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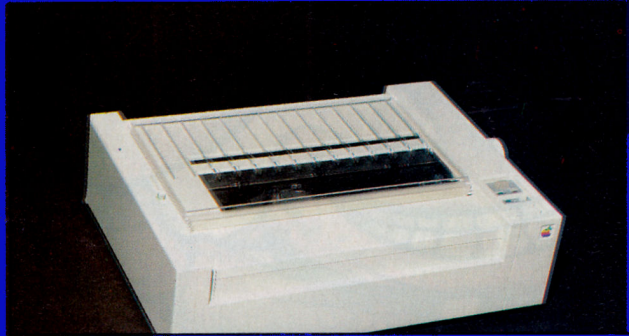
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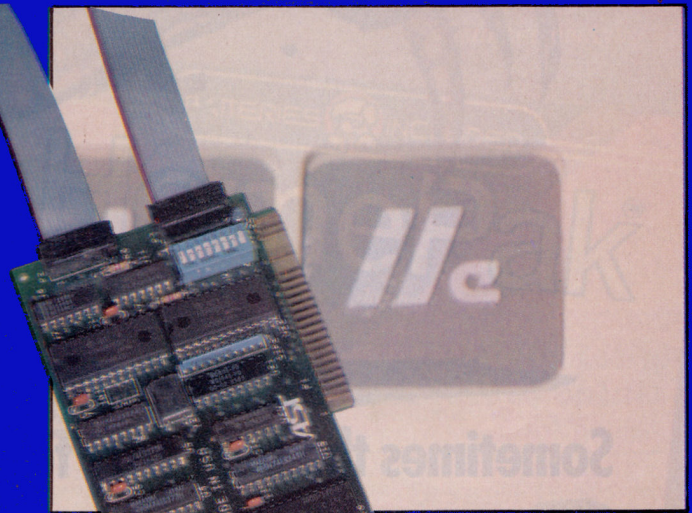
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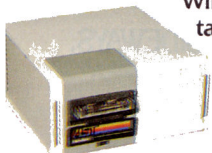
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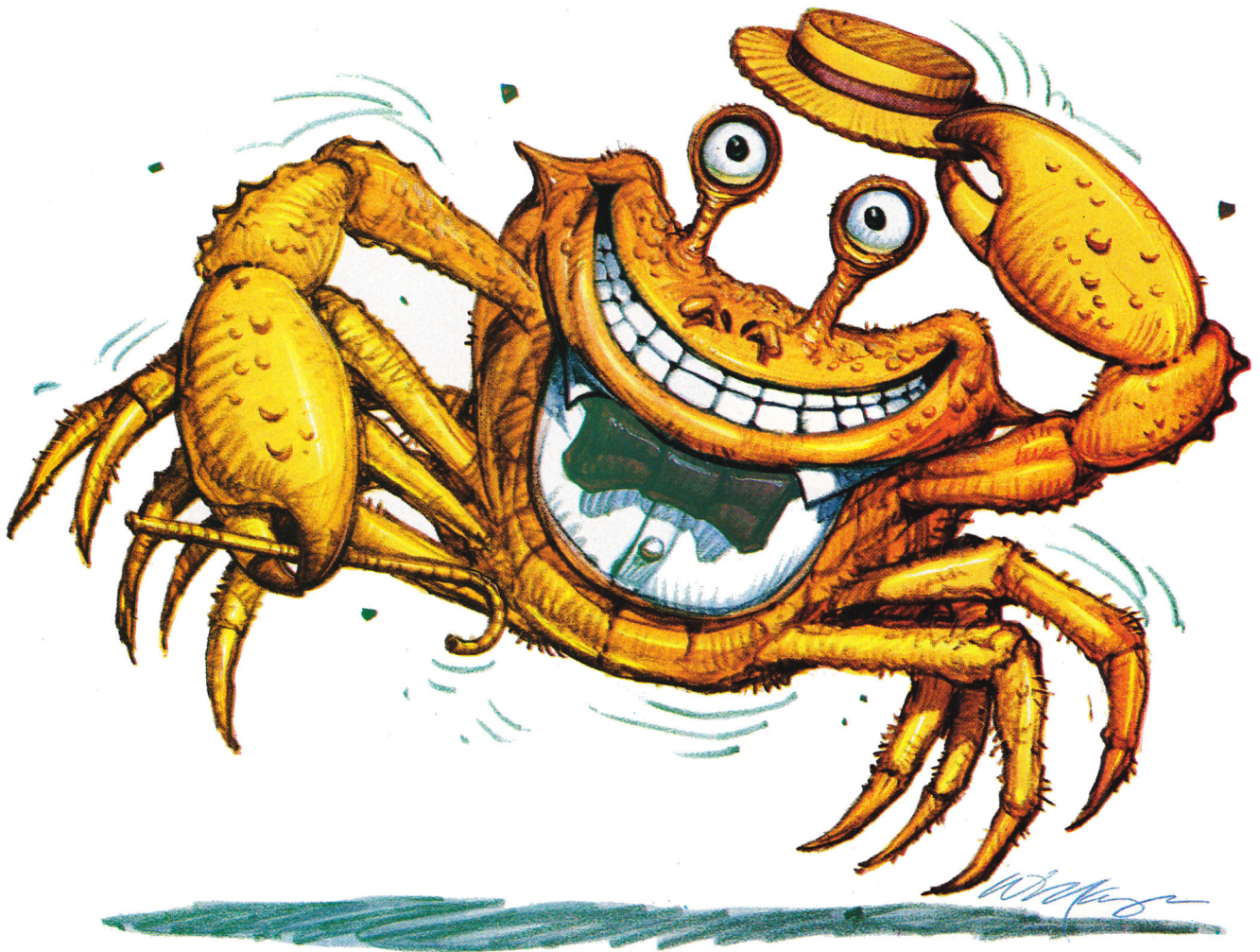
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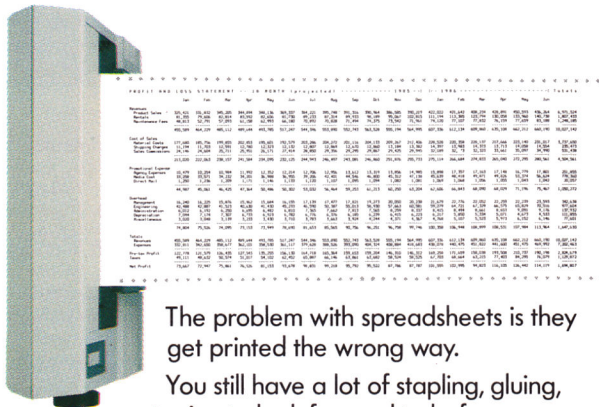
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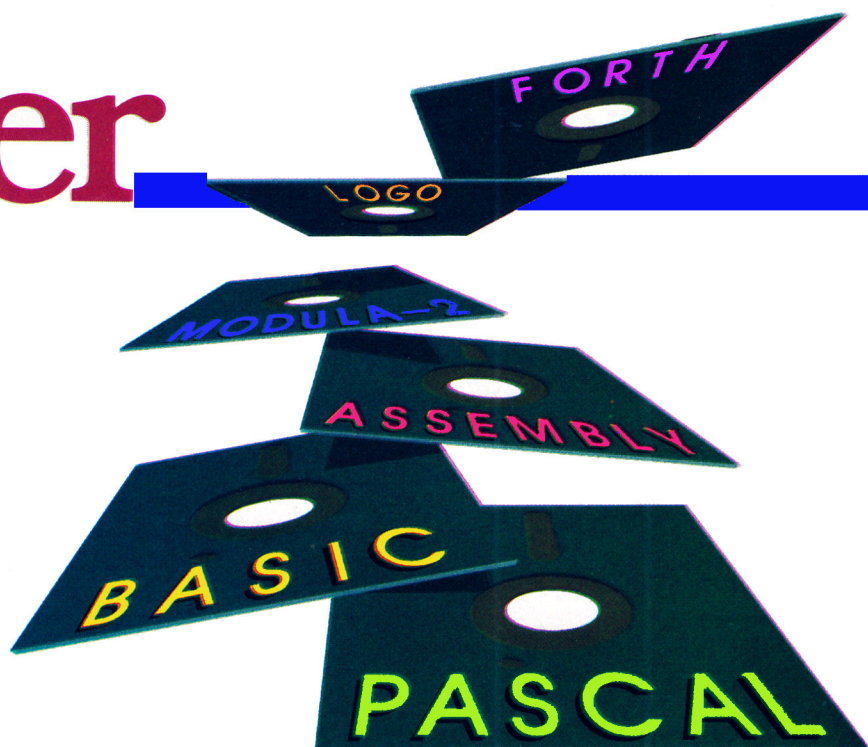
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12



14

ARTICLES

Digital Dialects: A Guide to Apple Languages

by Jeff Hurlburt

Does your Apple have an ear for languages? Try one—or more—of four popular programming languages presented here.

14

Practical Pascal

by Tom Swan

Pascal's the answer to a programmer's prayers. Our new monthly column, Pascal Primer, explores the fundamentals.

22

SuperCalc3a: Serious Business for the Apple II

by Gregory R. Glau

In the feature-review spotlight—SuperCalc3a, an integrated-software package with enough clout to make Lotus 1-2-3 owners take notice.

28

A Portable //c: The \$7.00 Solution

by Jack McCornack

Pack up your //c and go. Follow our how-to's and transform your transportable into a true portable.

36

Using ProDOS—Part 6: Operating in Harmony

by Lee Swoboda

You're in the home stretch. Our tutorial winds down with a discussion of the programming changes involved in making the move from DOS 3.3 to ProDOS.

38



61



28

DEPARTMENTS

Editorial

Letters

The Cider Press

Home-Control System; Overseas Software Trade; Industry Insights

Hints 'n' Techniques

Text Tricks; Superfriendly Menu

The Applesoft Adviser

Applesoft Access
by Dan Bishop

O'Brien's Journal

Confessions of a Beta Tester
by Bill O'Brien

Software Reviews

The Newsroom; Mr. Pixel's Cartoon Kit and Programming Paint Set; Creative Calc, Creative Writer, and Creative Filer; Perfect Software

Hardware Reviews

Hush 80P; ComputerEyes; Graphics Tool Kit

Apple Extract

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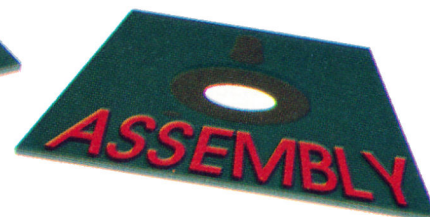
6	Beginner's Cookbook	94
8	Step-by-step instructions on how to type in <i>inCider's</i> program listings	
12	The Game Reserve	97
	Gemstone Warrior; Breakthrough in the Ardennes; Impossible Mission; Adventures in Narnia; Below the Root	
46	by Brian J. Murphy	
53	Ask inCider	102
	Answers to your software and programming questions	
61	Apple Clinic	105
	Answers to your hardware and firmware questions	
64	by Jim Sather	
	Corrections	108
	Data-Gram	109
	Free on-line data bases and money-saving tips	
70	by Matthew Lesko	
	Reader Services	110
76	Editors' Choice	112
	Where in the World Is Carmen Sandiego?	
78		
86		

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Editorial

Cameo Roles

Lately, I've noticed the way images of computer technology can either form the scaffolding of some of the more jerry-built movie plots these days, or—even more disturbingly—provide an occasion for some gratuitous expressions of technophobia.

Two cases in point: the latest James Bond adventure, *A View to a Kill*, and Stallone's *Rambo*.

The Bond film illustrates how pervasive a symbol Silicon Valley has become—almost reaching mythic proportions. Briefly, Bond's archrival is a psychopathic international industrialist, a product of the Nazis' genetic research gone awry. His megalomaniacal scheme for world domination involves dynamiting along the San Andreas fault line and flooding the whole Valley, leaving him with a monopoly in the chip industry.

In one scene, he and his cohorts—chortling all the while about the global havoc their plan will wreak—cruise at low altitude above the buildings housing both the products and the research personnel they're about to submerge, like a new Atlantis.

Both plot and dialogue verge on unintentional parody—and poor acting throughout the movie doesn't bring it off. Yet I'm still intrigued by the way the film reflects, albeit in comic-book tones, the significance of Silicon Valley as a dominant mythic landscape of the '80s—a new seat of power, the scene of Titanic struggles.

Maybe it's not all as far-fetched as it seems. Think of how the internal corporate struggles at Apple—which have, among other things, led to Wozniak's defection and Jobs' de-

mise—are played out in the media as scenes from a Greek tragedy. How often have words like charisma, cult, and guru been applied to the major figures and their scenario?

Rambo, with its steaming Vietnamese jungle scenes and a plot centering on a vet's impossible mission to reconnoiter for POWs still held captive by the Viet Cong, seems an unlikely juxtaposition to all of this, I know. And I would never have thought of pairing them, but for the final scene.

Double-crossed by the very people responsible for the mission, Rambo swears vengeance. But he doesn't "waste" the gutless official who would have left him, and the POWs he has freed, to die in the jungle. Rather, he blasts away at the computer terminals used to project and monitor the entire operation.

The audience sensed it was supposed to cheer at that moment. No one did—though displays of gross carnage had moved the same people to applaud. The climax was just too pat, too unsatisfying.

I can guess at the director's sim-

plistic intention: to pit the raw power of Rambo, lone hero beyond the law, against the machines that have orchestrated his fate in what becomes a bathetic finale—brute force striking out against mute machines.

Equating power and technology certainly isn't novel. What's interesting is that both films attempt to trade on a common phobia: our fear of the control over human destiny implicit in the possession of the technology.

As access to the technology broadens—say, in the form of personal computers—this paranoia may lessen; the oversimplification of the equation grows more apparent day by day. Oddly enough, a rather minor scene in the Bond film reminds us of that.

In the midst of a plot dependent, as usual, on futuristic inventions and strategies, the Apple //c makes a "cameo" appearance: Bond and the heroine use the //c to access a data base at a crucial moment.

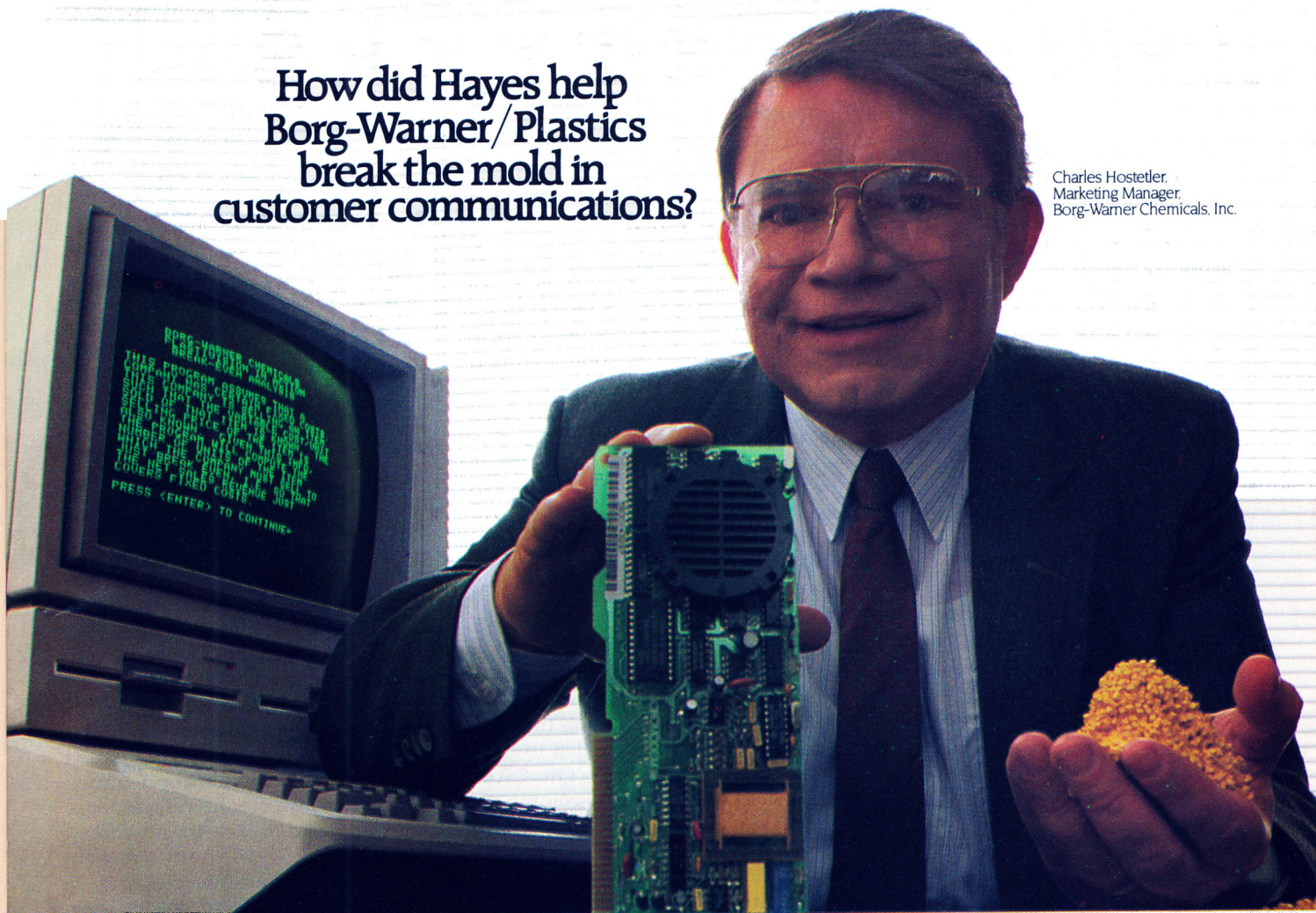
Then they go about the other-than-routine task of saving Silicon Valley from apocalypse. ■



by Susan Gubernat

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The Real Truth

With reference to my article, "CAP it all off" (*inCider*, April 1985, p. 40), I feel obliged to let you know there is a simpler way to accomplish the same thing [automatic toggling of the caps-lock key].

While setting up a program to use the operating environment presented in the article, I saw a way to implement it from BASIC using PEEKs and POKEs, rather than having to install the short machine-language routine. To turn on the restricted-case mode from BASIC, type:

```
PRINT CHR$(4) : "PR#3" : POKE 1275,
PEEK(1275) + 128:PRINT
```

I guess this amounts to a case of having first seen the complex solution, and only later seeing the "real truth" of what you needed to do to accomplish the task. The CALL 52569 to switch from 80-column display to 40-column display will still work. One other CALL was not documented in the article: To switch from 40-column display back to 80-column display, use CALL 52599.

I hope this will simplify things for readers who want to make use of the restricted-case environment.

Richard P. Winslow
Hall's Ranch Route, Box 8455
Wheatland, WY 82201

Both Sides of the Story

I disagree with Charles Doherty's opinion of The Sider hard disk in his review published in *inCider* (April 1985, p. 93).

I also purchased this product when it was first introduced at the end of 1984. I liked the price, the physical size, and the fact that it would support DOS 3.3, ProDOS, Pascal, and CP/M.

I used it occasionally for about four or five weeks until Murphy's Law hit. The system crashed! I lost everything on The Sider. I received the error message "disk did not come ready

"I purchased a product that was supposed to be 'first class.' Did I get a lemon?"

in time" when I booted it. I called the support people, and they said I needed to return it. Luckily, I had a recent back-up of important files.

About four weeks later, I got The Sider back from the repair shop. I formatted the hard disk in the morning, then went to lunch. When I came back to use my computer, I received the error message "disk did not come ready in time." I called the support people and they told me again I would have to return the system for repair. I purchased a product that was supposed to be "first-class." Did I get a lemon? I'm not sure, but I requested a refund. After a short discussion, they granted my request. I am still waiting for the refund, which I still hope to receive.

I am surprised the product received four stars in your magazine—a four-star rating means the product is "superlative." I think I'll stick with floppies a little longer.

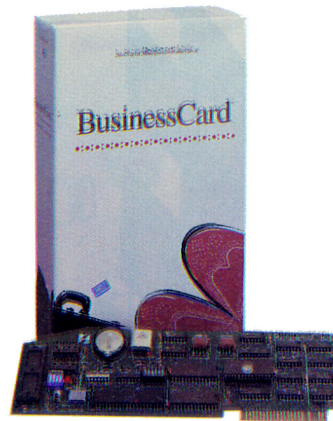
John Kidney
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The Editors' Choice column in the May 1985 issue of *inCider* was very reassuring to a relatively new Sider user. I've had one since early January, and I'm very pleased with its performance.

