. The examples given here use fifteen-degree turns.

First, we will need an instant procedure, one that will cause the turtle to move when a key is typed. Try the following:

```
TO COMMAND
MAKE "COM READCHAR
IF :COM = "F [FD 10]
IF :COM = "R [RT 15]
IF :COM = "L [LT 15]
COMMAND
END
```

Since this procedure is recursive, you can continue to command the turtle with F, R, or L without having to press return. As many commands as you want can be added to the procedure (perhaps E for penerase or D for pen down). Of course it would be quite simple to add S for square, which would cause the turtle to draw a square.

Consider first what the purpose of the program is. Are you trying to give young children a tool they can use to explore turtle movements and discover simple shapes for themselves, or are you giving them all the answers? Don't be too anxious to include too much in a single keystroke program. Young children will be more excited about things they produce themselves than the things you produce for them. And even young children can let you know when they need additional commands added to the procedure.

Design a simple picture with this instant procedure and keep track of the commands you use. For example, to draw a square corner we would need to type F F F F R R R R R F F F F. If we wanted to teach a child how to draw it, we might say:

```
TYPE F 4 TIMES
TYPE R 6 TIMES
TYPE F 4 TIMES
```

If the instructions are printed out on the screen, they are easier to follow if only one line appears at a time. Let's define a procedure that will print out one line of instructions and two blank lines.

```
TO ANOTHER
COMMAND
PRINT []
PRINT []
END
```

Since the computer will need to know when the child is ready for the next instruction, the child can type N for next when the present task is completed. N will cause the COMMAND procedure to stop; the next command will be carried out in the PICTURE procedure. Add N,

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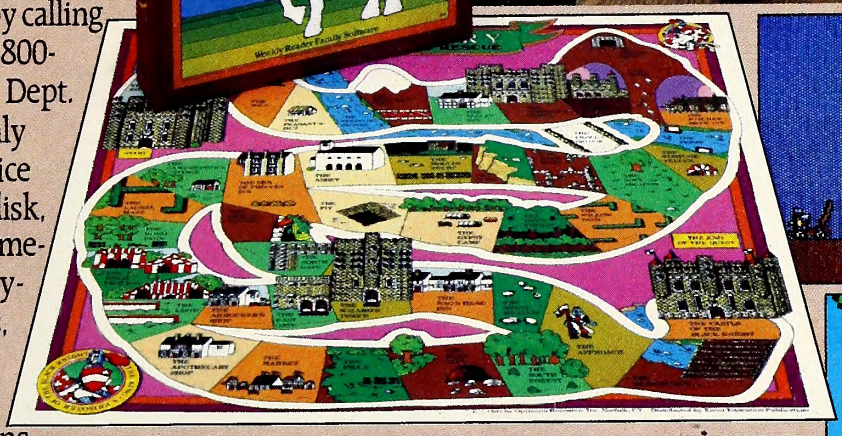

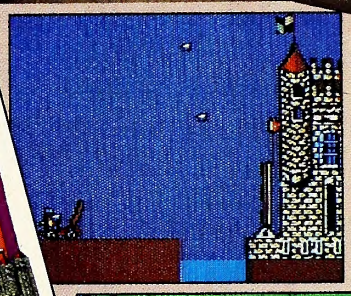

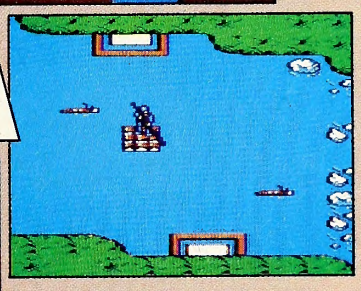

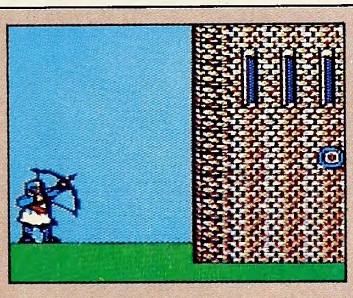

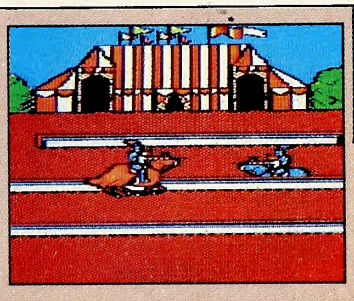

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B, E, and D to the COMMAND procedure:

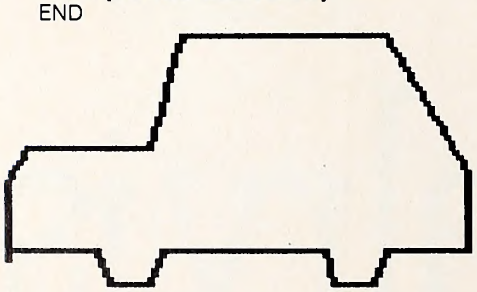
```
TO COMMAND
MAKE "COM READCHAR
IF :COM = "F [FD 10]
IF :COM = "R [RT 10]
IF :COM = "L [LT 15]
IF :COM = "B [BK 10]
IF :COM = "N [STOP]
IF :COM = "E [PENERASE]
IF :COM = "D [PENDOWN]
COMMAND
END
```

Define an INTRO procedure to give the first instructions:

```
TO INTRO
CS CLEARTEXT TESTSCREEN
PRINT [TYPE THE COMMANDS AND]
PRINT [THEN TYPE N FOR NEXT
  COMMAND.]
WAIT 200
ST
END
```

Now let's try PIC.1:

```
TO PIC.1
INTRO
PRINT [TYPE F 2 TIMES] ANOTHER
PRINT [TYPE R 2 TIMES] ANOTHER
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE R 4 TIMES] ANOTHER
PRINT [TYPE F 3 TIMES] ANOTHER
PRINT [TYPE L 5 TIMES] ANOTHER
PRINT [TYPE F 3 TIMES] ANOTHER
PRINT [TYPE R 5 TIMES] ANOTHER
PRINT [TYPE F 5 TIMES] ANOTHER
PRINT [TYPE R 4 TIMES] ANOTHER
PRINT [TYPE F 4 TIMES] ANOTHER
PRINT [TYPE R 2 TIMES] ANOTHER
PRINT [TYPE F 2 TIMES] ANOTHER
PRINT [TYPE R 6 TIMES] ANOTHER
PRINT [TYPE F 2 TIMES] ANOTHER
PRINT [TYPE L 5 TIMES] ANOTHER
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE R 5 TIMES] ANOTHER
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE R 5 TIMES] ANOTHER
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE L 5 TIMES] ANOTHER
PRINT [TYPE F 4 TIMES] ANOTHER
PRINT [TYPE L 5 TIMES] ANOTHER
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE R 5 TIMES] ANOTHER
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE R 5 TIMES] ANOTHER
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE L 5 TIMES] ANOTHER
PRINT [TYPE F 2 TIMES] ANOTHER
HT
PRINT [DO YOU SEE A CAR?]
END
```



As children follow the instructions, they may make a mistake and immediately realize they've typed too many Fs or turned one R too many. In the case of the turns, just type the opposite turn before typing N to get the next command. If already too far forward, type E for erase, type B for back, and then type D to put the pen back down. If a mistake was made several commands back, teach the child how to stop the program completely and start over by retyping the name of the procedure. This simply gives the child additional control over the program and the computer.

Again, you will probably want to start with simple pictures drawn with ninety-degree angles and perhaps a dozen or so commands. As the child gains control, make the pictures more complex.

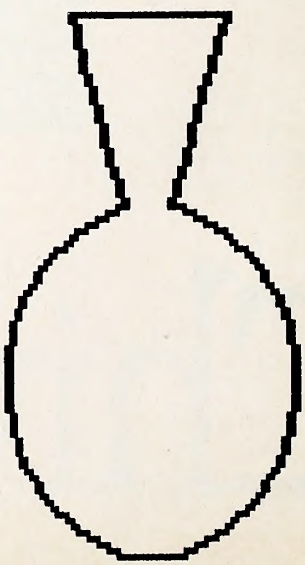
Here are the procedures for two other pictures drawn with fifteen-degree turns. The first is a circle. Watch children as they carry out the instructions and see whether they get into a natural rhythm of F N R N F N R N.

```
TO PIC.2
INTRO
REPEAT 24 [CIRCLE]
HT
PRINT [DO YOU SEE A CIRCLE?]
END

TO CIRCLE
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE R 1 TIME] ANOTHER
END
```

And how about a vase?

```
TO PIC.3
INTRO
PRINT [TYPE R 8 TIMES] ANOTHER
REPEAT 8 [CIRCLE]
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE R 2 TIMES] ANOTHER
PRINT [TYPE F 1 TIME] ANOTHER
PRINT [TYPE R 2 TIMES] ANOTHER
REPEAT 9 [CIRCLE]
PRINT [TYPE L 6 TIMES] ANOTHER
PRINT [TYPE F 4 TIMES] ANOTHER
PRINT [TYPE R 7 TIMES] ANOTHER
PRINT [TYPE F 3 TIMES] ANOTHER
PRINT [TYPE R 7 TIMES] ANOTHER
PRINT [TYPE F 4 TIMES] ANOTHER
HT
PRINT [DO YOU SEE A VASE?]
END
```



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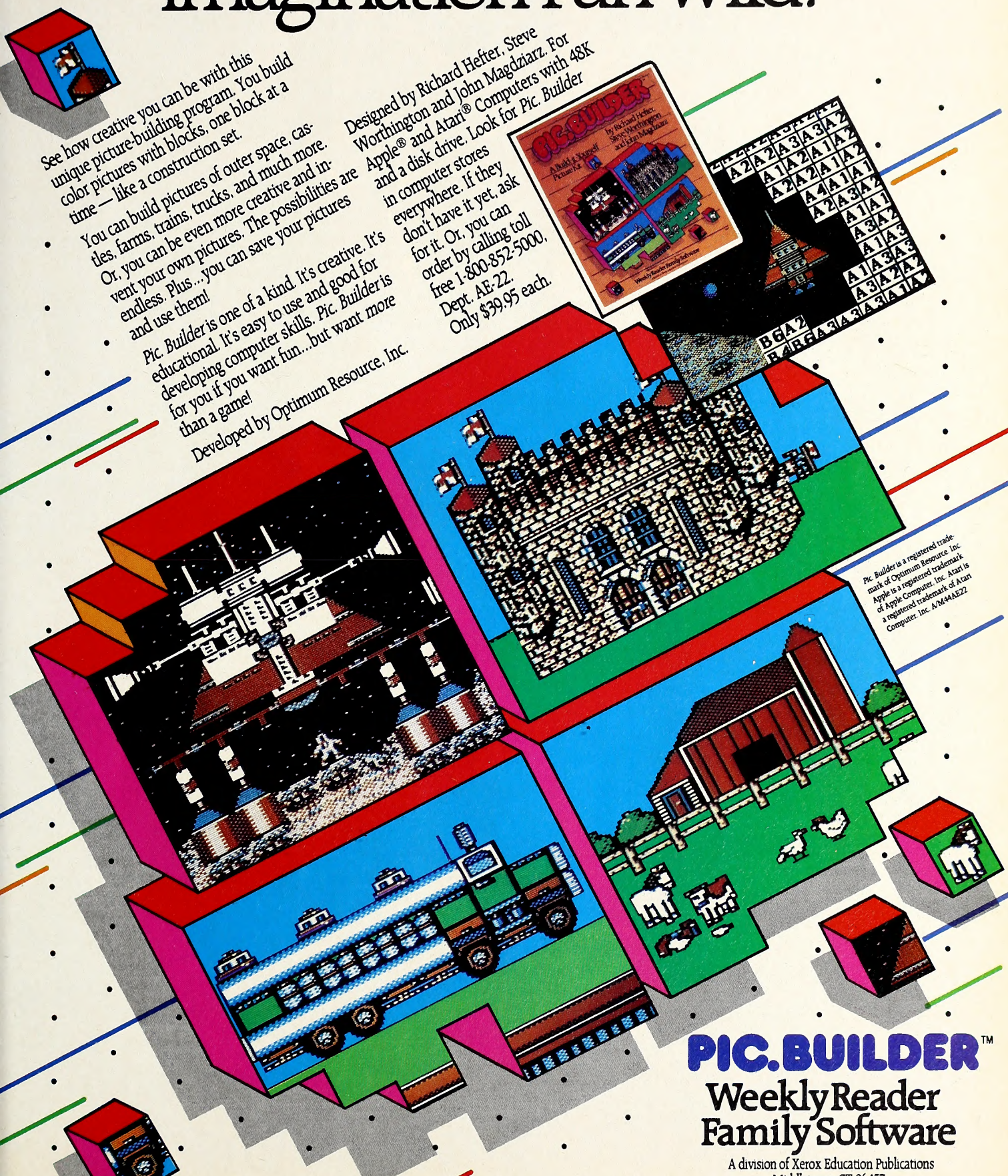

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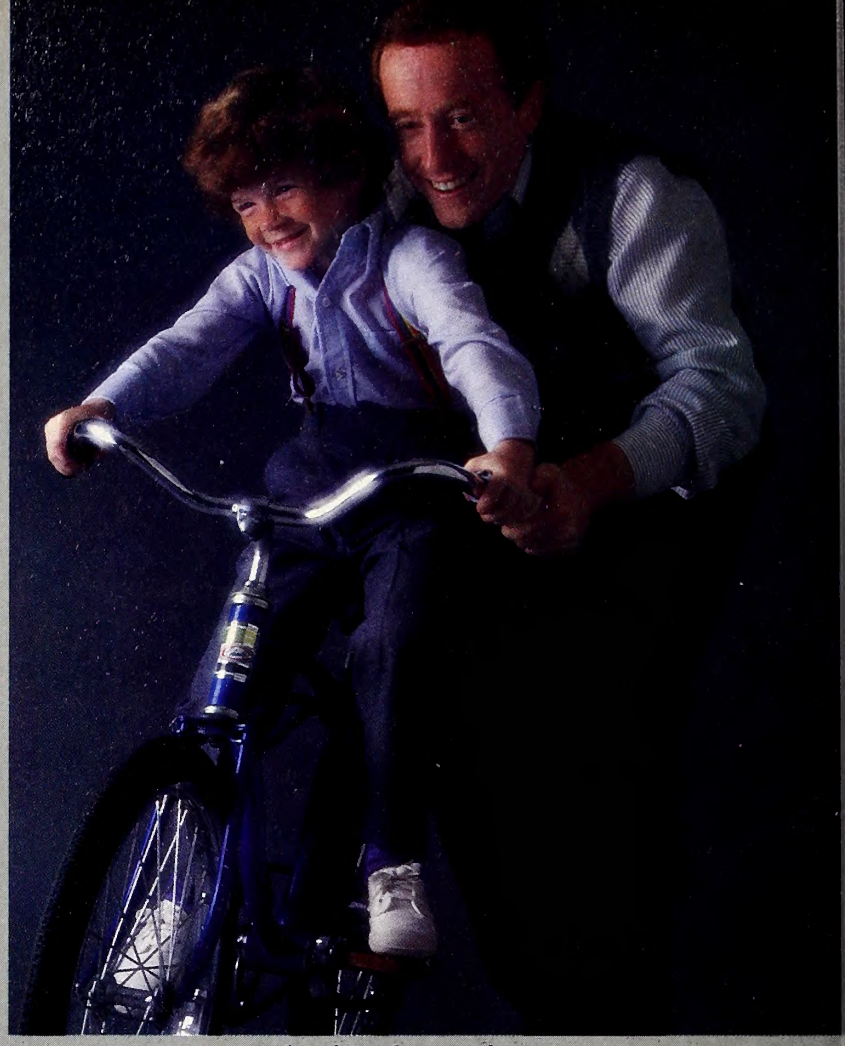

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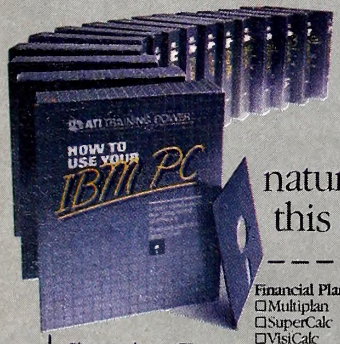

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IF I've been having a rough time trying to use the language card on my II Plus; I've been trying to load a shape table into it and have had little success. I first type *bload table,$D000* and then *poke 232,0:poke 233,208*, but when I do this the shapes come out as garbage. I have read the manual that comes with the card, but I couldn't understand it. I'd appreciate it if you could tell me what I'm doing wrong. *Greg Saccone, Walpole, MA*

THEN You won't be able to get a shape table to work from the language card area because a shape table is processed by Applesoft Basic, which resides in the same memory area in the other memory bank. An Apple with 64K of RAM actually has 80K of memory. 16K of that is *bank switched*, meaning you can only address 64K at a time. Most of the extra memory is ROM (read-only memory) that contains the Monitor subroutines and Basic. Machine language programs can switch the extra 16K back and forth rather easily, but Basic cannot. Since Basic occupies part of that bank-switched area, if you put a shape table in the alternate bank, either Basic or your shape table is lost when you try to use it! The best way to make use of the extra 16K is from machine language, although ProDOS and some modified versions of DOS 3.3 are set up to go into the language card, freeing up a lot of easily accessible RAM in the lower 48K. *Mark Pelczarski*

IF While programming an Applesoft program with hi-res graphics I encountered some things that I don't understand. One is that if a line is going from one corner of the screen and the color is set to white, every dot going down the screen is red, blue, green, orange, and so on. In programming a type of drawing board, I am not able to get the same color throughout the whole screen. Could you please explain how the hi-res graphics works?

Next, to wash the screen to one color I used this program:

```
1 HGR2
10 HCOLOR=X: REM X is the desired color
20 HPLOT 0,0:CALL 6254
```

When run, this washes the screen to the desired color, but when I plot another line across the screen it is jagged and about four lines thick. Why? *Mike Silberstein, Jericho, NY*

THEN Congratulations! You've discovered the first secret of Apple's hi-res graphics. Although one could write a book on the subject, here's a quick explanation of what you've discovered: The hi-res screen is 280 dots across by 192 dots down. The dots are arranged in groups of seven across. Each of these groups is only one dot tall. These groups are each stored in one byte, a unit of computer memory that can contain eight on and offs. Each dot is either on or off, and the eighth on/off is a color flag. More on that in a moment. When a dot is off, it is displayed as black. When a dot is on, its color depends on its position on the screen. Dots in even columns are blue or violet. Dots in odd columns are orange or green. There's no such thing as a white dot! You get a white dot by placing two dots next to each other.

What does all this mean? Well, a blue or an orange line horizontally across the screen is made up of only 140 dots: all the evens or all the odds. A white line across the screen has all the dots on, so it is made of 280 dots. A white line that is near vertical, however, will appear as the colors of the columns the line falls in, since the line itself is only one dot wide.

It's the color flag that tells if an odd dot is orange or green, or if an even dot is blue or violet. If the color flag for a byte is set, all seven dots in that byte will be blue or orange. If the color flag is off, all seven dots will be green or violet. That's why, when you clear the screen to a color such as orange and try to draw a violet line on it, many of the formerly orange dots will turn green. The color flags in each of the bytes that the violet line went through got reversed.

I should point out that while a lot of this seems strange, the Apple color mode should only be considered as 140 dots across. With the Apple, as opposed to most other computers, you can freely mix your six-color 140-dot mode with the two-color 280-dot mode. . . . It just depends on what you put on the screen. Most other computers require you to choose a specific mode for resolution or color, and the choice is either more resolution but little color, or less resolution and a few more colors. The ability to mix these two situations on the Apple is what makes a lot of the graphics stand out more . . . you put color where you want color, and detail where you want detail.

Apples with 128K (an Apple IIe with an extended eighty-column card) also have a new graphics mode called *double-res*. The black and white mode on it is 560 dots wide, and the 140-dot mode has fifteen colors. It makes a dramatic difference. And perhaps best of all, there is no color flag, so any color can be placed next to any other color without encountering the problem you discovered in standard hi-res. *Mark Pelczarski*

IF I recently encountered a problem about which I have been totally unable to find any discussion, much less a solution. Evidently, when an *hgr* or *hgr2* command is issued, a flag or soft switch is set so that even after exiting the graphics mode,

the hi-res pages remain inaccessible for program space. For example, I use a series of financial programs to keep track of household records. The main program gives an option on its main menu to display all categories on a graph. Choosing this option will run another program which, naturally, accesses the graphics page. Once the graph is displayed, pressing return will rerun the main program, but this results in an out-of-memory error. This is true even with DOS loaded into the upper 16K. How can I reset the flags or switches to make this space available after the graphics are no longer needed? *Hal Scoggins, Lake Jackson, TX*

THEN *Hgr* or *hgr2* does not set any memory switches, so I don't think those are causing your problem. Look for lomem, himem, or maxfiles commands or pokes to locations in the 0 to 255 range (especially 103 and 104) in your program. My best guess is to try resetting himem and maxfiles with the following lines at the beginning of the longer program:

```
PRINT CHR$(4) "MAXFILES 3"
HIMEM: 38400
```

If that fails, try adding *poke 103,1: poke 104,8.* If that fails, press control-reset. Hope that helps. *Mark Pelczarski*

IF I own an Apple II Plus and I was looking in the *Applesoft Basic Programming Reference Manual* about how to make, save, and use a shape table. My question is, how do you save a shape table on a disk? Using the instructions given, I made and saved the shape table and used it in a program. When I turned the computer off and then back on again, the shape table was erased. How do I save shape tables? *Keith Spiro, Black Mountain, NC*

THEN To save a shape table to disk you need to use a bsave command. You will need two numbers: the starting location of your table, and the length of the table. For example, let's assume that I poked in a table starting at 16384, it was 23 bytes long, and I wanted to name it Rhino. From the Basic prompt, type *bsave Rhino, A16384,L23* and press return. Done! If the address is in hexadecimal (like the sample shape in the Applesoft manual), use the hexadecimal address preceded by a dollar sign: *bsave Rhino,A$1DFC,L14.*

When you load the shapes back in, you have to make sure that the shape table pointer, locations 232 and 233 in page zero, points to the shape table. How to set the pointer to a particular memory location is explained in the manual section on shape tables; here's an easy way that will work every time provided the memory location you select doesn't conflict with anything else.

```
10 LOC = 16384: REM This is a safe place.
   Use 24576 if you're using hi-res page 2.
20 POKE 233, INT(LOC/256)
30 POKE 232, LOC-PEEK(233)*256
40 PRINT CHR$(4);"BLOAD SHAPES,
   A ";LOC
```

As noted in line 10, 16384 is a safe location for shapes if you're using hi-res page one, and 24576 is a safe location if you're using page two. If you know enough about memory use to do something that conflicts with these locations, you should know enough to be able to find other safe places. By the way, the manual uses $1DFC as an example location because it was written at a time when 16K Apples were common. *Mark Pelczarski*

IF I would like to make a binary program a boot program on our Apple II Plus and IIe's. I checked Apple's DOS and reference manuals but found nothing on how to do this. I read somewhere that if you poke 40515,52, then bload your program, and then type *init hello*, your hello program will be saved as a binary boot program. It didn't work. How can I render a binary program a boot program when I initialize a disk? *Ralph Cinque, Manchester, NH*

THEN You're on the right track. The full procedure is type *new*, which clears any Basic program from memory, then type *poke 40514,52*; the poke simply controls what command DOS uses when automatically running a disk's greeting program. You have to put the binary file on the disk yourself. (You can also exec a text file by poking in a 20.) Then type *init hello* (or whatever name you have given your binary greeting program). Type *delete hello* to get rid of the empty Basic file on your disk, and then use *FID* to move your binary program onto the new disk. You have to put the binary file on the disk yourself. *Tom Weishaar*

IF I have an Apple IIe, monitor, disk drive, Apple DMP, and eighty-column card. My problem involves switching to eighty-column screen display after sending data to my printer in eighty-column mode. I recently wrote a program that accepts and stores data concerning loan amortizations. One of the options of the program is to give the user a printed report of the data. Once the data is printed, control is passed back to the main program menu where the user may select another task or quit.

This is where the problem comes in. The program runs in eighty-column format, but when the menu is displayed (after the print job), the letters in each line (on the screen) are spaced two or three spaces apart. Some of them even wrap around to the left side of the screen. The commands I use to ready the printer are *pr#1:print CHR$(9);"80N"*. Once the report is printed, I turn it off with pr#0. I have exhausted myself trying different variations of printer control and cannot seem to shed light on my problem. *Kenneth Chauvin, Houma, LA*

THEN You have two problems. First, you are using pr# as a Basic command, and you should be using it with a control-D as a DOS command. Second, you need to turn off the eighty-column card before printing and turn it back on afterward. Try this sequence:

```
PRINT CHR$(21) : REM (control-U) turns off the
eighty-column card
PRINT CHR$(4);"PR#1" : PRINT
CHR$(9);"80N" : REM turns on printer
        print your report here
PRINT CHR$(4);"PR#3" : REM turns
eighty- column display back on
```

A lot of programmers have trouble dealing with Apple's eighty-column card. It might help to think of it as a device in slot 3. Thus, if you want to send output to some other slot, you need to turn slot 3 off first. The confusion is that most devices turn off automatically when you pass control to another slot. But not the eighty-column card. It demands a print chr$(21) (or escape control-Q if you're typing on the keyboard) as a signal that it should relinquish control. Note especially that using pr#0 (the typical way to turn off something in a slot) while Apple's eighty-column card is active always causes problems. *Tom Weishaar*

IF I am a beginning assembly language programmer with a IIe and one disk drive. I would like to convert Basic programs into assembly. Is there a way to convert the programs without doing it by hand or with an expensive compiler?

I've been wondering how to encode my programs and files so that they will run right. When someone else looks at the disk file, lists the program, or looks at the machine language version they appear as a jumbled mess. Also, can you prevent someone from listing an assembly program? And last, how can you program in binary on the Apple? *Steven Jensen, Houston, TX*

THEN There is no easy or free way to convert a Basic program to assembly. Compilers are available

for $75 to $150 and are in many ways the easiest conversion. However, they only speed up program execution time two to five times, on the average. This is because they only save Applesoft the problem of interpreting the listing; the actual routines are still done by the original Applesoft routines. Don't be too hard on Applesoft, though. Those routines that are ultimately called are in machine language, and are rather well-coded routines at that.

Additionally, many software companies produce machine language extensions to Applesoft. Many times, these extensions achieve the same results as writing the program in machine language; that is, your program gets both smaller in size and faster in execution speed. When you think about it, you don't really need to speed up *all* of your program. Usually it's just things like sorting, searching, graphics, and so on that are the problem. Applesoft extensions solve these specific problems with a minimum of effort.

Finally, you can convert or rewrite your program yourself directly in assembly language. Don't faint quite yet. Assembly language has unfortunately gotten a bad reputation for being difficult, but this is probably because of the lack of proper tools (read "software") in the past. With the current level of Apple assemblers available now, though, many people find that writing in assembly language isn't all that much more difficult than writing in Applesoft!

As far as hiding or otherwise encrypting your programs, you are really asking three questions here. To hide the disk file, you can alter the file name so that it includes backspaces and space characters at the end of the name. This will make the catalog operation overprint the name as it is printed with spaces, so that the name is invisible. Programs are available that will let you edit file names so as to put the names in inverse or flashing text, or to put control characters like the backspace in the name for the effect just described. If you just don't want somebody to be able to load the file, putting a control character in the file name is actually sufficient to discourage the casual user.

To keep someone from listing the program, there are two ways I know of. The first is to do a *poke 214,255* in one of the first lines of your program. When the program is run, this will set a flag in Applesoft that prevents that program from being listed. In fact, you won't be able to do anything from that point on but run the program or execute various disk commands like loading another program or rebooting the disk. Your program can reset this flag to normal by doing a *poke 214,0*. The disadvantage to this approach is that the program must first be run to do the pokes to set the flag.

As far as protecting from listing at the machine level, you're pretty much out of luck here. If you're that concerned with secrecy, the real answer is to try to avoid letting anyone get that far into your program. Once you're at the Monitor level of the computer, the user has complete control, and there's not much you can do to limit his activities!

One technique that can be used, though, is to have your program decode itself as it runs. What this means is that when a range of memory is sequentially exclusive-or'ed with a value, it is converted to apparent garbage. However, if the same range is again exclusive-or'ed with the same value again, the original contents are restored. This provides a technique where you can encode your final assembly code by exclusive-or'ing the block with a value, and then have your program decode itself as it runs. If this doesn't sound all that clear, my apologies. It's one of those areas that if you're familiar with the EOR opcode, it's fairly straightforward. If you haven't gotten to assembly language programming at all yet, then don't feel bad if it sounds like Greek!