The installation was easy. One problem I found could have been

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cured if the documentation were a little less ambiguous. It was not clear until after I had completed the installation and loaded a large number of files that the DOS system was loaded in VOL 001. As a result, I had to begin the installation again with the formatting step.

I am further impressed with First Class Peripherals' support, both before and after the purchase. My primary incentive was my need to access a 420K General Manager data base. This data base has since grown to about 575K, well beyond the capacity of four floppy drives. First Class Peripherals gave me the names of General Manager users who were willing to share their experiences.

Since the installation, I have loaded all my Word Juggler files to The Sider, and now use that device exclusively for word processing. I am disturbed that other systems I depend on to operate my business, principally Multiplan, do not support The Sider. At this price, software suppliers should get their act together to support a device that is no more expensive than a DuoDisk.

The support software supplied with The Sider is well-implemented, except for one potentially fatal flaw—the lack of a back-up facility for ProDOS. With the large capacity of /HARD1/, /HARD2/, and the path-name structure, it is difficult to ensure that all files have been dumped to a floppy for back-up. I am disappointed that First Class Peripherals' response to this problem is "We're working on it." A definite commitment would be more reassuring.

Thanks to your staff for producing a magazine that is very helpful to the small-business user. A little more emphasis on business applications would be appreciated, but even trying out some of the games is fun.

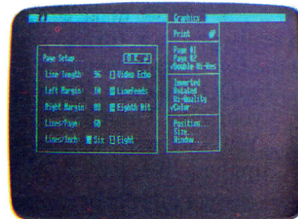
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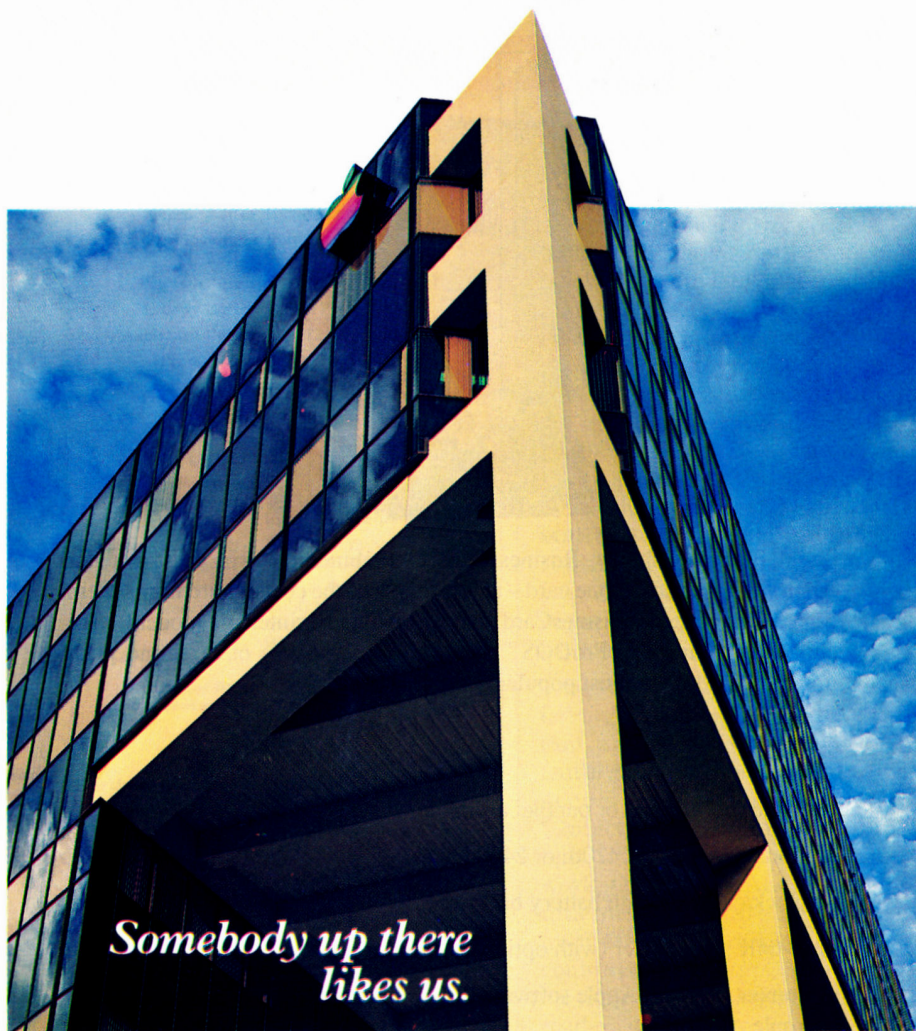
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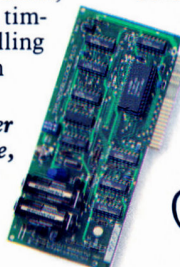


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LETTERS

Keep It in the Family

As an Apple IIe owner of about one year, I want to congratulate you on an informative, high-quality magazine. In the past few years, as I searched for information about computers, I subscribed to several computer magazines, including *inCider*. Now that I have become an Apple II owner, I find that your magazine alone has the kind of focus I want. It is great to find a magazine in which the articles, reviews, and advertisements focus on the Apple II.

I am convinced that the Apple II is the most versatile computer available today; *inCider* helps keep me abreast of new developments and provides information to help me use my computer better. Typing in your program listings has provided me with a number of useful utility programs and some enjoyable entertainment programs, as well. Your software reviews and advertisements have helped me make choices in software and accessories.

I will allow my subscriptions to *A +* and *Popular Computing* to lapse this year, because they include too many articles on other computers that are not of interest to me, articles through which I frankly do not want to wade. I hope you will continue to publish an Apple II magazine.

Thomas Anewalt
604 Pictwood Drive
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inCider will continue to be an Apple II-specific journal—and we're currently the only II-specific magazine on the market. —eds.

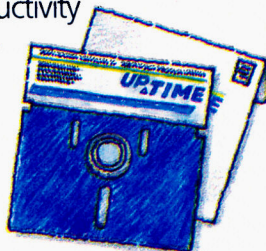
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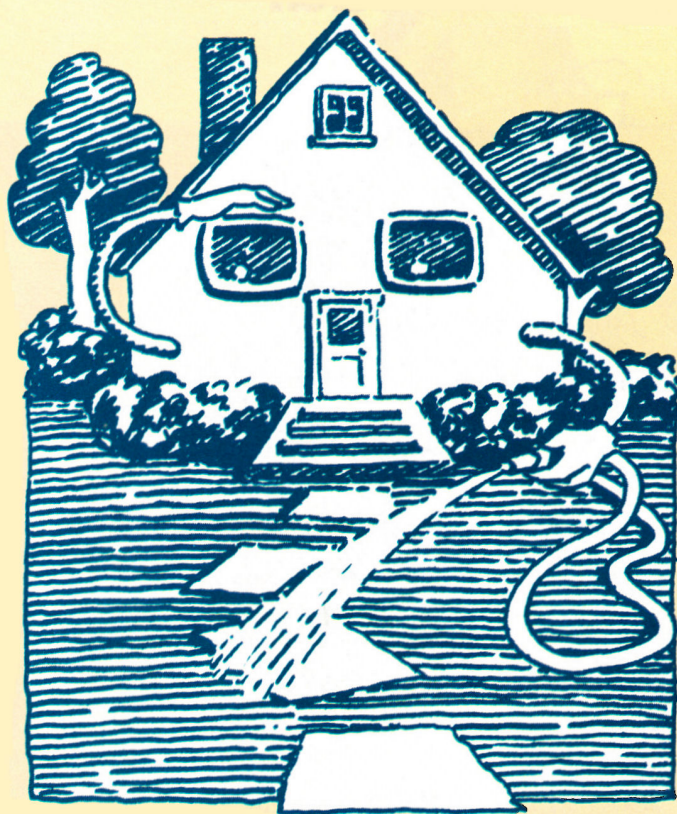
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All's Under Control

You come home after a hard day only to find 1001 things that need tending. Relax. Smarthome, from CyberLYNX Computer Products, can get the job done, whether it's regulating the temperature or watering the lawn.

Smarthome is a wireless home-control and security system included in the Lancashire Homes development in Antelope Valley, north of Los Angeles. At the homeowner's option, each house in the 200-unit development can come equipped with an Apple //c and the Smarthome system. The system is financed as part of the mortgage, and the expense is less than \$30 a month, estimates Cinda Johnson of CyberLYNX.

She explains that the Smarthome system—not the //c—is in control. The //c acts as a front-end processor for the system: it downloads programs to the Smarthome system, which controls the home scene. So, you can use the //c for other purposes while Smarthome runs the house.

"The homeowner can now use a personal computer to help guard the house against fire and burglary, water the lawn, and set back the thermostat—and at the same time, still have the computer available for home banking, menu planning, and helping the kids with their homework," says Emmet J. Roche, vice-president of CyberLYNX.

For more information, write to CyberLYNX, 4828 Sterling Drive, Boulder, CO 80301.

INSIDE OUT

•**Farewells.** . . Say goodbye to the Macintosh XL (AKA the Lisa). Kathleen Dixon, an Apple Computer public relations specialist, says the company ended XL production this past June. Dixon explains that with corporate concentration on the Mac office, the business computer took "a lot more energy and money to build" than the 128K or 512K Mac. The Lisa was introduced in 1983.

•**Reader notes.** . . According to a recent *inCider* subscriber survey, 98 percent of the respondents own a personal computer; the average value of a personal computer installed is \$3000.

•**All in agreement.** . . MicroAge Computer Stores will begin selling Apple products in its U.S. franchises starting this summer.

•**To teacher's rescue.** . . School personnel can send for a catalog listing educational software for Apple, TRS-80, Commodore, and IBM computers. While there is no charge for educators who send requests on institutional letterhead, others must forward \$1 per catalog. Contact Learning Arts, P.O. Box 179, Wichita, KS 67201.

•**Laser technology.** . . *InfoWorld* columnist John C. Dvorak reported in his May 13, 1985 column that Apple is planning a laser-disk interface for the Apple II.

Success Stories

Nowhere is the entrepreneurial spirit more alive than in the microcomputer-software industry. So says a *Wall Street Journal* report of a study conducted by Richard D. Teach and Fred A. Tarpley, Jr., professors at Georgia Institute of Technology, and Robert G. Schwartz, an Atlanta consultant.

Of the 193 companies studied, about half were started with less than \$10,000 initial capital. These companies are small, though, and only 20 percent reported sales exceeding \$1 million in 1984.

Who are the people who start companies that sell personal-computer software? According to the study, they tend to be male, college-educated, and have worked for computer-related companies.

Practically half of these companies emerged since 1980, and the researchers attribute the influx to the increased use of personal computers. For the most part, the companies remain small and sell four—or fewer—products.



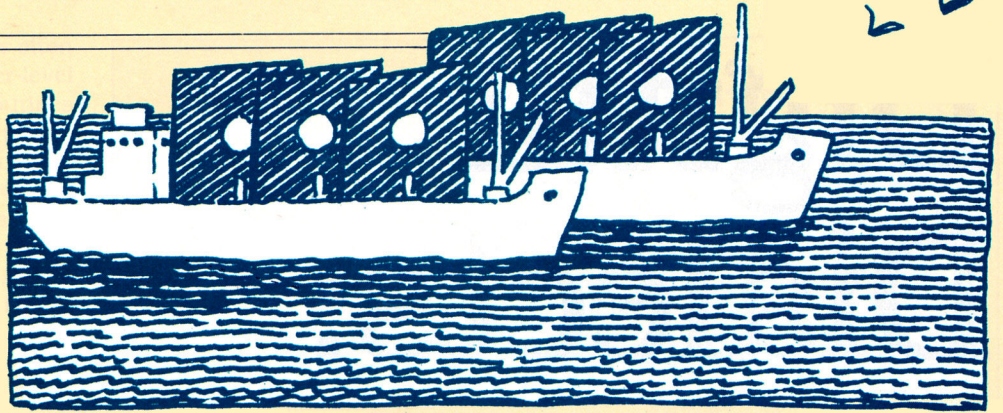
by Cynthia K. Carr, *inCider* staff

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Foreign-Trade Intrigue

Just last December, the U.S. Department of Commerce imposed complicated regulations on software companies that conduct overseas marketing. But recently, the office rescinded those restrictions so software companies may deal with free-world countries.

"We are extremely pleased that the Association of Data Processing Service Organizations' (ADAPSO) work with the Commerce Department

has helped relieve the burdensome nature of the regulations," says Jerome L. Dreyer, president of ADAPSO. "The U.S. software industry couldn't continue to maintain its world leadership in information technology without having access to foreign markets."

The restrictions mandated validated export licenses (which require a separate application and Commerce Department approval on a per-customer basis) for computer software, regardless of product destination, to prevent the sale of software to parties antagonistic to the United States.

The new regulations let American companies ship most software to free-world countries under a general license without specific Commerce Department approval.

Under a general license, companies may trade software determined to be not militarily significant to all foreign countries except Cuba, Cambodia, Libya, North Korea, and Vietnam. The software includes signal processing, local-area networks, compilers, diagnostic and maintenance software, operating systems, artificial intelligence, computer-aided design, and high-level languages.

Pink Slips

Apple Computer, Inc., recently laid off 75 workers from its Irvine and Garden Grove facilities in California. A spokeswoman said organizing the company's distribution operations and automating its manufacturing procedures were the reasons behind the layoffs.

Effective August 1, Apple will close the Irvine distribution center, where 50 of the 75 affected employees work. According to Kathleen Dixon, an Apple Computer public relations specialist, half of the Irvine workers have been given jobs in other departments, such as the Sunnyvale center, where the company plans to consolidate its West Coast distribution operations.

Calendar

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Digital Dialects:

A Guide to Apple Languages

by Jeff Hurlburt

*Still think C is a vitamin?
LISP a speech impediment?
Pascal a French mathematician?*

inCider brings you up to date and matches your needs with the right programming language.



If you're like most Apple owners, there comes a time when you want to do more with your computer than manage a data base or play Lode Runner. You'd like to take control of your machine, to make it do what you tell it to do—not what some professional programmer says it should do. In short, you want to learn to program. The question is: What language should you learn?

That's not a trivial point. Learning a programming language, especially your first one, takes hard work, so you have to make sure the language you pick is right for you. Here I'll present

an overview of the four most popular languages for the Apple (see the accompanying **Table**) and several less common ones from which you can choose.

As diverse as Apple languages are, they share a common thread—they are the intermediaries through which you control your computer. Without instructions, your Apple is just so much silicon and plastic—but with the proper sequence of statements and commands, it can do marvels. Programming languages give you a relatively easy way to determine the instructions your computer will execute.

Machine Code and Assembly Language

Machine code and assembly language are "low-level" languages (see the sidebar "Low-Level and High-Level Languages"). Writing machine code demands careful documentation, since you must express everything in groups of hexadecimal num-



Table. The Big Four programming languages.

Language	Level Low/High	Structured	Interpreted/ Compiled	Speed	Ease of Learning/Use	Applications
Assembly	Low	No	Compiled	Fastest	Difficult	Graphics, systems programs
BASIC	High	No	Interpreted	Slow	Easy	General purpose
Logo	High	Yes	Interpreted	Slow	Easy	Education, research
Pascal	High	Yes	Compiled	Fast	Moderate	General purpose

bers. Experienced programmers often use CALL statements in higher-level languages to access machine routines when speed is critical or when performance of some task would be impossible or cumbersome in high-level code.

For short routines, direct entry of hex code (the *source code*) is sometimes the most convenient route. Machine code becomes less attractive for larger programs, though, as the number of variables, branches, and sub-routine calls begins to mount.

To circumvent many of the difficulties associated with machine coding, you can “disassemble” the code into *assembly language* (the *object code*) using an assembler routine (see the sidebar “Language Translators”). A good assembler lets you include *labels* in your program—descriptive names you can substitute for subroutine calls (such as BELL for \$FBDD), as well as jump targets, branch destinations, variables, and macros (a label that stands for a sequence of instructions).

Assembler routines figure relative branch distances, substitute addresses for any labels, and convert your assembly-language instructions into machine code. Should you decide to modify or relocate the code, you need only load your source file, make the changes, and reassemble.



BASIC

The most popular language for Apple programming is Applesoft BASIC (Beginner's All-purpose Symbolic Instruction Code), built into the Apple II Plus, //e, and //c. Whenever you turn your computer on and hear that reassuring beep, you know that Applesoft is there, ready to go and virtually bombproof in its fortress of ROMs. Applesoft is in most cases the first, and often the last, programming language you will ever need. Quite simply, most of the things you want to do with your computer you can do with Applesoft.

Applesoft is a version of Microsoft BASIC, modified to run on the Apple. It was the second BASIC Apple released (the first was Integer BASIC), and it quickly became the preferred language of Apple II owners. Applesoft gives you both integer and floating-point numerics (all real numbers), dynamic string handling, and direct con-

Low-Level and High-Level Languages

Although it's very powerful, a microprocessor—MOS Technologies' 6502/65C02 for the Apple—can perform only a limited number of types of tasks, one operation at a time. These tasks make up the *instruction set* of the microprocessor and are “carved in stone” (or silicon, as the case may be). The microprocessing unit's design determines the way the flow of electricity can be channeled through it. The relationship of a computer language to the basic instruction set of the microprocessor determines whether the language is high-level or low-level.

The instructions built into the microprocessor and the instructions provided by a low-level language are in one-to-one correspondence. An example is assembly language. When you program in assembly, you are directly manipulating the instruction set of the microprocessor. The only buffer between you and the microprocessor's instruction set is the series of mnemonics (LDA and BNE, for example) describing the instructions. Remove the mnemonics and you're left with the most basic of the low-level languages—machine code or hex code. (A9 1B, for example, means “load \$1B into the accumulator.”)

High-level languages differ from

low-level ones in many respects. The most profound distinction is that each instruction in a high-level language (such as PRINT in BASIC) results in the execution of more than one microprocessor instruction—in some instances, several. High-level languages insulate you from the details of the hardware, letting you devote your energy to solving a problem, rather than tailoring your code to a specific microprocessor. These languages place a level of abstraction between you and the microprocessor, resulting in programs that are easier to write, but slower and less efficient than programs written in lower-level languages.

You should note that there is a level of software below the machine-code level. *Microcode* defines the functions of many modern central processing units, including some microprocessors. It isn't available to applications programmers, however. At the other end of the spectrum, many mainframe data-base management systems come equipped with a *query language* that lets you use natural English. And as personal-computer software becomes more sophisticated, you'll eventually see something akin to these query languages for your Apple. □

—Bob Ryan

inCider Technical Editor

trol of special Apple features such as low- and high-resolution graphics.

Applesoft is an extraordinarily well-documented language. In the seven years since its release, dozens of books and scores of articles have been published about the language and its applications. Its idiosyncrasies have been detailed, its entry points mapped, its bugs uncovered. If you're looking for a language that is well-supported, Applesoft is it.

Applesoft suffers from the same deficiencies that plague all versions of BASIC: It's not particularly fast or efficient, and it doesn't support structured programming, although you can simulate some features of structured languages with BASIC.

Applesoft is simple to use and fairly easy to learn. It's an excellent language for writing interactive programs, and

it does a good job with graphics. These strengths make it a fine all-purpose language.



Logo

Developed about 15 years ago by a group of programmers at MIT under mathematician Seymour Papert, Logo is a language specifically designed to be simple to use, yet powerful. Logo's built-in procedures (called *primitives*) make it a rich language and perhaps the easiest with which to get started in programming. Directional commands such as FORWARD and BACK move

Language Translators

All computer languages, except machine code, have one basic requirement: They must be translated into machine code, the only language the computer understands. There are two types of language translators—compilers and interpreters—and each has distinct advantages over the other.

BASIC is an *interpreted* language, and there exists no better example than Applesoft BASIC, which is built into your Apple. Applesoft, a program that resides in memory from address \$D000 to \$EFFF, translates BASIC programs (which usually begin at address \$800) into machine code, which the microprocessor then executes. Like all interpreters, Applesoft translates the program one line at a time and executes each immediately after translating it. An interpreter does not wait to translate the entire program before executing it.