To answer your final question, you can't program directly in binary (that is, by typing in 1s and 0s on the Apple), but you can do the next best (or worst, as the case may be) thing by using the Monitor to enter hex codes directly into memory. For example, if you wanted to enter the value $4C at location $300, you would just type in **300: 4C* and press return. If you have a language card and the System Master disk that came with your Apple disk drive, you have access to something called the Miniassembler that used to come as part of the stock Integer Apple II computer. You can use this utility by booting your System Master, then entering Integer with the int command. Enter the Monitor from Integer Basic with the usual call -151. Then type in **F666G*. The prompt will change to an exclamation point (!) and you can then use the Miniassembler. See your Apple reference manual for more information on this. The best approach, from an hours-of-your-life viewpoint, though, is to make the investment to get a real assembler. The Miniassembler is really only of value as a quick way to patch a few bytes of memory on occasion, and is not really a legitimate substitute for a full-fledged assembler. Have fun! *Roger Wagner*

IF I have a problem using DOS commands in machine language. Whenever a DOS command is issued, all goes well until the disk drive is finished. Then, five bytes of code are printed on the same line as the command. The bytes (always the same) are 00 01 EF D8 00. My question is, what are the bytes for, and are they from DOS or machine language? *Seth Rogers, Mariemont, OH*

THEN I assume that what you are referring to is the following effect: When from Basic you enter call -151 to enter the Monitor (asterisk prompt) and then type in a DOS command like catalog or lock, the DOS command and the bytes "00 01 EF D8 00" are printed on the screen. Frankly, this was something I noticed from time to time but never knew the answer to. Your question prompted some experiments, and a summary of the results follows.

The answer to your question has to do with how the Monitor handles the interpretation and execution of commands typed in the immediate mode. When you type in something like *300L* and press return, the Monitor starts scanning the line at the first character, and whenever it gets to a command letter like *L*, it performs the appropriate operation. It is possible to put several command statements on the same line, as in the case of

300L I 380L N FBDDG

This sequence would first disassemble the contents of memory starting at location $300. When that is finished, it will go into the inverse mode (because of the I). Then the contents of $380 will be disassembled, followed by a return to normal text output (the N is the Monitor command for normal text output). Last of all, the beep routine at $FBDD is called with the G command, and after the beep, control is returned to the user.

To properly sequence the execution of these commands, the Monitor makes use of a pointer that continually points to the last character it has analyzed, and thus the next character to be looked at when things resume. For instance, when the 300L is executed, the pointer is on the space after the L in 300L. After the disassembly is done, the Monitor resumes its interpretation of the line at this same point.

Now, before we give the exciting conclusion, let's take a moment to mention how DOS works. When you type something in and then press return, DOS steals control for a moment and gets the first shot at acting on what you've typed in. When it's done with either ignoring what you've entered or executing the DOS command (if, for example, you typed in *catalog*), it increments the input buffer pointer to the end of what you've typed and then passes control to the next level in the computer, usually the Applesoft Basic line interpreter. The problem occurs then because in Applesoft, the only remaining character in the input line that might be executed is a carriage return. In Applesoft, this would have no effect. But in the Monitor, if you press return alone, you will get a dump of the hex values at whatever address was examined last.

This is the key to our problem. The crucial hint is given when you press return alone after those first five bytes are printed out:

```
*LOCK HELLO
00 01 EF D8 00
* [press return once]
B800 - A2 00 A0 02 88 B1 3E 4A
```

Pressing return alone after the DOS command dumps the memory contents starting at $B800. Why $B800? Consider how the Monitor remembers the last address listed: It stores the address bytes in locations $3C,3D. What happens with your DOS command is that after DOS is done doing whatever it is you asked for, control is returned to the Monitor, which then executes the command associated with a return only, namely the dumping of some memory contents. In this case it uses the contents of $3C,3D to decide where to list from.

The address in $3C,3D always seems to be the same, since the same range of memory is dumped after your DOS command ($B7FB through $B7FF). We know $3C,3D is set to $B7FB because pressing return afterwards always lists at $B800. (Five bytes are printed after the DOS command; $B800 - 5 = $B7FB.)

This theory cannot be directly confirmed from the Monitor because $3C,3D are altered when you type the Monitor examination command. Thus, typing in **3C* and pressing return yields *3C - 3C*. This is because in evaluating what you typed in (that is, 3C), the Monitor puts the result in location $3C. The theory can be confirmed from Applesoft, though, by typing in and running this short program:

```
10 POKE 60,0: POKE 61,0: REM ZERO
   $3C,3D
20 PRINT CHR$(4);"LOCK HELLO"
30 PRINT PEEK(60), PEEK(61)
```

After the DOS command, the program will print 251 and 183 on the screen. This corresponds to locations $3C,3D holding the bytes $FB and B7, precisely the predicted values!

The final explanation then is that the problem is caused by a combination of the Monitor and DOS. It starts when DOS intercepts control and, in the process of executing any DOS command, leaves the values $FB,B7 in location $3C,3D. Control is then returned to the Monitor with a single carriage return (the one you pressed or printed after the DOS command) remaining on the line. The Monitor then dutifully executes this last command by printing the contents of five memory locations starting at $B7FB.

I suppose the only remaining question at that point might be why *five* bytes are printed. This has to do with the fact that the Monitor stops the display each time it gets to an eight-byte address boundary, that is, any address that ends with either an 8 or a 0. This is to facilitate the eight-bytes-at-a-time display that you get whenever you dump a large range of memory from the Monitor.

I hope this explanation hasn't been longer than you wished, but I wanted to also show a little bit of the process I went through in solving your problem. For me, one of the most rewarding aspects of the Apple is that you don't always have to have a book (or an expert) to answer questions, provided that you can sufficiently direct even simpler questions to the computer itself and use everything you already know about how the computer responds to given operations. *Roger Wagner*

IF I'm writing a little game on my Apple to study assembly using Roger Wagner's book, *Assembly Lines*, but I can't get my Apple to generate random numbers in assembly. How can I do this? *John Pry, Brussels, Belgium*

THEN The easiest solution to your problem is to use the random number generator built right into Applesoft Basic. This routine starts at location $EFAE and usually has the label RND in assembly source listings. When called, it scrambles the contents of the floating point accumulator (also called the FAC), which are the bytes $9D through $A2. If all you want is a single-byte random number, just use the contents of location $9D after calling the routine at $EFAE. For some examples of the RND routine put to use in some hi-res programs, you might try to find a back issue of the October 1982 *Softalk*. This uses the RND routine to create explosion-type noises. *Roger Wagner* ■

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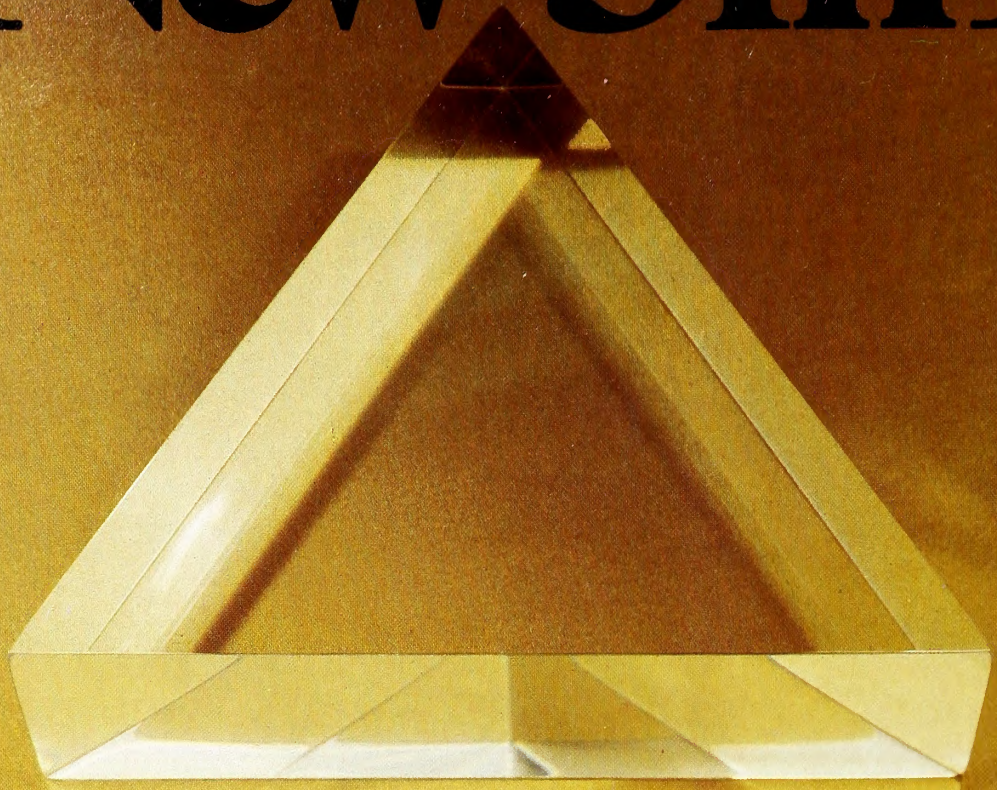

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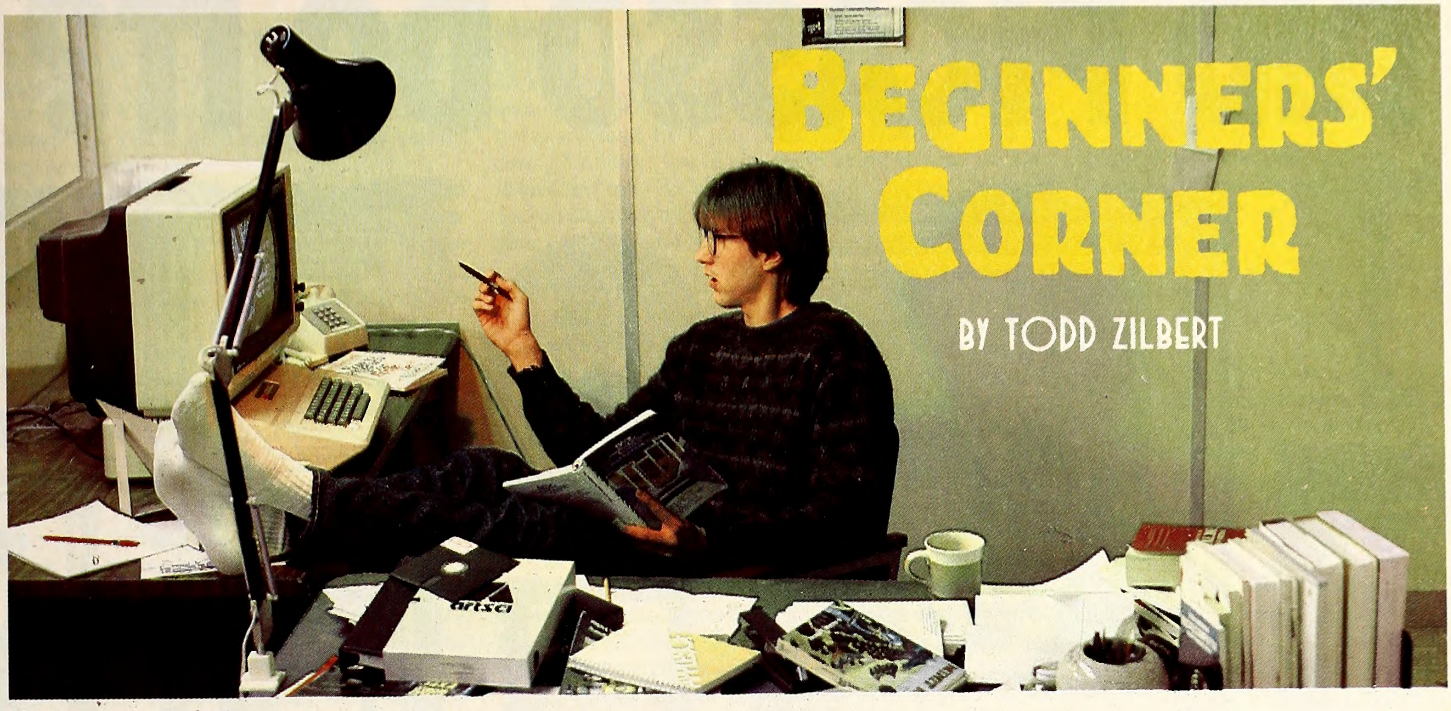


BEGINNERS' CORNER

BY TODD ZILBERT

Init: Hello

Look at your hands. Human hands are wonderful tools for gardening, for swinging from trees, for holding baseball bats, for manipulating forks and spoons and chopsticks, and for thousands of other things (no hitting).

Hands are also elementary computers. They can help the brain count, add, subtract, and perhaps multiply, divide, and compare values. As computers, hands work best for counting to ten, but they also work great for counting to five and for counting by fives. Look at the back of your right hand and make a fist. Now unfold your pinky. Let your pinky represent one. Now unfold your ring finger (easier said than done, eh?). It also represents one and can be added to your pinky, so that your right hand represents two ones. Hold up all of your fingers (thumbs too), and you have five ones, or five.

And now you have a choice—you can go to your left thumb and make that a sixth one, so you have six, and proceed on your left hand up to ten. Or you can have your left thumb represent all of the ones on your right hand—you can make it a five. Hold up your left hand, make a fist, hold up your thumb, and lower all of the fingers on your right hand. The thumb on your left hand represents the five fingers of your right hand.

With this method of counting, the fingers on both hands represent the number thirty. Whip off your shoes and socks and make your right toes each represent twenty-fives and your left toes each represent one hundred twenty-fives; all your digits taken together will add up to twenty, but they will represent seven hundred eighty.

What's going on here? Is this a computer magazine or an anatomy lesson on *Sesame Street*?

This is Beginner's Corner; this is not a classroom—there will be no tests, no desks, and no grades. Think of this as the children's reading room in a public library. All are welcome. Also, everything in this reading room is fun and wonderful, and if all you learn here is that computers are fun and no more threatening than Dr. Seuss, you'll have learned enough. We'll assume that you need everything explained to you, and that you have access to an Apple II Plus, IIe, or IIc, one disk drive, a monitor or television set, and some patience. Because most Apple owners are currently Apple IIe owners, this column will be directed toward the Apple IIe; however, II, II Plus, and IIc owners will all find that most of what is said applies to you, too. If this sounds good to you, put your socks back on and keep reading.

A computer is a tool that frees your hands for holding a cup of milk or coffee and a Danish. It performs the arithmetical operations add, subtract, multiply, and divide. Further, a computer can compare numbers—that is, perform the operations equal to, greater than, less than. And a computer can remember numbers. And that is—in essence—what a computer is.

Numbers are very important to computers. Numbers are what computers think about, and what they think with. What's nice—perhaps nicest of all—is that we don't have to think in numbers, even to use a computer. The fingers and toes lesson, besides being a ploy to get you to take your shoes off and stay awhile, is intended to illustrate a very basic lesson in number theory.

Usually we count by ones, tens, hundreds, and so on. Another way to say that is that we count in base ten. Consider the number 439. The rightmost number, the 9, represents nine ones. We say that it is in the ones column. The middle number, the 3, is in the tens column and represents three tens. The leftmost number, the 4, is in the hundreds column. It represents hundreds. We're all very comfortable with base ten, and any number we see we can interpret using this system.

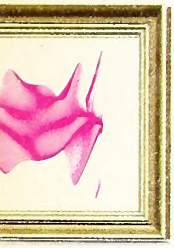
When we were counting on our fingers, however, we weren't counting in base ten; we were counting in base five. In base ten there are ten accepted digits in the ones column, 0 through 9. When we have ten ones, however, we spill over into the tens column. So, if we add a one to 439 we don't get 4310, we get 440. That is, we will carry ten ones—or one ten—into the tens column.

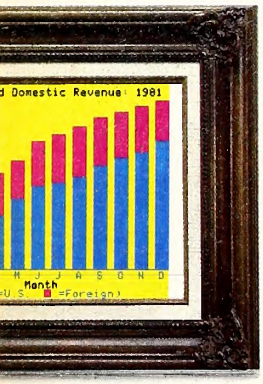
In base five there are five numerals accepted in the ones column, 0 through 4. After that we spill into the fives column. In base five, if we add a one to 440 we get 441, but if we add a five we don't get 445, we get 1000. That is, we start with zero in the ones column, four in the fives column, and four in the twenty-fives column. Adding to the ones column in base five is just like adding one to the tens column in base ten—we have to carry over into the next column. So we have five in the ones column; carry one five—since we only have one, we leave a zero behind. And since we have four in the fives column already, adding one will give us five—which we carry, leaving a zero—and so on.

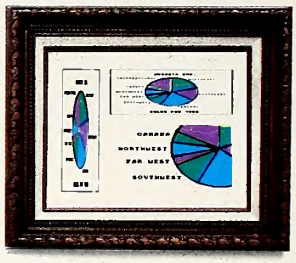
But enough theory! Let's get that computer up and running. Wiggle your Apple out of its box and consult the owners' manual for setup instructions. Look at the keyboard. At first glance it looks just like a typewriter keyboard. For most of us, that's a relief, because we've spent a lot of time and effort learning our way around a typewriter keyboard, and having to relearn everything would be nothing short of infuriating. If you don't know your way around a keyboard, you're in luck. Later on we'll mention ways your computer will teach you to type.

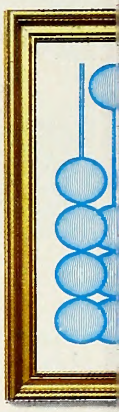
The IIe (and IIc) keyboard is not identical to that of a typewriter, however, so let's look at the differences. In the upper left-hand corner is a key marked escape, which you'll never find on your Brother. Don't be frightened; there is nothing to escape from—yet. Below escape is the familiar tab key, and below the tab key is a key marked control. (On the II Plus, it is marked "CTRL.") It works like a shift key in that, when used together with other keys, it makes them do something other than what they

DID PICASSO DO IT?









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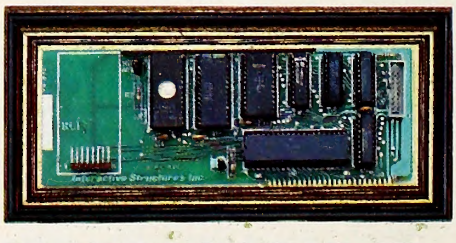

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normally do. The shift key produces upper-case letters or symbols (this is not true on an unmodified II Plus). When used with other keys, the control key usually gives the computer instructions. You'll learn more about the control key as we go along.

Find the z key. Below it is a small piece of plastic. It's the power light; when the computer is on, this will light up so that you know for sure that the computer is on. (On the IIc the power light is a thin slash above and to the right of the keyboard.) To the right of the power light is a key that looks like the outline of an apple. It's a special function key called the open apple key. To the right of the space bar is a similar key called the solid apple key. These keys function like the control key—they are nonprinting keys, and they give instructions to the computer.

To the right of the solid apple key are four keys with arrows on them. These keys help you move around on the screen—that's all we'll say about them for now. In the upper right-hand corner, recessed into the plastic case, is the reset key (IIc owners will find it above the keyboard, on the left side, while on the II Plus it is on the right but not recessed). Reset is a very powerful key, and for that reason it is placed in a difficult place to reach. You don't want to hit reset by accident.

All the other keys except delete are like the keys on a keyboard. When pressed they produce their respective characters on the screen. You may not recognize all the characters. Delete has various functions; sometimes it erases the characters made by other keys, other times it does not. We'll discuss methods of deleting in greater detail in later columns.

The best way to understand all of this is to try it out, so let's turn our computers on. Reach behind the computer to the back left-hand side and locate the power switch. It's inconveniently located for a reason—you don't ever want to turn your computer off accidentally. Later, when you're writing programs with hundreds of lines in them, accidentally turning off your computer would be like accidentally dropping your homework in the bathtub. Ruined.

You will hear the disk drive whir, and the words "Apple II" will appear on the monitor. (If you have a IIc, the monitor will tell you to check the disk; disregard this for now.) Find the control key, press it, and hold it down; now find the reset key and depress it, too.

What we've done is reset, or restart, the computer, simultaneously entering Applesoft Basic. Applesoft Basic is a version of the computer language Basic. This sounds technical, but don't worry; we'll discuss Basic in more detail later. For now, concentrate on the right, or close, bracket that has appeared on the screen. This bracket is called a *prompt*. There are many different kinds of prompts; the prompt for Applesoft Basic is the close bracket in front of you; when you see it you know that Applesoft Basic is available for use. The prompt for Integer Basic, another version of the Basic language, looks like a greater-than sign (>).

Next to the prompt is a flashing symbol. It is called a *cursor*. The cursor shows where the characters you type will appear on the screen. Like prompts, cursors come in various shapes and sizes; in Applesoft Basic, the cursor is usually a solid rectangle.

True to its name, the prompt is your cue to do something. By displaying the prompt, the computer is telling you that it is on and waiting for instructions from you. This may be intimidating initially, but if you think about it you should feel safe; the computer doesn't, and cannot, do anything by itself. It must be told. Computers do not think for themselves.

On the keyboard, type *Add two plus two*. Rather than do what you tell it, the computer will show what you've typed on the monitor. The letters will appear in upper case whether or not you typed them with the shift key down. Now press the return key—your computer responds with the words *?syntax error*. This is called an *error message*. Don't panic. No serious error has been made. You may find it reassuring to know that, in fact, nothing you type in can cause a serious error.

The computer has not incorrectly added two plus two. You just spoke to the computer in English, and the computer does not understand English. The error message is the computer's way of looking at you quizzically.

We learned earlier that computers think in numbers. The numeric language that computers think in is called binary. Binary is a language very much like Morse code. Morse code, the language used to speak over a telegraph, consists of nothing but dots and dashes, or shorts and longs. Binary consists of nothing but ones and zeros, or ons and offs.

Binary is a system of counting in base two.

Please don't panic; no more number theory today. Just be aware that computers think in binary and be glad that we don't have to. The reason we don't is that there are intermediaries, languages that will interpret what we think in English into what the computer thinks in binary.

There is even better news. There are people, called programmers, who have learned the intermediate languages so that the rest of us don't have to. Before you breathe a sigh of relief, you might as well know that you're going to learn at least a little bit of one such language, one that we've already mentioned, called Applesoft Basic. You'll enjoy it. Promise.

Type the word *home* and press the return key. The prompt and the cursor will jump to the top left-hand corner of the screen. Home is a command in most versions of Basic, including Applesoft Basic. Basic is composed of about one hundred commands.

Type the word *print*, followed by a quotation mark (which II Plus owners will get by holding down the shift key and pressing the 2 key) and your name. Finish with another quotation mark. The monitor (or your television screen) will display what you type. It should look like this: PRINT "MY NAME". Like the word *home*, print is a command in the Basic language. The computer will not act on the command, however, until you hit return. When you do so, your name will appear below the first line.

Try the same sequence, only replace your name with the words "This is fun!" Yes, this is fun, and the more we learn the more fun it will be. Now let's write a program.

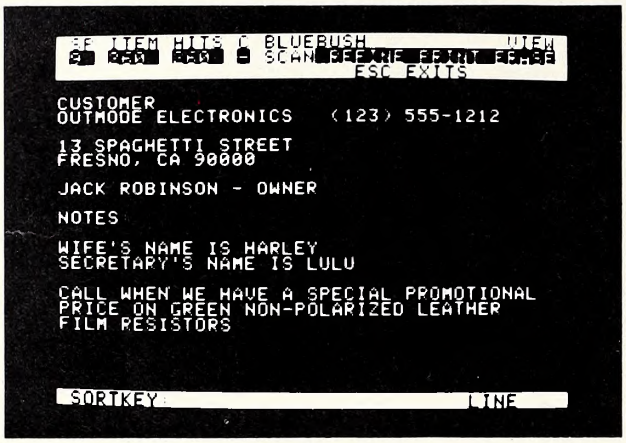
A program is a set of instructions that the computer understands and can follow. There are simple programs and complex programs. We're going to write a very simple one. Type the following: *1 HOME* and press return. (The reminder to press return will be omitted from now on; just remember that the computer won't act on a command until you press return.) The numeral 1 is called a line number. The command *home* you're familiar with. Together, 1 and home form a line. Now type: *2 PRINT "My name is* and your name, followed by a closing quotation mark. Finally, type *3 END*. *End* is a command in Basic that tells the computer that the program is finished.

Congratulations! You've written your first program. You can check the program by typing *list*. The *list* command tells Basic to display in numerical order the lines of the program. The three lines of the program will appear on the monitor. Did you type everything correctly? If not, simply retype the line, and list the program again to check it.

And now for the pièce de résistance. Type *run*. This command tells the computer to execute the program. Type run again and again—unless you misspell run, it works every time. If you do misspell it, you'll get another error message; spell run correctly and the program runs.

If you haven't already done so, put the *Apple Presents . . . Apple* disk in the disk drive and close the drive door, but don't turn your computer off. Type the following command: *pr#6*. We'll explain this command and talk about *Apple Presents . . . Apple*, and more, next time. Don't forget your shoes. ⌋■

How to find Jack Robinson quicker than you can say it.



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Speed File at a glance.

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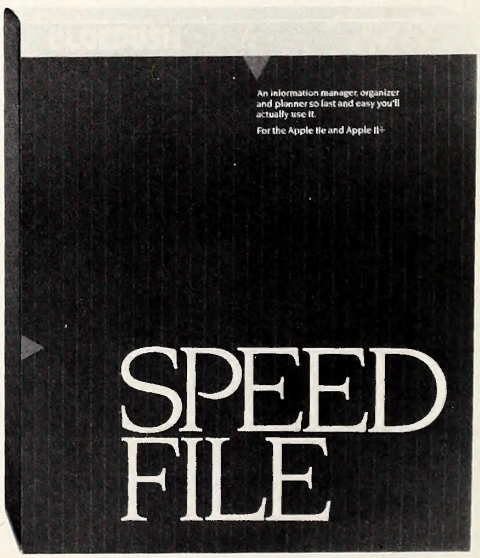

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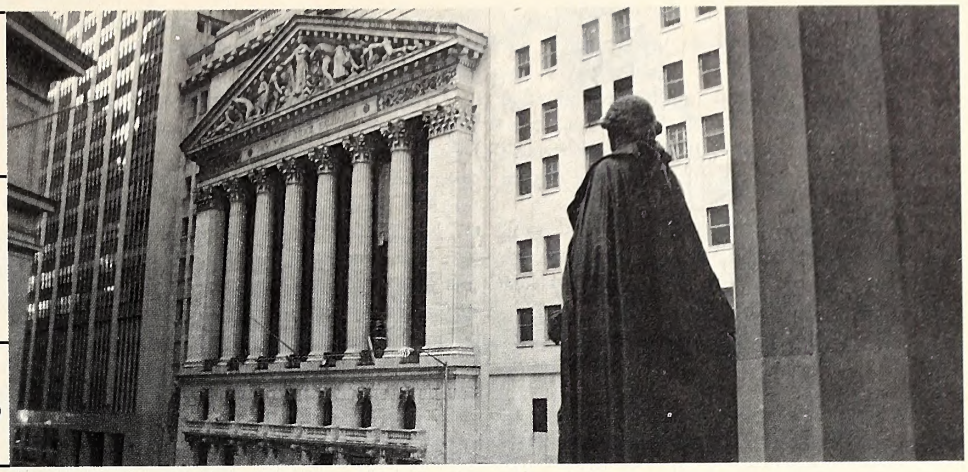
Buttonwood Apples

BY KEN LANDIS



Capital Strategy for Investors Reviewed

Most of the programs we've looked at in previous installments of Buttonwood Apples have been designed either to help us decide where to invest money or to help us keep track of money once we've invested it. Clearly, these are important concerns. But there's a third question each of us must also address, and that's how much money we should invest in the first place.

The program we'll look at this month, Ventura Data Systems's *Capital Strategy for Investors*, considers that issue. In fact, it would appear that the author of the program has engaged in original research in an effort to answer the question: How much money should I invest?

Capital Strategy for Investors, Ventura Data Systems (1061 Sage View, Chula Vista, CA 92010; 619-421-1251). $69.
System requirements: Apple II Plus, IIe, or Apple III (emulation mode); one disk drive.
Optional and recommended: printer.
Backup policy: Backup disk available from company for minimal charge.

The author of *Capital Strategy for Investors* defines capital strategy as "maneuvers in the employment of capital that seek to optimize capital growth without, however, accepting undesirable risks." He further states that "capital strategy is separate and distinct from the investment selection process."

This novel program is steeped in complex mathematical theories. The first ten pages of the documentation offer an explanation of the program's mathematical and statistical underpinnings. Reading these pages should give you a quick overview of Statistics 101, with an emphasis on probability theory. The author also spends a good deal of this section explaining some of his major concepts and vocabulary; we'll discuss some of these as we look at the program.