It's usually easier to develop a program with an interpreted language than with a compiled one.

When you make a mistake in an Applesoft program, you don't have to re-compile and re-link the program after making a correction. You merely change the line where the error occurred and run the program again. The disadvantage of an interpreted language is its speed—interpreters are very slow. Since translation into machine code takes place when you run the program, the translation time is added to the total execution time. Also, an interpreter doesn't keep track of the program lines it's already translated and those it hasn't. If a program line is part of a loop that is executed 10,000 times, the interpreter translates the line 10,000 times.

Like an interpreter, a *compiler* is a program that translates source code into machine code, but a compiled language separates the translation process from the execution of the program—thereby increasing performance at the expense of ease of use. Compilers are stored on disk, and are only loaded into memory

when you want to translate a program file. The compiler translates your source code into machine code and stores the results in an *object file*. With most compiled languages, you then have to link the object file with assorted run-time routines to create an executable module. To run your program, you run the module. If your program contains an error, you must correct it in the source file and re-compile and re-link the program.

Assemblers are a special class of compilers. Like other compilers, they separate the translation process from the execution of the program. Unlike the instructions in other compilers, however, each assembly-language instruction results in only one machine-code instruction. Compiled languages (and their assembly cousins) are generally faster and more powerful than interpreted ones—but you'll find interpreted languages easier to work with. □

—Bob Ryan

inCider Technical Editor

the Logo turtle, a hi-res graphics cursor; other commands deal with input/output, sound effects, and manipulation of words and lists; words (EXPO-NENT, for example) and symbols (+, -, *, /) perform arithmetic. You can also create your own procedures, "extending" the language in the process. The only distinction between primitives and the procedures you invent is that you must enter your own before using them.

Logo is a highly interactive language—always ready to respond immediately to your input. If you type FD 100, for example, the turtle appears and draws a line 100 units long on the screen. (FD stands for FORWARD.) It's a small step from experimenting with primitives to creating your own procedures. For example, the following lines define a triangle-drawing procedure named TRI (where RT 60 indicates a 60-degree right turn):

```
TO TRI :LENGTH
FD :LENGTH
RT 60
FD :LENGTH
RT 60
FD :LENGTH
END
```

Thereafter, simply entering TRI 50, for example, tells the program to draw an

equilateral triangle with sides 50 units long. You can save such a procedure to disk and use it in subsequent programs.

With the exception of BASIC, all languages available to Apple users allow some form of recursion—a procedure's ability to call itself. Logo, in fact, includes program-flow primitives (chiefly IF...THEN and REPEAT) that encourage recursion. Since it's a structured language (see the sidebar "Structured Programming Languages"), Logo's appearance reflects the grouping of primitives and the sequence of events.

Logo does not pretend to be a general-purpose language. As you might expect, this LISP dialect deals well with strings and lists (and lists of lists), but handles numbers poorly. Error reporting is excellent; graphics is another strong area, as long as speed is not critical.



Pascal and Modula-2

Since Pascal is a structured language, its sophisticated flow-control statements (IF...THEN, FOR, REPEAT, WHILE, and CASE) and versatile procedures promote the arrangement of code into neat blocks, making the program easier to write and maintain.

Pascal's procedures and functions also permit an extensibility and a flexibility unobtainable in BASIC. With Pascal, you can mix string and integer data types—for instance, VASES, 144, and \$250 in a single N-by-3 "RECORD" array. BASIC doesn't let you mix characters and numbers in an array; the example above would require three separate arrays, and the "\$250" entry would need extra processing.

A large, full-precision (with floating-point numbers) BASIC array gobbles memory space. Yet, midway through the program's execution the array may be unnecessary. BASIC won't let you use the space for other arrays you may need to create. If the amount of unused memory is insufficient, you must use the old array space (and name) for the new data. Such "kluges" hardly help the cause of readability. Pascal permits deallocation—you don't have to reuse variable names.

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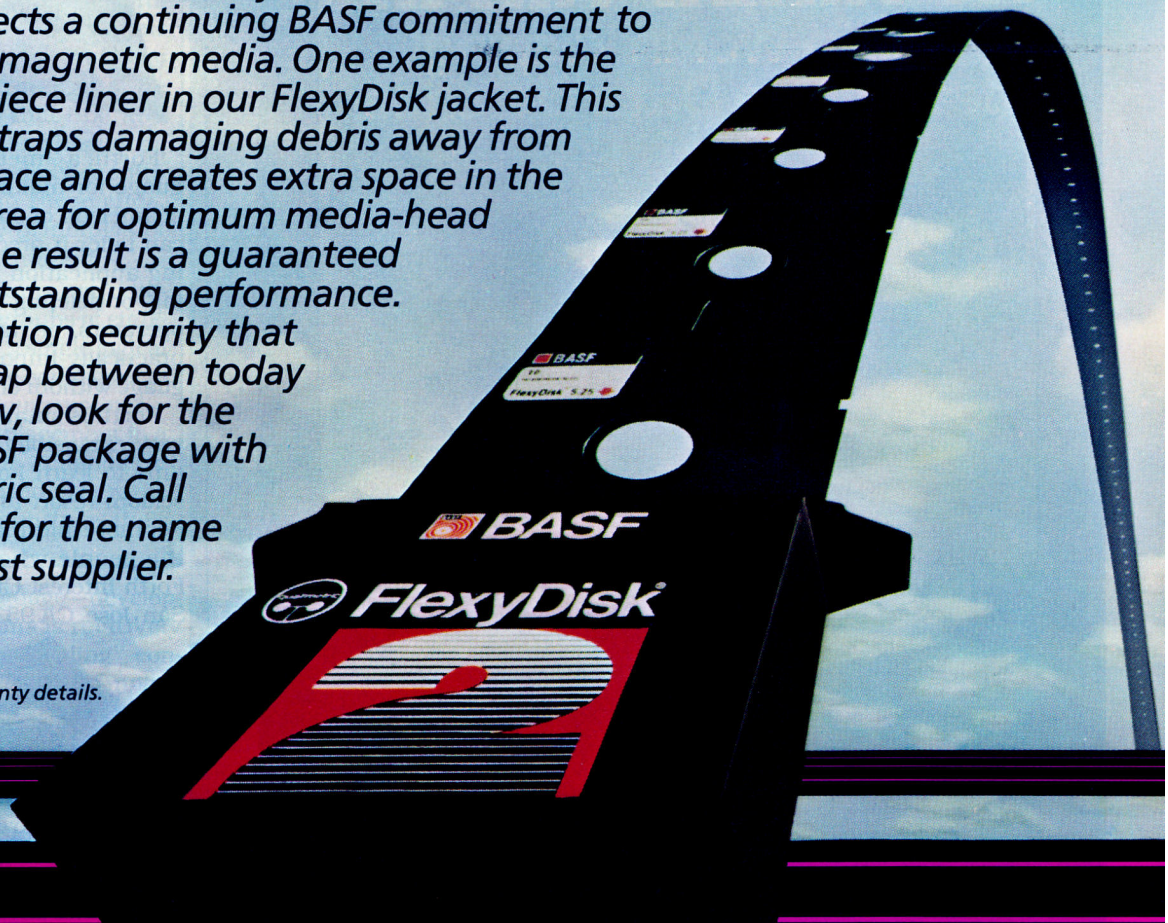
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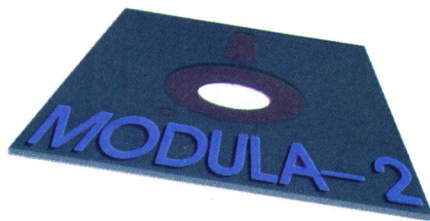
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Pascal compiles to and executes *pseudo code*, or p-code (a code between source and machine code that makes a program portable from one type of computer to another). Although slower than most other compiled languages, it surpasses BASIC in speed. Pascal's low interactivity is an obstacle to beginners, but a price many experienced users and professional programmers are willing to pay in return for Pascal's power and ease of maintenance. (For more information, take a look at *inCider's* new column, Pascal Primer, beginning this month on page 22.)

Taking its name from the modular organization of its products, Modula-2 greatly resembles Pascal, although

some differences in syntax and organization are apparent. Most notably, Modula-2 is case-sensitive.



Modula-2 has certain features Pascal lacks, including run-time dimensioning of arrays; LOOP, INC, and DEC statements; direct bit manipulation; and short-circuit evaluation of Boolean expressions.

Slower than C or Forth, Modula-2 is

notably faster than BASIC, and on average is faster than Pascal, making it well-suited to all but the more speed-sensitive applications. While its premium on planning will frustrate those who like to develop their programs at the keyboard, Modula-2 comes closer than any other high-level language to realizing the ideals and benefits of structured programming.

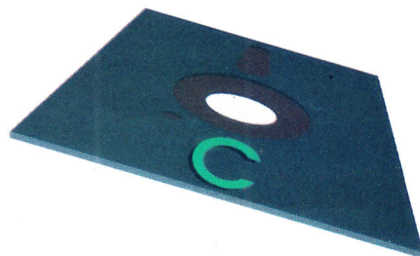
Other Languages

Often criticized as difficult to learn, impossible to read, obtuse, and even bizarre, **Forth** continues to attract avid followers and has been implemented on virtually every type of mini- and microcomputer.



Forth, a "meta-language"—a language for making languages—is the chameleon of computer dialects: You can tailor it precisely to any computing application by creating, redefining, or deleting "words" (commands, operators, or numbers). In fact, it is practically impossible to use the language without changing it.

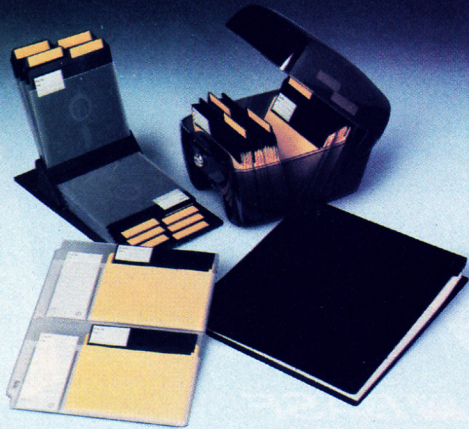
Forth is small, lightning-fast, and very extensible. People who take the time to learn Forth swear by it, and seldom resort to any other language. For more information about Forth and the people who use it, contact the Forth Interest Group, P.O. Box 8231, San Jose, CA 95155.



C is generally characterized as a medium-level language, since it can deal directly with the bits and bytes of the machine-code domain, as well as handle such sophisticated data types as floating point and pointer. Since most machine-specific coding is not actually part of the C language, you can often move C programs from machine to machine, enabling Apple C users to acquire utilities and libraries from other systems.

Although C is non-interactive, it is a

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Structured Programming Languages

In the 1950s and '60s, when many mainframe computers had less than 32K of RAM (random access memory), a programmer had to squeeze as much code as possible into a very limited work space. The programs written at that time were marvels of efficiency, but they suffered from some severe deficiencies: They were hard to write, difficult to understand, and nearly impossible to modify.

As computers evolved and applications became more complex, computer-science researchers came to realize that the old programming practices would have to go. Pioneers such as E.W. Dijkstra and Harlan Mills turned the data-processing establishment on its ear with the suggestion that efficiency was not a programmer's prime goal. They insisted that first and foremost a program should be clear, correct, and easily modifiable. To accomplish these ends, they developed the principles of *structured programming*.

Structured programs are composed of *modules*—groups of statements that carry out a single logical function. Modules are connected to each other in a *top-down* manner—a module's physical placement in a program corresponds to its logical placement. Structured programs are also *self-documenting*—their

function is evident from reading the source code.

Structured-programming techniques were commonly available by the early '70s, but their effectiveness was limited by the fact that the primary programming languages of that time—COBOL, FORTRAN, and BASIC—hadn't been designed to implement structured techniques. The first structured language to gain general acceptance was Pascal, first defined by Niklaus Worth in 1971. Its design—incorporating

functions and procedures, control structures, and global and local identifiers—makes it easy for programmers to implement structured-programming techniques.

Since the advent of Pascal, a number of structured languages have appeared, including C, Ada, Logo, and Modula-2. The growing popularity of structured languages portends the day when "spaghetti code" will be a thing of the past. □

—Bob Ryan

inCider Technical Editor

highly extensible language—developing your own functions is relatively easy. Indeed, its "tool-building" concept is central to the process of modeling the language for the best possible fit to your application.

One of the newest languages available for the Apple (or any other computer) is **Ada**, a modern, highly structured language designed under the aegis of the U.S. Department of Defense. Ada is modeled on Pascal, and it's one of the most powerful languages ever developed. Its capability, however, may be its most severe drawback: Many software engineers consider the language too big for any one programmer to handle. Implementations of Ada on Apples and other microcomputers are necessarily subsets of the complete language.

Another language developed with the support of the Department of Defense is **COBOL** (Common Business-

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Oriented Language). COBOL first appeared in the late 1950s, and quickly became the preeminent computer language in the world. COBOL has excellent string- and file-handling capabilities, making it the preferred language of large businesses. COBOL is still popular for large computer systems, but it hasn't been a success in the realm of personal computers.

FORTTRAN (FORMula TRANslation), like COBOL, has been around since the 1950s. Scientists and engineers appreciate it because it can handle just about any mathematical expression. Again like COBOL, FORTRAN has not made a very successful transition to microcomputers. Its string-handling functions are too cumbersome to be of use to most personal-

computer programmers.

PILOT (Programmed Inquiry, Learning, Or Teaching) is a specialized language. It was designed to let teachers write their own interactive tutorials, not to perform general data processing. It is easy to learn and therefore very attractive to teachers who want to do more in educational programming than run canned software.

LISP (LISt Processing) is an esoteric language—but then, it was designed to be used in a fairly esoteric field—artificial intelligence. Because of its special orientation, LISP is not suited for everyday applications. In the field of AI, however, its capabilities in handling symbolic strings of recursive data are without parallel.

It's a popular misconception that

the sole purpose of programming is to communicate a series of directives to a computer. If this were the case, any program would suffice for any application. But, as this overview of computer languages available for your Apple has probably convinced you, each language has its own special set of capabilities and limitations. You should choose a language carefully, paying particular attention to the application you have in mind—you'll be rewarded with a program precisely tailored to the operations you need to perform. ■

Address correspondence to Jeff Hurlburt at 7814 Santa Elena, Houston, TX 77061.

Resources

Although all language vendors provide documentation concerning the operational characteristics of their packages, most do not furnish language tutorials or comparable materials. When this is the case, I've listed one or more resources suitable for beginning users.

BASIC

Manual accompanying language software.

C

B. Kernigan and D. Ritchie, *The C Programming Language*. Prentice-Hall, 1978.

Forth

A. Anderson and M. Tracy, *Mastering Forth*. Brady Communications, 1984.

L. Brodie, *Starting Forth*. Prentice-Hall, 1981.

Logo

Manuals accompanying language packages.

Machine code and assembly language

R. Wagner, *Assembly Lines: The Book*. Roger Wagner Publishing, 1984.

Modula-2

N. Wirth, *Programming in Modula-2*. Wiley and Sons, 1983.

Pascal

H. Peckham, *Apple Pascal: A Hands-On Approach*. McGraw-Hill, 1981.

A Note on Operating Systems

An operating system is a set of routines that manages the hardware in your computer system. In the Apple II, the operating system consists primarily of the input/output routines found in the monitor and the disk operating system. Monitor routines handle input from the keyboard and output to the screen, while the disk operating system handles disk reading and writing—the transfer of data between disk and internal memory.

Your Apple is not limited to one disk operating system. You can run DOS 3.3, ProDOS, the UCSD p-System, CP/M, and many others. Some operating systems, however—notably CP/M—require special hardware to run on an Apple. In the list of language implementations that follows, special operating-system requirements are noted in parentheses.

Apple Logo II

Apple Computer
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
\$100

Reader Service Number 547

The Terrapin LOGO Language

Terrapin
222 Third Street
Cambridge, MA 02142
(617) 492-8816
\$99.95

Reader Service Number 548

Apple Pascal 1.2 (UCSD Pascal)

Apple Computer
\$250

Reader Service Number 549

Turbo Pascal (CP/M)

Borland International
4585 Scotts Valley Drive
Scotts Valley, CA 95066
(408) 438-8400
\$69.95

Reader Service Number 550

Master FORTH

Micro Motion
12077 Wilshire Boulevard #506
Los Angeles, CA 90230
(213) 821-4340
\$100
options \$40 each

Reader Service Number 551

Isys FORTH

Illyes Systems
P.O. Box 2516
Station A
Champaign, IL 61820
(217) 359-6039
\$99

Reader Service Number 552

Aztec C65

Manx Software Systems
P.O. Box 55
Shrewsbury, NJ 07701
(201) 780-4004
\$199

Reader Service Number 553

Janus/Ada 1.5.0 (CP/M)

RR Software
P.O. Box 1512

Madison, WI 53701
 (608) 244-6436
 \$500 for development package
 Limited quantity available

Reader Service Number 554

CIS COBOL (CP/M)
 Micro Focus
 1860 Embarcadero Road
 Palo Alto, CA 94303
 (415) 856-4161
 \$500

Reader Service Number 555

Apple Fortran (UCSD Pascal)
 Apple Computer
 \$200

Reader Service Number 556

Super Pilot
 Apple Computer
 \$200

Reader Service Number 557

LISP (Discontinued)

Data Soft
 19808 Nordhoff Place
 Chatsworth, CA 91311
 (818) 701-5161
 \$99.95

Reader Service Number 558

Assemblers

Merlin Merlin Pro
 Roger Wagner Publishing
 10761 Woodside Avenue
 Santee, CA 92071
 (619) 562-3670
 \$64.95, Merlin
 \$99.95, Merlin Pro

Reader Service Number 559

Lisa Assembler
 Lazerware
 925 Lorna Street
 Corona, CA 91720
 (714) 735-1041
 \$79.95

Reader Service Number 560

Sample Code

Listed below are programs written in each of the "Big Four" languages. These routines perform the same task—they run through a loop 101 times, printing the loop

counter with each iteration. The listings highlight the differences in the way each language handles the problem and provide a bit of the "flavor" of each language.

Listing 1. Assembly language.

```

1  *LOOP PROGRAM
2      ORG     $300
3  COUNT EQU   $09
4  PRBYTE EQU  $FDDA
5  CROUT EQU   $FD8E
6  START LDA   #$0
7      STA   COUNT
8  LOOP  LDA   COUNT
9      JSR   PRBYTE
10     JSR   CROUT
11     LDA   COUNT
12     CMP   #$64
13     BEQ   END
14     INC   COUNT
15     JMP   LOOP
16  END   RTS
  
```

Listing 2. BASIC.

```

10 PRINT COUNT
20 IF COUNT = 100 THEN 50
30 COUNT = COUNT + 1
40 GOTO 10
50 END
  
```

Listing 3. Logo.

```

TO SET
  MAKE "COUNTER 0
END

TO LOOP
  PRINT :COUNTER
  IF :COUNTER = 100 THEN STOP
  MAKE "COUNTER :COUNTER + 1
  LOOP
END
  
```

Listing 4. Pascal.

```

PROGRAM COUNTER (OUTPUT);

VAR
  COUNT: INTEGER;

BEGIN
  COUNT := 0;
  REPEAT
    BEGIN
      Writeln (COUNT);
      COUNT := COUNT + 1;
    END;
  UNTIL (COUNT > 100);
END.
  
```

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Practical Pascal

by Tom Swan

Discover the power and
simplicity of Apple Pascal

Pascal is quickly becoming BASIC's rival as the beginner's programming language, while remaining popular with experienced programmers. inCider introduces a new monthly column, Pascal Primer, to take Pascal enthusiasts from the very basics of the language through an exploration of the details of advanced programming.

If you have yet to discover the excitement of programming in Pascal, let me take you on an adventure that will add this language to your repertoire. If you've tried to learn Pascal before and haven't been successful, try again. Packed with new and useful examples, Pascal Primer should convince you that Pascal is a simple and powerful language. All you need is the equipment listed in **Table 1** and a desire to learn.

My first Apple Pascal system, purchased in 1980, soon after Apple announced it, had all the markings of a prototype being rushed to market—the editor had bugs, the compiler had bugs, the assembler had bugs, it was easy to crash random-access files beyond repair, and heaven help the unfortunate soul who had only a single disk drive and no printer. A patch was

22 inCider August 1985

Table 1. Equipment and software required.

Apple II or II Plus and a 16K RAM card in slot 0,
or an Apple //e or //c with at least 64K memory
or an Apple ///.

One or two disk drives (two recommended to avoid disk-swapping).

Apple Pascal Software version 1.2 on four disks labeled APPLE0:, APPLE1:, APPLE2:, and APPLE3:.

Printer and 80-column card recommended.

With a Macintosh or a Lisa, most of the material in this column will still apply, but many of the commands and displays will be different.

hand-soldered on the 16K language card (required in the pre-//e and -//c era). The documentation provided a fairly good technical discussion, but offered virtually no help for beginners. Also available were the famous Jensen and Wirth *Pascal Report*—which some say is the only beginner's tutorial

on Pascal written especially for expert Pascal programmers—and the Kenneth Bowles book, *Beginner's Guide for the UCSD Pascal System*, published by Byte Books—filled with examples that wouldn't run on the Apple!

Since then, Apple Pascal has undergone two major updates (version 1.2 is

the standard), and a newer edition is rumored. Many programmers now choose Pascal as their language, and schools and universities everywhere are using Pascal as both an introductory and an advanced programming language. Apple Pascal (or its parent, UCSD Pascal) comes in versions for the II, //e, //c, Macintosh, Lisa, and Apple III, and software written in Pascal abounds.

Before I introduce the first Pascal program, I want to stress that this column is not intended to replace the extensive documentation supplied with Apple Pascal, but rather to augment and enhance the instructions that come with your system. I don't want to spend a lot of time rehashing old potatoes, filling up precious space with details you can find elsewhere. Realizing, however, that some of you may run into trouble learning to use the Apple Pascal system on your own, the two accompanying sidebars describe some basic operations to help get you started.

Entering and Compiling Pascal Programs

Pascal is a *compiled* language (the entire program is translated into machine code before it is executed), as opposed to BASIC, which is an *interpreted* language (as each line of the program is translated into machine code, it is immediately executed). A Pascal program is composed of text you can enter and edit as though you were typing a letter with a word processor. In fact, you can use the Apple Pascal program editor for correspondence or other documents. After you type in a Pascal program, the text is saved in a disk file, which is then compiled, or translated, into code to run on the computer.

Before you can enter and run a program, the main command line must be visible on screen. (Booting the program automatically puts this line on the screen.) Press the E key to get into the edit mode. You should see the following prompt:

```
>Edit:
No workfile is present. File? ( <ret> for no
file <esc-ret> to exit ):
```

You can do one of three things—enter the name of a text file you want to edit, press the return key to start a new file, or press the escape key followed by the return key to get back to the main command line. For now, press the return key to clear the screen and start a new file, the *work file*. The following command line appears at the

Getting Started with Apple Pascal

The following instructions should help you start using Apple Pascal on a single- or a multiple-disk-drive system.

Single-Disk-Drive Systems

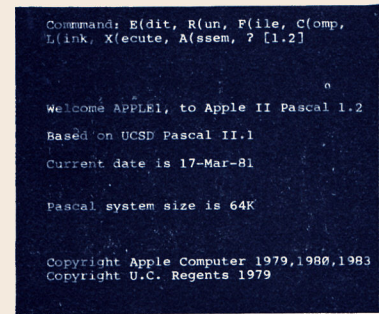
Put the disk marked APPLE3: into drive 1 and boot the computer (turn on the computer or enter PR#6 to the DOS prompt).

When you see the message "INSERT BOOT DISK WITH SYSTEM .PASCAL. . ." insert the APPLE0: disk and press the return key.

Multiple-Disk-Drive Systems

Put the APPLE1: disk into drive 1, the APPLE2: disk into drive 2 (optional), and boot the computer as described above.

After you boot the system, Apple



Pascal welcomes you with the display above.

To select a command from this menu at the top of your screen, press its first letter. For example, to execute a program, press X and then enter the program name. □

—T.S.

top of the screen:

```
>Edit: A(djst C(py D(lete F(ind I(nsr J(mp
R(place Q(uit X(chng Z(ap [1.2]
```

I'll concentrate on one of the more important commands, I(nsr, which lets you insert text into your work file. When you press I, the following line replaces the command line:

```
>Insert: Text { <bs> a char, <del> a line}
[ <etx> accepts, <esc> escapes]
```

Type in **Listing 1** (a complete, four-line Pascal program that writes "Hello, world!" on the display) in either upper- or lowercase. (For reference, I numbered each line starting with 0. These line numbers and colons are not part of the program, so you should not enter them.) Line 0, the program declaration, begins all Pascal programs; it contains the word PROGRAM, followed by your program's name and a semicolon. Line 1 marks the beginning of the program with the word BEGIN. This term produces no direct action; it simply marks or delimits the start of the main body of the program. The end of the program is similarly marked in line 3 with END and a period. (Some people like to think of a Pascal program as a sentence, containing various punctuated clauses, and ending with a period.)

Between the BEGIN and END in **Listing 1** is a WRITELN statement, similar to a PRINT command in BASIC. Any characters inside the WRITELN's parentheses are written on the display. In **Listing 1**, the WRITELN con-

tains a string, marked with beginning and ending single quote marks.

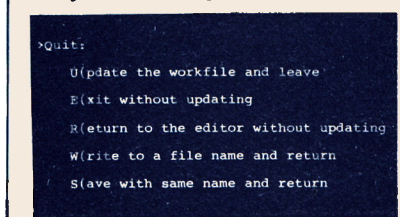
Listing 1. "Hello, world!" program.

```
0: PROGRAM HELLO;
1: BEGIN
2: WRITELN( 'HELLO, WORLD!' )
3: END.
```

To edit the listing while you are still in the insert mode, use the back-arrow key (<bs>) to erase a character or the delete key to erase a line. When you finish inserting text, press control-C (shown in the Insert command line as <etx>) to tell the editor to accept your new insertions.

The program then returns you to the main editor command prompt so that you can save your text on disk. Press the Q key to quit the editor. The screen displays the options shown in **Figure 1**. (While editing, if you accidentally hit the Q key, press the R key to return to editing.) Next, press the U key to update the work file and leave the editor. If you press the E key instead, you'll leave the editor without saving your

Figure 1. Before you quit the Pascal text editor, you'll normally update your work file and save your editing on disk.



text on disk. The last two options, W(rite and S(ave, are advanced commands I'll discuss in a later column.

After updating your work file, press the R key to run your program. It tells the Apple Pascal compiler to compile your program—to translate your text into code the Apple Pascal system knows how to run. While that process is taking place, several messages appear on screen. When the compiler is finished, your computer program is executed—displaying "Hello, world!" on the screen—if your program is error-free.

Dealing with Errors

With Apple Pascal, fixing errors is relatively quick and painless. **Figure 2** is what the compiler displays when it doesn't understand something. Four angle brackets (<<<<) point to the offending line, and a message explains that error number 14 occurred at line 1 (remember, the first line is numbered 0). I forced this error by removing the semicolon in line 0 of **Listing 1**.



Press the E key to return to the editor. Notice that the cursor is placed near the error, and the top line of your screen displays a description of that error. (Experienced programmers may want to press the space bar to find other errors, then fix them all at once before recompiling the program.)

Press the space bar to clear the error message, then correct the error by using a combination of the D(lete, X(chng, and I(nsrtr commands. First, use the arrow keys to position the cursor at the text you want to change. To delete text, press the D key and then use the left- and right-arrow keys and space bar to move the cursor over the text you want to remove. If you delete too much, press the escape key to recover your deleted text. To exchange (type over) text, press the X key, then enter your corrections. Press control-C to tell the editor to accept your changes. Then press the Q, U, and R keys to quit the editor, update the file, and compile and run your "Hello, world!" program.

Saving Your Programs

To see where your program is stored, press the F key to access the Apple Pascal Filer, which lets you per-

form a variety of operations with disk files. When the Filer command line appears, press the L key to select the List Directory operation. You should see the following prompt:

Dir listing of what vol ?

You must enter the volume name or unit number (see **Table 2**) of the disk drive with the directory you need. Your screen should appear similar to that in **Figure 3**. The disk file SYSTEM.WRK.TEXT stores the text of your program, and SYSTEM.WRK.CODE stores the compiled code, the part that actually runs.

Table 2. Unit numbers and volume names for peripheral devices.

Unit Numbers	Volume Names	Device
#1:	CONSOLE:	Monitor
#2:	SYSTEM:	Keyboard
#3:*		
#4:	disk name:	Drive 1
#5:	disk name:	Drive 2
#6:	PRINTER:	Printer
#7:**	REMIN:	Modem
#8:†	REMOUT:	Modem
#9:–#12:	disk name:	Additional drives

*Unused in Apple Pascal
 **For sending files
 †For receiving files

Figure 3. Choosing L from the Filer displays the directory of the disk. The files SYSTEM.WRK.TEXT and SYSTEM.WRK.CODE store the compiled program.

```
Filer: G(et, S(ave, W(hat, N(ew, L(dir,
R(em, C(hng, T(rans, D(ate, O(ut [1.2]
APPLE1:
SYSTEM.APPLE      32 25-Dec-83
SYSTEM.PASCAL    43 16-Oct-84
SYSTEM.EDITOR    47 25-Dec-83
SYSTEM.FILER     29 25-Dec-83
SYSTEM.LIBRARY   39 25-Dec-83
SYSTEM.MISCINFO  1 25-Dec-83
SYSTEM.CHARSET   2 14-Jun-79
SYSTEM.SYNTEX    12 25-Dec-83
SYSTEM.WRK.TEXT  4 17-Mar-81
SYSTEM.WRK.CODE  2 17-Mar-81
10/10 files<listed/in-dir>, 217
blocks used, 63 unused, 63 in largest
```

Before you can enter another program (the editor automatically reedit SYSTEM.WRK.TEXT if it exists), you have to save these work files somewhere else, then erase them. Insert a blank, formatted disk into #5: (drive 2). If you have only one drive, wait until the system prompts you to insert the blank disk. Press the S key to save your work files, then at the "Save as what file?" prompt, enter BLANK:HELLO and press the return key. You'll see a few lines similar to these:

```
APPLE1:SYSTEM.WRK.TEXT -->
      BLANK:HELLO.TEXT
APPLE1:SYSTEM.WRK.CODE -->
      BLANK:HELLO.CODE
```

This tells the Filer you want to save your work in files named HELLO.TEXT and HELLO.CODE of the disk named BLANK: (all newly formatted disks automatically receive the name BLANK:).

To check that you saved your work properly, list a directory of the BLANK: disk. Press the L key to select the L(dir operation again, and enter BLANK:. If your HELLO files are there, press the N key to tell the Filer to start a new work file. It will ask you, "Throw away current workfile?" Answer yes by pressing the Y key, then press the Q key to quit the Filer and return to the main command line.

A Short Review

This introduction to Apple Pascal has covered a lot of ground. By now, you should know how to perform these operations:

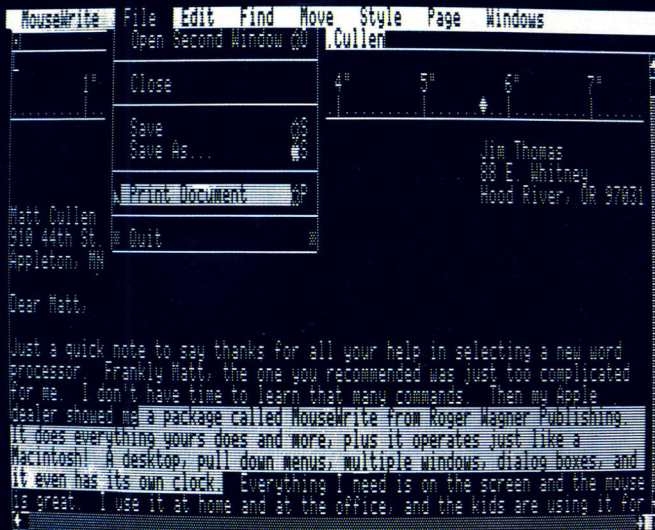
- 1) Start Apple Pascal.
- 2) Format blank disks.
- 3) Start the editor.
- 4) Insert text.
- 5) Accept your text.
- 6) Quit the editor and update your work file.
- 7) Run your program.
- 8) Reedit and fix errors.
- 9) Use the Filer to save your work files.
- 10) Start a new work file.

Listing 2. Fahrenheit-to-Celsius conversion.

```
0: PROGRAM CELSIUS;
1: VAR
2:   FDEGREES, CDEGREES : REAL;
3: BEGIN
4:   PAGE( OUTPUT );
5:   WRITELN( 'FAHRENHEIT TO CELSIUS CONVERSION' );
6:   WRITELN(
7:     REPEAT
8:       WRITE( 'DEGREES FAHRENHEIT (^C QUIT)? ' );
9:       READLN( FDEGREES );
10:      CDEGREES := ( ( FDEGREES - 32.0 ) * 5.0 ) / 9.0;
11:      IF NOT EOF( INPUT ) THEN
12:        WRITELN( 'DEGREES CELSIUS = ', CDEGREES:8:2 );
13:    UNTIL EOF( INPUT )
14:  END.
```

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You can use these ten basic steps to enter and run most Pascal programs and almost all the examples I'll show you in this series. For practice, enter and run **Listing 2** (a Fahrenheit-to-Celsius, or centigrade, temperature converter), then save your program as CELSIUS.TEXT and CELSIUS.CODE on a formatted disk. **Listing 2** has the same basic structure as **Listing 1**, but it contains some unfamiliar statements. Don't let these lines concern you now; what's important is that you can enter and run programs.

I hope you've enjoyed this introduction to Pascal as much as I've enjoyed getting started on the series.

Next month, I'll have more examples, and show you how to use numbers, strings, and other variables in Pascal programs. ■

Tom Swan is the author of several computer books, including Pascal Programs for Business, Pascal Programs for Games and Graphics, and Pascal Programs for Data Base Management, published by Hayden Book Company. Address correspondence to Tom at P.O. Box 206, Littitz, PA 17543. Please enclose a self-addressed, stamped envelope if you want a personal reply.

Formatting Blank Disks

Formatting prepares or initializes blank disks so that you can store programs and other files on them. Use the instructions below to format a blank disk on both single- and multiple-disk-drive systems:

1) Boot Apple Pascal as described in "Getting Started with Apple Pascal."

2) If you have only one disk drive, insert the APPLE3: disk into drive 1. Otherwise, insert the APPLE3: disk into drive 2.

3) Press the X key to run a program stored on the disk. When "Execute what file?" appears, enter APPLE3: FORMATTER and press the return key. The following message should appear:

```
APPLE PASCAL DISK FORMATTER
PROGRAM [1.2]
FORMAT WHICH DISK (4, 5, 9..12) ?
```

4) To format a blank disk in drive 1, insert a blank disk into that drive and enter 4. To format a blank disk in drive 2, insert it into drive 2 and enter 5. (All devices in Apple Pascal are given unit numbers such as #4: and #7:, as well as volume names such as PRINTER: and CONSOLE:—see **Table 2** for complete information. Although this makes it easy to write programs for printers and modems, you have to remember that drive 1 is actually unit #4:, drive 2 is unit #5:, and so on.)

5) Formatting then proceeds automatically. If the disk is already formatted, however, you'll be asked if you want to destroy (reformat) its surface. Press the Y key to reformat the disk and erase all files stored there, or press N to preserve the disk contents.

6) Repeat steps 4 and 5 to format all blank disks. Then press the return key. If you formatted any blanks in #4: (drive 1), reinsert APPLE0: (single-drive systems) or APPLE1: (multiple-drive systems) into drive 1, and press the return key once more. □

—T.S.

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APPLEWORKS MEMORY Even though Ramworks enhances and expands a VAST ARRAY of other programs, Appleworks is our claim to fame. A 64K Ramworks will ADD 46K to your available desktop memory, a 128K Ramworks will ADD 91K, a 256K Ramworks will ADD 182K, a 512K Ramworks will ADD 364K and a 1 meg Ramworks will give you nearly an 800K desktop. And it's all done automatically! When you plug in more memory chips into your Ramworks card, Appleworks will find them—automatically. Ramworks also increases the maximum number of records from 1350 to 4300. And should you ever create a file larger than your disk capacity, Ramworks will automatically prompt you to insert more disks, so that any size file can be saved on regular floppies or a hard disk.

APPLEWORKS SPEED AND POWER Ramworks does more than just increase the desktop memory (as if that weren't enough). With Ramworks, Appleworks will be able to run up to 20 times faster. If you buy a 256K or larger Ramworks card, Appleworks will automatically load itself in Ramworks. This greatly increases the speed at which Appleworks operates by eliminating all that nasty, time consuming disk access on Drive 1. These are but a few reasons why we say that Ramworks is Appleworks' best friend.

EXPANDABILITY Ramworks was designed with the future in mind. As your needs increase, so can Ramworks. Clear instructions show you how to plug in more memory.

CO-PROCESSOR POWER A memory expansion connector on Ramworks will allow future co-processor cards to access the Ramworks memory, so you'll be able to take advantage of the new 16 and 32 bit microprocessors. This connector will also allow Ramworks to be expanded another 2 megabytes, so as memory technology improves, so will Ramworks.

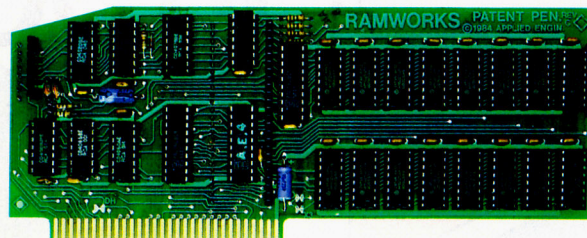
SPEED Today, as programs become more and more sophisticated, they inevitably become larger. And many of today's best selling programs (like Appleworks) won't fit in a 128K Apple, so many of these new larger programs continually go back to disk in search of more data. With Ramworks, you can have enough memory so that the entire program will be loaded into Ramworks' memory. This greatly increases the speed of software because your disk runs at 300 RPM, but Ramworks operates at the speed of light!

COLOR The same slot that's used for memory expansion is also the slot that's used for RGB color display, so all those lesser memory cards of yesterday make you decide in advance if you want RGB color. Ramworks lets you decide later to add RGB color. For only \$129, an RGB option can be added to Ramworks to give you double high resolution color graphics and 80 column text. All with a razor sharp, vivid brilliance that's unsurpassed in the industry. The RGB option does not waste another valuable slot, but rather plugs into the back of Ramworks and attaches to any Apple compatible monitor. Remember, you can order the RGB option with your Ramworks or add it on at a later date.

COMPATIBILITY, OF THE SOFTWARE KIND Programs like Appleworks, Magic Office System, Flashcalc, The Spread Sheet, Diverse-A-Dos, Supercalc, Magicalc and many others automatically recognize all or most of Ramworks' memory (512K is average). The simple fact is that Ramworks is compatible with more off-the-shelf software than any other RAM card. Ramworks is 100% compatible with ALL software written for the Apple 80 column and extended 80 column card. Additionally, Ramworks can emulate other RAM cards so software written for other cards will run without modification. Software written for Ramworks will not work on other cards. We can emulate others, but others can't emulate us.

COMPATIBILITY, OF THE HARDWARE KIND Unlike others, Ramworks is fully compatible with hardware add on's from other companies, like the Sider and Profile hard disks. And Ramworks was designed in accordance with the official expansion rules defined by Apple so you don't have to worry about compatibility problems. As you continue to expand and make your Apple more powerful with other expansion products from Applied Engineering, you'll appreciate how each product has extra features designed to work with Ramworks and other products to give you a total performance package that is more powerful than the sum of its parts.

IT'S POPULAR Popularity translates into great software support because software companies can't support all RAM cards, they can only support the ones their customers are likely to own. And software companies appreciate the fact that when they write software for Ramworks in the IIe, they're also writing software for our memory expansion card for the IIc, Z-RAM. And our customer list reads like the Who's Who of Apple computing with just about every software company in the land buying one, including Apple Computer



(in the hundreds), Rupert Lissner, and Steve Wozniak (we didn't give one to Mr. Wozniak just to use his name, 2 one meg Ramworks were paid for at full price).