Capital Strategy for Investors is a menu-driven program containing eight modules, all of which are accessible from the main menu. The modules are the quick formula, the general formula, the reprise general formula, data frequency, merge probabilities, occurrences, flat bet ruin, and configure. Once you're in a particular module, the program prompts you for required inputs and performs its calculations automatically as soon as sufficient information has been supplied.

Before running the program, you must decide whether the capital minimum factor, which is set through the configure option, agrees with your personal investing style. This figure is the point below which you are unwilling to let the value of your investments drop. If, for example, you have $100 invested in your portfolio and you are unwilling to lose more than $50 before you sell off your capital holdings, your capital minimum factor is .5, or 50 percent. The author appropriately refers to this figure in very non-quantitative terms as the "discomfort factor." The default value of this factor in the program is .5. Once the factor is set, you're ready to get started with any of the program's modules.

Module 1 is the quick formula. As its name implies, this formula enables you to get a quick analysis. In order to take advantage of it, you must first specify the probability for success of a contemplated investment (a sure bet is 1, or 100 percent, while a sure loser is 0, or 0 percent), the return that can be expected if the investment is successful (defined as the "estimated profit decimal fraction"), and the estimated loss if the investment is unsuccessful (defined as the "estimated loss decimal fraction").

Let's take a moment to discuss estimated-profit-and-loss decimal fractions. An understanding of these concepts is essential if you wish to use the quick formula analysis method.

We'll assume, for the sake of illustration, that you have placed a bet on the outcome of a basketball game. The odds on the bet are even, 1–1; you bet a dollar to win a dollar. In this assumption, your estimated profit decimal fraction is 1, or 100 percent. If you lose, you'll lose all your money, so your estimated loss decimal fraction is also 100 percent, or 1. If the odds on the investment were 2–1, you'd be betting $1 to win $2, so your estimated profit decimal fraction would be 2, or 200 percent. If you happened to lose, however, you'd still lose only the amount of your investment, so your estimated loss decimal fraction would still be 100 percent, or 1.

To further our understanding of profit-and-loss decimal fractions, let's consider a different form of investment, one that may be more or less speculative: a stock. Assume that you buy one share of Surething Industries for $10. Your best guess is that Surething's price will increase. But by how much? Let's assume the price is going to rise $3, to $13 per share. Thus, your expected profit decimal fraction is .3, or 30 percent. You bought the stock because you expected it to increase in value by 30 percent.

If you're a wise investor, you've also attempted to assess your downside risk. What if instead of increasing, the stock's price were to fall. "How far is it likely to fall?" you ask yourself. Let's say that having taken into account both the history of the stock and the outlook for the market, you've assumed that if Surething were to fall, it wouldn't fall any more than $1, to $9 a share. Your estimated loss decimal fraction in this instance, then, would be .1, or 10 percent.

Now that we understand profit-and-loss decimal fractions, we're ready to plug them into our analysis. Running these figures through the quick formula module sets in motion a number of calculations.

The first quick formula calculation is the maximum investment per trial. This figure is the maximum percentage of your total capital that you'd want to invest. It is computed on the basis of the maximum constant fraction. In essence, the maximum constant fraction is the point at which each dollar you invest has a diminishing marginal utility—that is, the point at which every additional dollar you invest earns less than the previous dollar did, or even worse, loses money.

The second calculation, the average capital growth rate per replication, is the average capital growth factor for a single investment trial. In a situation where the average capital growth rate per replication was 1.1, you could expect an average overall appreciation on the investment of 10 percent for each try at the investment. For example, if you had purchased shares of Surething Industries three weeks apart, your average capital appreciation on the two investments would have been 10 percent. One trial, or purchase, could have realized a gain of 8 percent, while the other trial resulted in a 12 percent gain, for an average of 10 percent.

The third calculation shows the profit earned on the money invested. This figure is profit as a percentage of the dollars actually invested, as opposed to profit on the overall capital.

The fourth computation, the flat bet assump-

tion, assumes that you have distributed your money equally among your investments. For example, under the flat bet assumption, if you had five stocks you wanted to invest in and had $100 to invest, you'd invest $20 in each one. The result of this calculation shows your overall profit (or loss) as a percentage of total capital invested.

The fifth calculation computes your capital growth factors. Capital growth factors illustrate how your entire capital base might grow (or contract) over a number of replications (tries). As with any form of forecasting, these results are contingent upon your assumptions being correct.

The sixth computation shows how many losses you can sustain before your capital falls below the minimum you've set. The result is expressed in the form "A loss of string X will reduce your capital to Y." X is the number of losses in a row you can sustain before your capital drops below the capital minimum, and Y is the capital minimum factor you specified when you configured the program at the outset. This calculation uses a variable called the constant fraction.

Recall that in the flat bet scenario we divided our $100 among five investments, and no matter what happened to each individual investment, we did not adjust our original investment in any way. Thus, if it happened that two of the investments went bust, one made money, and the other two stayed the same, we would not have moved any capital from one investment to the other in an effort to maintain the original capital distribution (20 percent of our capital in each investment).

Constant fraction investing is another story. If this were our approach, we would be redistributing our total capital each and every time the results of the investments came in. So, if our portfolio were to double in value, for example, we would redistribute our money so that there was $40 on each stock. By the same token, if our portfolio's value fell to half of what it was originally (to $50), we'd redistribute our capital so that we had $10 on each stock.

This approach has some obvious weaknesses. To follow a constant fraction investing strategy effectively, the investor would have to readjust the portfolio at the very least once a day, and the brokerage fees he'd incur would steadily reduce the capital base of the portfolio. However, the next computation tells you how often you can expect a string of losses sufficient to put you below your capital minimum. The format this calculation takes in the report is "A loss string of X or more may occur at least once every Y trials." The program then proceeds to calculate and display the first ten such patterns (events) that would lead to your reaching the capital minimum you've already established.

The final calculation in the quick formula module lets you know what the probability is that your capital will be reduced to your specified capital minimum within a given number of tries. The results are displayed three ways—as a decimal fraction, as a percentage, and as a statement of chance.

Once you've had the opportunity to consider the results of the quick formula analysis, you can perform a "what if" analysis by adjusting either the constant fraction and/or the capital minimum factor. Each time you change a variable, the entire analysis is recalculated on the basis of the new assumption. By analyzing the changes that result from the choices of various constant fractions and capital minimum factors, you can discover the investment that holds the optimum mix for you.

The next quick formula calculation evaluates the effects that the constant fraction you've selected will have on your capital. Named capital and profit, this section computes the win and loss probabilities of your investment, the average profit on wins, average loss on losses, the probability of break-even or better in a given number of investor-specified trials, and the projected changes in your capital base.

The general formula differs from the quick formula in the types and quantities of data it will accept. Data presented to the general formula module can take the form of probabilities (similar to the data in the quick formula) or frequency distributions. Data can be entered into this module via the keyboard or through the frequency or merge probabilities modules we'll examine shortly. The other difference worth noting is that the general formula takes the need to borrow money to invest (margin or opportunity cost) into account, whereas the quick formula does not.

Information entered into the general formula module can be saved to disk and run again later via the reprise general formula module. This formula is identical to the general formula in its calculations; its purpose is simply to allow you to rerun an analysis you've saved to a disk file (which you can't do via the general formula module itself).

The data frequencies module acts like a utility program for *Capital Strategy*. It is designed to accept large quantities of data and to translate them into a form that facilitates the efficient running of the general formula module. You can enter information to this module via the keyboard or from a standard text file. Once the data you supply has been analyzed, statistics on the nature and characteristics of the data are produced and printed.

The merge probabilities module performs a complex, large-scale set of calculations on probability/expected return relationships. The foundations of this approach are highly technical and as such well beyond the scope of this column; the technique and the module itself are explained in the documentation, however.

The occurrences module calculates the probability of a given number of occurrences within an investor-specified number of trials. By examining the various probabilities, the investor can ascertain whether the investment he's considering is an acceptable risk, based on the amount of capital available and the probability that the event (positive or negative) will occur. The results of the calculation print out in a fashion similar to the way the quick formula "occurrences" section treats the decimal, percentage, and statement of chance results.

The flat bet ruin module calculates the number of losses you can sustain before you drop below your capital minimum, based on a flat bet assumption. It's nearly identical to the constant fraction section of the quick formula.

On the back of the *Capital Strategy for Investors* program disk (not a very good place for them) are file creation and maintenance utilities. The program can use information generated by *VisiCalc* and similar spreadsheet programs.

The author of *Capital Strategy* appears to be a skilled mathematician, statistician, and investor. And to the best of our knowledge, the principles on which the program is founded are sound. Unfortunately, the translation of these theories into a commercial software product did not go well. The documentation, while informative, does not meet acceptable commerical standards, and the same could be said for the program.

These points notwithstanding, the program produces sophisticated information, and its output has the potential to be very valuable to a sophisticated investor.

Capital Strategy for Investors is designed to help investors analyze the risk at which they're putting their money and, based on that risk, to tell them how much they should invest. The intent of the program is admirable, and a product of this sort is definitely needed. But like many other "technical" forms of analysis, this program incorporates some disciplines and assumptions that can be dangerous unless the investor understands them fully. The concepts are fascinating and the author should be commended for his work, but if *Capital Strategy for Investors* is to gain wide acceptance, it needs an overhaul.

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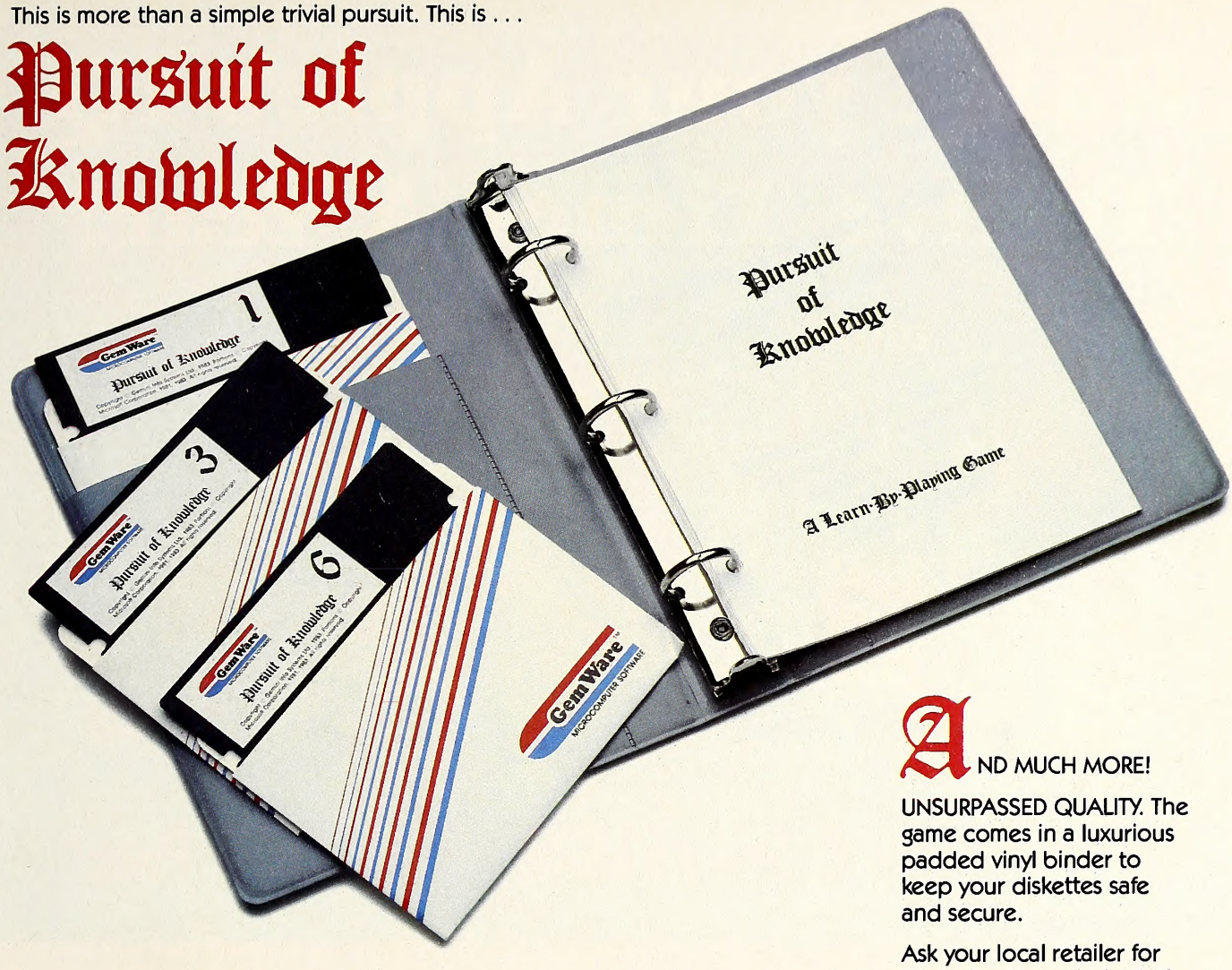

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THE BASIC SOLUTION

by Roger Wagner

Faster List Searches in Applesoft

Locating a data item in a sorted list is akin to looking up a person's name and phone number in the telephone book (white pages). Suppose you wanted to write a phone number and address database, or whatever, and you wanted to create the fastest look-up possible when retrieving the information associated with a given person's name. The most obvious way to search the list would be to start with the first record in an Applesoft array and compare the name field with the name you're looking for. If it didn't match, you would go on to the next item.

Using this method, it should be obvious that people whose names start with letters closer to the beginning of the alphabet will be located faster than people whose names start with the letter Z.

Here's a short program that provides an example of this type of approach:

```
0 REM SLOW TABLE LOOK-UP
5 DIM X$(696)
10 FOR I = 0 TO 695
20 X$(I + 1) = CHR$ (I / 26 + 65) + CHR$
   (I - INT (I/26) * 26 + 65)
30 NEXT
35 INPUT "CHARACTERS TO FIND?";A$:
   FOUND = 0
40 FOR I = 1 TO 696
50 IF A$ = X$(I) THEN PRINT
   "CHARACTERS FOUND. POSITION:";I:
   PRINT : FOUND = 1 : I = 696
60 NEXT I
90 IF NOT FOUND THEN PRINT "NUMBER
   NOT FOUND.": PRINT
100 GOTO 35
```

Rather than making you enter an actual list of "real" names, this program will first create a list of 696 pairs of letters starting with *AA* and ending with *ZZ*. This will simulate the sorted list of names that might be found in a name/address database. There's nothing magic about the number 696 other than that's how many letter pairs you get when you create a list in this manner.

Lines 10 through 30 fill the array (X$) with 696 pairs of letters, starting with *AA*, continuing with *AB*, *AC*, and finally ending with the letter pair *ZZ*. If the logic of line 20 is not particularly clear to you, don't worry about it right now. The real point of this particular column is the material that follows. If you really want to pursue it, though, you might want to hand-compute the values that line 20 generates when the variable I is in the range of 25 to 28.

After the list has been created (which takes a minute or two), line 35 asks you to enter a pair of letters to search for.

Lines 40 through 60 then search the list of letter pairs sequentially until a match is found. The pair *AA* is found virtually instantaneously; the pair *ZZ* takes about five seconds to locate.

Is there a faster way? Think for a moment about how you locate a name in the phone book. Do you start with the first name and then examine *each* name until you find the one you're looking for?

More likely, you open the book at about the middle and see if the name you're looking for is before or after the part of the phone book you've opened to. Depending on the result, you then flip forward or back until you get to the initial letter of the name. (Actually, you probably start by making a good guess as to where to open the book, but it's easier to tell a computer to start in the middle than it is to tell it to make a good guess.)

This process is then repeated on a smaller scale by making a guess about how many pages to jump forward or back to get to the beginning letter followed by the second letter of the name you're looking for. Eventually, you more or less "home in on" the name you're seeking, and only in the final stages do you need to look at each name to make the final determination.

This process of jumping back and forth and gradually making each succeeding guess more accurate is known by a variety of names, one of which is the *binary search method*.

A formal version of this approach can be applied to our first program to yield this improved version:

```
0 REM BINARY SEARCH LOOK-UP
5 DIM X$(696)
10 FOR I = 0 TO 695
20 X$(I + 1) = CHR$ (I / 26 + 65) + CHR$
   (I - INT (I/26) * 26 + 65)
30 NEXT
35 INPUT "CHARACTERS TO FIND?";A$
40 P1 = 0:P2 = 697: I = 348
60 IF A$ = X$(I) THEN PRINT
   "CHARACTERS FOUND. POSITION:";I:
   PRINT : GOTO 35
70 IF A$ > X$(I) THEN P1 = I:I = INT ((P1
   + P2) / 2): GOTO 85
80 IF A$ < X$(I) THEN P2 = I:I = INT ((P1
   + P2) / 2)
85 IF I = P1 THEN PRINT "CHARACTERS
   NOT FOUND.": PRINT : GOTO 35
90 GOTO 60
```

This program is similar, but with some very important additions. First of all, we have established two pointers, P1 and P2. Also, what used to be the counter I is now used to indicate the element in the list we are currently examining.

On line 60, when the first comparison is done, instead of looking at item 1, I starts with a value of 348, starting the search with the element in the center of the list. As it happens, item 348 in the list is the letter pair *MN*, so if you enter this as the pair you want to look for, the program will find it immediately.

If this comparison fails, we then check (in lines 70 and 80) to see if element 348 is greater than or less than (alphabetically speaking) the letter pair we're looking for.

Important note: Not everyone is aware of the fact that the > and < symbols can be used for comparing strings as well as numbers. Applesoft treats the comparison the way you'd hope it would. "CAT" is *less than* "DOG" and "HOUSE" is *greater than* "AIRPLANE".

This may be new to you and is definitely worth remembering.

Let's look at line 70 carefully to see just what happens. Let's imagine for a moment that the letter pair we've asked the program to search for is ZZ. In this case, line 70 will check to see if "ZZ" is greater than "MN". It is.

We know we're looking for a *higher-numbered* element than 348. What we want to do, then, is to take the portion of the list from element 348 to 696, divide it in half, and look at the element in the middle of that range. Then, depending on whether the letter pair we find there is greater than or less than "ZZ", we'll

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again divide the appropriate range by two. We'll repeat this process until the range is reduced to only one element, at which point either the comparison will succeed and we will have found the desired data, or the comparison will fail and we'll know the item is not in the list.

After the comparison on line 70, the next statement on the line sets P1, the pointer to the bottom of the range being examined, to I (in this case 348). P2 is the pointer for the upper limit of the range we are searching (currently equal to 696).

This now limits the search area to elements 348 through 696 of the list. I is then recalculated to be the midpoint of 348 and 696. The expression I = INT((I + P2)/2) does this for us. Calculating INT ((348 + 696)/2) gives the desired result of 522. The *goto 85* then skips the next comparison. (Since I has changed, A$ < X$(I) would yield a meaningless result.) For the first comparison, then, I would end up with a value of 522.

If A$ had been less than X$(I), then line 80 would have performed a function similar to that of line 70, except that the upper bound P2 would have been set to I, and the midpoint would have been determined on that basis.

Line 85 checks to see if we have narrowed our current search range to nothing. If I, which has been set to the integer value of the average of the top and bottom of the range, equals the bottom (P1), then there is nothing in the range. If this happens, it means the item we are looking for is not in the list.

If the test on line 85 fails, program flow goes back to test the current possibility. The process repeats itself until either a match is made or the search terminates on line 85.

When you run this program, note that even the longest search takes only a second. This is because we have to do, at most, only ten comparisons, instead of a worst case of 696 comparisons for the first program.

Why the number ten? Since we are repeatedly dividing the search range by two, you can predict the worst case number of divisions by seeing how many times you can divide 696 by 2 before you are left with a search range of one, or a single element, as shown in the accompanying table.

Comparison	Elements
1st	696
2nd	348
3rd	174
4th	87
5th	43
6th	21
7th	10
8th	5
9th	2
10th (and last)	1

Each check of the list divides the search range by two.

Is there an easy way to determine the maximum number of steps to locate an item in a list of a given length? The answer is yes, but it does involve a little math. The number of comparisons is related to the LOG (base 2) of the number of elements in the list. If this sort of stuff doesn't appeal to you, just skip down to the conclusion.

A real adventurer! Glad to see you're still here. Logarithms comprise a numeric function that is related to the number of times you can repeatedly multiply or divide one number by another.

For example, the LOG (base 10) of 1000 is 3. This means that you can repetitively divide 1000 by 10 three times:

1. 1000/10 = 100
2. 100/10 = 10
3. 10/10 = 1

The base of the logarithmic function must be specified, so that you know what number is to be used as the divisor. If the base is 2, then you can tell how many times you can divide 2 into the number in question. For example, if the base is 2, then the LOG (base 2) of 16 is 4:

1. 16/2 = 8
2. 8/2 = 4
3. 4/2 = 2
4. 2/2 = 1

These two lists should look very similar to the one we created to see how many comparisons were needed for a given number of elements in a list. The only difference is that our list began with the original number (696). Our search range list always has one more item (the first) than the division list.

Since the division list always has the same number of steps in it as the LOG (base 2) of a number, if we want to know how many steps should be in the search range list, the final solution is to just add 1 to the LOG (base 2) of the number of items in the list to be searched.

If you want to calculate this for any given number of items in a list to be searched, this line will always give the maximum number of comparisons:

```
10 X = LOG(NUM)/LOG(2) + 1
```

where X is the number of comparisons and NUM is the number of items in the list.

Conclusion. The binary search method can be used as a high-speed way to search any *sorted* list. It will not work on unsorted lists.

It is faster than a conventional (sequential) search because, for a list of *N* items, a conventional search can make up to *N* comparisons. In the binary search method, there will only be a maximum of LOG (base 2) of *N + 1* comparisons. For a list of 1,000 items, this means that the binary search method will make, at most, only 10 comparisons, versus 1,000 for a sequential search. This is a speed improvement of up to 100 times faster.

Next time we'll have a new solution to a problem in Applesoft. Don't forget to write once in a while to let us know what kind of problems *you're* having! Also, if you have some unique solutions to problems you've encountered, drop us a letter so we can share your genius with the rest of the world! ■

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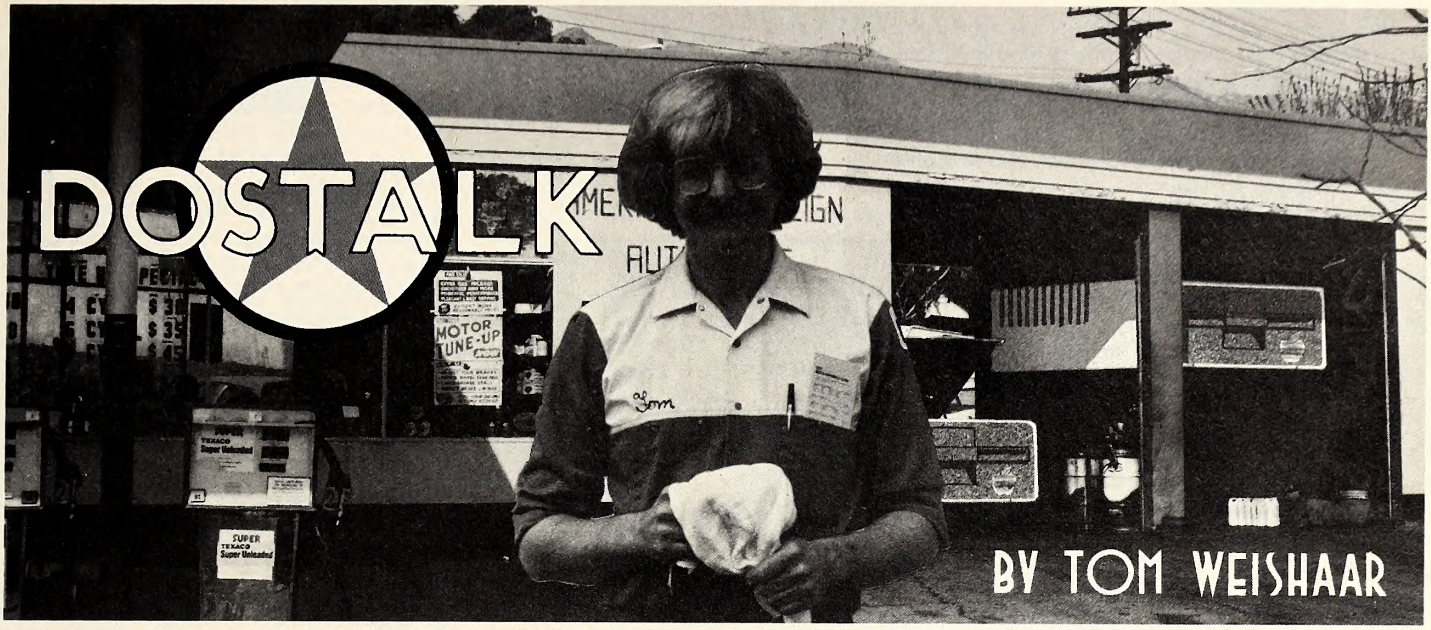

A *Type* Command for ProDOS

Last month we added a *type* command to DOS 3.3 and this month we'll do the same for ProDOS. This command lets you see what's in text files. It's an indispensable command for people who write programs that use text files—it lets you see if what's *supposed* to be in a file is actually there. Type is also handy for sending text files to your printer or any other device.

If We're All Friends, Who's an Alien? As we saw last month, DOS 3.3 doesn't provide any formal method of adding commands to DOS. Adding commands requires a good deal of information about DOS 3.3's internal structure. In addition, unless you make major modifications, adding a command requires the deletion of an existing command.

ProDOS, on the other hand, includes special features that make it quite easy for assembly language programmers to add new commands to ProDOS. In fact, Apple's *ProDOS Basic Programming Examples* disk includes a file that adds a *help* command to ProDOS.

Just as DOS 3.3 has no formal technique for adding commands, it has no defined protocol for assigning memory space to machine language utilities. In the world of DOS 3.3, machine language utilities from various publishers rarely work together. Since there is no formal way to add them, there is usually a memory conflict somewhere. If you try to use two or more utilities from different publishers at once, your computer usually goes down in flames, or worse.

ProDOS, on the other hand, does provide a way for assembly language programs to ask for and to be assigned memory space. By following a few *extra* rules, in fact, programmers of ProDOS utilities can make their software completely compatible with any other software that follows the same rules.

This is significant. We feel so strongly about the advantages of compatibility here at DOStalk that as we develop our ProDOS *type* command we'll also demonstrate this protocol. Our type-command installation program includes all the routines an assembly language programmer needs to add utilities or other machine language programs to ProDOS.

Before we get started, we have a couple of confessions to make. First, the material that follows may be too intense for younger children and non-assembly language programmers. This month's DOStalk is by far the most technical ever—we promise to return to easier stuff next time.

Second, the complete source code for our ProDOS type command can be found at the end of this column. The program line numbers we refer to in the following material can be seen in all their glory there.

Third, but most important, you should know that Mark Simonsen, one of the assembly language wizards in the Beagle Bros kennel, helped us with this protocol and its routines. But the routines are in the public domain—use them, *please*. Mark says his life will be a lot easier when alien software stops stepping on his programs.

ProDOS and Assembly Language. If you are an assembly language programmer interested in ProDOS, the first thing you need to do after reading this column, if you haven't done so already, is to get a copy of Apple's *ProDOS Technical Reference Manual*. This book is where you'll find all the basic information about how to deal with ProDOS from assembly language. If you're serious about ProDOS programming, you'll need this book.

From an assembly language programmer's point of view, ProDOS consists of two distinct parts. One is the ProDOS kernel. This package resides in the language-card memory area. In addition, the ProDOS kernel always uses page $BF ($BF00–$BFFF) in lower RAM memory for a *system global page*. This page contains a lot of interesting stuff, such as vectors for disk-device drivers, a system bit map you can use to protect vital memory areas from being overwritten, the date and time, and a machine identification byte that indicates what kind of Apple II is in use, how much memory it has, and whether it has an eighty-column card or a clock.

But most important, the first three bytes of this page always contain the ProDOS *Machine Language Interface* vector. Assembly language programs use ProDOS by making calls to this machine language interface, or MLI.

There are twenty-five different calls that can be made to the ProDOS MLI. These include housekeeping calls, such as create and rename; filing calls, such as open and read; and system calls, such as get_time and alloc_interrupt. Each time you call the MLI you must build a command parameter table somewhere and pass its address to the MLI. Calls to the MLI always look like this:

```
CALLMLI  JSR   MLI       call the MLI vector at $BF00
         .DA   #CMDNUM   a one-byte number indicating the
                         command
         DA    CMDLIST   a two-byte pointer to a command
                         parameter list
         BCS   ERROR     the MLI returns here—error if carry set
```

As you can see, the MLI command number and parameter table address are actually embedded in your program's code. The MLI finds them by referencing the call's return address in the stack. While messing with the return address, the MLI bumps it by three bytes so that control will be passed back to your BCS instruction. The embedded information, obviously, cannot be executed.