IT'S FROM APPLIED ENGINEERING Unlike most of the competition, we only make accessories for Apple, so we'll never spend your money on IBM product research. Applied Engineering's years of experience and wide product line really pays off, and because of our high sales levels we buy most of our I.C. chips factory direct. So don't let our low prices fool you, they're caused by high volume production. That's why we can offer the most memory for the least money. Guaranteed!

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- Can Use 64K or 256K RAMS in any combination
- Adds Memory to Appleworks
- Accelerates Appleworks
- 100% Compatibility with All IIe software
- RAM Disk software available, compatible with Applesoft, PRO-DOS, DOS 3.3 and PASCAL (\$29)
- RAM Disk available for CP/M (\$29). (This program is included with our CP/M card)
- Visicalc preboot available (\$29)
- RGB option
- Takes only one slot
- 3 year no hassle warranty

THE PATENT OFFICE HAS ONE There are many advanced features on Ramworks, but two parts of the design are so advanced we applied for patents. One patent application deals with our ultra fast, ultra smooth 80 column screen display, and the other patent application deals with our ingenious way of dramatically reducing the power and heat of memory chips and improving reliability at the same time.



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SuperCalc3a: Serious Business for the Apple II

by Gregory R. Glau

While the integrated-software wars raged, Apple owners were forced to watch from the periphery. But passive spectators finally became active participants when Apple introduced the \$70 upgrade kit (three new ROM chips and a 65C02 CPU). Thanks to the new processor, you can run SuperCalc3a, the Apple answer to Lotus 1-2-3. And in a world littered with overpriced software, SuperCalc3a's \$195 price tag may just be the bargain of the year.

Integrated software such as SuperCalc3a provides a single, comprehensive user interface in which the screen displays and commands are the same for many functions. Given SuperCalc's simple, automatic data transfer, you can easily work with the same information in each area of the program. Readily available on-screen help details your actions.

The program can translate the data stored in Apple Works or VisiCalc files into SuperCalc files. And if you want

to send information from an IBM PC to your Apple—in a format SuperCalc3a can understand—the system can oblige.

How Much Clout?

SuperCalc3a consists of a spreadsheet, graphics package, data base, and a program that prints worksheets sideways on the page. The main operating section, the worksheet, is a 254-row-by-63-column grid with 16,002 cells (**Photo 1**). Its special memory-management system doesn't worry about empty cells, and it provides more usable space with faster access.

Based on the worksheet, you can design seven graphics images—from standard line and column graphs to exploded pie charts. You can also print or plot your pictures.

The data base follows the spreadsheet's row-column format; each row becomes a record, and each column in a row is a data field within the record. (You're limited to 253 records, one less than the number of available rows.)

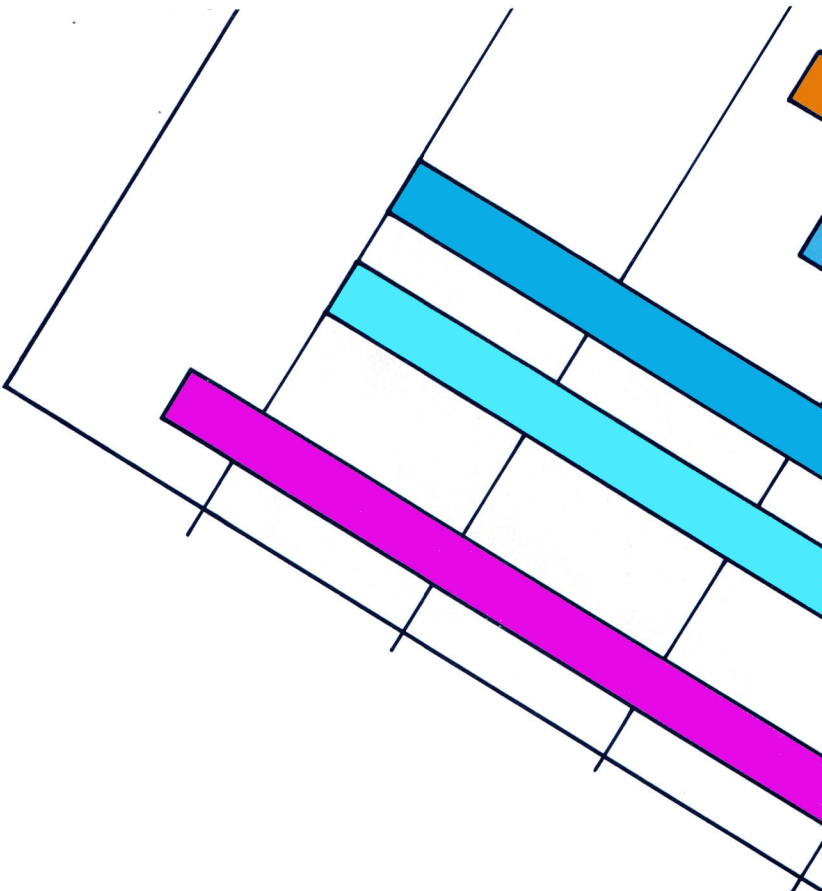
Since your data are in memory, searching is especially fast.

The fourth component, Sideways, is a handy printing tool. Spreadsheet grids usually have more columns than rows, so the sideways format provides a continuous printout instead of page-sized increments.

The Spreadsheet

If you've used a spreadsheet before, you'll feel very comfortable with SuperCalc3a. It's comparable to early versions of VisiCalc: Enter a slash (/), and the program displays a command line with a letter representing each command. SuperCalc3a uses *interpretive prompting*—when you enter a letter representing a command, the system fills in the rest of it. For example, if you want to insert a new column or row into your worksheet, type /I. The program completes the command and you see I(nsert).

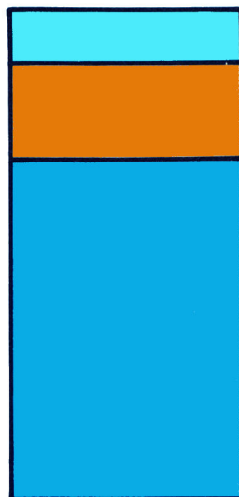
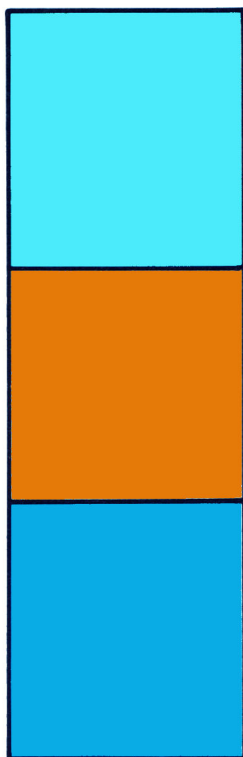
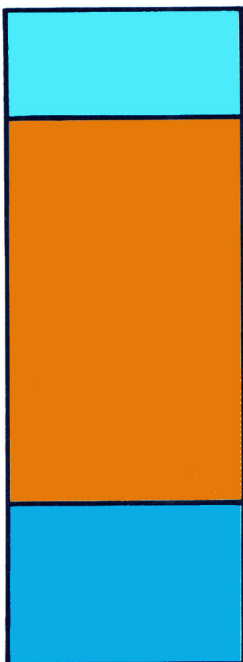
The package mimics other spreadsheets in its commands (/R means replicate a cell or group of cells; /B blanks



This powerful integrated spreadsheet offers an Apple alternative to Lotus 1-2-3 at a reasonable price.

out a cell) and functions. You can split your screen into two windows (to view two sections of your worksheet simultaneously, as shown in **Photo 2**) and lock your titles. The program also includes financial functions, such as internal rate of return (IRR) calculations and logical operators (such as AND, IF, and NOT).

The few differences between SuperCalc3a and other spreadsheets are for the better. For instance, instead of VisiCalc's shifted greater-than symbol (>),



which means "go-to" a cell, SuperCalc3a uses the equal sign—you can enter the command with one keystroke instead of two. When figuring a percentage, don't worry about decimal places: 61%C7, for instance, calculates and displays 61 percent of the total in cell C7.

SuperCalc3a also controls date manipulations by assigning a number to each day from March 1, 1900 to February 28, 2100. First, the program prompts you for the current date. You can then direct it to produce specific information, such as entering any date into a cell or determining the correct date if, say, you wanted to subtract

100 days from March 17, 1986. The program knows what's what: If you try to enter February 29, 1985, the system won't accept it. However, SuperCalc3a (**Photo 3**) will let you enter February 29th for a leap year.

This package is fast. Once you enter data and move down a column, for example, the return key keeps you heading in the same direction. You may not always want the program to perform this way, however, so you can override the function. Flexibility is a trademark of SuperCalc3a. Since you can conduct some functions in more than one way, you can select the one that works best for you.

As in other spreadsheets, you can adjust individual column widths, hide specific information, and protect cells so their data can't be changed. The system lets you create lookup tables and move a full screen in any direction. To select a range of cells (to graph their data, for example), you can either enter the starting and ending cells or point to specific cells with the cursor. If you follow the latter option, the cells appear in inverse video on your screen. If you want special formatting (such as commas or dollar signs) for a group of cells, use the program's eight user-definable formats, which you can adjust to your specifications.

Command Files

In the command-file mode, you can write instructions the program will

1 A
2) CONSOLIDATED MONTHLY PAYROLL: JULY

Today's Date 7/17/1984 Deduction Percentages
Payroll Start Date 7/ 1/1984 Fica 6.700%
Days this period 17 State .82
Recalculate YTD? N

Emp#	Employee	St	Gross Salary	Total Deduct	Net Pay	YTD Gross
34	Adams	M	\$1,100.00	(\$82.50)	\$1,017.50	\$6,200.00
92	Jones	M	\$750.00	(\$56.25)	\$693.75	\$5,250.00
84	Johnson	S	\$1,200.00	(\$90.00)	\$1,110.00	\$5,950.00
92	Jones	M	\$900.00	(\$67.50)	\$832.50	\$6,300.00
12	Samson	S	\$500.00	(\$42.00)	\$458.00	\$3,920.00
19	Santos	M	\$650.00	(\$48.75)	\$601.25	\$4,550.00
45	Smith	S	\$700.00	(\$52.50)	\$647.50	\$4,900.00

Total # employees 7
Totals in 100s:
Gross Salaries \$58.6

↑ A2
Width: 6 Memory: 52 Last Col/Row: H36 ? for HELP

Photo 1. SuperCalc3a's spreadsheet is a 254-row-by-63-column grid.

carry out automatically. This mode lets you streamline your data entry. When you load a worksheet, data move from cell to cell; then the worksheet waits and prompts you to enter more data according to your instructions. All keyboard commands are available in this mode.

Picture Perfect

One of SuperCalc3a's highlights is its ability to create graphs based on your worksheet's data. You can display seven graph types in up to 15 colors on a color monitor, or chart up to 99 colors with a plotter. (See **Photo 4** for an example.) The *V*(iew) command is almost automatic, since the options have built-in defaults. You can change the default settings to add titles, legends, grid lines, and the like.

Select from eight fonts (similar to Lotus 1-2-3's) for your picture text. The program will scale your graphs, but you can also do it manually. You can adjust the printed size of your image and tell the system where to place the picture on paper. For a pie chart, the program automatically converts data into a percentage of the total. Each worksheet can contain descriptions and details for up to nine graphs.

The package displays your pictures fairly rapidly, but it doesn't reproduce them as fast on paper. And it's designed to work more effectively with a plotter than a printer.

You'd expect the usual line, column, and pie charts, but the program also offers X-Y graphs, pie charts highlighted with a detached slice, stacked column charts, and high-low charts

for graphing information such as stock prices. These types work well, but I was disappointed with SuperCalc3a's area graphs—graphs that fill in the area below a line with shading or color. SuperCalc3a's area graphs plot the values of more than one data set, but display the total as a line chart. Despite this drawback, you can use label points and grid lines and put names and numbers along either axis. Printing or plotting is always only two key-strokes away—a nice feature.

Data Manipulations

With SuperCalc3a's miniature data base, you can search through your

spreadsheet's rows or columns for information. You may request exact or partial matches between data and search criteria, or you may place a copy of those data in another area of your worksheet. You can also ask for an AND search (find items that meet both this criterion AND that criterion) or an OR search (find items matching this OR that). To find textual data, however, the fit must be exact (the word "Apple" doesn't match "apple").

The system can also sort alphabetically or numerically on two fields simultaneously. Since everything is in memory, sorting is almost instantaneous.

Sideways

A terrific extra is Sideways, a package that lets you print your worksheet down the page. With six type sizes, the program gives you complete margin control, variable spacing between lines and characters, and a double-strike option for darker print.

You can print your worksheet any time, but you must follow additional steps to print it sideways. Change your page width to zero, then save the worksheet on disk as a special print file. Exit SuperCalc3a, load Sideways, and print the worksheet. When you want to print a file using Sideways, the file name must include a special .PRN extension. It's a small, but somewhat annoying, price to pay for clean printouts.

A Few Suggestions

SuperCalc3a's manual is filled with good illustrations, and includes two quick-reference cards and three copy-

1 A
2) Income Statement

	Q1	Q2	Q3	Q4	Year
Sales	25000	20000	35000	25000	SUM(B5:E5)
Costs	60285	60205	60205	60205	60205
Profit	85-06	05-06	05-06	E5-E6	F5-F6
EXPENSES					
General & Admin	3,750.00	3,000.00	5,250.00	3,750.00	15,750.00
Consultant Fees	3,000.00	2,400.00	4,200.00	3,000.00	12,600.00
Total Expenses	6,750.00	5,400.00	9,450.00	6,750.00	28,350.00
Net Before Tax	3,250.00	2,600.00	4,550.00	3,250.00	13,650.00
Income Tax	650.00	520.00	910.00	650.00	2,730.00
Net Income	2,600.00	2,080.00	3,640.00	2,600.00	10,920.00

↑ A2
Width: 15 Memory: 54 Last Col/Row: G19 ? for HELP

Photo 2. A SuperCalc3a spreadsheet with windowing option.

you oughtta be **the contest**
in pictures

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- Animate
- Produce Your Own Computer Movies



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- Bob Singer; Art Director, Hanna Barbera Productions
- Vibeke Sorensen; Educator/Animator, California Institute of Technology, California Institute of the Arts
- Maggie Canon; Editor, A + Magazine

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CITY, STATE, ZIP _____

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able program disks. The package, however, needs a thorough tutorial both in the documentation and on disk, similar to VisiCalc's. An introductory booklet supplies some tutorial information, but little else.

SuperCalc3a's manual says nothing about statistical analysis, other than a reference to LEASTSZ.CAL, a worksheet on the Tools disk. This worksheet provides a template that calculates the mean, standard deviation, least square regression, and the correlation coefficient of a series of numbers you enter. Unfortunately, neither the worksheet nor the manual elaborates on these features. The authors seem to expect that if you understand the terms, you can figure things out for yourself.

Although you can use the system with a single disk drive, it's much more effective with two. Most commands don't need to go to the disk for instructions, but some do, so your program disk must always be in the drive. As you load or save worksheets, you must constantly swap your program and data disks. The situation gets worse when you work with graphics; when you create a picture of your numbers, the program always reads from disk for a few seconds. That means you must juggle three disks—program, data, and graphics.

The situation improves with two disk drives, but it isn't perfect. When you want to create a graph with the /V(iew) command, the program goes to the Graph disk for instructions. If you want to change the graph or title, for example, you must repeat the procedure. Each time you alter something on your picture, you must wait for the disk to load instructions. Examining the same set of numbers on different graphs or scales—one benefit of looking at pictures of your data—becomes a slow process.

While you can add titles and other descriptive labels to your charts, there are some limitations. For instance, any axis label or text for a title must already reside in a cell on the worksheet—you can't just type it in. There is no provision (as there is with other programs) for positioning textual data on your graph.

The Bottom Line

Here's a nice touch: Once you register your package, Sorcim/IUS provides free telephone support (but no toll-free number). If a representative doesn't answer your call within two minutes, a machine will record your name and



Photo 3. SuperCalc3a.

number and someone on the courteous, adept staff will return your call.

If we're to understand our own numbers, the integration between spreadsheet data and graphics is a must. SuperCalc3a's ability to print or plot with a keystroke or two is useful and convenient. The data-base function is less comprehensive, but it's there if you want it.

Although I'd like to see full-word prompts, so that you don't have to remember that /U means "unprotect" or /M means "move," SuperCalc3a is a terrific package that fits today's business needs. ■

Write to Gregory R. Glau at 508 Miller Road, P.O. Box 1627, Prescott, AZ 86302.

Product Information

SuperCalc3a

Sorcim/IUS
215 Fortune Drive
San Jose, CA 95131
(408) 942-1727

Integrated spreadsheet, graphics, and data base with Sideways print utility
Apple //c and enhanced //e, 128K
\$195

★ ★ ★

Reader Service Number 546

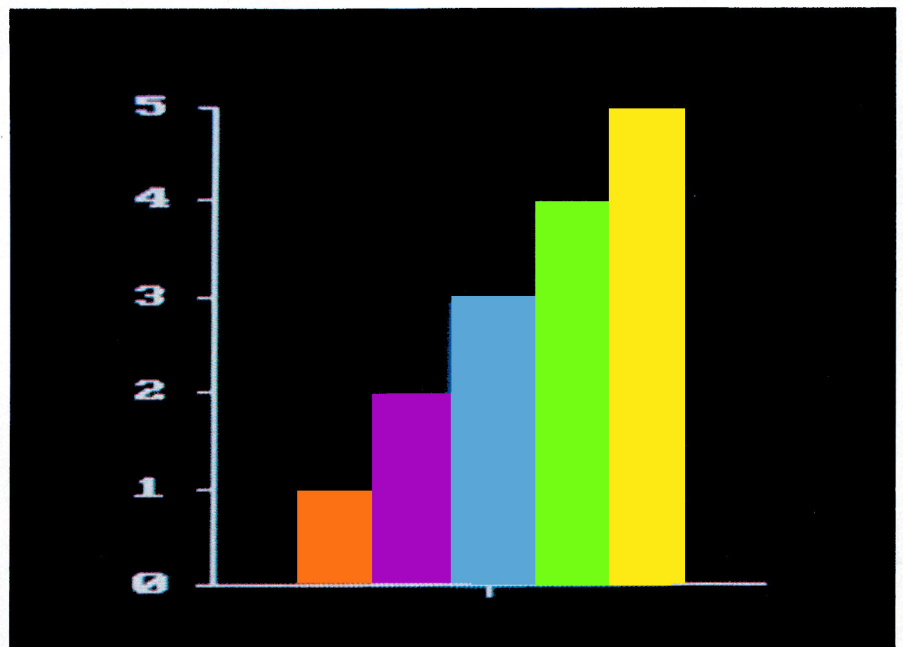


Photo 4. SuperCalc3a creates graphs based on your worksheet's data.

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CORRESPONDENCE QUALITY	
Standard	Not Available
MULTI-TYPESTYLE CARTRIDGES	
Yes	No
MODULAR INTERFACE	
Yes	No

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Circle 6 on Reader Service Card.



Expanding Your IIC Is Easy With Z-RAM

Applied Engineering and Apple computer have teamed up to take your IIC to new heights.

Applied Engineering's Z-RAM card for the IIC is available with 256K or 512K of additional memory and a powerful Z-80 microprocessor for running CP/M software.

Z-RAM fits neatly inside the IIC. Installation is easy, clear instructions show you how. You'll need a screwdriver and about 10 minutes (if you can change a light bulb you can install Z-RAM).

Z-RAM and Appleworks will knock your socks off.



A 256K Z-RAM will give you a 229K available desktop and Appleworks will be completely loaded into memory. Appleworks will now run about 10 times faster in your IIC with 1 disk drive than in other IIC's with 2 disk drives. A 512K Z-RAM will give you a 413K available desktop. A 256K Z-RAM can be upgraded to 512K by just plugging in more memory chips.

Z-RAM is also a high speed solid state disk drive. With Z-RAM, your programs will load and save over 20 times faster. Z-RAM's RAM disk is compatible with Applesoft, ProDOS, DOS 3.3, PASCAL and CP/M. And with Z-RAM, you can copy a disk in one pass. Just insert the original, remove the original, insert blank disk! That's it! Z-RAM is another disk drive, only 20 times faster, 4 times larger capacity, and no whirring, clicking or waiting!

But before you start panting over all that extra memory, don't forget that the Z-RAM card has a built-in high speed Z-80 processor chip that allows you to run CP/M programs like Wordstar, dBASE II, Turbo PASCAL, Microsoft BASIC, FORTRAN and COBOL and over 3,000 other CP/M programs. So Z-RAM not only makes Apple programs run better and faster, it lets you run MORE programs.

With the Z-RAM card installed, your IIC is still your IIC only now you'll have that extra memory that Appleworks

and other programs need. And you can run all that great CP/M software that others can only dream about.

Z-RAM is 100% compatible with all IIC software and hardware including the mouse, 2nd disk, modem and printer. Z-RAM is easily handled by the IIC power supply as power consumption is kept very low by using two custom integrated circuits and a patent pending power saving design. And Z-RAM is from Applied Engineering, the acknowledged leader and innovator of accessories for the Apple.

Z-RAM comes complete with manual, RAM disk software, Z-80 operating system, CP/M manual and a 3 year no hassle warranty.

So the next time somebody asks you why you didn't get an IBM P.C., tell him you bought a IIC because the IBM didn't have enough memory and was too slow and couldn't run CP/M software. And tell him you made it past the 8th grade.

Z-RAM with 256K
Z-RAM with 512K

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\$549

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by Jack McCornack

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And you thought you ordered a II to go. They told you that little bundle of compact circuitry was portable when they sold you the //c, didn't they? And it could be—if it came with 128K feet of extension cord. You can easily carry the //c from one wall plug to another, but that's not true portability. Portability means you can use it not only in your office or home, but in a car, a campsite, or a foreign country.

With a bit of time and equipment, you can wean your //c from the wall plug. Most people think the //c operates on 110-volt alternating current. Not so—your 15-volt computer actually has a house-current adapter, but it can run on 12 volts. For portability's sake, simply eliminate the adapter.

With about \$7 and one hour's work, you can make an "un-adapter." Given a few more dollars, you can have an adapter that will plug into your car's cigarette lighter. And since the //c can run on 12 volts, you've greatly improved your machine's chances of portability. More than likely, your car has a 12-volt battery—so does your motorcycle, snowmobile, ultralight aircraft, and ski-boat. Add a pocketful of flashlight batteries or a 12-volt rechargeable power pack, and your //c can tag along wherever you roam.

36 inCider August 1985

Table 1. Automobile adapter parts list.

Part	Part Number	Price
Dashboard power cord with replaceable fuse	RS#270-1533	\$ 3.49
Fast-acting 1.5-amp fuse	RS#270-1274	.69
Seven-pin DIN socket (female)*		3.10

*From Pearl Electronics

Table 2. Universal un-adapter parts list.

Part	Part Number	Price
Inline fuse holder	RS#270-1281	\$.89
Insulated, stranded, 20-gauge copper wire	RS#278-554	1.99
Two heavy-duty insulated clips (one red, one black)	RS#270-349	1.79
Fast-acting 1.5-amp fuse	RS#270-1274	.69
Seven-pin DIN socket (female)*		3.10

*From Pearl Electronics

Equipment and Materials

You'll need a soldering iron, wire stripper, solder, and heat-shrink insulation tubing to get started. If you can't find these things at home, check your Radio Shack or local computer store. Refer to **Tables 1** and **2** for the parts you'll need to build the automobile adapter and the universal un-adapter.

On the back of your //c, the power inlet has seven pins in a circle with a gap at the top (see the **Figure**). The first and last pins, the ones adjacent to the gap, aren't connected to anything. The bottom pin is the chassis ground,

which connects to the ground prong on the house-current adapter. You need to be concerned only with pins 2, 3, 5, and 6. The two pins closest to the power switch are negative, and the other two are positive (see the **Figure**).

To avoid miswiring, remove connectors 1, 4, and 7 from the socket—not the computer. Bend connector tabs 2 and 3 together and tabs 5 and 6 together, so you can solder each pair to one wire.

For the automobile adapter (see **Photo 1**), strip half an inch of insulation from each lead on the dashboard

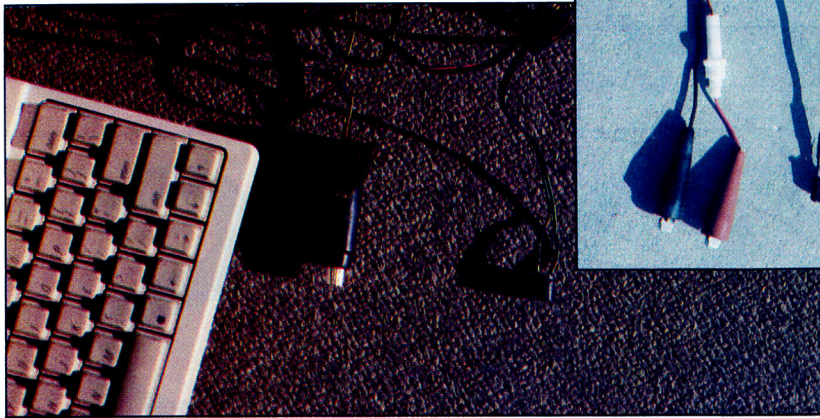


Photo 1. The automobile adapter for the Apple //c.

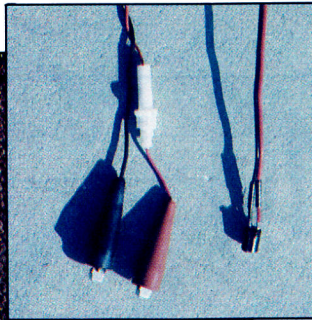


Photo 2. The universal un-adapter.

power cord. Solder the black wire (negative) to the pair of tabs on the switch side of the socket. Solder the red wire (positive) to the other pair of tabs.

The universal un-adapter (see **Photo 2**) is a little trickier:

- 1) Cut two convenient lengths of wire (enough to cover the distance from your computer to the power supply) and strip each end.
- 2) Solder one end of each wire to a pair of tabs on the socket.
- 3) Attach the black clip to the negative wire.
- 4) Solder one lead of the fuse holder to the positive wire, and the other lead to the red clip.

You can clean up the soldered joints by covering them with heat-shrink tubing, but it isn't necessary. Just install the 1.5-amp fuse and you're ready to go.

Not so fast, though. You still need a 12-volt monitor—either Apple's Flat Panel Display or a portable 5-inch television from Radio Shack. Each has its advantages and drawbacks: The Flat Panel Display suffers from low contrast, a stretched screen, and a high price, but it's small and lightweight, and has a low current draw (see *inCider's* review, June, p. 95). The portable television rivals the //c in size and

requires flashlight batteries or another lead to the power cord you made. It's only one-fifth the price of the Flat Panel Display, however, and the screen is bright and undistorted.

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DC is the same everywhere. And since today's automobiles have 12-volt batteries, battery chargers are available worldwide. So, just hook in your "un-adapter" (and an American television or monitor) and do some work while you're away from home.

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When he's not traveling with his //c, Jack McCornack picks up his mail at Box 2071, Los Gatos, CA 95031.

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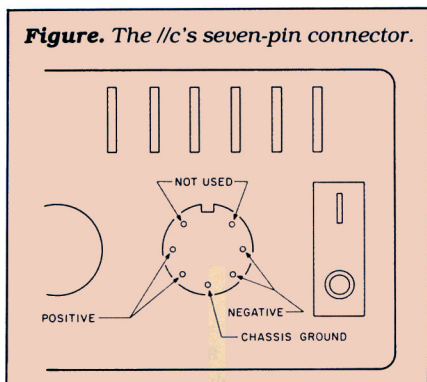
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Using ProDOS Part 6

Operating in Harmony

by Lee Swoboda

Now that you're familiar with ProDOS directory structure and the use of ProDOS commands in BASIC programs, let's examine ProDOS' compatibility with existing programs and some of the new errors you may run into. Although most Applesoft commands work the same way in ProDOS as they do in DOS 3.3, you will have to alter others (see **Table 1**). A discussion of some of these changes follows:

● **Control-D.** Because of a curious interaction between the Applesoft GET command and DOS 3.3, some programs insert a carriage return, CHR\$(13), before control-D, CHR\$(4). Use only control-D in ProDOS.

● **File-access commands.** In ProDOS, you can use semicolons within a PRINT statement to join parts of it, but you can't end the statement in a semicolon.

● **Volume parameter.** With DOS 3.3, you can initialize a disk with a specific volume number from zero to 254, and

Switching from DOS 3.3 to ProDOS means modifying your programs.

reference it with a V parameter in your file-access commands. The volume name in ProDOS completely negates the need for a volume parameter.

● **Chaining.** The DOS 3.3 System Master disk contains a binary program called Chain. Using it is rather involved (see p. 106 of *The DOS Manual*). The ProDOS CHAIN command is a simplified simulation of this process.

● **Ending a program.** The END statement is optional in both DOS 3.3 and ProDOS. ProDOS, however, doesn't automatically close text files when the program ends—you must insert a CLOSE statement at each exit.

● **Formatting.** ProDOS has no single command like DOS 3.3's INIT to format a blank disk (see Part 2 of this series). You will have to rewrite any part of a BASIC program that uses the INIT command.

● **File buffers.** DOS 3.3's MAXFILES command lets you vary the maximum number of files that may be open at one time from one to 16. ProDOS allows a maximum of eight open files, with no provision to vary that number.

● **Garbage collection.** ProDOS' special FRE command clears old strings from memory. (See Part 4 of this series for further information.)

● **Free memory.** As in DOS 3.3, the ProDOS formula also lets you determine the amount of random access memory left after the computer allocates space to your BASIC program and variables.

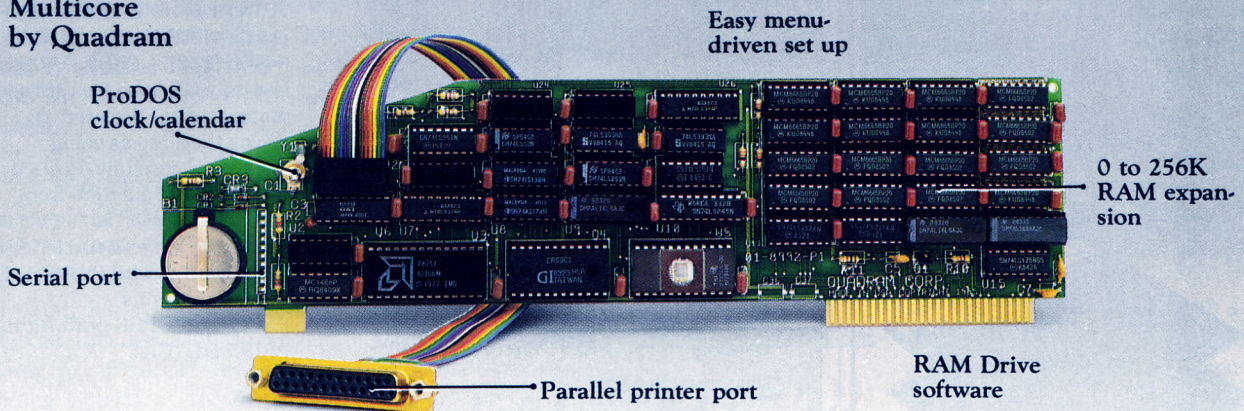
New Errors

With ProDOS, as with DOS 3.3, some errors are related to the operat-

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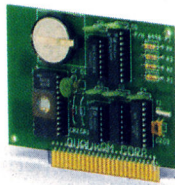
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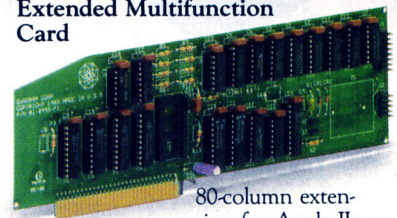
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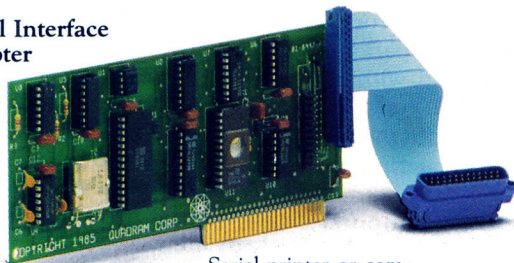
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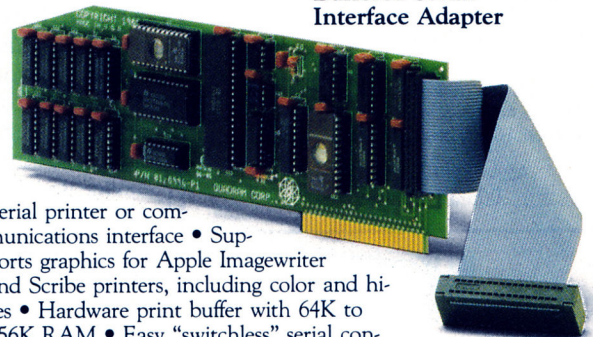
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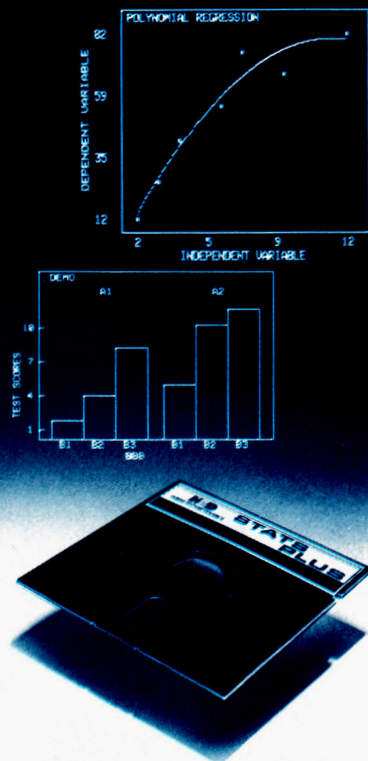


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Table 1. Conversion of DOS 3.3 Applesoft programs to ProDOS.

Subject	DOS 3.3 Format	ProDOS Format
*Control-D	D\$ = CHR\$(13) + CHR\$(4)	D\$ = CHR\$(4)
*File access	PRINT D\$;"OPEN"; PRINT F\$	PRINT D\$;"OPEN";F\$
*Volume name	VO-V254	/VOLUME.NAME
*Chaining	PRINT D\$;"BLOOD CHAIN, A520";CALL 520;"FILE 2"	PRINT D\$;"FILE.2"
*Ending	END PRINT D\$;"FP"	PRINT D\$;"CLOSE";END PRINT D\$;"CLOSE";NEW:END
*Formatting	PRINT D\$;"INIT. . ."	Not allowed
*File buffers	PRINT D\$;"MAXFILESn"	Ignored
Monitor DOS	PRINT D\$;"MON C,I,O"	Not allowed
	PRINT D\$;"NOMON C,I,O"	Ignored
I/O slots	IN#slot PR#slot	PRINT D\$;"IN#slot" PRINT D\$;"PR#slot"
*Garbage	X = FRE(0)	PRINT D\$;"FRE"
Free memory	PRINT FRE(0)	PRINT D\$;"FRE";PRINT PEEK (111) - PEEK(109) + 256 (PEEK(112) - PEEK(110))
HIMEM		Use only when no files are open and no strings declared
PEEK, POKE, or CALL		Check the address being referenced carefully. ProDOS addresses are different from DOS 3.3
BLOOD or BRUN		Check the address and length to avoid conflict with ProDOS or HIMEM locations
Path names	PRINT D\$;"OPEN file name"	PRINT D\$;"OPEN path name"
Catalog	PRINT D\$;"CATALOG"	PRINT D\$;"CAT"
*Discussed in text.		

ing system and others to the language (Applesoft BASIC). The new ProDOS commands introduce additional possibilities for error. The error-handling procedure for ProDOS, however, is similar to that for DOS 3.3: The computer beeps and prints an error message on the screen. **Table 2** summarizes the errors you can make with each ProDOS command, and **Table 3** explains their probable causes. Below is a more detailed explanation of the errors you might encounter when using ProDOS's new commands:

● **No device connected.** This error occurs if you use the slot/drive parameters in a ProDOS command with no interface card in the slot, or if you specify a peripheral slot number in the IN# or PR# command when the peripheral device isn't connected.

● **Path not found.** If the computer can't find the path name you specify, check your spelling and make sure the file actually exists. Also, check that you didn't use a partial path name that is invalid for the current prefix, or that you didn't change floppy disks, making the current prefix invalid.

● **Invalid option.** Make sure you use the correct options with ProDOS commands (see **Tables 4** and **5**).

● **Directory full.** You can't add

(SAVE, BSAVE, CREATE, or STORE) more than 51 files to the volume directory. If you have additional files, you should rearrange your disk to place more files in subdirectories, since ProDOS doesn't limit their size.

● **File not open.** You must first open a file with the OPEN command before you can perform an operation (POSITION, READ, or WRITE) on it. The DOS 3.3 READ and WRITE commands automatically open and close files before performing the operation.

● **Duplicate file name.** You can't create or rename a file with a name that already exists.

● **File busy.** It is difficult to destroy data in files with ProDOS; for instance, it won't let you perform an operation (CAT, CATALOG, DELETE, or RE-NAME) on a file that is still open. You must open files yourself, and close them later.

● **File(s) still open.** This message occurs when an error or control-C halts program execution without closing open files. You must close open files from the immediate mode before you can load or run the next program.

Benchmarks

Since ProDOS accesses files and collects garbage faster than DOS 3.3, pro-

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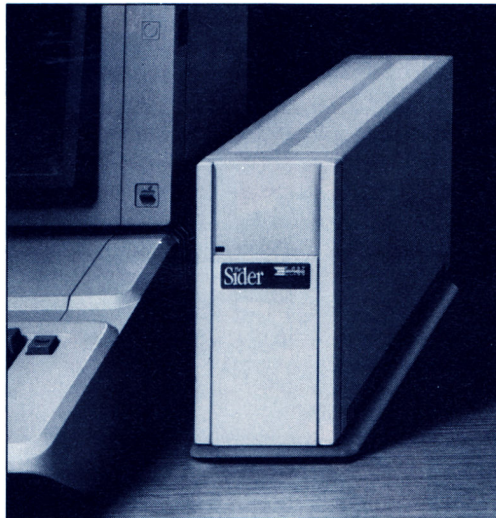
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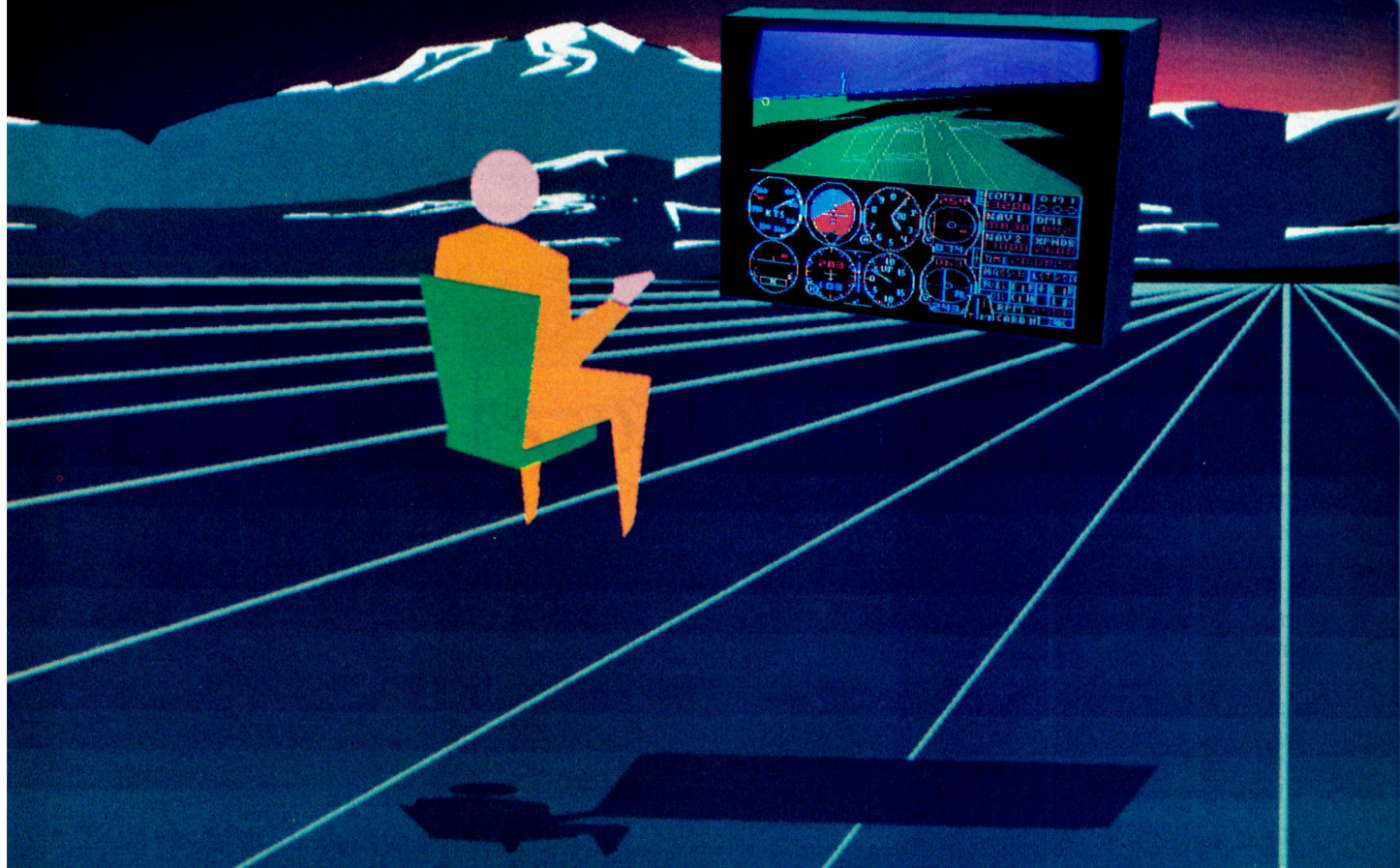
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grams that use strings and disk access extensively usually execute faster under ProDOS. Results vary with the circumstances, but from **Table 6** you can see that ProDOS is consistently faster than DOS 3.3 in all file-access operations, especially in accessing text files. That additional speed, along with the new INPUT and FRE commands, brings Apple up to par with CP/M- and MS-DOS-based computers in ease of handling.