Each MLI command has its own command number and parameter table format. The *ProDOS Technical Reference Manual* describes the parameter tables in great detail. These tables may scare you at first, but after working with them awhile you'll find that this system is really very elegant.

Later in the column we'll show you an actual MLI call, complete with parameter table.

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have nothing to do with Basic, all you have to learn about in order to use ProDOS is the machine language interface. You can save your work as a ProDOS *system program* (see Chapter 5 of the *ProDOS Technical Reference Manual* for complete information). Your program will have lots of memory—the entire "lower forty-eight," with the exception of page $BF—available to use however you like.

If your primary language is Basic, on the other hand, and you dip into assembly language only when necessary for speed or direct system manipulations such as our type command, you must become familiar with the second major part of ProDOS, *Basic.system*.

This package translates the DOS commands we know and sometimes love into MLI calls. It also provides several enhancements to our old friend Applesoft Basic, including vastly improved garbage collection. And, as mentioned earlier, if asked politely, Basic.system will allocate memory to assembly language programs. These can be Applesoft *ampersand* or *usr* routines, special device drivers, new DOS commands, or any other kind of assembly language routine.

The beauty of Basic.system is that it provides a way that any number of these routines, written by anyone, can coexist and *work together*. This is something that was never possible with DOS 3.3.

Basic.System's Buffers. Basic.system resides in the same memory range that DOS 3.3 usually uses, from $9600 to $BEFF. Of course, as we have already seen, page $BF belongs to the ProDOS kernel. Basic.system also has a *global page*, which can always be found at $BE00–$BEFF.

Unlike DOS 3.3, Basic.system normally allocates space for just one DOS buffer. DOS buffers are used to store information about a file and the disk the file is on while the file is open. DOS 3.3 normally allocates space for three of these buffers.

Basic.system's buffers are somewhat larger than DOS 3.3's: 1,024 bytes (4 pages, 1K) versus 595 bytes (2.3 pages, .6K). The one buffer Basic.system always allocates is known as the *temporary command buffer*. It's used by commands such as catalog and load that only need a buffer while they are active. This buffer's home is at $9600–$99FF, but, as we shall see, it's on the road a lot.

When you open a file, Basic.system allocates a second buffer. This buffer will stick around until the file is closed. To make room for this buffer, *himem* (the highest address Applesoft can use, kept at $73–$74) will be lowered by four pages ($400 bytes). The temporary command buffer is moved into the new area, and the newly opened file gets the nice warm buffer that the temporary commands had been using.

Normally, Applesoft strings reside in the area just below himem. Basic.system moves them down too, automatically, as it adjusts the himem value.

If you open a second file, another DOS buffer will be built. Again everything will be moved down. You can open as many as eight buffers unless you run out of memory. As you close files, buffers will be deallocated. Basic.system will automatically move everything back up.

If you exec a file, it will get the highest buffer. The temporary command buffer is always the lowest buffer. To see this in pictures, refer to the accompanying figure.

Please Note Tech Note #9. The ProDOS technical manual explains all this buffer manipulation on pages 116, 117, and 118. If you have one of these manuals, get a red pen and cross out the warning box on page 117 and everything the manual says on page 118 about putting routines above himem, except for the warning and little gray boxes. Write yourself a note to refer to this DOStalk column instead.

The manual indicates that you can obtain space for assembly language routines by adjusting himem yourself, but the procedure is tricky. Basic.system's temporary buffer *always* lies just above himem. Thus, it will move as you adjust the himem value. The space you create by moving himem will be on the other side of the temporary buffer; that is, *1K above himem* (this isn't crystal-clear in the manual, but it's true nonetheless). The manual warns you to do this only when no files are open, no string variables are declared, and only in 256-byte ($100) increments.

After the manual was written, the ProDOS development team came up with a much better way to get yourself some space—ask Basic.system for it. This technique is documented in *ProDOS Technical Note #9*, which has been sent to licensed ProDOS developers.

To use this technique, simply place the number of pages you need in the accumulator and *jsr getbufr* ($BEF5). The first space allocated goes just below Basic.system (page $99 and downward), regardless of the number and type of DOS buffers that are open. If more allocations are requested, they will be installed immediately below the first. Basic.system will automatically move all DOS buffers and any Applesoft strings that need to be moved.

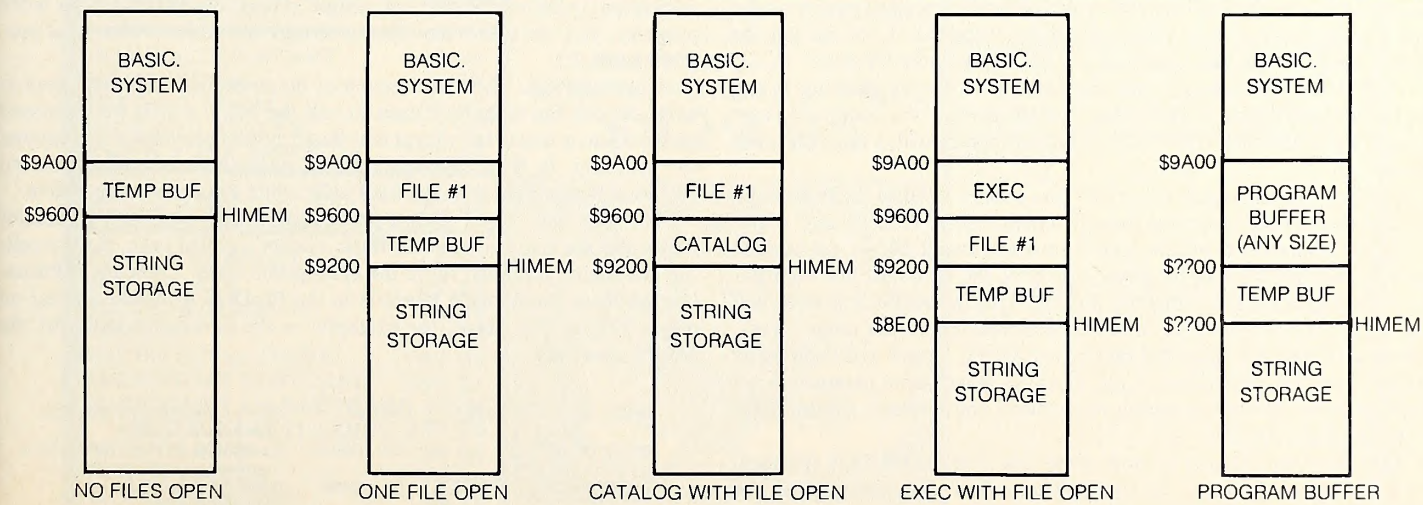
When Basic.system passes control back to you, the carry flag indicates whether the call was successful. If the carry is set, an error occurred and the accumulator will return the error code. If the carry is clear, on the other hand, the call was successful. In this case the accumulator will hold the high-byte address of the memory space that was assigned to you (the low byte of the address will always be zero). The actual area you get will depend on how many other programs asked for space before yours did.

In the type-command program listing, we ask for memory space in lines 1670 through 1830.

There are many advantages to this system of letting Basic.system give you space for your programs. Obviously, if you let Basic.system do it, you don't have to worry whether any files are open or any strings declared. Basic.system will give you a secure niche and automatically move anything that needs to be moved.

Why *Nohelp* is No Help at All. Tech note #9 also refers to a vector called *freebufr* ($BEF8). When you call this vector, *all* of the program memory spaces that have been allocated are freed. There is no way to selectively deallocate these spaces.

It's just as well. Assume memory spaces *could* be selectively deallocated. And say your program was the second entity to ask for one. If the first program could then say it didn't need its space anymore, your program would have to be relocated. Who's going to do that and keep your program functioning?



Basic.system buffer allocation.

In the interests of compatibility, DOStalk recommends that you *never call freebufr*. If a user wants to reclaim a buffer, the only safe procedure is to reboot or to rerun Basic.system.

Consider, for example, Basic.system's *help* program. Help includes a *nohelp* command, which removes *help* and frees its buffer. But if any other routine is loaded after help, nohelp frees *its* buffer too. If the second routine is a special screen driver or any of several other types of programs, the system will crash soon after you enter "nohelp."

(Even worse is the attitude of the *Applesoft Programmer's Assistant*, another program on the ProDOS Basic Examples disk. It calls freebufr even before it calls getbufr. If your program has already received a buffer when *help* is run, help expires with a *no buffers available* error. *APA*, on the other hand, first knocks you out of your buffer with its freebufr call and asks questions later. This self-centered kind of programming is not welcome, thank you.)

Don't Tread on Me. As mentioned earlier, the ProDOS system global page includes a *system bit map*. ProDOS uses the bit map to keep itself from accidentally overwriting itself, its data, or other sensitive system areas, such as the stack and the text screen. If you like, you can protect the memory space you are assigned by Basic.system. (Basic.system does *not* do this for you.)

The advantage to marking the bit map is that the ProDOS kernel won't allow you or anyone else to load a file into your memory space accidentally. However, this can also be a disadvantage. Our type command, for example, reads files by repeatedly making one-byte read calls to the MLI. We tell the MLI to place the byte in an unused part of our memory space. But if our space is marked in the system bit map, ProDOS will refuse to do this.

Thus, we can do one of the following: leave our assigned memory space unprotected or clear a location elsewhere in memory for passing the file. It is easier, and far less dangerous than not wearing seat belts, to leave the buffer unprotected.

If you prefer to protect your buffer, the information you need to do so is in the ProDOS technical manual on pages 88 and 89.

Tapping the Command Line. Whenever a DOS command is entered, Basic.system looks to see if it is one of the ProDOS commands. If not, Basic.system does a *jsr extrncmd* ($BE06) to give other routines, such as type, a chance to claim the command. If no external command routine is installed, extrncmd contains a jump to $BE9E, which is an *rts* that will return control to Basic.system.

To hook in your own command, you must change the jump at $BE06 so it points to your routine rather than to the rts at $BE9E. However, don't just wildly go in and overwrite what's there.

Always assume your program will be the *second* one to connect itself to the external command vector. When Basic.system gets a command it doesn't recognize, it will pass the command to you. *If you don't recognize it either, you should pass control to whatever was in $BE06 before you.* This way, any number of separate routines can share the external command vector. See lines 1880–1960 of the type-command program for an example of how to do this.

If your program doesn't use the external command vector but connects itself to the system elsewhere, such as the ampersand vector or the input/output links, *use the same procedure*. If the call is not for you, be nice to the rest of us and pass it on. We'll do the same for you.

You determine whether the command is yours by peeking in the keyboard input buffer at $200. You will always find the command here, even if it was executed from inside a Basic program with a *print D$* command.

In our type-command program, this occurs in lines 3230 through 3330, with the help of the *get.chr* subroutine at lines 4270 through 4360.

If the command is yours, and if your command allows parameters such as slot and drive to be given, you have the option of allowing Basic.system to *parse* the command for you. This means Basic.system will dig out the correct numbers from the command, check for range errors, update all necessary flags and tables, and so on. Unless your command doesn't have any parameters at all, or unless it has some parameters not used by Basic.system, we highly recommend you let Basic.system parse your command for you.

Complete information on how to do this is in the ProDOS technical manual on pages 124–127. In the type-command program, you can see the basic procedure in lines 3350 through 3490.

Call the Movers. Any program you write that will insert itself in a space provided by Basic.system will have two parts. The first part will ask for the memory space, perhaps protect it, tap into whatever vector your program will use, and then actually move the second part to the assigned location. The second part of your program will set up house and can expect to be a part of the system until the computer is turned off or rebooted.

Since you can't predict exactly where Basic.system will give you space (it depends on how many programs asked for space before you did and how long they were), the first part of your program must *relocate* the second part. This means that all absolute memory references in the second part of your program, such as *jmp*s, *jsr*s, and references to data and variables, must be changed.

One way to solve this problem is to avoid internal references—that is, make the second part of your program relocatable. This is usually a lot of trouble, however. The more common method of solving this problem is to write a routine that properly relocates your program. Our type-command program demonstrates a simple method of doing this.

If you look at a machine language disassembly of any 6502 program, you'll note that all the bytes that have to be changed when the program is moved are at the end of three-byte instructions. There is a Monitor routine you can call (it's part of the Monitor's *list* command) that will tell you how long any given machine language instruction is. If it's a three-byte instruction, you then look at the third byte and see if it points within your program. If so, change it. Otherwise, leave it as is and go to the next instruction. You can see how this procedure is implemented in lines 1980–2120 and 2590–2760 of the type program.

If you want to use this technique in your own programs, you need to be aware of a couple of limitations.

First, you must split your program into three distinct parts: code, address tables, and strings and variables. You adjust the code as mentioned above, then you adjust the second byte of all the address tables (see lines 2140–2220). Leave everything else alone.

Second, never refer to addresses that lie within your program with *#immediate* addressing. The relocation program can't tell whether immediate data is an address or something else. For example, code such as this is very hard to relocate:

```
LDX  #BYTEBUF      some assemblers use #<BYTEBUF
LDA  /BYTEBUF                 and #>BYTEBUF
STX  RWDATA
STA  RWDATA+1
```

Instead, do it like this:

```
LDX  BUF.ADR
LDA  BUF.ADR+1
STX  RWDATA
STA  RWDATA+1
and so on . . .


BUF.ADR  .DA  BYTEBUF
```

By placing the address in an address table, it is easy to adjust it during relocation. Also notice that for simple relocation techniques to work properly, you can't have any data or strings embedded within your program code.

Gosystem Go. This requirement of no embedded data may seem in conflict with the technique used to call the MLI, which we discussed earlier. And it would be, except that Basic.system provides a way around the problem. In Basic.system's global page there is a vector called *gosystem* that is used to make MLI calls while Basic.system is active.

The gosystem vector uses a set of ready-made command parameter tables that are also contained in Basic.system's global page. Before calling gosystem, you must fill in the appropriate table. Complete information on these ready-made tables is in the ProDOS technical manual on pages 122 to 124. Here, for example, is the parameter table for the MLI's *open* call:

```
BECB- 03          SOPEN     .DA  #3        Open's command parameter table
                                            has three parameters.
BECC- BC BC                 .DA  TXBUF-1   Pointer to the file's path name—this is
                                            provided by Basic.system.
BECE- 00 00       OSYSBUF   .DA  $0000     Pointer to the file's buffer—you
                                            must provide this.
BED0- 00          OREFNUM   .DA  $00        Reference number of opened file—this is
                                            returned by the ProDOS kernel.
```

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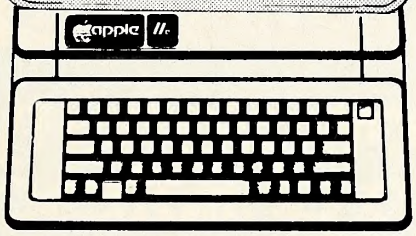

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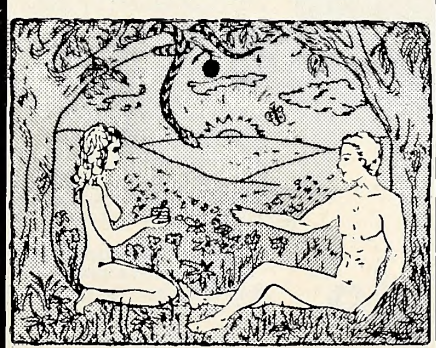

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To open a file, you simply put the address of the buffer the file will use in *osysbuf*, load the A register with the number for the open command ($C8), and *jsr gosystem*. ProDOS will open the file and pass back a reference number in *orefnum*. This reference number is used in other command parameter tables to indicate this file.

The type command opens the file to be *typed* in Basic.system's temporary command buffer, which is always found just above himem. Lines 3620 to 3690 of the type program show how simple an open call can be.

Here's what happens when you call *gosystem*. Note that all of the following code is inside Basic.system's global page:

```
BE70- 8D 85 BE GOSYSTEM STA  SYSCALL   Embed command number below.
BE73- 8E A8 BC          STX  CALLX     Save X register temporarily.
BE76- 29 1F             AND  #$1F      Strip off high bits of command
BE78- AA                TAX              number and use as an index to
BE79- BD 5F B8          LDA  SYSCTBL,X   find low byte of this command's
BE7C- 8D 86 BE          STA  SYSPARM     parameter table. Embed it.
BE7F- AE A8 BC          LDX  CALLX     Retrieve X.
BE82- 20 00 BF          JSR  MLI       Call MLI.
BE85- 00        SYSCALL  DA  #0        Command number and parameter table
BE86- 00 BE     SYSPARM  DA  $BE00        address. (High byte always $BE.)
BE88- B0 01              BCS BADCALL   Branch if error encountered.
BE8A- 60                 RTS

BE8B- A2 12     BADCALL  LDX #18       Compare ProDOS error number (30
BE8D- DD 40 BA  MLIERR1  CMP MLIERTBL,X   possible) with the 19 errors

BE90- F0 05              BEQ MLIERR2      Basic.system has messages for.
BE92- CA                 DEX
BE93- 10 F8              BPL MLIERR1
BE95- A2 13              LDX #19        Use I/O ERROR if not recognized.
BE97- BD 53 BA  MLIERR2  LDA BIERRTBL,X Convert to Basic.system error #.
BE9A- AE A8 BC           LDX CALLX      Retrieve X.
BE9D- 38                 SEC            Set carry to denote error.
BE9E- 60                 RTS            Basic.system error # returned in A.
```

After our type command has opened the appropriate file, the file's reference number is retrieved from *orefnum*. We place this number in the parameter table used for reads and writes (lines 3740–3750). In addition, the table must include the address of a buffer (*bytebuf*) that ProDOS can use to pass us the bytes it reads. We also tell ProDOS to give us just one byte at a time (lines 3770–3850).

We then load A with the ASCII code for a carriage return and enter the main loop of the program. The carriage return is printed, the keyboard is checked for a press of the escape key (which would halt execution of *type*), and we *jsr gosystem* to read the next byte in the file (lines 3870–3950).

When control returns to us, we check for an error. ProDOS stores all file bytes in the low-value ASCII format. If no error has occurred, we pick up the byte ProDOS found in the file from *bytebuf*, convert to the high-value ASCII format so it will appear correctly on the screen, and loop back to the beginning of our main loop to print it (lines 3960–4000).

This normally continues until ProDOS gets to the end of the file. When the end of the file is reached, our *gosystem* call will return with the carry set. We then branch to an error handler (lines 4050–4160) that will close the file for us and tell Basic.system to handle the error, unless it was END OF DATA. In that case, we tell Basic.system that no error occurred and life goes on.

Commanding the Type Command. The syntax of our ProDOS type command is

TYPE path name [,Sn] [,Dn]

The DOS 3.3 type command we implemented last month allowed the relative field parameter. This one doesn't.

Our ProDOS type command also neglects to check file types. This means you can *type* any kind of file: text, basic, binary, even directories and subdirectories! However, the display you get is usually completely devoid of meaning unless the file is a text file. Other file types rarely contain the ASCII-encoded data that we humans need to make sense of things. If you have a robot, it may find a use for *type* with non-ASCII files, but few humans will.

Whenever a zero byte is encountered in a file, the ProDOS type command will return an inverse @, just as our DOS 3.3 type command does. However, zero bytes have far less meaning in ProDOS files than in DOS 3.3 files.

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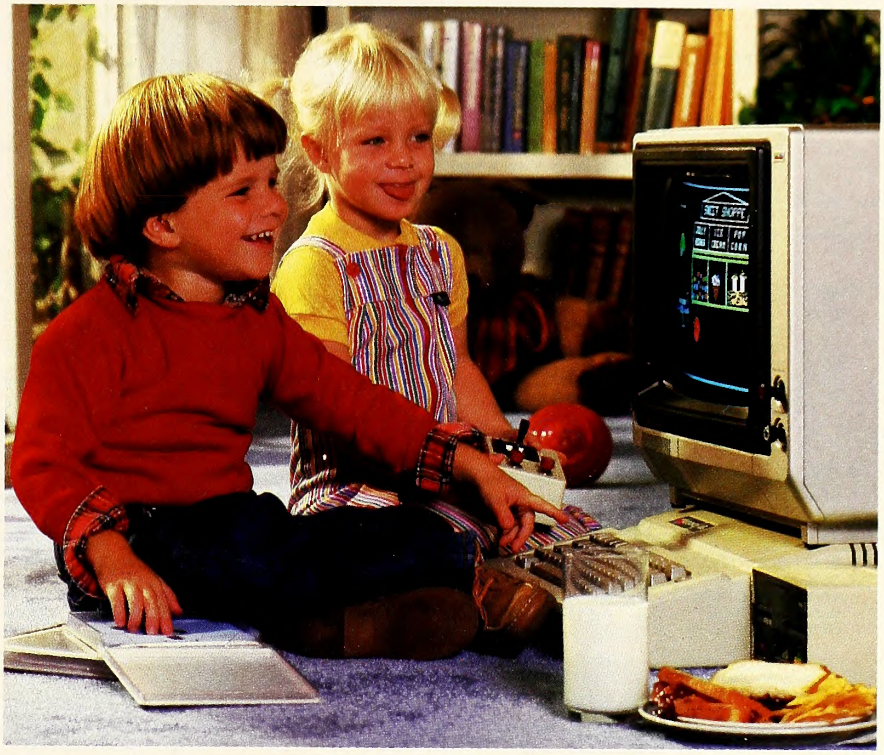

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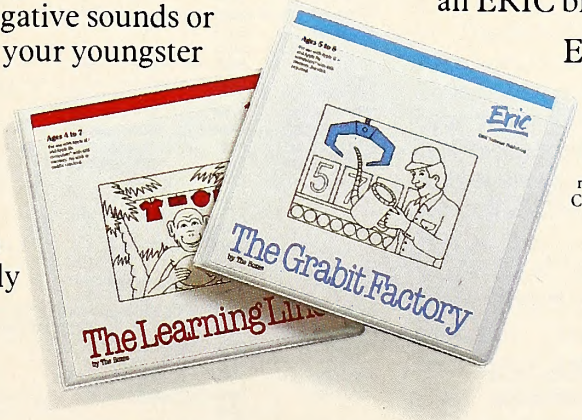

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As we saw last month, the first zero byte in a DOS 3.3 file marks the end of the file. ProDOS doesn't use internal markers at the end of files but instead keeps an end-of-file *pointer* with each file's directory entry. Zero bytes in ProDOS files always indicate that nothing has been stored in that part of the file yet.

If you have a few hours, try *type*ing the file called *helpscreens* on the ProDOS *Basic Programming Examples* disk. This file, which takes up a mere sixty blocks (30,720 bytes) on the disk, is well over twelve million bytes long (note the number under *endfile* for this file when you do a catalog). Nothing has ever been stored in 99.7 percent of this file. ProDOS and *type* will be glad to show you all those zeros if you don't believe us.