Where Do You Go from Here?

In this series, I've condensed the most important aspects of ProDOS, but I've only scratched the surface. Here are some additional topics you might explore:

- **Machine-language interface (MLI).** Machine-language routines for assembly-language programmers are easy to access with ProDOS.
- **File structure.** You can use a hard

disk on your Apple II to avoid worrying about the size of your files.

- **Treatment of text.** ProDOS handles text differently from DOS 3.3.
- **Interrupts.** ProDOS can handle interrupts—signals from another device that it needs attention; DOS 3.3 can't.
- **Directory structure.** The internal structure of ProDOS's directories is different from that of DOS 3.3's.
- **Disk arrangement.** The ProDOS disk, like the DOS 3.3 disk, has 35

Table 2. ProDOS commands and error messages.

Command	Error Message																					
	Range error	No device connected**	Write protected	End of data	Path not found**	I/O error	Disk full	File locked	Invalid option**	No buffers available	File type mismatch	Program too large	Not direct command	Syntax error	Directory full**	File not open**	Duplicate file name**	File busy**	File(s) still open**	Undef'd statement error	Bad branch error	
APPEND	•	•	•		•	•		•	•	•	•		•	•								
BLOAD	•	•			•	•		•		•	•		•	•								
BRUN	•	•			•	•		•		•			•	•								
BSAVE	•	•	•		•	•	•	•		•			•	•								
*CAT	•	•			•	•		•	•	•			•	•			•					
CATALOG	•	•			•	•		•	•	•			•	•			•					
*CHAIN	•	•			•	•		•		•	•		•	•						•	•	
CLOSE					•			•					•	•								
*CREATE	•	•	•		•	•	•	•					•	•		•						
DELETE	•	•	•		•	•		•		•			•	•			•					
EXEC	•	•			•	•		•	•	•			•	•								
*FLUSH	•				•			•					•	•								
FP													•	•					•			
*FRE													•	•								
INT													•	•					•			
IN#	•	•						•					•	•								
LOAD	•	•			•	•		•		•	•		•	•								
LOCK	•	•	•		•	•		•		•			•	•								
OPEN	•	•	•		•	•	•	•	•	•		•	•	•								
POSITION	•			•		•		•				•	•	•		•						
*PREFIX	•	•			•	•		•		•			•	•								
PR#	•	•						•					•	•								
READ	•			•		•		•				•	•	•		•						
RENAME	•	•	•		•	•		•		•			•	•		•	•					
*RESTORE	•	•	•		•	•	•	•		•	•		•	•								
RUN	•	•			•	•		•		•	•		•	•						•	•	
SAVE	•	•	•		•	•	•	•		•			•	•								
*STORE	•	•	•		•	•	•	•		•			•	•								
UNLOCK	•	•	•		•	•		•		•			•	•								
WRITE	•		•		•	•	•	•				•	•	•		•						
*DASH(-)	•	•			•	•		•	•	•	•		•	•			•	•	•			

*New commands
**New ProDOS errors

tracks with 16 sectors per track, but ProDOS uses them differently.

Additionally, Apple publishes three excellent manuals on ProDOS, each with an accompanying disk:

- *ProDOS User's Kit* (Apple product A2D2010, \$40), including the *ProDOS User's Manual*, *ProDOS Supplement to Apple //e Owner's Manual*, and ProDOS User's Disk (the ProDOS master disk). The manual covers the use of ProDOS utilities.

- *ProDOS BASIC Programmer's Kit* (Apple product A202037, \$35), including the *BASIC Programming with ProDOS* manual and ProDOS BASIC Programming Examples disk. The

manual covers the use of ProDOS in BASIC. The disk provides examples of BASIC programs that use ProDOS commands, and also includes the AppleSoft Programmer's Assistant (APA), which lets you renumber and merge Applesoft programs.

- *ProDOS Technical Reference Workshop* (Apple product A2W0010, \$25), including the *ProDOS Technical Reference Manual* and ProDOS Exerciser disk. The manual thoroughly covers the technical details of ProDOS—the location of all bytes. The disk leads you through step-by-step instructions for using ProDOS from machine language.

These six articles should help those of you who own ProDOS to use it more effectively and understand how it differs from DOS 3.3. ProDOS is a sophisticated disk operating system, and is a significant improvement over DOS 3.3—I hope this series will influence those of you who don't already own ProDOS to buy it. ■

Lee Swoboda can't answer all questions individually. However, if the answer is not lengthy and you include a stamped, self-addressed envelope, he'll do his best to respond. Lee Swoboda's address is Padapple Computer Consulting, 1451 N.E. Paulson Road, Poulsbo, WA 98370.

Table 3. ProDOS errors and probable causes.

Applesoft
ProDOS
DOS 3.3

Error Message	Code**		Probable Cause
Bad subscript	107	•	Array subscript beyond DIM'd value
*Directory full	17	•	Attempt to add more than 51 files to volume directory
Disk full	9	• •	No more storage space on disk
Division by zero	133	•	Divisor in Applesoft formula is zero
*Duplicate file name	19	•	Attempt to CREATE or RENAME file that already exists
End of data	5	• •	Attempt to READ beyond last record of TXT file
*File busy	20	•	Attempt to OPEN file that is already open
File locked	10	• •	Attempt to WRITE to locked file
*File not open	18	•	Attempt to READ or WRITE closed file
File type mismatch	13	• •	Attempt to use invalid command for file type
*Files still open	21	•	Last program ended without closing files
Formula too complex	191	•	More than two IF. . . THEN conditions executed at once
I/O error	8	• •	Disk drive door open, no disk in drive, or disk unformatted
Illegal quantity	53	•	Numeric value beyond allowable range
*Invalid option	11	• •	Invalid optional command parameter
Language not available	1	•	Attempt to run integer BASIC program
NEXT without FOR	0	• •	More NEXTs than FORs
No buffers available	12	• •	Attempt to OPEN more than eight files
*No device connected	3	• •	Attempt to access an empty peripheral slot
Not direct command	15	• •	Command must be used in deferred mode
Out of data	42	•	Attempt to READ past last DATA statement
Out of memory	77	•	Program too large or too many variables
Overflow	69	•	Attempt to use number greater than ± 1.7E38
*Path not found	6	• •	No path with indicated name
*Path not found	7	• •	No path with indicated name
Program too large	14	• •	Insufficient memory for CHAIN
Range error	2	• •	Optional command parameter beyond allowable value
REDIM'd array	120	•	Attempt to use DIM statement for previously DIM'd array
RETURN without GOSUB	22	•	More RETURNS than GOSUBs
String too long	176	•	Attempt to build string longer than 255 characters
Syntax error	16	• • •	Spelling or punctuation error
Type mismatch	163	• •	String and numeric variables mixed in same operation
Undef'd function	224	•	Used FN statement without DEF FN
Undef'd statement	90	•	Attempt to GOTO nonexistent line number
No message displayed	254	•	Invalid response to INPUT statement
No message displayed	255	•	Control-C program interruption

* New ProDOS error

** Value obtained using Applesoft statement "PRINT PEEK(222)"

Table 4. Valid options for ProDOS commands.

ProDOS Command Format

BLOAD path name, <i>An,Bn,Ln,Txxx,Sn,Dn</i>	IN#n
BLOAD path name, <i>An,Bn,En,Txxx,Sn,Dn</i>	IN#An
BRUN path name, <i>An,Bn,Ln,Sn,Dn</i>	LOAD path name, <i>Sn,Dn</i>
BRUN path name, <i>An,Bn,En,Sn,Dn</i>	LOCK path name, <i>Sn,Dn</i>
BSAVE path name, <i>An,Ln,Bn,Txxx,Sn,Dn</i>	POSITION path name, <i>Fn</i>
BSAVE path name, <i>An,En,Bn,Txxx,Sn,Dn</i>	POSITION path name, <i>Rn</i>
CAT path name, <i>Sn,Dn</i>	PREFIX path name, <i>Sn,Dn</i>
CATALOG path name, <i>Sn,Dn</i>	PR#n
CHAIN path name, <i>@n,Sn,Dn</i>	PR#An
CLOSE path name, <i>Sn,Dn</i>	PR#n,An
CREATE path name, <i>Txxx,Sn,Dn</i>	RENAME path. 1, <i>path.2,Sn,Dn</i>
DELETE path name, <i>Sn,Dn</i>	RESTORE path name, <i>Sn,Dn</i>
EXEC path name, <i>Fn,Sn,Dn</i>	RUN path name, <i>@n,Sn,Dn</i>
EXEC path name, <i>Rn,Sn,Dn</i>	SAVE path name, <i>Sn,Dn</i>
FLUSH path name, <i>Sn,Dn</i>	STORE path name, <i>Sn,Dn</i>
FRE	UNLOCK path name, <i>Sn,Dn</i> - path name, <i>Sn,Dn</i>

Sequential Text-File Commands

APPEND path name, <i>Txxx,Sn,Dn</i>	READ path name, <i>Fn,Bn</i>
OPEN path name, <i>Txxx,Sn,Dn</i>	WRITE path name, <i>Fn,Bn</i>

Random Access Text-File Commands

APPEND path name, <i>Ln,Sn,Dn</i>	READ path name, <i>Rn,Fn,Bn</i>
OPEN path name, <i>Ln,Sn,Bn</i>	WRITE path name, <i>Rn,Fn,Bn</i>

Roman portions are mandatory; italic portions are optional.



Table 5. Allowable values for options shown in Table 4.

Description	Syntax	Range of n
Slot number	.Sn	1 to 7
Drive number	.Dn	1 or 2
Field number	.Fn	0 to 65535
Record number	.Rn	0 to 65535*
Number of bytes	.Bn	0 to 65534**
Address in RAM	.An	0 to 65535
Length in bytes	.Ln	1 to 65535
End address in RAM	.En	1 to 65535
At line number	.@n	0 to 65535
Slot number***	n	0 to 7
File type	Txxx	see Part 2

- * Rn is limited to 16 megabytes divided by record length (L) or 65535, whichever is less.
- ** Bn is limited to one less than the record length (L - 1) or 65535, whichever is less.
- *** Used in the IN# and PR# commands.

Table 6. Faster execution of certain commands under ProDOS.

Command	ProDOS Execution Rate (Times Faster than DOS 3.3)
WRITE	3-4
READ	5-6
APPEND	3-4
SAVE	2
LOAD	5-6
BLOAD	3-4
BSAVE	2


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Text Tricks

by Konstantin J. Zsigo

Custom-designed text-screen displays add elegance and interest to programs. Creating them is not as difficult as it may seem—the routines presented here will teach you how.

The customary Applesoft commands for putting characters on the screen are PRINT, VTAB, HTAB, TAB(), and SPC(); HOME clears the screen. Using just this simple vocabulary, a one-line program such as **Listing 1** can create an attractive display.

The key element is the VTAB PEEK (37) command. Location 37 contains the value of the line on which the cursor currently rests, minus one. So,

Listing 1. Text Tricks.

```
10 HOME : FOR A = 29 TO 8 STEP -
1: FOR B = 1 TO A: PRINT TAB(
B);"TEXT TRICKS": VTAB PEEK
(37): NEXT B: PRINT : NEXT A:
GOTO 10
```

when you VTAB to that location, the cursor returns to the previously printed line, and the next PRINT statement prints over the old TEXT TRICKS—this time, one position to the right.

Now, try replacing:

```
: PRINT TAB(B); "TEXT TRICKS"
```

with

```
: HTAB B : PRINT "TEXT TRICKS"
```

Notice the difference between the two

commands: One leaves a trailing T; the other doesn't.

The tabbing and printing routine in **Listing 1** is specialized and restricted. Sliding a word backward, sideways, or upside down involves a more complicated—and slower—solution in BASIC. To manipulate the text screen more easily, you must understand

Listing 2. Byte arrangement.

```
10 FOR A = 1024 TO 2047
20 POKE A,197: NEXT A
```

what it is and how it's arranged.

The text screen is simply a 24-row by 40-column area composed of rectangles (960 in all) dedicated to display. Each rectangle, called a byte, represents one character. Your Apple, however, actually has 1024 bytes reserved for the text screen. The remaining 64 bytes remain unused to save computational time for assembler ROM routines.

In addition, these bytes are numbered in a way that makes great mathematical sense in assembler—but not in BASIC—as **Listing 2** demonstrates. The letter E fills the text screen in three installments—first, a line on top, then one in the middle, and finally one on the bottom; then it follows this sequence until the screen is completely filled. This awkward numbering system makes accessing the text-screen bytes cumbersome, but, with a little time and practice, easily managed.

What if you want to put the letter A in the bottom-right corner of the

Listing 3. Backward Text Tricks.

```
10 HOME
20 FOR T = 1477 TO 1448 STEP - 1
30 POKE T + 11,160: REM ERASE TAIL
31 POKE T + 10,147: REM LETTER 'S'
32 POKE T + 9,139: REM LETTER 'K'
33 POKE T + 8,131: REM LETTER 'C'
34 POKE T + 7,137: REM LETTER 'I'
35 POKE T + 6,146: REM LETTER 'R'
36 POKE T + 5,148: REM LETTER 'T'
37 POKE T + 4,160: REM LETTER ' '
38 POKE T + 3,148: REM LETTER 'T'
39 POKE T + 2,152: REM LETTER 'X'
40 POKE T + 1,133: REM LETTER 'E'
41 POKE T,148: REM LETTER 'T'
50 NEXT T
```

screen and keep it there? A PRINT statement will put it there, but the letter (and the whole line) will immediately scroll up a line. A POKE statement remedies this: POKE 2039,193 places and retains the letter A in location 2039.

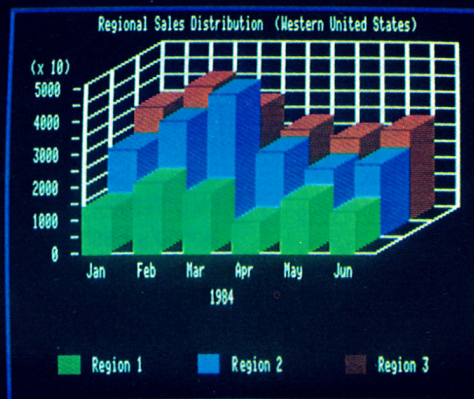
To determine the text-screen location to POKE, you must know the base address of the line, the number corresponding to the leftmost byte on the line (see **Table 1**). To this number add one less than the column position of the location you want.

Next you must determine the ASCII (American Standard Code for Information Interchange) code of the character you want to put in that location. **Table 2** shows a chart of all ASCII codes and their relation to the text screen. The codes range from zero to 255 (\$00-\$FF hexadecimal). To put a flashing Q at line 6, column 17, you must POKE the ASCII code for a flashing Q (81) into line 6, column 17: (166 + 16): POKE 1680,81.

Table 1. Base Addresses.

Line	Base Address
1	1024
2	1152
3	1280
4	1408
5	1536
6	1664
7	1792
8	1920
9	1064
10	1192
11	1320
12	1448
13	1576
14	1704
15	1832
16	1960
17	1104
18	1232
19	1360
20	1488
21	1616
22	1744
23	1872
24	2000

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Table 2. Relationship between ASCII codes and the text screen.

CHR	INV	FLASH	NORM1	NORM2	\$INV	\$FLASH	\$NORM1	\$NORM2
@	000	064	128	192	\$00	\$40	\$80	\$C0
A	001	065	129	193	\$01	\$41	\$81	\$C1
B	002	066	130	194	\$02	\$42	\$82	\$C2
C	003	067	131	195	\$03	\$43	\$83	\$C3
D	004	068	132	196	\$04	\$44	\$84	\$C4
E	005	069	133	197	\$05	\$45	\$85	\$C5
F	006	070	134	198	\$06	\$46	\$86	\$C6
G	007	071	135	199	\$07	\$47	\$87	\$C7
H	008	072	136	200	\$08	\$48	\$88	\$C8
I	009	073	137	201	\$09	\$49	\$89	\$C9
J	010	074	138	202	\$0A	\$4A	\$8A	\$CA
K	011	075	139	203	\$0B	\$4B	\$8B	\$CB
L	012	076	140	204	\$0C	\$4C	\$8C	\$CC
M	013	077	141	205	\$0D	\$4D	\$8D	\$CD
N	014	078	142	206	\$0E	\$4E	\$8E	\$CE
O	015	079	143	207	\$0F	\$4F	\$8F	\$CF
P	016	080	144	208	\$10	\$50	\$90	\$D0
Q	017	081	145	209	\$11	\$51	\$91	\$D1
R	018	082	146	210	\$12	\$52	\$92	\$D2
S	019	083	147	211	\$13	\$53	\$93	\$D3
T	020	084	148	212	\$14	\$54	\$94	\$D4
U	021	085	149	213	\$15	\$55	\$95	\$D5
V	022	086	150	214	\$16	\$56	\$96	\$D6
W	023	087	151	215	\$17	\$57	\$97	\$D7
X	024	088	152	216	\$18	\$58	\$98	\$D8
Y	025	089	153	217	\$19	\$59	\$99	\$D9
Z	026	090	154	218	\$1A	\$5A	\$9A	\$DA
[	027	091	155	219	\$1B	\$5B	\$9B	\$DB
\	028	092	156	220	\$1C	\$5C	\$9C	\$DC
]	029	093	157	221	\$1D	\$5D	\$9D	\$DD
^	030	094	158	222	\$1E	\$5E	\$9E	\$DE
—	031	095	159	223	\$1F	\$5F	\$9F	\$DF
space	032	096	160		\$20	\$60	\$A0	
!	033	097	161		\$21	\$61	\$A1	
"	034	098	162		\$22	\$62	\$A2	
#	035	099	163		\$23	\$63	\$A3	
\$	036	100	164		\$24	\$64	\$A4	
%	037	101	165		\$25	\$65	\$A5	
&	038	102	166		\$26	\$66	\$A6	
'	039	103	167		\$27	\$67	\$A7	
(	040	104	168		\$28	\$68	\$A8	
)	041	105	169		\$29	\$69	\$A9	
*	042	106	170		\$2A	\$6A	\$AA	
+	043	107	171		\$2B	\$6B	\$AB	
.	044	108	172		\$2C	\$6C	\$AC	
-	045	109	173		\$2D	\$6D	\$AD	
.	046	110	174		\$2E	\$6E	\$AE	
/	047	111	175		\$2F	\$6F	\$AF	
0	048	112	176		\$30	\$70	\$B0	
1	049	113	177		\$31	\$71	\$B1	
2	050	114	178		\$32	\$72	\$B2	
3	051	115	179		\$33	\$73	\$B3	
4	052	116	180		\$34	\$74	\$B4	
5	053	117	181		\$35	\$75	\$B5	
6	054	118	182		\$36	\$76	\$B6	
7	055	119	183		\$37	\$77	\$B7	
8	056	120	184		\$38	\$78	\$B8	
9	057	121	185		\$39	\$79	\$B9	
:	058	122	186		\$3A	\$7A	\$BA	
:	059	123	187		\$3B	\$7B	\$BB	
<	060	124	188		\$3C	\$7C	\$BC	
=	061	125	189		\$3D	\$7D	\$BD	
>	062	126	190		\$3E	\$7E	\$BE	
?	063	127	191		\$3F	\$7F	\$BF	

Demo Programs

Now run **Listing 3**. This program uses POKE statements to mimic the sliding TEXT TRICKS in **Listing 1**—but this time backward along line 12 (base address 1448). It's easy to experiment with this routine. Change line 20 to:

```
20 FOR T = 1477 TO 1024 STEP -1
```

The display now slides TEXT TRICKS backward along several lines—one line at a time.