Here's the complete source code for the ProDOS type command:

```
                1000 *--------------------------------------------------------------------------------
                1010 *      : ProDOS TYPE COMMAND
                1020 *      :
                1030 *      :    This program demonstrates the use
                1040 *      :    of the "DOStalk Protocol" for adding
                1050 *      :    machine language utilities to ProDOS.
                1060 *      :
                1070 *      : By Tom Weishaar and Mark Simonsen
                1080 *      :    June 1984
                1090 *      :
                1100 *      : A public domain program
                1110 *--------------------------------------------------------------------------------
                1120 ;
003C-           1130 POINTER    .EQ $3C     Zero-page locations used by section one.
0073-           1140 HIMEM      .EQ $73
                1150 ;
003C-           1160 RANGE.STRT .EQ $3C     Addresses related to Monitor's move routine.
003E-           1170 RANGE.END  .EQ $3E
0042-           1180 MOVE.TO    .EQ $42
FE2C-           1190 MOVE       .EQ $FE2C
                1200 ;
0200-           1210 INBUF      .EQ $200    Locations used by section two.
FDED-           1220 COUT       .EQ $FDED
                1230 ;
BE06-           1240 EXTRNCMD   .EQ $BE06   Basic.system's external command vector.
BE09-           1250 ERROUT     .EQ $BE09   Basic.system's error vector.
BE70-           1260 GOSYSTEM   .EQ $BE70   Basic.system's machine language interface vector.
BEF5-           1270 GETBUFFR   .EQ $BEF5   Basic.system's buffer allocation vector.
                1280 ;
BE50-           1290 XTRNADR    .EQ $BE50   Command execution vector.
BE52-           1300 XLEN       .EQ $BE52   Command string length - 1.
BE53-           1310 XCNUM      .EQ $BE53   Command number (zero if external command).
BE54-           1320 PBITS      .EQ $BE54   Command parameter flags.
BF58-           1330 BITMAP     .EQ $BF58   ProDOS system bit map.
                1340 ;
00C8-           1350 MLI.OPEN   .EQ $C8     Number for MLI's open command.
BECE-           1360 OSYSBUF    .EQ $BECE       Address of system buffer for this file.
BED0-           1370 OREFNUM    .EQ $BED0       Reference number assigned to this file by MLI.
                1380 ;
00CA-           1390 MLI.READ   .EQ $CA     Number for MLI's read command.
BED6-           1400 RWREFNUM   .EQ $BED6       File's reference number.
BED7-           1410 RWDATA     .EQ $BED7       Address of data buffer.
BED9-           1420 RWCOUNT    .EQ $BED9       Number of bytes to be read.
BEDB            1430 RWTRANS    .EQ $BED8       Number of bytes actually read.
                1440 ;
00CC-           1450 MLI.CLOSE  .EQ $CC     Number for MLI's close command.
BEDE-           1460 CFREFNUM   .EQ $BEDE       File's reference number.
                1470 ;
                1480         .OR $2000
                1490         .TF TYPE.CMD
                1500 ;
                1510 *--------------------------------------------------------------------------------
                1520 *
                1530 * Section I
                1540 *      This section asks Basic.system for a memory space we
                1550 *          can place our routine in. After the space has been
                1560 *          allocated to us, we hook our routine into Basic.system's
                1570 *          external command vector, while saving the current
                1580 *          contents of that vector for daisy-chaining.
                1590 *      Next, we adjust all addresses inside our routine to
                1600 *          reflect the routine's assigned location.
                1610 *      Then we move the routine into place.
                1620 *      Finally, we send the user a "type-installed"
                1630 *          message.
                1640 *
                1650 *--------------------------------------------------------------------------------
                1660 ;
                1670 PREP.CMD
2000- 18        1680         CLC                    Check memory availability so that buffer
2001- AD CB 20  1690         LDA END.ADR+1            allocation doesn't overwrite our
2004- 6D CC 20  1700         ADC PAGES                program. End-of-program plus number
2007- C5 74     1710         CMP HIMEM+1              of pages to be requested must be
2009- 90 05     1720         BCC GET.BUF              less than the current himem value.
                1730 ;
                1740 NOBUFS
200B- A9 0E     1750         LDA #14                Code for PROGRAM TOO LARGE error.
                1760 NOBUFS.1
200D- 4C 09 BE  1770         JMP ERROUT             New command cannot be installed.
                1780 ;
                1790 GET.BUF
2010- AD CC 20  1800         LDA PAGES
2013- 20 F5 BE  1810         JSR GETBUFR            Ask for a buffer A pages in length.
2016- B0 F5     1820         BCS NOBUFS.1           Error encountered, no buffer allotted.
2018- 8D CE 20  1830         STA OUR.BUF+1          Save start of allotted buffer space.
201B- 38        1840         SEC
201C- ED C9 20  1850         SBC CODE.STRT+1        Compute increment for address adjustments.
201F- 8D CF 20  1860         STA INCREMENT
                1870 ;
                1880 SET.HOOKS
2022- AE 07 BE  1890         LDX EXTRNCMD+1
2025- AD 08 BE  1900         LDA EXTRNCMD+2
2028- 8E 39 21  1910         STX CMDLINK+1          Link into external command vector,
202B- 8D 3A 21  1920         STA CMDLINK+2            saving current external vector
202E- AE CD 20  1930         LDX OUR.BUF              for daisy-chaining.
2031- AD CE 20  1940         LDA OUR.BUF+1
2034- 8E 07 BE  1950         STX EXTRNCMD+1
2037- 8D 08 BE  1960         STA EXTRNCMD+2
                1962 ;
203A- AE C8 20  1964         LDX CODE.STRT
203D- AD C9 20  1966         LDA CODE.STRT+1        Initialize pointer to beginning of Section II.
2040- 86 3C     1968         STX POINTER
2042- 85 3D     1970         STA POINTER+1
                1972 ;
                1980 ADJ.CODE
2044- A0 00     1990         LDY #0                 Adjust routine's internal address references. . . .
2046- B1 3C     2000         LDA (POINTER),Y          Get instruction byte.
2048- F0 18     2010         BEQ ADJ.TABLES           0 (brk) MUST separate code from address tables.
204A- 20 8E F8  2020         JSR $F88E                Ask Monitor if this is a 1-, 2-, or
204D- A4 2F     2030         LDY $2F                    3-byte instruction.
204F- C0 02     2040         CPY #2                 If Monitor returns a 2 at $2F it is a 3-byte
2051- D0 07     2050         BNE .1                   instruction. Else skip it.
2053- B1 3C     2060         LDA (POINTER),Y        Get high byte of embedded address.
2055- 20 AB 20  2070         JSR FIX.ADR              Make adjustment for new location.
2058- 91 3C     2080         STA (POINTER),Y        Store result.
205A- C8        2090 .1      INY
205B- 98        2100         TYA                    Add one to index,
205C- 20 BC 20  2110         JSR INC.PNTR             adjust pointer,
205F- 4C 44 20  2120         JMP ADJ.CODE             and repeat.
                2130 ;
                2140 ADJ.TABLES
2062- A9 01     2142         LDA #1                 Increment pointer 1 byte.
2064- 20 BC 20  2144         JSR INC.PNTR
                2146 ;
                2148 ADJ.TABLES.1
2067- A0 01     2150         LDY #1                 Adjust routine's address tables. . . .
2069- B1 3C     2160         LDA (POINTER),Y          Get high byte of address
206B- F0 0D     2170         BEQ MOVE.CMD             0000 MUST separate tables from data/strings.
206D- 20 AB 20  2180         JSR FIX.ADR            Make adjustment for new location.
2070- 91 3C     2190         STA (POINTER),Y          Store result.
2072- A9 02     2200         LDA #2
2074- 20 BC 20  2210         JSR INC.PNTR           Increment pointer 2 bytes,
2077- 4C 67 20  2220         JMP ADJ.TABLES.1         and repeat.
                2230 ;
                2240 MOVE.CMD
207A- AE C8 20  2250         LDX CODE.STRT
207D- AD C9 20  2260         LDA CODE.STRT+1        Set up parameters for Monitor's move command.
2080- 86 3C     2270         STX RANGE.STRT
2082- 85 3D     2280         STA RANGE.STRT+1
                2290 ;
2084- AE CA 20  2300         LDX END.ADR
2087- AD CB 20  2310         LDA END.ADR+1
208A- 86 3E     2320         STX RANGE.END
208C- 85 3F     2330         STA RANGE.END+1
                2340 ;
208E- AE CD 20  2350         LDX OUR.BUF
2091- AD CE 20  2360         LDA OUR.BUF+1
2094- 86 42     2370         STX MOVE.TO
2096- 85 43     2380         STA MOVE.TO+1
                2390 ;
2098- A0 00     2400         LDY #0                 Ask Monitor to move routine into
209A- 20 2C FE  2410         JSR MOVE                 allotted buffer.
                2420 ;
209D- A0 00     2430         LDY #0
209F- B9 D0 20  2440 .1      LDA MSG,Y              Tell user that *ype command has
20A2- F0 06     2450         BEQ INSTALL.END          been successfully installed.
20A4- 20 ED FD  2460         JSR COUT
20A7- C8        2470         INY
20A8- D0 F5     2480         BNE .1
                2490 ;
                2500 INSTALL.END
20AA- 60        2510         RTS                    End of installation program, return to Basic.
                2520 ;
                2530 *--------------------------------------
                2540 *
                2550 * Section I: subroutines
                2560 *
                2570 *--------------------------------------
                2580 ;
                2590 FIX.ADR
20AB- CD C9 20  2600         CMP CODE.STRT+1        Is this address lower than routine's start?
20AE- 90 0B     2610         BCC .2                   Yes—don't change it.
20B0- CD CB 20  2620         CMP END.ADR+1          Is it higher than routine's end?
20B3- F0 02     2630         BEQ .1
20B5- B0 04     2640         BCS .2                   Yes—don't change it.
20B7- 18        2650 .1      CLC
20B8- 6D CF 20  2660         ADC INCREMENT          Add distance from here to buffer location.
20BB- 60        2670 .2      RTS
                2680 ;
                2690 INC.PNTR
20BC- 18        2700         CLC
20BD- 65 3C     2710         ADC POINTER            Add value in A (1, 2, or 3) to pointer.
20BF- 85 3C     2720         STA POINTER
20C1- A5 3D     2730         LDA POINTER+1
20C3- 69 00     2740         ADC #0
20C5- 85 3D     2750         STA POINTER+1
20C7- 60        2760 .1      RTS
                2770 ;
                2780 *--------------------------------------
                2790 *
                2800 *Section I: data
                2810 *
                2820 *--------------------------------------
                2830 ;
20C8- 00 21     2840 CODE.STRT .DA ROUTINE.STRT  Address of beginning of routine
20CA- C2 21     2850 END.ADR   .DA ROUTINE.END   Address of end of routine
20CC- 01        2860 PAGES     .DA #1            Number of pages needed for routine
                2870 ;
20CD- 00 00     2880 OUR.BUF   .DA $0000
20CF- 00        2890 INCREMENT.HS 00
                2900 ;
20D0- 8D        2910 MSG       .HS 8D
20D1- A2 D4 D9
20D4- D0 C5 A2
20D7- A0 C3 CF
20DA- CD CD C1
20DD- CE C4 A0
20E0- CE CF D7
20E3- A0 C1 D6
20E6- C1 C9 CC
```

```
20E9- C1 C2 CC
20EC- C5 A3      2920          .AS -/"TYPE" COMMAND NOW AVAILABLE./
20EE- 8D 8D 00   2930          .HS 8D.8D.00
                 2940 ;
20F1-            2950          .BS $2100-*        Fill program with empty bytes so following
                 2960 ;                             section will start on a page boundary to
                 2970 ;                             make things easy on the relocation routine.
                 2980 ;
                 2990 *-------------------------------------------------------------------------
                 3000 *
                 3010 * Section II
                 3020 *  This section holds the routine that is actually moved into
                 3030 *   the space allocated by Basic.system. It has two parts.
                 3040 *  Basic.system passes control to the first part of this routine
                 3050 *   whenever a command is entered that Basic.system doesn't
                 3060 *   recognize. Our routine looks at the command. If the command
                 3070 *   isn't ours either, we pass it to the next routine on the
                 3080 *   daisy chain. If the routine is ours, we notify Basic.system
                 3090 *   and pass back control so the rest of the command can be
                 3100 *   parsed.
                 3110 *  After the command is parsed, Basic.system sends control to the
                 3120 *   second part of this section, where the type command is
                 3130 *   actually executed.
                 3140 *
                 3150 *-------------------------------------------------------------------------
                 3160 ;
                 3170 *-----------------------------------
                 3180 *
                 3190 * Section II: part 1
                 3200 *
                 3210 *-----------------------------------
                 3220 ;
                 3230 ROUTINE.STRT
2100- D8         3240          CLD                (identification byte)
2101- A2 00      3250          LDX #0             DOS has a command it doesn't recognize;
2103- A0 00      3260          LDY #0               let's take a look at it.
2105- 20 A4 21   3270 .1       JSR GET.CHR        Get a character of the command.
2108- F0 2D      3280          BEQ NOT.US           Character was comma or return—cmd
                                                    not ours.
210A- D9 BC 21   3290          CMP CMDNAME,Y      Compare character to our command string.
210D- D0 28      3300          BNE NOT.US           Not equal—cmd not ours.
210F- C8         3310          INY                Increment command index.
2110- C0 04      3320          CPY #CMDLEN        Compare index to length of command.
2112- 90 F1      3330          BCC .1               Less—check next character.
                 3340 ;
                 3350 ITS.US
2114- 88         3360          DEY                The command is ours, so. . . .
2115- 8C 52 BE   3370          STY XLEN             Save cmd length - 1 at xlen.
2118- AE B6 21   3380          LDX DO.ADR
211B- AD B7 21   3390          LDA DO.ADR+1       Save command execution address
211E- 8E 50 BE   3400          STX XTRNADR          at xtrnaddr.
2121- 8D 51 BE   3410          STA XTRNADR+1
2124- A9 00      3420          LDA #0             Put a zero at xcnum so Basic.system
2126- 8D 53 BE   3430          STA XCNUM            knows the command was recognized.
2129- AE C0 21   3440          LDX PARMS
212C- AD C1 21   3450          LDA PARMS+1        Flag the parameters we allow with
212F- 8E 54 BE   3460          STX PBITS            our command in pbits.
2132- 8D 55 BE   3470          STA PBITS+1
2135- 18         3480          CLC                Ask Basic.system to finish parsing command.
2136- 60         3490          RTS
                 3500 ;
                 3510 NOT.US
2137- 38         3520          SEC                The command isn't ours, so. . . .
                 3530 CMDLINK
2138- 4C 00 00   3540          JMP $0000            Pass it down the daisy chain (address
                 3550 ;                               filled in by Section I).
                 3560 *-----------------------------------
                 3570 *
                 3580 * Section II: part 2
                 3590 *
                 3600 *-----------------------------------
                 3610 ;
                 3620 DO.CMD
213B- A6 73      3630          LDX HIMEM          Actual command execution starts here.
213D- A5 74      3640          LDA HIMEM+1          Use Basic.system's temporary buffer
213F- 8E CE BE   3650          STX OSYSBUF            for type command's buffer.
2142- 8D CF BE   3660          STA OSYSBUF+1      (Adr of temp buf always same as himem.)
                 3670 ;
2145- A9 C8      3680          LDA #MLI.OPEN      Put number for open in A.
2147- 20 70 BE   3690          JSR GOSYSTEM       Open file.
214A- 90 03      3700          BCC INIT.READ
214C- 4C 09 BE   3710          JMP ERROUT           If error on open, pass control to error handler.
                 3720 ;
                 3730 INIT.READ
214F- AD D0 BE   3740          LDA OREFNUM        Get file's reference number
2152- 8D D6 BE   3750          STA RWREFNUM         for read command table.
                 3760 ;
2155- AE B8 21   3770          LDX BUF.ADR
2158- AD B9 21   3780          LDA BUF.ADR+1      A one-byte data buffer where ProDOS
215B- 8E D7 BE   3790          STX RWDATA           can put our data.
215E- 8D D8 BE   3800          STA RWDATA+1
                 3810 ;
2161- A2 01      3820          LDX #1
2163- A9 00      3830          LDA #0             We want one byte at a time.
2165- 8E D9 BE   3840          STX RWCOUNT
2168- 8D DA BE   3850          STA RWCOUNT+1
                 3860 ;
216B- A9 8D      3870          LDA #$8D           (carriage return)
                 3880 ;
                 3890 MAINLOOP
216D- 20 ED FD   3900          JSR COUT           Print it!
2170- AD 00 C0   3910          LDA $C000          Check keyboard.
2173- C9 9B      3920          CMP #$9B             Is it escape?
2175- F0 10      3930          BEQ HALT             Yes—halt.
2177- A9 CA      3940          LDA #MLI.READ        No—read next character.
2179- 20 70 BE   3950          JSR GOSYSTEM
217C- B0 0E      3960          BCS ERROR          End of file or other error?
217E- AD C2 21   3970          LDA BYTEBUF          No—get character from one-byte buffer
2181- F0 EA      3980          BEQ MAINLOOP           and print it if control-@,
2183- 09 80      3990          ORA #$80               else change it to hi-value ASCII.
2185- D0 E6      4000          BNE MAINLOOP       (always branches)
                 4010 ;
2187- A9 05      4020 HALT LDA #5                 Fake end-of-data error.
2189- 8D 10 C0   4030          STA $C010          Clear keyboard strobe.
                 4040 ;
                 4050 ERROR
218C- AA         4060          TAX                Save error code in X.
218D- AD D0 BE   4070          LDA OREFNUM        Put file's reference number in
2190- 8D DE BE   4080          STA CREFNUM          close command table.
2193- A9 CC      4090          LDA #MLI.CLOSE     Close file.
2195- 20 70 BE   4100          JSR GOSYSTEM
2198- B0 07      4110          BCS REALERR        If error on close, pass control to error handler.
219A- 8A         4120          TXA                Retrieve error code from before.
219B- C9 05      4130          CMP #5             Is it end-of-data?
219D- D0 02      4140          BNE REALERR          No—pass control to error handler.
219F- 18         4150          CLC                  Yes—tell system no error occurred.
21A0- 60         4160          RTS                Done.
                 4170 ;
                 4180 REALERR
21A1- 4C 09 BE   4190          JMP ERROUT         Problem encountered; let Basic.system fix it.
                 4200 ;
                 4210 *-----------------------------------
                 4220 *
                 4230 * Section II: subroutines
                 4240 *
                 4250 *-----------------------------------
                 4260 ;
                 4270 GET.CHR
21A4- BD 00 02   4280          LDA INBUF,X        Get a character from the input buffer.
21A7- E8         4290          INX                  Increment character index.
21A8- C9 8D      4300          CMP #$8D           Test for return.
21AA- F0 08      4310          BEQ .1
21AC- C9 AC      4320          CMP #",            Test for comma.
21AE- F0 04      4330          BEQ .1               If comma or return, pass back "equal".
21B0- C9 A0      4340          CMP #$A0           Test for blank.
21B2- F0 F0      4350          BEQ GET.CHR          If blank, skip it and get next character.
21B4- 60         4360 .1       RTS
                 4370 ;
21B5- 00         4380          BRK                Separates code from data for relocator.
                 4390 ;
                 4400 *-----------------------
                 4410 *
                 4420 * Section II: data
                 4430 *
                 4440 *-----------------------
                 4450 ;
21B6- 3B 21      4460 DO.ADR    .DA DO.CMD
21B8- C2 21      4470 BUF.ADR   .DA BYTEBUF
                 4480 ;
21BA- 00 00      4490          .DA $0000          Separates address tables for relocator.
21BC- D4 D9 D0
21BF- C5         4500 CMDNAME   .AS -"TYPE"
0004-            4510 CMDLEN    .EO *-CMDNAME
21C0- 01 04      4520 PARMS     .HS 01.04          Filename required / slot, drive allowed.
21C2- 00         4530 BYTEBUF   .HS 00
                 4540 ;
21C2-            4550 ROUTINE END .EO *-1
                 4560 ;
                 4570          .EN
```

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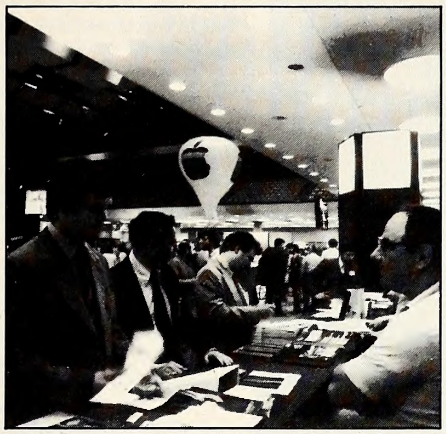

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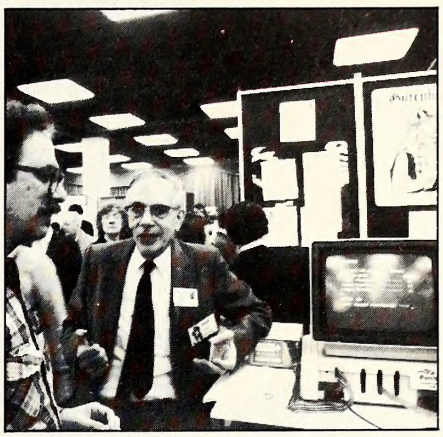

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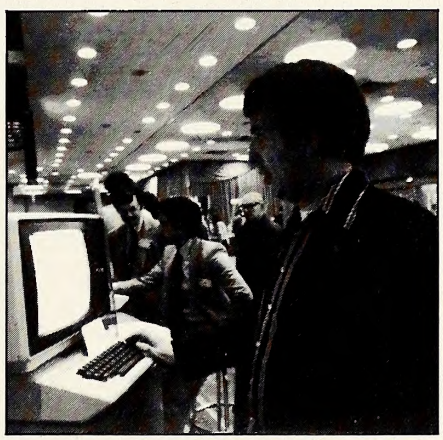

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The Coveted Mirror. Berns, Thomason. Nicely drawn characters, arcade subgames, and fun, logical puzzles enliven nonviolent medieval adventure. Humorous and animated. Penguin, Box 311, Geneva, IL 60134. $34.95. *11/83.*

Crypt of Medea. Britto, Lamb. A real horror adventure: blood and body parts are everywhere, death loiters in every shadow. Thin plot. Not for the squeamish; not to be played just before, or just after, meals. Sir-tech, 6 Main St., Ogdensburg, NY 13669. $34.95. *4/84.*

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Deadline. Blank, Lebling. Episode one in a series of murder mysteries by the authors of the Zork trilogy. Includes inspector's casebook, lab report. Text. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *8/82.*

Death in the Caribbean. Hess, Hess. Challenging quest for pirate treasure features a mischievous ghost, huge maze, lush graphics. Well worth it. Micro Lab, 2699 Skokie Valley Rd., Highland Park, IL 60035. $35. *9/83.*

Enchanter. Blank, Lebling. First of trilogy sequel to Zorks expands interaction with other characters, goes above ground, increases use of logical magic. No big breakthroughs, but simply delightful. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *9/83.*

•**Hi-Res Adventure #1: Mystery House.** Williams. Whodunit in a Victorian mansion. First adventure with pictures. Two-word parser with logical comprehension. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $24.95.

•**Hi-Res Adventure #2: The Wizard and the Princess.** Williams, Williams. The king has offered half his kingdom to the one who will bring back the kidnapped princess. Cross mountains, deserts; battle the wizard to claim your reward. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $32.95. *11/80.*

Infidel. Berlyn. Excellent puzzles and a surprising bad-guy hero in well-written treasure hunt. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *11/83.*

✓**Institute.** Whether you're in a prehistoric jungle or aboard the ill-fated *Titanic*, you're in the Institute. Dream analysis provides the only escape route in this Freudian adventure. Screenplay, Box 3558, Chapel Hill, NC 27514. $29.95.

Planetfall. Meretzky. A lovable robot steals the show in this science-fiction text adventure. Includes many outstanding puzzles, rich, colorful, intelligent text. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *8/83.*

•**Prisoner 2.** Mullich, EduWare. Totally relandscaped but loyal version of original game: full-color hi-res graphics added, puzzles reworded, obstacles expanded. Sophisticated and difficult exercise in intimidation with elements of satire. Escape from an island requires player to solve logical puzzles, overcome obstacles, and answer riddles. Excellent computer fare; nothing else like it. Peachtree Software, 3445 Peachtree Rd. N.E., #830, Atlanta, GA 30326. $32.95. *The Prisoner, 3/81*; *Prisoner 2, 10/82.*

The Quest. Snell, Toler, Rea. As the king's newest advisor, you must accompany a champion on a dragon-slaying mission. Champion, parser accept advice in full and multiple sentences. Penguin, Box 311, Geneva, IL 60134. $34.95. *9/83.*

•**S.A.G.A. Series.** Adams. Scott Adams's prototypical adventures—12 in all—spruced up with 100-color graphics and Votrax vocals. Fun, not always logical, very story-oriented series. Each adventure has its own theme and often exotic locale. They map small but score big on imagination. Adventure International, Box 3435, Longwood, FL 32750. $29.95 each. *7/82.*

Sorcerer. Meretzky. Sequel to *Enchanter*. Navigate a 3-D maze, part the Red Sea, wax floors, avoid traps, and cast spells to rescue the guild master from a demon. Delightful. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95.

Suspended. Berlyn. Well-plotted adventure demands control of six independent robots who can act simultaneously. Intelligent, challenging exercise in logic. A milestone. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *4/83.*

•**Swordthrust Series.** Set of adventures, seven so far, that integrate fantasy role playing. Create one character, make friends in each new adventure, battle monsters and achieve goals together. Good stories, fun to map. Vocabulary no mystery, but puzzles are. Single character goes through all. CE Software, 801 73rd St., Des Moines, IA 50312. Number 1 prerequisite for rest. Each adventure, $29.95. *8/82.*

Transylvania. Antiochia. Some of best graphics ever in a hi-res adventure. Excellent puzzles and logic—no unfair tricks. Enjoyable. Penguin, Box 311, Geneva, IL 60134. $34.95. *10/82.*

Witness. Galley. Interactive mystery adventure set in 1938 reflects the style of pulp detective fiction popular then. Fun packaging and fun to play, although less complex than *Deadline*. A good step forward for an infant genre. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *7/83.*

•**Zork I, II, III.** Blank, Lebling. Text lives! Three masterpieces of logic and grand adventure to revel in. Hard, logical puzzles with erudite parser that understands complete compound sentences and questions, has amazing vocabulary. *I* and *II* use standard scoring, standard goals; *III* has unique point system, and benevolence pays. Infocom, 55 Wheeler St., Cambridge, MA 02138. $39.95 each. *Zork I, 6/81*; *Zork II, 3/82*; *Zork III, 9/82.*

Business

Apple II Business Graphics. Converts numerical data into charts and graphs. Features mathematical and statistical functions. Requires 64K. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $175.

AppleWorks. Lissner. Word processor, database, and spreadsheet—each full-size, full-featured. Holds several files on "desktop." Proportionally spaced type. A winner. For IIe, IIc. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $250. *4/84.*

BPI General Accounting. Performs like *General Ledger*. Prints checks, permits greater flexibility in handling accounts, produces 40 reports. Eighty columns. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $395.

BPI System. Popular six-module business package; programs also available separately. Includes *General Ledger* (a bestseller), accounts receivable, accounts payable, payroll, inventory control, and job costing. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $395 each; job costing, $595.

dBase II. Speedy relational database management system. Requires SoftCard. Ashton-Tate, 9929 W. Jefferson Blvd., Culver City, CA 90230. $700.

DB Master. Comprehensive database management system with password protection, extensive report creation options, 1,000 characters per record. Stoneware, 50 Belvedere St., San Rafael, CA 94901. $229. *10/81.*

DB Master Utility Pak #1 and Utility Pak #2. Compatible with version III. Translates *DB* files to Apple text, restructures existing files, replicates and merges, and recovers crashed files. *Pak #2* includes label printer, global editor, file merge, reblocker, and forms printer. Stoneware, 50 Belvedere St., San Rafael, CA 94901. $99 each.

Expense Account Manager. Tracks yearly expenses—such as business trips, including mileage, lodging, places visited, purpose of trip, business-related entertainment—for tax and other record-keeping purposes. Easily customized. Adaptive, 1868 Cavell Ave., Highland Park, IL 60035. $150.

Multiplan. Easy-to-learn electronic worksheet using plain-English commands. Powerful modeling and presentation capabilities. For use in analysis, forecasting, technical engineering, and the home. Versions 1.04 and up use 80 columns and extended memory on the IIe. Microsoft, 10700 Northup Wy., Bellevue, WA 98004. $275.

PFS:File. Page, Roberts. User controls data in totally unstructured database. Up to 32 pages (screens) of information in each record. IIe version has 80 columns, u/lc. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $125. *10/80.*

PFS:Graph. Chin, Hill. Works alone or interfaces with files created with *PFS:File* and *VisiCalc*. Produces bar, line, and pie charts merging data from several sources. Has 80 columns and increased graphics support in IIe version. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $125. *5/82.*

PFS:Report. Page. Powerful report generator designed for use with *PFS:File*. Sorts, calculates, totals, formats, and prints presentation-quality columnar reports. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $125. *6/81.*

Quick File IIe. Easy-to-use personal database filing system that generates reports, sorts. Fifteen fields; files as long as disk allows. IIe, two disk drives. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $100.

Risk Simulator. Estimates probability distributions related to risk situations, such as automobile maintenance expenses or employer funding of health benefits. Actuarial Microcomputer Software, 3915 Valley Ct., Winston-Salem, NC 27106. $185.

State of the Art System. Standalone or interfaceable modules for a 12-month accounting period. Includes *General Ledger*, *Accounts Receivable*, *Accounts Payable*, *Payroll*, *Inventory Control* ($495 each), *Budget and Financial Reporting*, *Sales Invoicing* ($395 each), and *Professional Time and Billing* ($795). State of the Art, 3183-A Airway Ave., Costa Mesa, CA 92626. *Accounts Receivable, 10/83.*

TK!Solver. Bricklin, Frankston. Modeling program from the creators of *VisiCalc*. Trades variables off against one another to find optimum balance of variables. Converts answers to specified units, generates tables and graphs quickly. Difficult. Requires IIe, extended eighty-column card. Software Arts, 27 Mica Ln., Wellesley, MA 02181. $399. *4/84.*

•**VisiCalc.** Bricklin, Frankston, Software Arts. Electronic worksheet for any problem involving numbers, rows, and columns. No programming necessary. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $250. *10/80.*

VisiCalc Advanced IIe. Virtually the same as advanced version for the Apple III. Create spreadsheet templates, provide uniform approach to forecasting, budgeting, and planning tasks for an entire organization. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $400.

Communications

ASCII Express: The Professional. Robbins, Blue. Greatly improved version of original modem software package features automatic redial, individual macro files, and conversion of Integer, Applesoft, or binary programs into text files. Works with a plethora of hardware. United Software Industries, 1880 Century Pk. E., Los Angeles, CA 90067. $129.95. *12/82.*

Data Capture 4.0. Copyable, modifiable smart terminal program; compatible with Apple III and most lower-case adapters. Southeastern Software, 6414 Derbyshire Dr., New Orleans, LA 70126. $65. *7/81.*

P-Term: The Professional. Supports all Pascal-compatible interfaces, asynchronous serial cards, Apple-compatible modems, and baud rates up to 2400. United Software Industries, 1880 Century Pk. E., Los Angeles, CA 90067. $129.95.

Transend 1, 2, 3. Intelligent-terminal software with multiple hardware compatibility. Advanced, easy to use. *1* sends text only; menu-driven, limited editor. *2* sends DOS files error-free, several files at once. *3* does both and handles electronic mail with automatic redial, clock/calendar, and password protection. Upgrade: difference in price between two packages plus $20 service fee. Transend, 2190 Paragon Dr., San Jose, CA 95131. *1*, $89; *2*, $149; *3*, $275. *9/82.*

Z-Term: The Professional. More than an update. Compatible with a great variety of modems, interface cards, and screen modes. Simple file transfer with integrity. United Software Industries, 1880 Century Pk. E., Los Angeles, CA 90067. $149.95. *5/81.*

Fantasy

Role-playing games involving characters that develop through experience in adventuresome stories, and whose actions players determine via set commands.

•**Beneath Apple Manor.** Worth. The original dungeon game for the Apple, created in 1978. Latest version has hi-res, sound effects, a few more magic items, but still the classic game. Quality, 21601 Marilla St., Chatsworth, CA 91311. $29.95. *2/83.*

Exodus: Ultima III. British. Super third installment of Ultima saga. Contains many features not found in *Ultima II*. Original score, wind and wave motion, four characters who can interact, tactical combat, and full-color dungeons combine with much more solid, involved plot to make an engrossing fantasy. Origin Systems, Box 99, N. Andover, MA 01845. $54.95. *11/83.*

Knight of Diamonds. Greenberg, Woodhead. Second scenario of Wizardry, requiring thirteenth-level characters from the original. Individual quests on each of six dungeon levels. Great. Sir-tech, 6 Main St., Ogdensburg, NY 13669. $34.95. *7/82.*

Legacy of Llylgamyn. Greenberg, Woodhead. Third scenario in classic Wizardry series. To save Llylgamyn, descendants of the adventurers of other Wizardry scenarios (requires *Overlord*) must wrest a mystical orb from the dragon L'kbreth. New full-screen dungeon, Lisa-like information screens. Sir-tech, 6 Main St., Ogdensburg, NY 13669. $39.95. *7/83.*

•**Odyssey: The Compleat Apventure.** Clardy. Fantasy adventure far beyond one place and one setting. Castles, catacombs, an ocean voyage, and the orb of power. Synergistic, 830 N. Riverside Dr., #201, Renton, WA 98055. $30. *10/80.*

Standing Stones. Schmuckal, Sommers. Fifteen levels, 200 monsters, humor, and 3-D perspective in dungeon role-playing adventure. Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403. $40.

SunDog: Frozen Legacy. Webster. Create a character to pilot the *SunDog*, the beat-up space freighter you inherited. Fix the ship and engage in intergalactic trade, all with only a joystick. Macintosh-style windows, epic scope. Be prepared to spend a while. FTL Games, 7907 Ostrow, Suite F, San Diego, CA 92111. $39.95.

•**Temple of Apshai.** Lead title in Dunjonquest series, winner 1981 Academy of Adventure Gaming Arts and Design "Computer Game of the Year" award. Epyx/Automated Simulations, 1043 Kiel Ct., Sunnyvale, CA 94086. $39.95.

•**Ultima.** British. Hi-res color adventure, progressing from Middle Ages to beyond the space age. A master-

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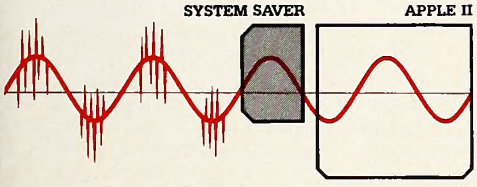

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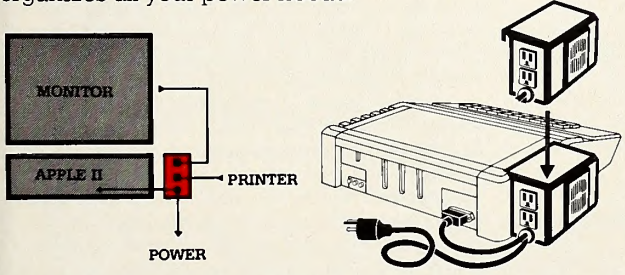

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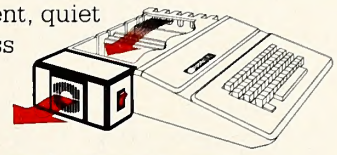

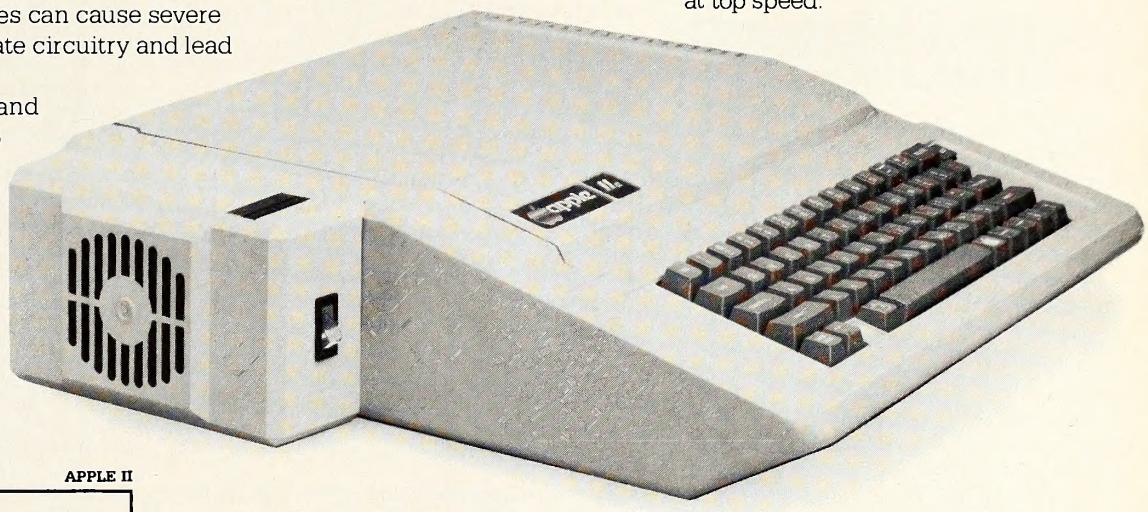

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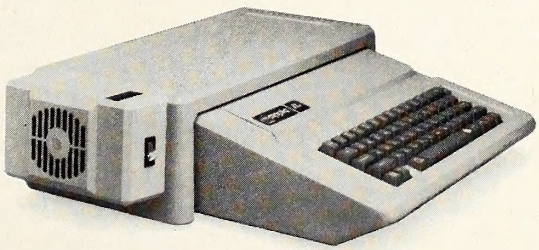

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*Softsel Computer Products Hot List. **PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

piece. California Pacific, 757 Russell Blvd., Davis, CA 95616. $39.95. *6/81.*

Ultima II. British. Faster play in a bigger universe with a time-travel option. Typically British look and feel. Events are much more interdependent; larger realm of fantasy with more transactions available. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $59.95.

•**Wilderness Campaign.** Clardy. First fantasy game to leave the dungeon for the great outdoors; first in hi-res; first to bargain with merchants; and more. Synergistic, 830 N. Riverside Dr., #201, Renton, WA 98055. $17.50.

•**Wizardry.** Greenberg, Woodhead. Ultimate role-playing fantasy; ten-level maze in hi-res. Generate 20 characters, 6 at a time on expeditions. Gripping game; superbly reproduced. Sir-tech, 6 Main St., Ogdensburg, NY 13669. $49.95. *8/81.*

WizPlus. Conner. Utility for the Wizardry series that allows players to change, restore, add to, recover, edit, or move any character, equipment, spells, or treasure. Datamost, 8943 Fullbright Ave., Chatsworth, CA 91311. $39.95.

Graphics

Alpha Plot. Kersey, Cassidy. Hi-res graphics and text utility with optional xdraw cursor and proportional spacing. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $39.50.

The Complete Graphics System. Pelczarski. A wealth of graphics tools at a reasonable price. Make 2-D drawings with game paddles; add text in destructive, nondestructive, or reverse modes; create 3-D figures and shape tables. Manual features complete outline of command structure. Penguin, Box 311, Geneva, IL 60134. $69.95. *7/81.*

Doublestuff. Bonfiglio, Joselow. Programming language similar to Applesoft designed for use with Apple's stunning double-resolution modes. Requires IIe with B motherboard, 128K. Doublestuff Software Development, 2053 W. 11th St., Brooklyn, NY 11223. $39.95. *12/83.*

Flow Charting. Patton. Elegantly solves problems of designing and printing flow charts. Fun, easy to use, powerful. Patton and Patton, 340 Lassenpark Circle, San Jose, CA 95136. $138. *12/83.*

Flying Colors. Albinger, Norby. Track ball or joystick controls eleven brush-tips, sixteen diagonal and crosshatched color patterns, four solid colors, two blacks, two whites, circle and box functions, freehand drawing, and a micro mode for detail work. Friendly and fun. Computer Colorworks, 3030 Bridgeway, Sausalito, CA 94965. $39.95. *3/84.*

Fontpak 1-3. Additional character sets for use with *Fontrix*. *Fontpak 1* for headline and decorative type, *Fontpak 2* for art and technical type, *Fontpak 3* for letterforms and posters. Data Transforms, 616 Washington St., Denver, CO 80203. $20 each.

Fontrix. Boker, Houston. Character generator creates unlimited number of typefaces, uses them to write on a screen extended 16 times. Extremely significant development in graphics. Data Transforms, 616 Washington St., Denver, CO 80203. $75. *7/83.*

The Graphics Magician. Jochumson, Lubar, Pelczarski. Outstanding animation package consisting of picture editor and shape-table extender. Comes with utility program to transfer binary files. Penguin, Box 311, Geneva, IL 60134. $59.95. *5/82.*

•**LPS II.** Superb hi-res-graphics drawing system with light pen. Draw freehand or use circles and lines to create geometric shapes. Fill routine with colors and patterns; fun animation demo; programmable Pentrak driver. Gibson, 23192-D Verdugo Dr., Laguna Hills, CA 92653. $349. *10/82.*

Zoom Grafix. Holle. Graphics-printing utility allows display of picture on-screen prior to print; prints out selected portion at any size. Phoenix, 64 Lake Zurich Dr., Lake Zurich, IL 60047. $39.95. *2/82.*

Home

Basic Accounting. Jarvis. Single-entry home accounting program, ideal for home budgeting. Performs inventories and automatic transactions, provides graphics and a wide variety of reports. File names up to 25 characters. Firefighter, 31245 La Baya Dr., Westlake Village, CA 91362. $89. *4/84.*

✓**Checks & Balances.** Computerizes bookkeeping without requiring a change in checking method. Tracks and instantly updates 16 user-defined expense categories. Full editing options. Wordmovers, 15818 Hawthorne Blvd., Lawndale, CA 90260. $49.95.

✓**Compucard.** Card filing system updates, edits, and stores card files. Comes with or without Rolodex Filer, continuous form cards. Rolodex, 245 Secaucus Rd., Secaucus, NJ 07094. $49.95; with filer and cards, $68.50.

•**Crossword Magic.** Crossword puzzle maker. Choose subject, words, and clues; program automatically connects words. Play on-screen or make printout. L&S Computerware, 1589 Fraser Dr., Sunnyvale, CA 94087. $49.95. *10/81.*

Dollars and Sense. Mullin. Establishes budgets, writes checks, reminds to pay bills. Uses graphs, reports to analyze cash flow, balance sheets, make year-to-date summaries, expense projections. Monogram, 8295 S. La Cienega Blvd., Inglewood, CA 90301. $100.

Dow Jones Market Analyzer (formerly *RTR Market Analyzer*). Automatically collects, stores, and updates historical and daily market quotes. Provides technical analysis and plots 18 different types of charts. Dow Jones Software, Box 300, Princeton, NJ 08540. $350.

Golf Statistician. Haberle. Helps golfers lower their scores by examining their strengths and weaknesses. GolfSoft, 10333 Balsam Ln., Eden Prairie, MN 55344. $34.95.

Home Accountant. Schoenburg. Thorough, powerful home finance program. Monitors five checking accounts against a common budget, plus credit cards and cash; one-step record or transfer of funds. Arrays/Continental, 11223 S. Hindry Ave., Los Angeles, CA 90045. $74.95. *4/82.*

Internist. Based on the *Merck Manual*, assesses 450 symptoms to assist in diagnosis of 331 common diseases. Prints diagnoses and references. Requires 64K. N-Squared, 5318 Forest Ridge Rd., Silverton, OR 97381. $95.

Micro Cookbook. Recipe-management system allows entry and modification; selection of recipes by common ingredients, name, or classification. Calorie and nutrition guide. Virtual Combinatics, Box 755, Rockport, MA 01966. $40. *6/83.*

Music Construction Set. Harvey. Interactive music composition and learning tool allows user to create music or experiment with included music library. Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403. $40. *12/83.*

Oddsmaker. Zieg. Do-it-yourself pari-mutuel betting system for office pools, sporting events, you name it. Allows for up to 14 pools, prints tickets, calculates odds. CZ Software, 358 Forest Rd., South Yarmouth, MA 02664. $44.95. *3/84.*

✓**Personal Tax Planner.** Spreadsheet answers tax questions and devises financial strategies rather than preparing tax forms. Makes five-year projections. More useful if you know about tax laws. Aardvark/McGraw-Hill, 783 N. Water St., Milwaukee, WI 53202; $99. *5/84.*

Tax Advantage. Assists with Form 1040 and related tax schedules. Simulates the 1040 on-screen, averages income, explains each item on the form. Arrays/Continental, 11223 S. Hindry Ave., Los Angeles, CA 90045. $69.95.

Tax Preparer. Record-keeping program with wide variety of federal tax forms and schedules; creates itemized lists. Yearly updates. Howard Software, 8008 Girard Ave., #310, La Jolla, CA 92037. $225. *3/81.*

ThinkTank. Idea processor program allows you to see ideas in outline form. Outline can be collapsed to see the big picture or expanded to reveal hidden details. Living Videotext, 1000 Elwell Ct., #232, Palo Alto, CA 94303. $150. *8/83.*

Home-Arcade

Fast-action skill games; may include elements of fantasy.

•**Alien Rain.** Suzuki. Monsters in this classic seem to take it personally when you gun down one of their own kind. Broderbund, 17 Paul Dr., San Rafael, CA 94903. $29.95. *9/81.*

•**Apple Panic.** Serki. Rid a five-story building of crawling apples and butterflies by running up and down connecting ladders, digging traps, then covering critters before they devour you. Extremely addictive, excellent hi-res play. Broderbund, 17 Paul Dr., San Rafael, CA 94903. $29.95. *9/81.*

B.C.'s Quest for Tires. Grey. Jump over rocks and potholes, bounce across a river on the backs of turtles, fly over lava, confront a dinosaur, in an effort to save the first woman. Cartoon look, slow play. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $34.95.

Beagle Bag. Kersey. Twenty games and miscellany, written in Basic and unprotected. Great humor, good two-player games. Manual is worth the price of admission. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50. *1/83.*

✓**Black Belt.** Ryan. Simulates a championship tae kwon do sparring match. Five computer opponents represent five belt levels; play becomes increasingly difficult with each successive level. Stresses self-control rather than deliberate violence. Earthware, Box 30039, Eugene, OR 97403. $29.95.

✓**Centipede.** Save the mushroom patch from invading centipedes, scorpions, spiders, and fleas in Apple rendition of arcade classic. Atarisoft, 1265 Borregas Ave., Box 427, Sunnyvale, CA 94086. $34.95.

✓**C'est La Vie.** Eastman. Guide Jacques through a mazelike city to pick up tens, twenties, and fifties. Help Jacques elude robbers and tax collectors, stay out of the hospital, deposit money in banks, invest in the market—this isn't a game, it's parenting. Adventure International, Box 3435, Longwood, FL 32750. $34.95.

•**Choplifter.** Gorlin. Fly your chopper to rescue 64 hostages, avoiding interceptor jets, homing mines, and tanks. Challenging, realistic, and playful. Stunning graphics. Broderbund, 17 Paul Dr., San Rafael, CA 94903. $34.95. *7/82.*

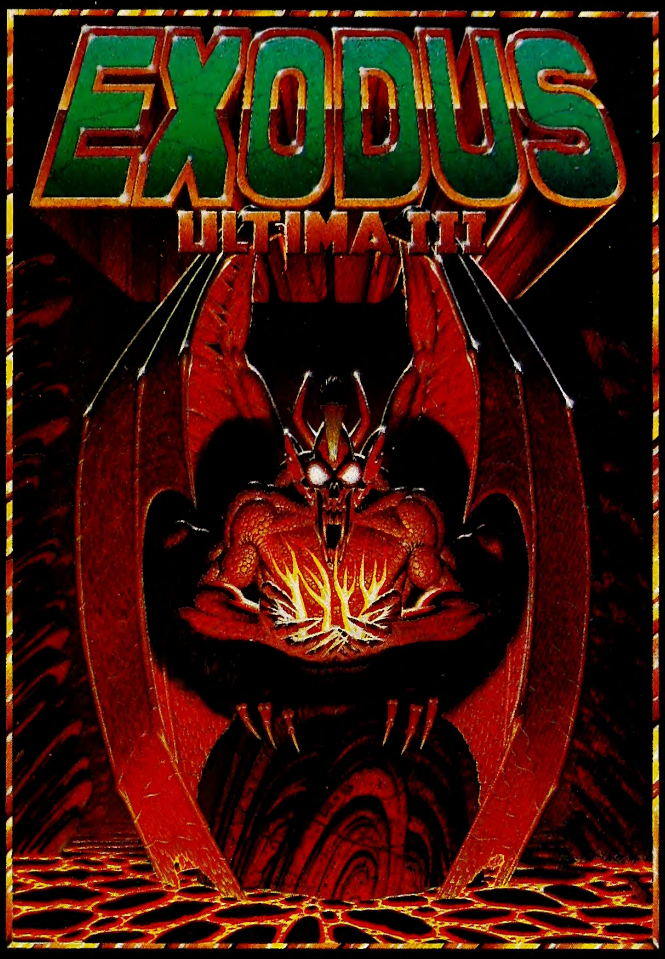
•**Crossfire.** Sullivan. Critters come at you from four directions on a grid laid out like city blocks. Strategy and intense concentration required. Superb, smooth animation of a dozen pieces simultaneously. One of the great ones. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $29.95. *1/82.*

Defender. Fly and shoot, fly and shoot, and don't forget to save the planet. Atarisoft, 1265 Borregas Ave., Box 427, Sunnyvale, CA 94086. $34.95. *3/84.*

Dig Dug. Dig Dug moves horizontally and vertically, burrowing tunnels in search of vegetables. Hidden monsters make his task tougher. Atarisoft, 1265 Borregas Ave., Box 427, Sunnyvale, CA 94086. $34.95.

Donkey Kong. Mario the carpenter climbs girders and rides elevators to reach the top of a building where a giant gorilla holds his sweetheart captive. Try to keep him from falling or getting bumped off. Atari-

"A LIVING TAPESTRY . . ."



"The world of Ultima III can only be compared to a living tapestry — complex and beautiful . . . This is the best fantasy game in computing. Indeed, it is one of the best fantasy worlds in which to live. Lord British is a veritable JRR Tolkien of the keyboard." — Popular Mechanics

"Exodus: Ultima III, with a superior plot to match its superior gaming system, is a great game. It upgrades the market; in several ways it sets new standards for fantasy gaming state of the art." — Softline

"Exodus: Ultima III is Lord British's magnum opus — so far. It's fun and exciting to play and constantly intriguing. And the ending is marvelously unexpected and not a bit disappointing — except that it is the ending, and as with a good book, you'll probably wish there were more." — Softalk

Available on: Apple, Atari, Com64, IBM

ORIGIN SYSTEMS INC. 1545 OSGOOD ST., #7 NORTH ANDOVER, MA 01845
(617) 681-0609

soft, 1265 Borregas Ave., Box 427, Sunnyvale, CA 94086. $34.95.

Dr. J and Larry Bird Go One-on-One. Hammond, Bird, Erving. Graphically and intrinsically captures the moves, grace, and bearing of basketball forwards Dr. J and Larry Bird as they play one on one. The best video basketball imaginable, for one or two players. Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403. $40. *2/84.*

Drol. Ngo. Charming rescue mission set in a dream world with witch doctors, Garfield-like scorpions, kamikaze vacuum cleaners. Marvelous, smoothly animated graphics; challenging and playable. Broderbund, 17 Paul Dr., San Rafael, CA 94903. $34.95. *12/83.*

Frogger. Lubeck. Not even close. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $34.95. *12/82.*

•**Gorgon.** Nasir. Fly over planet shooting and dodging invaders and saving kidnapped inhabitants. Outstanding hi-res graphics, challenging refueling sequence. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $39.95. *8/81.*

Hard Hat Mack. Abbot, Alexander. Poor Mack. He must avoid vandals, inspectors, falling rivets, and hungry cement mixers to complete his building. Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403. $35. *7/83.*

The Heist. Livesay, Mooney. Similar to Livesay's Apple version of *Miner 2049er*; pick up all of the artwork in sixteen-level museum. Passive—no one is chasing you—but challenging. Micro Lab, 2699 Skokie Valley Rd., Highland Park, IL 60035. $35.

•**Lode Runner.** Smith. Ascend 150 unique levels in super run-climb-dig-jump game—or design your own puzzles, scenes, and setups—in quest to retrieve stolen gold from the Bungeling Empire. Voted Most Popular Program of 1983. Broderbund, 17 Paul Dr., San Rafael, CA 94903. $34.95. *8/83.*

•**Meteoroids (Asteroids) in Space.** Wallace. Make little asteroids out of big ones, plus occasional hostile alien ships. Hyperspace, autobrake, autofire. Quality Software, 21601 Marilla St., Chatsworth, CA 91311. $19.95.

•**Microsoft Decathlon** (formerly *Olympic Decathlon*). Smith. Ten standard decathlon events. Hi-res animated athletes, muscle-stirring music; you provide the sweat. Microsoft, 10700 Northup Wy., Bellevue, WA 98004. $29.95. *6/81.*

Miner 2049er. Livesay, Hogue. Run, jump, climb, and slide through the mines, reinforcing the groundwork along the way. Elevators, cannons, chutes, and ladders help; mutants don't. Hot stuff, best of the genre. Micro Lab, 2699 Skokie Valley Rd., Highland Park, IL 60035. $39.95. *1/83.*

✓**Oil's Well.** Mitchell, Strand. Guide a drill bit through underground mazes, gobbling up oil deposits and avoiding oozy oil monsters and mines planted by competing oil barons. Multilevel, underground mazes gaining in complexity. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $29.95.

Pac-Man. Official, original eat-'em-up arcade giant now available for the Apple II. Atari, Box 2943, S. San Francisco, CA 94080. $34.95.

Pinball Construction Set. Budge. Design and play your own computer games on-screen, with zero programming. A miracle of rare device. Superior. BudgeCo, 428 Pala Ave., Piedmont, CA 94611. $39.95. *2/83.*

•**Pool 1.5.** Hoffman, St. Germain, Morock. Makes most shots you could on a real pool table, with the advantages of instant replay and slow motion. Four different games. IDSI, Box 1658, Las Cruces, NM 88004. $34.95. *6/81.*

•**Raster Blaster.** Budge. First realistic pinball game. *Softalk* readers' Most Popular Program of 1981. BudgeCo, 428 Pala Ave., Piedmont, CA 94611. $29.95. *5/81.*

•**Sneakers.** Turmell. Many-layered shooting game; one of the best. Stomping sneakers and other creatures requires varying techniques. Fun. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95. *9/81.*

Spare Change. Zeller, Zeller. Bright graphics, ultrasmooth animation, clever sound effects, and cute characters add up to create an instant classic—the first computer slapstick comedy. Broderbund, 17 Paul Dr., San Rafael, CA 94903. $34.95. *11/83.*

Stargate. Crisper, smoother, faster version of *Defender*. The radar is poor, but the action more than compensates. Atarisoft, 1265 Borregas Ave., Box 427, Sunnyvale, CA 94086. $34.95. *3/84.*

•**Super Invader.** Hata. Progenitor of home arcades. Still good hi-res, still a challenge. *Softalk* readers' Most Popular Program of 1978-80. Astar International, through Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07960. $19.95.

Zaxxon. Garcia. 3-D scrolling air raid brought to the Apple with little sacrifice in playability. Datasoft, 9421 Winnetka Ave., Chatsworth, CA 91311. $39.95. *9/83.*

Home Education

Algebra 1-4. EduWare. Sets of learning units progressing from algebraic rules to definitions to graphing and inequalities. Individualized teaching styles to fit everyone's needs. Good for adults wanting to overcome math anxiety as well as for schoolkids. Peachtree Software, 3445 Peachtree Rd., N.E., #830, Atlanta, GA 30326. $39.95 each. *Algebra 1, 5/81.*

✓**Alphabet Circus.** Six activities, including Juggler, Alphabet Parade, and Ringmaster, teach young children letter recognition, alphabetical order, and elementary words. Circus sounds and graphics. DLM, 1 DLM Park, Allen, TX 75002. $29.95.

Alphabet Zoo. Disharoon. Two programs in one. The first helps young children match letters with sounds. In the second, school-age kids move through a maze, selecting letters that spell words introduced in the first part. Generally good sound and graphics, animal motif. Spinnaker Software, 215 1st St., Cambridge, MA 02142. $29.95. *1/84.*

Apple Logo. Papert. Custom version (by its inventor) of turtle graphics language. First-rate educational tool. Great kid-friendly documentation. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $175.

Arcademic Skill Builders in Math. Chafin, Maxwell. *Alien Addition*, *Alligator Mix*, *Demolition Division*, *Dragon Mix*, *Meteor Multiplication*, and *Minus Mission*. Arcade action blended with addition, subtraction, multiplication, and division problems. Shooting correct answers to problems gets rid of pesky attackers. Choose speed, difficulty levels, game length. Developmental Learning Materials, 1 DLM Park, Allen, TX 75002. $29.95 each. *7/83.*

Barron's SAT. Pinpoints students' strengths and weaknesses, outlines study program. Four complete SATs in two modes. Question mode explains answers, suggests strategies, gives hints. Test mode scores answers, gives scaled SAT score. Barron's, 113 Crossways Pk. Dr., Woodbury, NY 11797. Three disks, guides, $89.95.

Computer SAT. Prepares college-bound students for admittance test. Diagnoses strengths, weaknesses; creates study plan, exercises. Harcourt Brace Jovanovich, 1250 6th Ave., San Diego, CA 92101. $79.95.

Delta Drawing. Kids can make colorful drawings by using single-key commands. No special talent needed; this one develops programs that create complex graphics. Spinnaker, 215 1st St., Cambridge, MA 02142. $59.95. *11/82.*

Early Games for Young Children. Paulson. Basic training in numbers, letters, Apple keyboard for children ages two to seven; no adult supervision needed. Has a neat little drawing program. Counterpoint Software, 4005 W. 65th St., Minneapolis, MN 55435. $29.95. *11/82.*

Early Games Fraction Factory. Eyestone. Aided by colorful graphics and music, children see and describe fractions, find equal values with different denominators, multiply whole numbers by fractions, add and subtract fractions. Ages 8 to 12. Counterpoint Software, 4005 W. 65th St., Minneapolis, MN 55435. $29.95.

Early Games Matchmaker. Adolf, Boody. Helps children aged two to six develop matching, grouping, and discrimination skills. Requires no knowledge of keyboard; does require adult supervision. Counterpoint Software, 4005 W. 65th St., Minneapolis, MN 55435. $29.95. *2/84.*

Early Games Music. Paulson. Illustrates music with fun and theory. Children compose music and set to graphics or learn note reading and piano keyboard. Counterpoint Software, 4005 W. 65th St., Minneapolis, MN 55435. $29.95. *8/83.*

Early Games Piece of Cake. Eyestone. Kids become baker's assistants; adding, multiplying, subtracting, dividing cakes. Includes CatchaCake, a problem-solving race against time to stop a cake from falling. Counterpoint Software, 4005 W. 65th St., Minneapolis, MN 55435. $29.95. *10/83.*

Facemaker. DesignWare. Exercises kids' creativity and introduces programlike command sequencing as kids create faces and link them together in animated patterns. Spinnaker, 215 1st St., Cambridge, MA 02142. $34.95.

•**French Hangman, Latin Hangman, Spanish Hangman.** Protelsch, Earl. Hangman games that tell you the answer—in a foreign language. Interesting sentences, many formats. Addicting! George Earl, 1302 S. General McMullen, San Antonio, TX 78237. Two-sided disk, $29.95. *9/83.*

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•Gertrude's Secrets. Gertrude the Goose teaches four- to nine-year-olds shape and color relationships. Solve logic puzzles, create forms. The Learning Co., 545 Middlefield Rd., #170, Menlo Park, CA 94025. $44.95. *2/83.*

Hey Diddle Diddle. Disharoon. Three reading and vocabulary games that strengthen reasoning ability. Ages 3 to 10. Spinnaker, 215 1st St., Cambridge, MA 02142. $29.95.

In Search of the Most Amazing Thing. Snyder. Role-playing game lets players negotiate with aliens, fly hot-air balloon. Ages 10 to adult. Spinnaker, 215 1st St., Cambridge, MA 02142. $44.95. *7/83.*

Kindercomp. Learning exercises for ages three through eight. Spinnaker, 215 1st St., Cambridge, MA 02142. $29.95.

Learning and Loving It! Division of Whole Numbers. Borns. Makes learning long division as palatable as possible. Race Apple Annie to the remainder in entertaining beginning level. Intermediate and advanced levels soberly studious. Borns Software, 19841 Sea Canyon Circle, Huntington Beach, CA 92648. $39.95. *4/84.*

Master Match. Robbins. Matching game with a TV quiz show format. Designed to enhance memory, teach vocabulary and concepts. For one or two players. Additional subject disks include *Basic Skills*, *Science and Math*, *Math and Social Studies*, and foreign language. Advanced Ideas, 1442-A Walnut St., #341, Berkeley, CA 94709. $39.95; additional subject disks, $19.95.

•MasterType. Zweig. Learn to type by playing a game; simple and ingenious. IIe version teaches new keyboard. Lightning, Box 11725, Palo Alto, CA 94306. $39.95. *4/81.*

Math Blaster. Davidson, Eckert. Elementary-school-level training in four basic math functions. Options to create lessons; several levels of difficulty for various ages. Human cannonball arcade game for each function. Davidson and Associates, 6069 Groveoak Pl., #12, Rancho Palos Verdes, CA 90274. $49.95.

•The New Step by Step, Step by Step Two. *The New Step by Step* teaches beginning programming. *Step by Step Two* teaches intermediate Basic programming, peeks and pokes, hexadecimal numbers, concatenations, and more. Program Design, 11 Idar Ct., Greenwich, CT 06830. Each $99.95. *7/83.*

✓Number Farm. Six different farm activities acquaint young children with numbers, numerical order, number recognition, number words, keyboard skills, and problem solving. Musical accompaniment with on-screen lyrics. DLM, 1 DLM Park, Allen, TX 75002. $29.95.

Rhymes and Riddles. Cross. Four games to teach reading and spelling to elementary schoolchildren. Fill in the blanks with the necessary phrase. Spinnaker, 215 1st St., Cambridge, MA 02142. $29.95.

Rocky's Boots. Robinett, Grimm. Rascally raccoon helps children build logical thinking and computer understanding. Construct machines of logical gates in convolutions of thickening complexity. Music and sound effects add to fun. The Learning Co., 545 Middlefield Rd., #170, Menlo Park, CA 94025. $49.95. 2/83.

✓Shape and Color Rodeo. Cowhand motif in six activities develops shape and color recognition and hand-eye coordination. Twirl a triangular lasso, throw your hat into a green ring. DLM, 1 DLM Park, Allen, TX 75002. $29.95.

Snooper Troops. Snyder. Ongoing hi-res mystery series in form of educational games. Highly structured; excellent fourth-through-eighth-grade educational tool. Fun for adults too. Spinnaker, 215 1st St., Cambridge, MA 02142. $44.95 each. *9/82.*

Spellicopter. UFOs try to stop player's helicopter from picking up letters to form words in latest spellicader. Slow in spots, not up to top arcade standards, but will help kids through spelling doldrums. DesignWare, 185 Berry St., San Francisco, CA 94107. $39.95. *12/83.*

Stickybear. Hefter, Worthington, Rice, Howe. Animated early education programs. In *Stickybear ABC*, moving pictures with sound represent letters. In *Stickybear Numbers*, groups of moving objects teach numbers and simple arithmetic. Ages three through six. In *Stickybear Bop*, ducks, planets, and balloons bop across screen in three shooting galleries. For all ages. In *Stickybear Shapes*, animated pictures teach shape recognition. In *Stickybear Opposites*, Stickybear and friends illustrate opposites. Weekly Reader Family Software, 245 Long Hill Rd., Middletown, CT 06457. $39.95 each. *Numbers*, *ABC*, *Bop*, *5/83. Shapes*, *12/83. Opposites*, *3/84.*

Story Machine. Helps develop positive attitude toward writing and ability to write correctly. Words come to life when sentence is acted out on-screen. Kids five to nine love to type "The Bumpus zots the tree" and see it do so. Spinnaker, 215 1st St., Cambridge, MA 02142. $34.95.

Supermap. Maps show ecological regions, geographical features, time zones. Shows cities and tells population, latitude, longitude, principal post office zip code and area codes. For kids 10 to 15. Softsmith, 1431 Doolittle Dr., San Leandro, CA 94577. $39.95.

Terrapin Logo. MIT. The Logo language, using a Terrapin turtle to teach state, control, and recursion. Terrapin, 380-C Green St., Cambridge, MA 02139.

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Typing Tutor. Ainsworth, Baker. Four levels of proficiency; individualized drills created with time-response monitoring. Microsoft, 10700 Northup Wy., Bellevue, WA 98004. $24.95.

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Bermuda Race. Biddle, Mattox. Excellent yachting simulation of Rhode Island-to-Bermuda race. First-rate graphics; challenging and exciting. Includes sailing, navigation tutorial; for one or two players. Howard W. Sams, 4300 W. 62nd St., Indianapolis, IN 46268. $29.95. *11/83.*

•**Castle Wolfenstein.** Warner. First game to fuse successfully strategy, home-arcade, fantasy. Escape from Nazi stronghold with secret plans. Room layout changes with each new game. Enemy speaks (in German). Muse, 347 N. Charles St., Baltimore, MD 21201. $29.95. *10/81.*

•**Computer Ambush.** Williger. Gutty soldier-to-soldier street fighting in World War II France. Latest version is 40 times faster than the original, which was one of the best games ever created for Apple, except for slowness. Strategic Simulations, 883 Stierlin Rd., A-200, Mountain View, CA 94043. $59.95.

•**Computer Baseball.** Merrow, Avery. Simulates individual player abilities from the teams of 13 famous World Series. Enter and play teams of your own creation. Strategic Simulations, 883 Stierlin Rd., A-200, Mountain View, CA 94043. $39.95. *9/81.*

•**Flight Simulator.** Artwick. Uses aerodynamic equations, airfoil characteristics for realistic takeoff, flight, and landing. Two years on Top Thirty. SubLogic, 713 Edgebrook Dr., Champaign, IL 61820. $33.50.

Flight Simulator II. Artwick. Update of the original *Flight Simulator* features animated 3-D color graphics, transcontinental flight, World War I aerial battle. SubLogic, 713 Edgebrook Dr., Champaign, IL 61820. $49.95.

Gin Rummy. Carpet. Play against computer. Hi-res hand can be arranged. Knocking allowed. Computer plays pretty well. Datamost, 8943 Fullbright Ave., Chatsworth, CA 91311. $29.95. *6/82.*

Hi-Res Computer Golf 2. A masterpiece; requires judgment, strategy, and visual acuity. One of the few computer sports simulations that require dexterity. Avant-Garde, Box 30160, Eugene, OR 97403. $34.95. *6/83.*

•**Microgammon II.** Program for play, practice, improvement of backgammon skills. Pretty good competition. Artsci, 5547 Satsuma Ave., North Hollywood, CA 91601. $19.95. *2/81.*

Millionaire. Zuber. Investment simulation lets you know if you have what it takes to make a quick million in the stock market. Every little market fluctuation represented on a weekly basis, includes investment tips. Blue Chip Software, 6744 Eton Ave., Canoga Park, CA 91303. $59.95. *12/83.*

•**Pensate.** Besnard. Chess-type thinking game with new tactics. Computer's many pieces move in relation to player's piece; each of 10 types of computer pieces has unique rules. Makes full use of computer capabilities. Intriguing, progressive, and addicting. Penguin, Box 311, Geneva, IL 60134. $29.95. *7/83.*

Professional Tour Golf. Richbourg. Determine the average distance of your drive and the precision of your putts and then stride the links with Palmer and Nicklaus or a friend or three. Two courses, lots of hazards. Strategic Simulations, 883 Stierlin Rd., A-200, Mountain View, CA 94043. $39.95. *4/84.*

Rails West! Thar's fortunes can be made in railroads, sonny. It's 1870; start a corporation or orchestrate a takeover. Choose level of play, number of players—up to eight—and scenario, ranging from boom times to panic. Strategic Simulations, 883 Stierlin Rd., A-200, Mountain View, CA 94043. $39.95.

•**RobotWar.** Warner. Strategy game with battling robots is great teaching device for programming. Muse, 347 N. Charles St., Baltimore, MD 21201. $39.95. *1/81.*

•**Sargon III.** Spracklen, Spracklen. Plays good chess fast. Much improved from *Sargon II*, contains 107 classic games from the past for instruction or entertainment. Hayden, 600 Suffolk St., Lowell, MA 01853. $49.95. *10/83.*

Utility

Apple Mechanic. Kersey. Multiple disk utility with shape editor, custom typefonts, byte rewriter, and tricks to facilitate music, text, and hi-res generation. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50. *9/82.*

Apple Mechanic Typefaces. Twenty-six new fonts for use with *Apple Mechanic*. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $20.

The Assembler. Floeter. Machine language assembler that understands Basic, generates machine language code from Basic commands. Includes line editor. When used with *MacroSoft*, a library of routines, system acts as a complete high-level language. MicroSparc, Box 325, Lincoln, MA 01773. *The Assembler*, $69.95; *MacroSoft*, $49.95; both, $99.95. *9/83.*

Apple Pascal. Structured operating system featuring enhancements of color graphics, sound generation, and Apple's I/O features. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $495.

Beagle Basic. Simonsen. Allows you to enhance and customize Applesoft by adding up to 12 functions. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $34.95. *10/83.*

Bug Off! Byington. Not the mosquito repellent, installs into Apple Pascal source code to eliminate source code editing. Run programs in or out of debugging mode, set break points to see variables and change values without having to reedit or recompile the source code. Includes command macros, on-line help files, listing command. Pesky manual. First Byte, 2845 Temple Ave., Long Beach, CA 90806. $49.95. *5/84.*

DiskQuik. Bruce, Hite. Uses an extended 80-column card to make the Apple IIe think a disk drive is connected to slot three. Eighty-column card holds about half as much data as a disk. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50. *5/84.*

DOS Boss. Kersey, Cassidy. Utility to change DOS commands, customize catalog. Good ideas and witty presentation. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $24. *10/81.*

Double-Take. Simonsen. Multiple utility features two-way scrolling for listings and catalogs. Improved list format. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $34.95. *10/83.*

Einstein Compiler. Goodrow, Einstein. Translates Applesoft programs into machine language for run time up to 20 times faster. Supports all graphics modes, defined functions, and DOS commands, Einstein, 11340 W. Olympic Blvd., Los Angeles, CA 90064. $129. *5/83.*

Flex Type. Simonsen. Adds graphics to text and vice versa; prints variable-width text with no hardware. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50.

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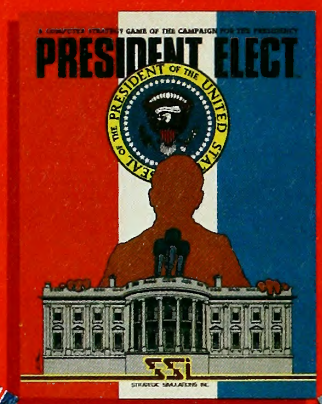

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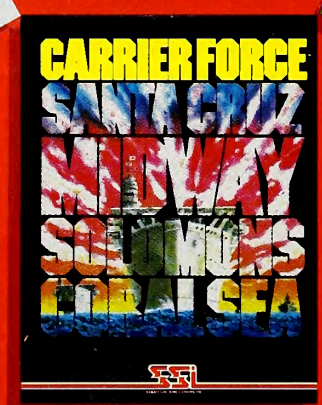

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generates professional presentations of graphics, text frames. Text screen editor lets you create text slides, add type live during shows. Optional preprogrammed display for unattended shows. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50.

•**Global Program Line Editor.** Enhanced version of *Program Line Editor* with programmable cursor and listing control. Edit line by line or by range of lines and search for strings. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $49.95. *12/82.*

Master Diagnostic II, II Plus, and IIe. Romano. Identifies bad ROM and RAM chips, parallel cards, video monitor, speaker, paddles, disk drive speed, head alignment, and write-protect switch. Gives hardware repair, replacement, and cleaning instructions where viable. Nikrom Technical Products, 25 Prospect St., Leominster, MA 01453. $55 each.

Merlin. Does assembly language programming with a dozen editing commands and 28 pseudo-ops. Roger Wagner Publishing, 10761-E Woodside Ave., Santee, CA 92071. $64.95. *1/83.*

✓**ProDOS User's Kit.** Converts DOS 3.3 data files to work with ProDOS-based application programs. Provides an organized method for managing large numbers of files on large storage devices. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $40.

Programmer's Workshop. Sixty general-purpose subroutines to integrate into Basic programs. Includes variety of visual and sound effects, math utilities, sorting, input/output subroutines, and screen controls. Hayden Software, 600 Suffolk St., Lowell, MA 01853. $49.95.

ProntoDOS. Weishaar. High-speed disk utility cuts about two-thirds of the time off bload and save functions. Compatible with all DOS commands; frees up to 15 extra sectors per disk. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50.

Silicon Salad. Kersey, Simonsen. Grab bag of utilities including Applesoft error trapper, fast word alphabetizer, and a disk scanner that seals off bad sectors. Features Tip Disk #2 and Beagle Blackjack. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $24.95. *4/84.*

•**Super Disk Copy III.** Hartley. Easy-to-use menu-driven software utility; correct file sizes, undelete, free DOS tracks, more. Sensible, 6619 Perham Dr., W. Bloomfield, MI 48003. $30. *10/81.*

Tip Disk #1. Kersey. One hundred *Beagle Tip Book* programs on disk. Includes Apple command chart and peeks/pokes chart. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $20.

✓**Turbo Pascal.** CP/M Pascal complier offers a complete standard Pascal, several built-in string functions, fast compilation and execution, resident text editor with block moves, search, replace. High performance, low price. Requires CP/M. Borland International, 4807 Scotts Valley Dr., Scotts Valley, CA 95066. $49.95. *5/84.*

Type Faces. Printing enhancement tool for dot-matrix printers; 15 hi-res character fonts available. Alpha, 12 New England Executive Park, Burlington, MA 01803. $125.

Utility City. Kersey. Twenty-one utilities on one disk. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50.

XPS-Diagnostic. Peters. Comprehensive hardware diagnostic utility by author of *Apple Cillin* includes graphic display of bad memory chips, tests for printers, RAM, ROM, and peripheral cards. XPS, 323 York Rd., Carlisle, PA 17013. $49.95. *4/84.*

Word Processing

Apple Writer II and IIe. Includes WPL (word processing language). Additional functions menu; continuing features and functions menu; continuous readout of characters and length. *IIe* has shift, shift-lock, and tab, four-arrow cursor control, and delete key; data files compatible with *II*. Apple, 20525 Mariani Ave., Cupertino, CA 95014. *II*, $150; *IIe*, $195 each.

Apple Writer II Preboot. Armstrong, Borgersen. Allows you to run *Apple Writer II* in 80-column format with the Videoterm 80-column card. Videx, 1105 N.W. Circle Blvd., Corvallis, OR 97330. $19.

Bank Street Writer. Kuzmiak, Bank Street College of Education. Designed for use by whole family. Universal search and replace, word wrap are standard. U/lc without hardware. On-disk tutorial. Takes advantage of memory, keyboard on IIe, if you have one. Broderbund, 17 Paul Dr., San Rafael, CA 94903. $69.95. *2/83.*

Format-II, Enhanced Version. Hardwick, Beckmann. Word processor supports all popular 80-column cards, stores up to 50 pages of text on one disk. Includes single keystroke editor, mailing list database; displays text on-screen exactly as it will print out. Compatible with hard disk drives. Kensington Microware, 919 3rd Ave., New York, NY 10022. $150.

HomeWord. TC Computer Systems. Icon-operated, displays print-formatted document on-screen, mixes bold, underlined, or regular type. Tiny window displays page format. Automatic outline formatting. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $49.95. *12/83.*

Lexicheck IIe. Spell-checking companion to *Word Juggler IIe* has 50,000-word vocabulary, room for auxiliary personal dictionary, features global replacement of misspelled words. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $129. Requires *Word Juggler IIe* 128K. *10/83.*

Magic Window II. Forty, 70 (in hi-res), or 80 columns in this expanded version. With user-tailored, fast menu, underlining, global search and replace. IIe version uses all 64K. Artsci, 5547 Satsuma Ave., North Hollywood, CA 91601. $149.95.

PFS:Write. Edwards, Crain, Leu. Interfaces with other PFS programs. Includes search and replace, moving and duplicating of text blocks, help screens. Document appears on-screen as it will look when printed—including page breaks, underlining, boldfacing. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $125. *12/83.*

•**Sensible Speller.** Hartley. Spell-checking program sports listable 85,000 words, extensible up to 110,000 words. Recognizes contractions, gives word counts, word incidence, number of unique words. Clear documentation and simplicity of operation. Works with many word processors' files. Best of breed. Sensible, 6619 Perham Dr., W. Bloomfield, MI 48033. $125. *11/82.*

State of the Art Word Processing. Password-protected, menu-driven, integrates with State of the Art's accounting programs. Boldfacing and underlining. Insert data from accounting packages into documents. State of the Art, 3183-A Airway Ave., Costa Mesa, CA 92626. $395. *3/84.*

Word Handler II. Elekman. Simple program with straightforward documentation. Eighty-column printing with the IIe. Silicon Valley Systems, 1625 El Camino Real, #4, Belmont, CA 94002. $199. *11/82.*

Word Juggler IIe. Gill. Sophisticated word processor with search, replace, and block move. Printout can be viewed on-screen prior to printing; prints multiple copies of selected pages. Now includes *Lexicheck*, a fifty-thousand-word spelling checker. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $189. *10/83.*

WordStar. Screen-oriented, integrated word processing system in CP/M. Requires Z-80 card. MicroPro, 33 San Pablo Ave., San Rafael, CA 94903. $495.

Apple III

Access III. Communications program for timesharing and standalone tasks; gives access to remote information services, minis, and mainframes. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $150.

Apple Business Basic. High-level structured programming language. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $125.

Apple Speller III. Sensible Software. Spell-checking program based on the Random House Dictionary recognizes 81,400 words including geographic terms, names, abbreviations, figures. Gives word counts, word incidence; works with most Apple III word processors. Directly accessible from *Apple Writer III*, version 2.0. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. $175.

Apple III Business Graphics. BPS. General-purpose graphics program draws line graphs, bar graphs in three formats, overlays, and pie charts in 16 colors. Continuous or discrete data; curve-fitting capabilities. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $175.

Apple III Pascal. Program preparer with editor, compiler, disassembler, linker, filer, system library. Features cursor control, text modeling, formatting. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $250.

Apple Writer III. Lutus. Uses WPL (word processing language) to automate text manipulation and document creation. Adjusts print format during printing; translates from typewriter shorthand to English or other language and back again. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $225.

BPI General Accounting. BPI Systems. Includes *General Ledger, Accounts Receivable, Accounts Payable,* and *Payroll.* Maintains customer, employee, and vendor files; prints customer statements, checks. Analyzes budget, compares historic information, keeps independent financial records for 99 different departments and locations. Provides password protection for each company, can be maintained on one disk. Requires 256K Apple III, ProFile hard disk. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. $495.

Catalyst. Allows boot from hard disk; transfers all programs to ProFile. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $149.

Data Capture III. Moves data among mainframes, micros, bulletin boards. Off-line editing, menu-driven, copyable. Southeastern, 7743 Briarwood Dr., New Orleans, LA 70128. $90.

Hardisk Accounting Series, 2.0. General ledger, accounts receivable, and accounts payable handle 32,776 customers or accounts; inventory features five methods of evaluation. Also payroll, management analysis, and mailing labels. Great Plains, 1701 S.W. 38th St., Fargo, ND 58102. $395 to $595 per module.

Inkwell. Wunderlich. Word processor prints documents as they appear on-screen, simulates typewriter or creates form letters from mailing list. Horizontal scrolling allows text up to 155 characters wide. Foxware Products, 2506 W. Midwest Dr., Taylorsville, UT 84118. $185.

Keystroke. Handles large amounts of data. Can hold up to 32,000 records on hard disk and provide instant access. User-definable keys. Access two files at once or join two files. Report generator saves up to eight report formats. Easily merges with *VisiCalc, Apple Writer,* and *Word Juggler.* Brock, Box 799, 8603 Pyott Rd., Crystal Lake, IL 60014. Database, $249. Report generator, $149.

Lexicheck. Spelling checker that runs from inside *Word Juggler.* Fifty-thousand-word dictionary; add your own words. Eight-thousand-word legal dictionary disk also available. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $145.

Mail List Manager. Generates, stores, sorts, edits, and prints mailing list files. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $150.

Micro/Terminal. Gives access to any in-house or remote database; set up and log only once. Built-in editor or edit off-line. Microcom, 1400-A Providence Hwy., Norwood, MA 02062. $99.95.

PFS:File. Page. Form-oriented information management system stores and retrieves up to 32,000 entries. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $175.

PFS:Graph. Chin, Hill. Works alone or interfaces with PFS databases and *VisiCalc* files. Produces bar, line, and pie charts, merging data from several sources. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $175.

PFS:Report. Page. Generates reports; sorts, calculates, and manipulates data filed with *PFS:File.* Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $125.

Quick File III. Personal index card or filing system that generates reports, sorts. Fifteen fields; file as long as disk allows; can be put on ProFile. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $100.

Senior Analyst III. Business Solutions. Financial spreadsheet develops models for budgets, planning, profit and loss reports, cash flow projections, and forecasts. Protects model from changes in anything but a value. Links pages easily. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $350. *4/83.*

State of the Art General Ledger and **Business Modules.** Standalone interfaceable modules for 12 accounting periods. *General Ledger* can handle 470 accounts, 100 transactions before updating files. Modules for budget and financial reporting, accounts receivable/payable, inventory control, sales invoicing, payroll, professional time and billing. State of the Art, 3183-A Airway Ave., Costa Mesa, CA 92626. *General Ledger, Accounts Receivable, Accounts Payable, Payroll, Inventory Control,* $595; *Sales Invoicing, Budget and Financial Reporting,* $495; *Professional Time and Billing,* $795.

Stock Portfolio System. Tracks investments, generates reports on current portfolio status, profit and loss statements, individual security status, dividend and interest income, expenses. Stores quotes for historical recall, calculates return on investments before and after tax, provides notice of stocks going long-term, dividends coming due, options expiring. Smith Micro Software, Box 604, Sunset Beach, CA 90742. $185.

3 E-Z Pieces. Lissner. Word processor, database, and spreadsheet—each full-size, full-featured. Holds several files on "desktop." Saves report formats with file. Proportionally spaced type. A winner. Haba Systems, 15154 Stagg St., Van Nuys, CA 91405. $295. *4/84.*

VersaForm. Landau. State-of-the-art business-forms processor. Does invoicing, purchasing orders, mailing lists, client billing. Powerful, complex, worth getting to know. Hard-disk-compatible. Applied Software Technology, 14128 Capri Dr., Los Gatos, CA 95030. $495. *8/82.*

VisiCalc:Advanced Version. Bricklin, Frankston, Software Arts. For corporatewide modeling applications; develop sophisticated templates to be filled in by novice users. On-screen help, IRR and calendar functions, macro facility, variable column widths, locked cell values, and hidden cell contents. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $400.

VisiCalc III. Bricklin, Frankston, Software Arts. Just like it sounds; expanded memory, u/lc, 80 columns. Four-way cursor movement. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $250.

VisiSchedule. Critical path PERT scheduler. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $300.

Word Juggler. Gill. Word processor uses expanded memory. Printout can be viewed on-screen prior to printing; prints multiple copies of selected pages. Includes *Lexicheck,* a fifty-thousand-word spell checker. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $295. *12/82.*

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Fraction Factory	22.00
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Accessories

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Novation 212 Apple Cat II	365.00
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BROTHER	
HR-25	749.00
HR-35	Call
DYNAX	
DX-15	439.00
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IDS	
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Prism 132 (basic)	1225.00
Prism 132 (full)	1855.00
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6100	449.00
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770P	899.00
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TRANSTAR	
120	429.00
130	599.00
315	459.00
PICS Card	95.00

Disk Drives

	Our Price
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Disk II Drive	345.00
Duo Disc w/Acc. Kit	695.00
ProFile Disk Drive	1525.00
INDUS	
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MICRO SCI	
A2 143K	225.00
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RANA	
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QUENTIN	
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Color II Plus	429.00
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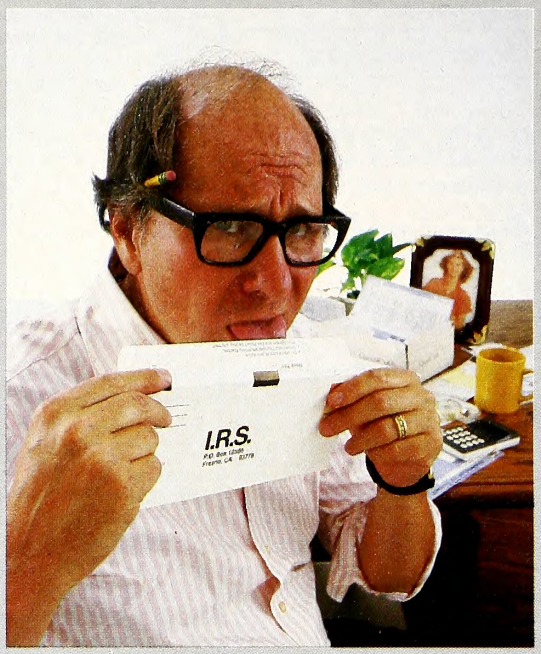

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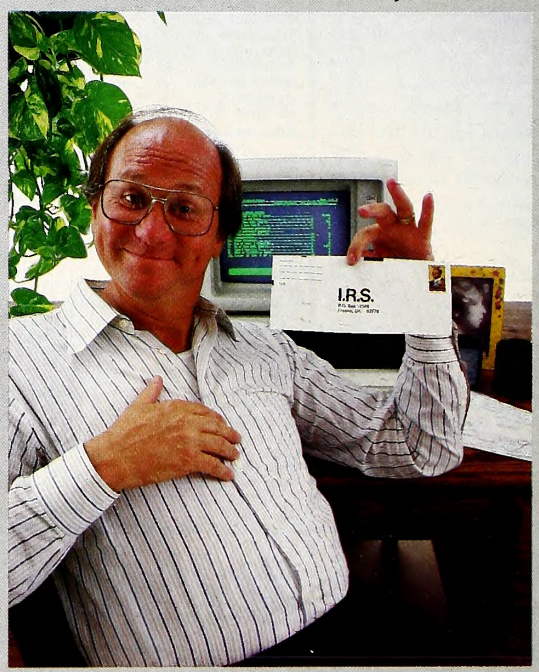
Instead of shoeboxes full of illegible bits of paper, Tax Preparer puts an electronic form on the screen of your IBM-PC compatible, TI Professional, or Apple computer. Just fill in the blanks and let Tax Preparer do the rest. HowardSoft's unique Translate feature lets you enter information as it accumulates. Then each year's update applies the data to the new tax laws in a matter of minutes.



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She always looks as good or better than the bride and enhances every wedding party. Yet she remains single.

Finally, somebody will damn her with the shibboleth, "Always a bridesmaid, never a bride."

As with other catch phrases representing folk wisdom, this one's been carried over into other areas of society.

The Brooklyn Dodgers were in umpty-ump World Series before they finally won one in 1955.

Sham ran second to Secretariat in the Triple Crown races (well, actually, Sham wasn't second in the Belmont, but Secretariat was so far ahead of the field in that race that they shouldn't have awarded a second place).

Avis trumpets its status as number two in the car rental business.

Jack-in-the-Box can't catch McDonald's.

Strother Martin appeared in more than 100 pictures but never got a leading role.

And so it seemed with Bruce Artwick.

Never has it been more appropriate for a person to have *art* as part of his name. He's an artist using code as a medium in the same way that Michelangelo used stone, Titian used oils, Shakespeare used pen and ink, D.W. Griffith used film, Duke Ellington used the piano, and Ella Fitzgerald uses her voice. A programmer at the level of Bruce Artwick is a lot of things. One of those things is an artist.

Artwick seemed permanently cast in the role of Lou Gehrig, playing on the same team as Babe Ruth.

In *Softalk*'s first poll, printed in October 1980, Artwick's *Flight Simulator* placed second to *VisiCalc*. It stayed among the five most popular programs in the Apple market for six months, but other software artists were at work, eclipsing the market's interest in Artwick's creation.

Ken and Roberta Williams brought out *Hi-Res Adventure #2: The Wizard and the Princess*. Bill Budge was hot with *Bill Budge's 3-D Graphics System*. Nasir Gebelli hit with *Star Cruiser*. Tony Suzuki zoomed to number one with *Apple Galaxian* (later called *Alien Rain*). Silas Warner conjured up *ABM*. Gebelli hit again with *Space Eggs*. Infocom struck with *Zork*. Jun Wada delivered *Snoggle* (the first *Pac-Man* imitation).

Through all that competition, *Flight Simulator* hung in there in the top five programs. Then it started to tail off, until its appearances in the Top Thirty were sporadic, although it remained a strong competitor on the Strategy 5 list.

Artwick turned his attention to the new IBM Personal Computer and delivered up a version of *Flight Simulator* that contained far more detailed graphics and color. Did he get the number one position? Of course not. He managed to hit the market simultaneously with another hot program, *1-2-3*, which has led the IBM market wire to wire since its introduction. *Flight Simulator* was again number two.

Apple III

This Month	Last Month	
1.	2.	**III E-Z Pieces**, Rupert Lissner, Haba Systems
2.	2.	**Catalyst**, Tim Gill, Quark
3.	1.	**Apple Writer III**, Paul Lutus, Apple Computer
4.	—	**VisiCalc III**, Software Arts/Dan Bricklin and Robert Frankston, VisiCorp
5.	5.	**Quick File III**, Rupert Lissner, Apple Computer
	—	**Inventory**, Great Plains Software

Arcade 10

This Month	Last Month	
1.	4.	**Julius Erving and Larry Bird Go One-on-One**, Eric Hammond, Julius Erving, and Larry Bird, Electronic Arts
2.	1.	**Lode Runner**, Doug Smith, Broderbund Software
3.	3.	**Choplifter**, Dan Gorlin, Broderbund Software
4.	2.	**Zaxxon**, John Garcia, Datasoft
5.	9.	**Pinball Construction Set**, Bill Budge, Electronic Arts
6.	5.	**Miner 2049er**, Mike Livesay and Bill Hogue, Micro Fun
7.	—	**Beagle Bag**, Bert Kersey, Beagle Bros
8.	8.	**Spare Change**, Dan and Mike Zeller, Broderbund Software
9.	10.	**Hard Hat Mack**, Michael Abbot and Matthew Alexander, Electronic Arts
10.	—	**Pac-Man**, Atarisoft

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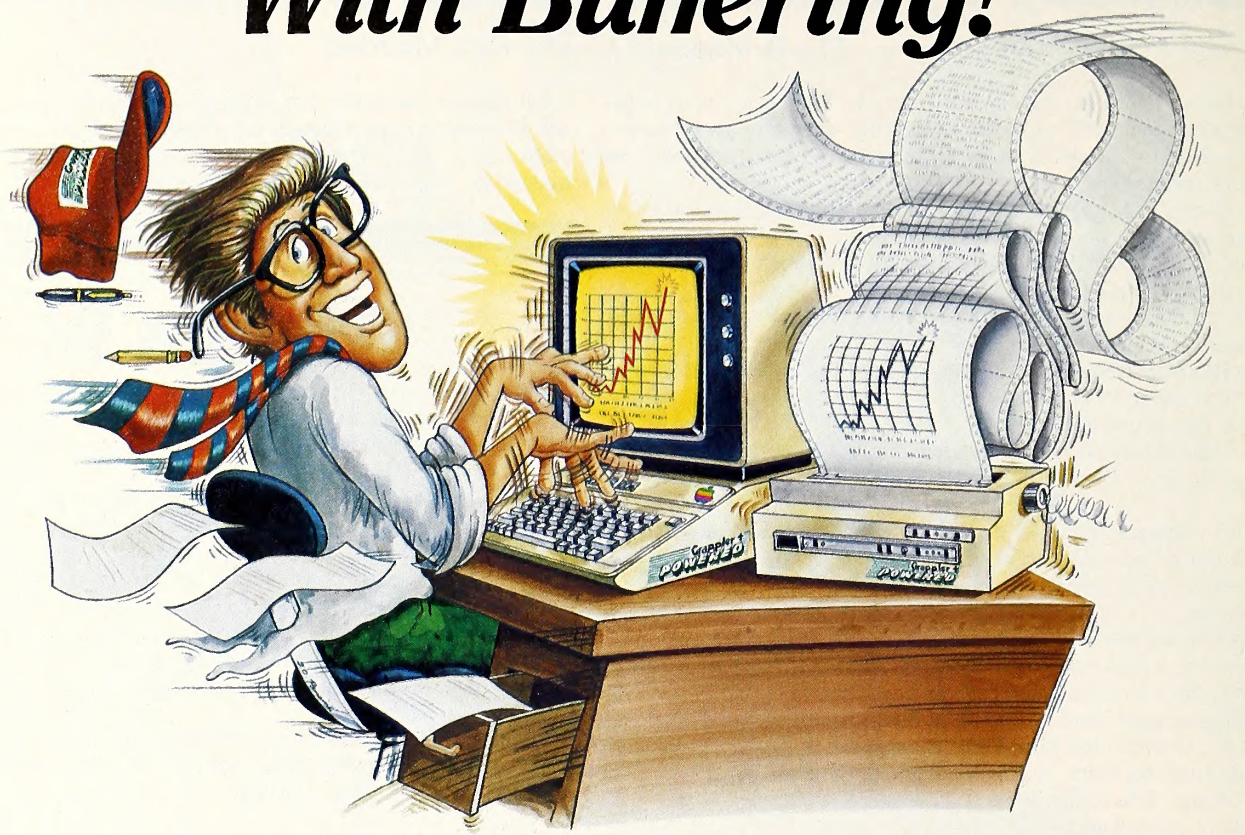

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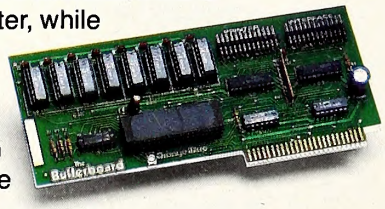

The Bufferboard uses an available Apple slot and "Docks" onto most popular interfaces, including Epson, Apple and Orange Micro Grappler configurations. No external power supplies, no clumsy boxes and cables. It's the easiest and most economical way to add buffering.

If you're just adding a printer...

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The Buffered Grappler+ is the most powerful Apple printer interface you can buy. All the memory features of the Bufferboard have been merged with the smartest interface available... the Grappler+. The Buffered Grappler+ now gives you over 27 different built-in features. Buffer expansion capability allows up to 20 full pages of text memory. Exclusive new features give you special support of IIe 80 column text, screen dumps for Epson graphic aspect ratios, and support of the new IIe Double Hi Resolution Graphics.

Other features you'll be using in no time include Dual HiRes Graphics, Mixed Mode Screen Dumps, Enhanced Graphics, text formatting and much, much more. The New Buffered Grappler+. So much interface power you'll never need anything else.

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Returning to the Apple, Artwick brought *Flight Simulator* up to the standard he had set on the IBM. It was a stunning achievement. Apple owners loved it.

It ran number two to *Apple Writer IIe*.

What's a poor fellow to do?

In the present case, what needed to be done was to soup up the delivery system for the software. There was no shortage of demand for *Flight Simulator II*, but dealers kept running out of product. SubLogic doesn't have the clout with dealers that Apple—the seller of *Apple Writer IIe*—has.

Happily, market forces conspired in Artwick's favor this time. SubLogic did pep up its distribution system, and a new product siphoned off sales from *Apple Writer IIe*. The result?

Flight Simulator II led the pack in sales in April.

Never have an author and program deserved it more. Artwick is an artist in programmer's clothing. *Flight Simulator* has wowed hundreds of thousands of computer owners on Radio Shack, Apple, and IBM micros.

It even overcame the handicap of an awkward moniker. There's nothing wrong with *Flight Simulator*, although it's a rather generic title. But it came into the world as *A2FS1*. (Artwick's outstanding *Night Mission Pinball* game was once *A2PB1*.) That's a name with all the sex appeal of Marjorie Main. Or Richard Nixon.

A2FS1 does not connote favorable images. It doesn't rank with Mount Kilimanjaro, Tahiti, Yellowstone, or Coney Island in a list of neat things to see or do. It has more the ring of Orwell's *1984* than of fun and excitement. Nevertheless, overcoming even that handicap, *Flight Simulator II* is now the bestselling program in the Apple market.

Word Processors 10

This Month	Last Month	
1.	1.	**Apple Writer IIe**, Paul Lutus, Apple Computer
2.	3.	**Bank Street Writer**, Gene Kuzmiak and the Bank Street College of Education, Broderbund Software
3.	2.	**PFS:Write**, Sam Edwards, Brad Crain, and Ed Mitchell, Software Publishing Corporation
4.	5.	**Word Juggler IIe**, Tim Gill, Quark
5.	6.	**Sensible Speller**, Charles Hartley, Sensible Software
	4.	**HomeWord**, Ken Williams and Jeff Stephenson, Sierra On-Line
7.	7.	**Apple Writer II Pre-Boot Disk**, Kevin Armstrong and Mark Borgerson, Videx
8.	10.	**Format-II**, G.K. Beckmann and M.A.R. Hardwick, Kensington Software
9.	9.	**WordStar**, MicroPro
10.	—	**ScreenWriter II**, David Kidwell, Sierra On-Line

Home Education 10

This Month	Last Month	
1.	1.	**MasterType**, Bruce Zweig, Scarborough Systems
2.	2.	**Typing Tutor**, Dick Ainsworth, Al Baker, and Image Producers, Microsoft
3.	3.	**Apple Logo**, Logo Computer Systems, Apple Computer
4.	5.	**Early Games for Young Children**, John Paulson, Counterpoint Software
5.	—	**Facemaker**, DesignWare, Spinnaker Software
6.	7.	**Computer SAT**, Harcourt Brace Jovanovich
7.	—	**Kindercomp**, Doug Davis, Spinnaker Software
8.	8.	**Algebra 1**, EduWare, MSA
9.	9.	**Early Games: Piece of Cake**, Bob Eyestone, Counterpoint Software
10.	—	**Barron's SAT**, Barron's

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*Available on most versions.

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Well, almost.

Continental Software

A division of Arrays, Inc.

The name of the new kid on the block raises some questions as well. It's called *AppleWorks*. Is *works* a noun or a verb here? Can't you see a smug Commodore dealer pointing at that title and saying, "It's about time!"

Of course, the title draws on Germanic usage. *Volkswagenwerks* is the all-encompassing place where they make Volkswagens. And *AppleWorks* is intended as an all-encompassing program for owners applying Apples to serious projects.

AppleWorks incorporates a word processor, a spreadsheet, and a database manager under one umbrella. Like its competitor, *The Incredible Jack*, it's an attempt to bring to the Apple market the functionality that *1-2-3* brought to the IBM market.

But that's where the likeness ends, judging by the reaction of the market. IBM owners look at *1-2-3* as a spreadsheet that happens to do other things. It was *VisiCalc* and *SuperCalc* that took headers when *1-2-3* came out.

Apple owners are looking at *AppleWorks* as a word processor that happens to do other things. The first program to suffer from its appearance on dealer shelves was another Apple product, *Apple Writer IIe*. After a year of dominating Apple software sales, *Apple Writer IIe* tailed off to fourth in the first month that *AppleWorks* was in general distribution.

AppleWorks looks like it might attain the dominant status that *Apple Writer IIe* once had. That's based on the fact that Apple did not do a thorough job of releasing *AppleWorks* into the market. Many stores didn't have the product, and others had only limited quantities. Yet it came in second to *Flight Simulator II*. That portends heavier sales and a number one position for the product in some future month.

Adventure 5

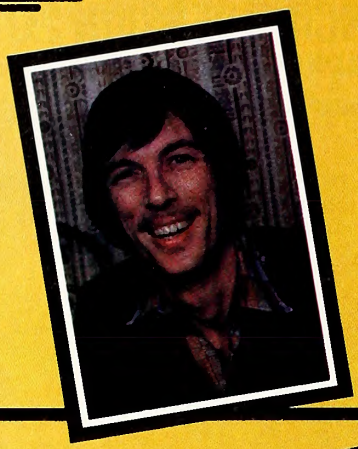
This Month	Last Month	
1.	1.	**Zork I**, Infocom
2.	5.	**Death in the Caribbean**, Philip and Bob Hess, Micro Fun
3.	3.	**Zork II**, Infocom
4.	4.	**Zork III**, Infocom
5.	—	**Sorcerer**, Steve Meretzky, Infocom

Strategy 5

This Month	Last Month	
1.	1.	**Flight Simulator II**, Bruce Artwick, SubLogic
2.	2.	**Sargon III**, Dan and Kathe Spracklen, Hayden
3.	3.	**Castle Wolfenstein**, Silas Warner, Muse
4.	4.	**Millionaire**, Jim Zuber, Blue Chip Software
5.	5.	**Bermuda Race**, John Biddle and Gordon Mattox, Howard W. Sams and Company

Fantasy 5

This Month	Last Month	
1.	1.	**Wizardry**, Andrew Greenberg and Robert Woodhead, Sir-tech
2.	3.	**Exodus: Ultima III**, Lord British, Origin Systems
3.	2.	**Legacy of Llylgamyn**, Andrew Greenberg and Robert Woodhead, Sir-tech
4.	5.	**Knight of Diamonds**, Andrew Greenberg and Robert Woodhead, Sir-tech
5.	—	**Questron**, Charles Dougherty, Strategic Simulations



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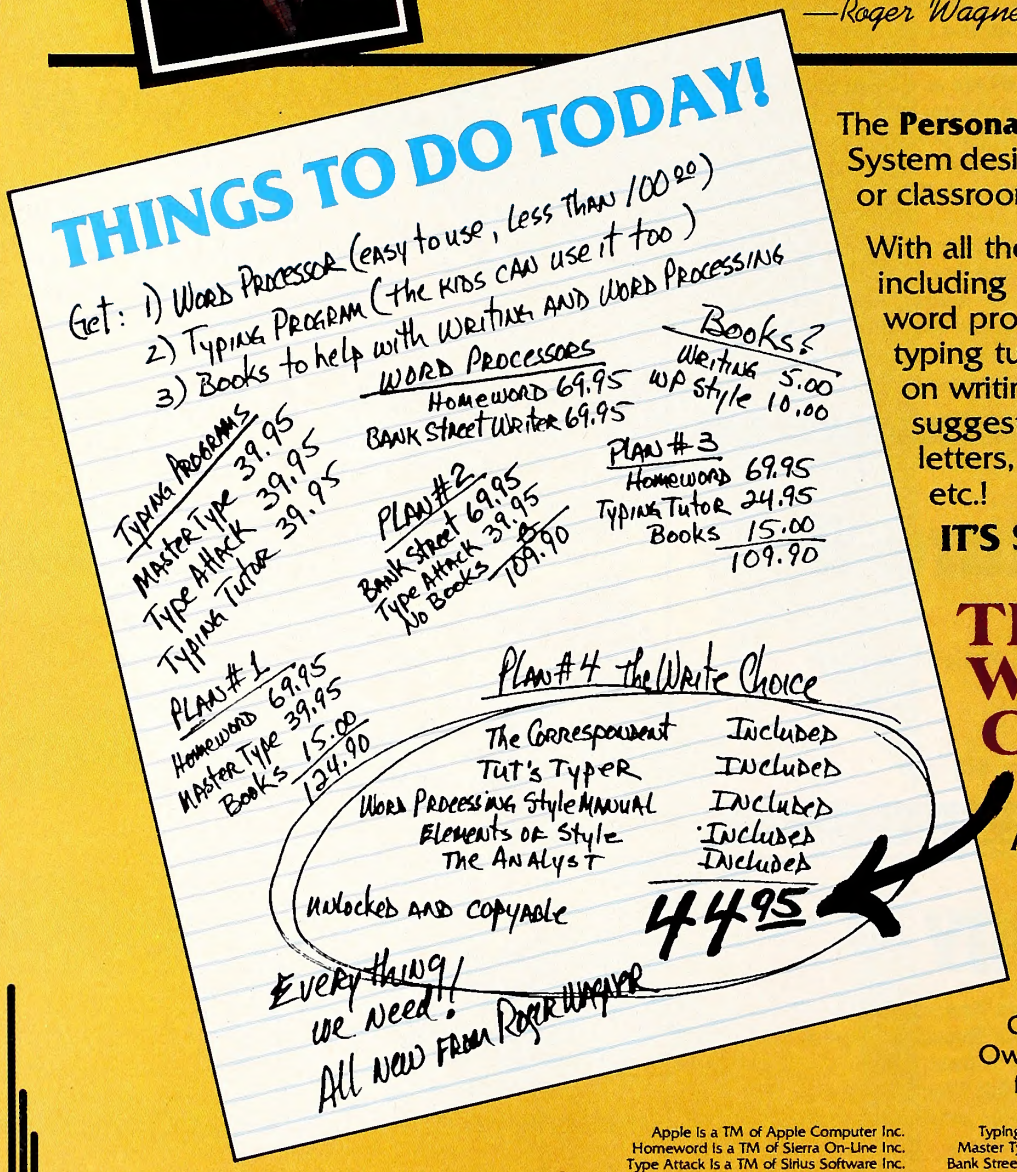
—Roger Wagner, President



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Master Type is a TM of Scarborough Systems Inc.
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AppleWorks is a close relative of *III E-Z Pieces*. Both products were developed by Rupert Lissner—*AppleWorks* for Apple and *III E-Z Pieces* for Haba Systems. *III E-Z Pieces* hit the market first in an attempt to resuscitate the Apple III market, a valiant attempt that seems to have failed, based on reports that Apple has stopped development work on the III, although it will continue to market it.

The two products can share data, making them valuable additions to

Business 10

This Month	Last Month	
1.	—	**AppleWorks**, Rupert Lissner, Apple Computer
2.	1.	**PFS:File**, John Page and D.D. Roberts, Software Publishing Corporation
3.	3.	**PFS:Report**, John Page, Software Publishing Corporation
4.	2.	**Quick File IIe**, Rupert Lissner, Apple Computer
5.	5.	**Multiplan**, Microsoft
6.	9.	**PFS:Graph**, Bessie Chin and Stephen Hill, Software Publishing Corporation
7.	4.	**VisiCalc: Advanced Version**, Software Arts/Dan Bricklin and Robert Frankston, VisiCorp
8.	7.	**BPI General Accounting**, John Moss and Ken Debower, Apple Computer
9.	6.	**VisiCalc**, Software Arts/Dan Bricklin and Robert Frankston, VisiCorp
10.	—	**BPI Accounts Payable**, John Moss and Ken Debower, Apple Computer

Hobby 10

This Month	Last Month	
1.	2.	**Silicon Salad**, Bert Kersey and Mark Simonsen, Beagle Bros
2.	8.	**Beagle Basic**, Mark Simonsen, Beagle Bros
3.	5.	**DiskQuik**, Harry Bruce and Gene Hite, Beagle Bros
4.	5.	**Global Program Line Editor**, Neil Konzen, Beagle Bros
5.	7.	**Pronto DOS**, Tom Weishaar, Beagle Bros
6.	4.	**Fontrix**, Steve Boker and Duke Houston, Data Transforms
7.	8.	**Apple Mechanic**, Bert Kersey, Beagle Bros
	—	**Graphics Magician**, Chris Jochumson, David Lubar, and Mark Pelczarski, Penguin Software
9.	8.	**DOS Boss**, Bert Kersey and Jack Cassidy, Beagle Bros
10.	—	**Frame-Up**, Tom Weishaar, Beagle Bros

Home 10

This Month	Last Month	
1.	1.	**Home Accountant**, Bob Schoenburg, Larry Grodin, and Steve Pollack, Arrays/Continental Software
2.	4.	**Music Construction Set**, Will Harvey, Electronic Arts
3.	2.	**Dollars and Sense**, Frank E. Mullin, Monogram
4.	6.	**ASCII Express: The Professional**, Bill Blue and Mark Robbins, United Software Industries
5.	8.	**Micro Cookbook**, Brian E. Skiba, Virtual Combinatics
6.	9.	**Crossword Magic**, Steve and Larry Sherman, L&S Computerware
7.	7.	**Tax Preparer**, James Howard, HowardSoft
8.	3.	**Tax Advantage**, Henry Hilton and Harry Coons, Arrays/Continental Software
9.	—	**Transend 1**, Tim Dygert and Bob Kniskern, Transend Corporation
10.	—	**Softerm II**, Lynn Stricklan, Softronics

Softalk Presents The Bestsellers

homes or offices that have both Apple II and Apple III computers. But both also stand up well alone, as indicated by the fact that *III E-Z Pieces* topped the Apple III market in sales even before *AppleWorks* was available. Also, *AppleWorks* is already selling in quantities much greater than would be expected if its niche were only the environment shared by IIs and IIIs.

Almost overlooked in the excitement generated by *Flight Simulator II* and *AppleWorks* is the growing strength of Electronic Arts as a force in the Apple market. *Julius Erving and Larry Bird Go One-on-One* jumped to eighth place on the Top Thirty and led all programs on the Arcade 10. *Music Construction Set* vaulted into seventeenth position, the highest showing—other than *AppleWorks*—for any program joining the Top Thirty for the first time.

Other than the changes implied by the results previously reported, there were few significant moves among the subsidiary lists.

III E-Z Pieces, *Catalyst*, and *Apple Writer III* were the only pieces of software to move in significant numbers on the Apple III.

One-on-One edged out *Lode Runner* for leadership of the Arcade 10, which remained otherwise fairly static. The sole newcomer, Atarisoft's *Pac-Man*, replaced Atarisoft's *Centipede*.

Apple Writer IIe was the only word processor seriously affected by the introduction of *AppleWorks*. *Bank Street Writer* and *PFS:Write* were fifth and sixth on the Top Thirty and second and third on the Word Processors 10. Tenth among the word processors was a former leader of the category, *ScreenWriter II*.

There were no changes at the top of the Education 10 list, where *MasterType* retains a commanding lead, followed by *Typing Tutor* and *Apple Logo*. But two Spinnaker programs rejoined the list. The only true newcomer was *Barron's SAT*.

Infocom again captured four of the five places in the Adventure 5. *Death in the Caribbean* again was the spoiler, ranking second. *Sorcerer* replaced *Enchanter* in fifth place.

There were no changes in the Strategy 5, but strategy-game publisher Strategic Simulations pulled a surprise by placing *Questron* fifth on the Fantasy 5 list.

AppleWorks topped the Business 10, where John Page and Rupert Lissner seem set to battle it out. Page coauthored *PFS:File* and wrote *PFS:Report*, which are second and third. Lissner has *AppleWorks* and *Quick File IIe*, the first and fourth programs on the list. As an aside, cumulating *VisiCalc*'s results for both *VisiCalc* and *VisiCalc: Advanced Version* would have made the program twentieth on the Top Thirty (though neither appears there this month) and fourth on the Business 10. *Multiplan* is currently the bestselling spreadsheet when the two VisiCorp products are measured separately.

Mark Simonsen appears to be the hot new utility author. In conjunction with Bert Kersey, he authored *Silicon Salad*, the Hobby 10 leader. And his *Beagle Basic* was a solid second. Beagle Bros took eight of the ten positions, with only *Fontrix* and *Graphics Magician* in the hunt.

Home Accountant remains atop the Home 10. *Tax Preparer*, oldest of the tax packages in the market, reasserted its leadership in April, at double the sales of the next competitor, *Tax Advantage*. The rewritten *Softerm II* package moved into tenth after a year off the list. ART

Apple-franchised retail stores representing approximately 4.91 percent of all sales of Apple and Apple-related products volunteered to participate in the poll.

Respondents were contacted early in May to ascertain their sales for the month of April.

The only criterion for inclusion on the list was the number of units sold—such other criteria as quality of product, profitability to the computer store, and personal preferences of the individual respondents were not considered.

Respondents in May represented every geographical area of the continental United States.

Results of the responses were tabulated using a formula that resulted in the index number to the left of the program name in the Top Thirty listing. The index number is an arbitrary measure of the relative strength of the programs listed. Index numbers are correlative only to the month in which they are printed; readers cannot assume that an index rating of 50 in one month represents equivalent sales to an index rating of 50 in another month.

Probability of statistical error is plus or minus 2.58 percent, which translates roughly into the theoretical possibility of a change of 2.91 points, plus or minus, in any index number.

The Top Thirty

This Month	Last Month	Index	
1.	6.	98.88	**Flight Simulator II**, Bruce Artwick, SubLogic
2.	—	86.92	**AppleWorks**, Rupert Lissner, Apple Computer
3.	2.	82.14	**MasterType**, Bruce Zweig, Scarborough Systems
4.	1.	64.99	**Apple Writer IIe**, Paul Lutus, Apple Computer
5.	7.	64.19	**Bank Street Writer**, Gene Kuzmiak and the Bank Street College of Education, Broderbund Software
6.	5.	58.21	**PFS:Write**, Sam Edwards, Brad Crain, and Ed Mitchell, Software Publishing Corporation
7.	4.	54.22	**PFS:File**, John Page and D.D. Roberts, Software Publishing Corporation
8.	23.	50.24	**Julius Erving and Larry Bird Go One-on-One**, Eric Hammond, Julius Erving, and Larry Bird, Electronic Arts
9.	9.	48.64	**Lode Runner**, Doug Smith, Broderbund Software
10.	16.	37.08	**Wizardry**, Andrew Greenberg and Robert Woodhead, Sir-tech
11.	12.	36.28	**PFS:Report**, John Page, Software Publishing Corporation
12.	22.	33.89	**Word Juggler IIe**, Tim Gill, Quark
13.	13.	29.56	**Typing Tutor**, Dick Ainsworth, Al Baker, and Image Producers, Microsoft
14.	3.	28.70	**Home Accountant**, Bob Schoenburg, Larry Grodin, and Steve Pollack, Arrays/Continental Software
15.	10.	27.11	**Zork I**, Infocom
16.	17.	26.71	**Apple Logo**, Logo Computer Systems, Apple Computer
17.	—	25.91	**Music Construction Set**, Will Harvey, Electronic Arts
18.	28.	25.51	**Sensible Speller**, Charles Hartley, Sensible Software
	20.	25.51	**HomeWord**, Ken Williams and Jeff Stephenson, Sierra On-Line
20.	8.	23.52	**Quick File IIe**, Rupert Lissner, Apple Computer
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	15.	21.93	**Multiplan**, Microsoft
23.	—	21.13	**Silicon Salad**, Bert Kersey and Mark Simonsen, Beagle Bros
24.	—	20.73	**PFS:Graph**, Bessie Chin and Stephen Hill, Software Publishing Corporation
25.	—	19.93	**Beagle Basic**, Mark Simonsen, Beagle Bros
26.	28.	19.53	**Exodus: Ultima III**, Lord British, Origin Systems
27.	19.	19.13	**Legacy of Llylgamyn**, Andrew Greenberg and Robert Woodhead, Sir-tech
28.	—	18.74	**DiskQuik**, Harry Bruce and Gene Hite, Beagle Bros
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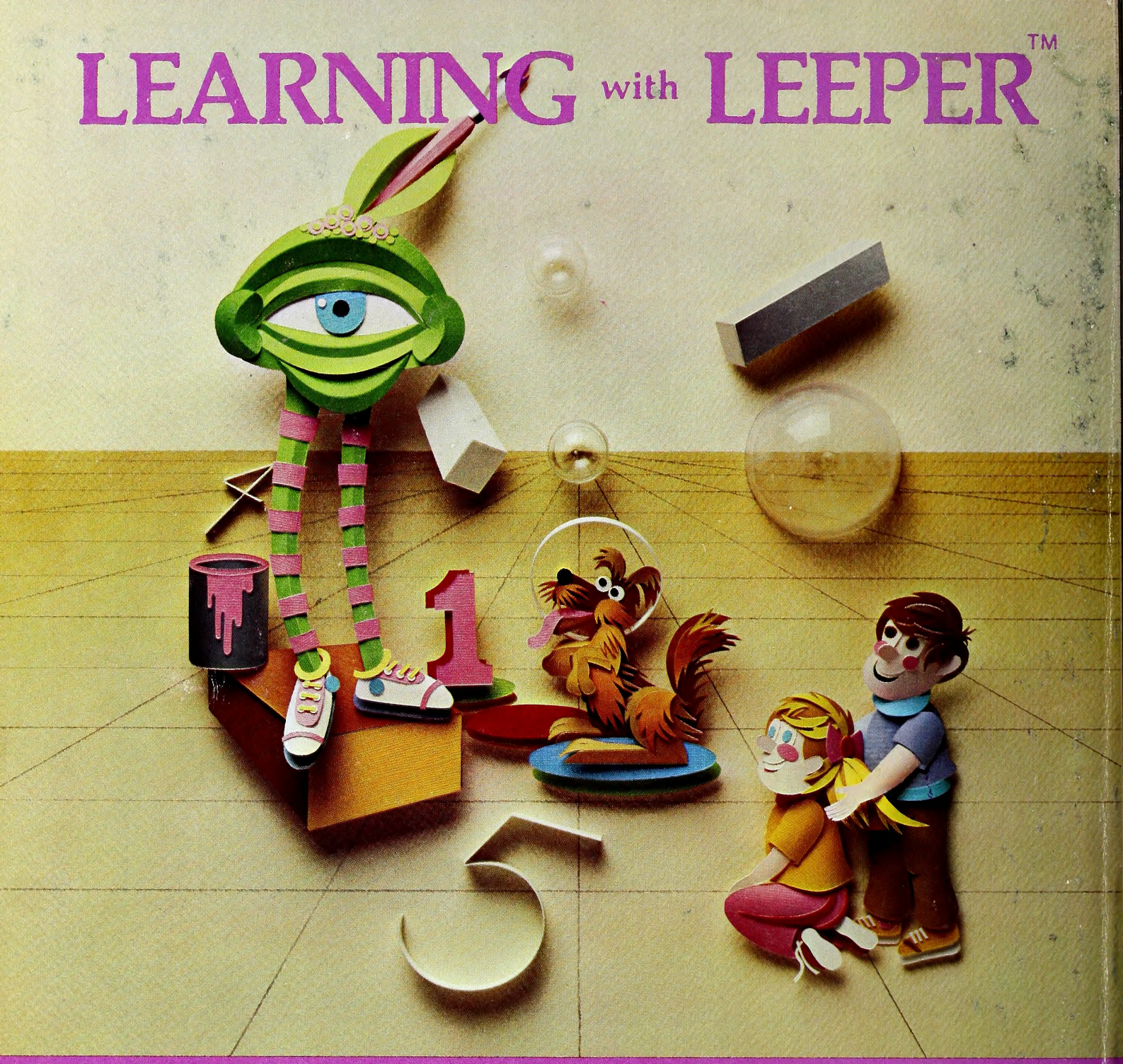

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