Listing 4 takes off on this idea and does something that would be almost impossible (and definitely impractical) with PRINT statements: It "lays a track" of addresses (an invisible rectangle centered on your screen), along which characters can be passed much like a train. Variable A% assigns the addresses to an array for ease of handling and flexibility. (The percent sign indicates that the addresses are whole-number integers, which Applesoft handles faster.)

CHR	NORM2	\$NORM2
,	224	\$E0
a	225	\$E1
b	226	\$E2
c	227	\$E3
d	228	\$E4
e	229	\$E5
f	230	\$E6
g	231	\$E7
h	232	\$E8
i	233	\$E9
j	234	\$EA
k	235	\$EB
l	236	\$EC
m	237	\$ED
n	238	\$EE
o	239	\$EF
p	240	\$F0
q	241	\$F1
r	242	\$F2
s	243	\$F3
t	244	\$F4
u	245	\$F5
v	246	\$F6
w	247	\$F7
x	248	\$F8
y	249	\$F9
z	250	\$FA
{	251	\$FB
|	252	\$FC
}	253	\$FD
~	254	\$FE
delete	255	\$FF

Test your track by adding line 20 to **Listing 4**:

```
20 FOR M = 1 TO 58 : POKE A%(M),255 :
NEXT
```

You should see a rectangle. If you don't, check your typing.

Now that you've laid the track, you can get creative and pass various characters over it. Modify **Listing 4** by making the changes shown in **Listings 5-8**. Notice the different effects **Listings 5** and **6** produce. (In **Listing 6**, the first two POKEs draw and erase the first light, and the second two POKEs draw and erase the second light.)

Now add a border to enhance the light pattern in **Listing 6** (see **Listing 7**). The train seems to "dig out" its track. Finally, try the variation in **Listing 8**. It uses the plus sign (ASCII 171) for its track, instead of the blank (ASCII 160).

As you can see, the possibilities for creating exciting effects are endless. Try experimenting on your own. Make the track a figure 8, a bigger rectangle, a square, or even a circle. Use a smaller border and words inside the rectangle. You can POKE these values in or print them before the lights begin moving.

As a final demonstration, type in **Listing 9**, Chicago Breeze. Its approach is purely mathematical, but, as you'll see, even math on a computer can be fun. And the only limit is the breadth of your imagination. ■

Address correspondence to Konstantin J. Zsigo at 1709 West Hibbard Road, Owasso, MI 48867.

Superfriendly Menu

by Clay Carr

How would you like to write menus you don't have to "error-trap"—because the user can't make a mistake? How about menus you can operate by pressing any key—no keyboard skills required? What about menus you can set up quickly and easily with a standard formula?

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program for you. Even if you don't like some aspects of it, you can adapt as much of it as you want to your own programming.

Listing 4. Laying the track.

```
10 HOME : DIM A%(59) : GOSUB 200
199 END
200 REM LAY THE TRACK
210 FOR T = 1417 TO 1438 : B = B +
1 : A%(B) = T : NEXT T
220 FOR B = 23 TO 29 : READ A%(B) :
NEXT B
225 DATA 1566,1694,1822,1950,109
4,1222,1350
230 FOR T = 1478 TO 1457 STEP -
1 : A%(B) = T : B = B + 1 : NEXT T
240 FOR B = 52 TO 58 : READ A%(B) :
NEXT B
245 DATA 1329,1201,1073,1929,180
1,1673,1545
250 RETURN
```

Listing 5. Hello text train.

```
18 REM HELLO TEXT TRAIN
20 FOR M = 1 TO 53
22 POKE A%(M + 5),136 : REM LETTER 'H'
24 POKE A%(M + 4),133 : REM LETTER 'E'
26 POKE A%(M + 3),140 : REM LETTER 'L'
28 POKE A%(M + 2),140 : REM LETTER 'L'
30 POKE A%(M + 1),143 : REM LETTER 'O'
32 POKE A%(M),160 : REM ERASE TAIL
40 NEXT M
```

Listing 6. Inversed blanks (lights).

```
18 REM INVERSED BLANKS (LIGHTS)
20 A%(59) = A%(1) : FOR T = 1 TO 29 :
POKE A%(T + 1),32 : POKE A%(T)
,160 : POKE A%(T + 30),32 : POKE
A%(T + 29),160 : NEXT : GOTO 20
```

Listing 7. Bordered inversed blanks.

```
12 REM INVERSED BLANKS WITH BORDER
15 FOR T = 1024 TO 2039 : POKE T,255 :
NEXT
20 A%(59) = A%(1) : FOR T = 1 TO 29 : POKE
A%(T + 1),32 : POKE A%(T),160 : POKE
A%(T + 30),32 : POKE A%(T + 29),1
60 : NEXT : GOTO 20
```

Listing 8. Track using plus sign.

```
18 REM LAYING TRACK WITH + SIGNS
20 A%(59) = A%(1) : FOR T = 1 TO 29
: POKE A%(T + 1),160 : POKE A%
(T),171 : POKE A%(T + 30),160 :
POKE A%(T + 29),171 : NEXT T :
GOTO 20
```

Listing 9. Chicago Breeze.

```
10 FOR A = 2 TO 200 : FOR B = 1024
TO 2039 STEP A : POKE B,255 : NEXT
B : HOME : NEXT A
20 FOR A = 200 TO 2 STEP - 1 : FOR
B = 1024 TO 2039 STEP A : POKE
B,255 : NEXT B : HOME : NEXT A
30 GOTO 10
```

Listing 10. Superfriendly Menu.

```
100 TEXT : HOME
110 REM
*****
120 REM
SET UP PARAMETERS
130 REM
*****
140 ITEM = 6 : REM NUMBER OF MENU I
TEMS
150 FOR I = 0 TO ITEM : READ MENU$(
I) : NEXT I
160 CHAR$(I) = "*" : REM THIS WILL BE
THE BORDER CHARACTER
170 REM
*****
180 REM
COMPUTE HT (HT IS
190 REM HORIZONTAL TABS FOR
200 REM THE MENU ITEMS)
210 REM
*****
220 HT = 0
230 FOR I = 1 TO ITEM : HT = HT + LEN
(MENU$(I)) : NEXT I
240 HT = HT / ITEM
250 HT = INT (20 - HT * .5)
260 REM
*****
270 REM
SET UP FN V TO SET
280 REM VERTICAL TABS FOR
290 REM MENU FUNCTIONS
300 REM *****
310 DEF FN V(X) = 11 - ITEM + (X
- 1) * (2 + (ITEM < 6)) + 2 *
(ITEM > 5)
320 REM
*****
330 REM
SET UP MENU
340 REM *****
350 INVERSE : FOR J = 1 TO 40 : PRINT
CHAR$(J) : NEXT J
360 HTAB 1 : PRINT CHAR$(J) : TAB (20 -
LEN (MENU$(J)) * .5) : PRINT MENU$(J)
: TAB (40) : CHAR$(J)
370 FOR J = 1 TO 40 : PRINT CHAR$(
J) : NEXT
380 FOR J = 3 TO 23 : VTAB J : HTAB
1 : PRINT CHAR$(J) : HTAB 40 : PRINT
CHAR$(J) : NEXT J
390 FOR J = 21 TO 23 STEP 2 : VTAB
J : HTAB 2 : FOR K = 1 TO 38 : PRINT
CHAR$(K) : NEXT K, J
400 VTAB 22 : HTAB 2 : PRINT TAB (
40)
410 NORMAL
420 FOR J = 1 TO ITEM
430 VTAB FN V(J) : HTAB HT
440 PRINT MENU$(J)
450 NEXT J
460 REM
*****
470 REM MENU SELECT ROUTINE
480 REM *****
490 FOR J = 1 TO ITEM
500 VTAB FN V(J) : HTAB HT : INVERSE
510 PRINT MENU$(J)
520 NORMAL
530 FOR TIME = 1 TO 40
540 IF PEEK ( - 16384) > 127 THEN
POKE - 16368,0 : GOTO 590
550 NEXT TIME
```

Listing continued.

Listing continued.

```
560 HTAB HT: PRINT MENU$(J)
570 NEXT J
580 GOTO 490
590 VTAB 22: HTAB 3: INVERSE
600 PRINT "DO YOU WANT TO "MENU$(
J)"? ";
610 GET IN$: ON 1 + (IN$ = "Y") +
2 * (IN$ = "N") GOTO 610,2020
620 HTAB 2: PRINT TAB( 40);: NORMAL
630 VTAB FN V(J): GOTO 560
1990 REM
*****

2000 REM MAIN BODY OF PROGRAM

2010 REM *****
2020 NORMAL
2030 END
9985 REM
*****

9990 REM MENU ITEMS

9995 REM *****
10000 DATA SUPERDUPER AUTOMENU,AD
DATA A RECORD,DELETE A RECORD,CH
ANGE A RECORD,SET UP A REPORT
,PRINT A REPORT
10010 DATA GRAPH A REPORT,GRAPH A
DATA SET,AVERAGE A DATA SET
```

End of listing.

Just what makes a computer or program "user-friendly"? Generally, it seems to mean meeting the user on his or her terms—no special knowledge of internal computer operation, programming, or elaborate commands necessary.

The menu routine I've created (see **Listing 10**) doesn't require the user of your application to be familiar with the computer—or the keyboard. That may sound strange at first, but many people are not comfortable typing, and don't want to become typists to be able to use computers.

With Superfriendly Menu, the user doesn't have to type, at least not to select an option. This routine includes some handy programming techniques, and can be used as a universal menu generator. Let's take a look at it in more detail.

First, in lines 100–150, the program asks you for the number of options that will appear on the menu (ITEM =). It reads in the menu title with MENU\$(0), then each item. Change the value of ITEM to see how the program works with a varying number of selections. (The program's data statements provide for two to eight options.) Line 160 then defines the character for the border of the menu.

The next section, lines 220–250, sets the left tabs for the menu items at the point that represents the average of all the entries. There's no error check here, so make sure no line is more than 38 characters long.

In line 310, the computer sets vertical tabs. Since the vertical tab is different for each line, it must be determined by a function, instead of by a single value as the horizontal tab is determined. This function triple-spaces all menus with fewer than six items and double-spaces menus with six to eight selections.

Lines 350–410 set up the menu format. (You can change the appearance of the border any way you like, or omit it altogether if you prefer.)

You may use the program up to this point to generate any kind of menu. Lines 490–580, however, produce a specific menu design: This section of the program cycles automatically through the list, and the user presses any key when the item he or she wants is highlighted.

In this part of the program, I've used the built-in Applesoft function that continuously "reads" the keyboard to determine if a key has been pressed. The computer then stores the result of each reading in location 49152 (or – 16384 in Applesoft's negative notation). If the value there is greater than 127, the computer "knows" the user has hit a key.

The program resets the value of the function to zero (POKE – 16368,0) and branches to a checking routine in lines 600–630. If the item selected is really the one the user wants (indicated by pressing Y or N), control passes to line 2020 in your main application. If not, everything cancels out, and the highlight loop resumes at the point where it was interrupted.

Superfriendly Menu requires no error-traps and no knowledge of the layout of the keyboard, except the locations of the Y and N keys. (You can even dispense with that by omitting the double-checking routine in lines 590–630).

Equally important, the program includes a standard formula you can use over and over to create menus, and you can vary it to suit your needs. The point is that once you have a formula, generating menus becomes a quick and easy task. And isn't that the name of the programming game? ■

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Applesoft Access

If you're serious about programming, learning to write disk-access routines is essential. In last month's column, I introduced several concepts relating to disk-file input/output (I/O). This month I'll show you how to set up random-access files for storing and retrieving data. The sample program I've included will provide a foundation on which we'll build in succeeding columns.

More on File Names

Last month I pointed out that you can construct program names and file names according to the same rules. (However, your computer automatically assigns a "T" to denote data files in the disk directory.) In addition, you can append three other parameters (in any order) to file names. You must enter a parameter on the same line as the file name, with commas separating it from the name and any other parameters.

The first two parameters let you access data on a different disk drive from the default drive on which the computer initially booted itself. If you have two drives, both connected to the same controller card, drive 1 is the default. To refer to any program or file on drive 2 you must add ,D2 to the file name. If you have more than two disk drives, you must attach the additional drives to extra controller cards. These cards plug into internal slots other than the default (usually slot 6). To refer to a program or file on one of these drives, you must specify both the slot number and the drive number. For example, adding ,S5,D1 to the file name indicates that you wish to access drive 1 on the controller card in slot 5.

You must watch out for one quirk in Applesoft. Once you have turned your

Random-access I/O routines let you store and retrieve data on disk.

Apple's attention to a different drive or slot number, the computer makes the new values the defaults. To refer again to slot 6, drive 1, you must specify those values.

The third parameter you may add to a file name is a volume number, a value between one and 254. Volume numbering is a technique you can use to uniquely identify individual floppy disks. When you initialize a disk using the INIT command, you can add ,V25, for example, to the HELLO program name, and the computer will always catalog that disk with volume number 25. Whenever you use a volume parameter with a file name in a program, the computer checks the disk you have referenced to see if its volume number matches that attached to the file name; a VOLUME MISMATCH error message appears if they are not the same. This feature lets you program your computer to make sure you're using the proper data disks for any given application program.

You can attach these three additional parameters to any Applesoft command requiring a file name (such as SAVE, RUN, LOAD, DELETE, or RENAME), as well as to CATALOG and INIT. Suppose you want to load and execute a program called Fly by Night from a disk in drive 2 of a slot 5

controller card. If you've initialized the disk with volume number 167, you can enter RUN FLY BY NIGHT, V167, S5, D2. (Note that even if you initialize a disk with a volume number, you may still use disk commands without a volume specifier.)

The Mysterious D\$

When I first began working with Applesoft BASIC some years ago, I picked up a number of magazines containing programs. Since I had been using BASIC for many years, I was interested in any new features or techniques available with Applesoft.

Disk I/O routines were easy to recognize, because they always started with the standard BASIC command OPEN. But most of these commands began with a PRINT D\$, which just didn't correspond to any other version of BASIC with which I was familiar. I discovered that in each of these programs, D\$, a string variable, had been assigned a value equal to a control command 4, using the simple statement D\$ = CHR\$(4).

The control command 4 in Applesoft BASIC identifies the disk drives. Before you issue any BASIC command to access the disk drives for input or output, you must PRINT a control command 4 to tell the computer which I/O device to address.

The next thing I discovered was that the common BASIC disk-file I/O commands PUT and GET are missing from Applesoft. (PUT transfers a string of data from a RAM file buffer to the disk, while GET copies a disk record into the file buffer.) For record input from disk in Applesoft, you must use the READ command followed by an INPUT command. To store a record on disk, use WRITE followed by a PRINT com-

by Dan Bishop

Listing 1. Simplest type of random-access disk-I/O routine. This sample program stores and retrieves single-field records, each containing up to 63 bytes, using record numbers you supply.

```

10 D$ = CHR$(4)
20 HOME
30 PRINT "SAMPLE RANDOM ACCESS FILE"
40 PRINT "      DEMONSTRATION PROGRAM"
50 PRINT "-----"
60 PRINT "SELECT A NUMBER: "
70 PRINT "    <1> SAVE DATA TO DISK"
80 PRINT "    <2> RETRIEVE DATA FROM DISK"
90 PRINT "    <3> END THE PROGRAM."
100 PRINT : INPUT X
110 ON X GOSUB 1000,2000,200
120 GOTO 20
200 END
991 REM
992 REM
993 REM
994 REM *****
995 REM SUBROUTINE FOR SAVING
996 REM DATA TO DISK.
997 REM *****
998 REM
999 REM
1000 HOME
1010 PRINT "ENTER UP TO 63 CHARACTERS THAT YOU"
1020 PRINT "  WISH TO SAVE TO DISK..."
1030 PRINT "-----"
1040 PRINT : INPUT X$
1050 PRINT : PRINT "WHAT RECORD NUMBER DO YOU WISH TO SAVE"
1060 INPUT "THIS MESSAGE UNDER...";RN
1070 IF LEN(X$) > 63 THEN X$ = LEFT$(X$,63)
1080 GOSUB 9800
1090 PRINT : PRINT "YOUR MESSAGE HAS BEEN SAVED IN"
1100 PRINT "RECORD "RN"."
1110 PRINT : INPUT "PRESS <RETURN> TO CONTINUE...";X$
1120 RETURN
1991 REM
1992 REM
1993 REM
1994 REM *****
1995 REM SUBROUTINE FOR DATA
1996 REM RETRIEVAL FROM DISK
1997 REM *****
1998 REM
1999 REM
2000 HOME
2010 PRINT "ENTER THE RECORD NUMBER FOR THE MESSAGE"
2020 PRINT "  THAT YOU WISH TO RETRIEVE..."
2030 PRINT "-----"
2040 PRINT : INPUT RN: PRINT
2050 GOSUB 9900
2060 PRINT "YOUR MESSAGE FROM RECORD "RN" IS..."
2070 PRINT : PRINT X$
2080 PRINT : INPUT "PRESS <RETURN> TO CONTINUE...";X$
2090 RETURN
9791 REM
9792 REM
9793 REM
9794 REM *****
9795 REM SUBROUTINE TO HANDLE
9796 REM OUTPUT FROM RANDOM
9797 REM ACCESS DATA FILES
9798 REM *****
9799 REM
9800 PRINT D$ + "OPEN TEST DATA FILE, L64"
9810 PRINT D$ + "WRITE TEST DATA FILE, R" + STR$(RN)
9820 PRINT X$
9830 PRINT D$ + "CLOSE TEST DATA FILE"

```

Listing continued.

mand. To add a little confusion, the OPEN, READ, and WRITE commands must be part of the individual PRINT statements that include the D\$ control command mentioned earlier.

If this sounds a bit troublesome, don't worry. In actual practice, the whole disk-I/O procedure boils down to a few command sequences that vary little from one application to the next. In fact, using the techniques described below, you can set up a sub-routine to handle all your random-access disk-I/O procedures without alteration, no matter the application.

Disk-File I/O

Regardless of the version of BASIC you may be using, storing data in random-access disk files and retrieving data from them always includes the same steps:

- 1) First identify the data file you'd like to use and "open" it.
- 2) Specify a total length for that file's records.
- 3) Tell your computer which record you are saving or retrieving.
- 4) Transfer the data to or from the disk file.
- 5) "Close" the file.

Use the single command `9500 PRINT D$ + "OPEN TEST DATA FILE, L64"` to handle steps 1 and 2. (In these examples, the name of the data file is TEST DATA FILE, and it contains records requiring 63 bytes, plus 1 byte for the end-of-record marker, a return.) Substitute a name that corresponds to your own data-file applications, and the number you're using for your record length. You must have already defined D\$ as CHR\$(4).

Step 3 is also handled by a single command, but its form depends on whether you are saving data to the disk (WRITE) or retrieving data from it (READ):

```
9510 PRINT D$ + "WRITE TEST DATA
FILE, R33"
```

or

```
9510 PRINT D$ + "READ TEST DATA
FILE, R33"
```

Both commands expect the computer to handle record 33 in the random-access file. Use a number that corresponds to the specific record you desire to save or retrieve.

The fourth step, data transfer, uses a simple PRINT command if you want to

save the data to disk, or INPUT if you are retrieving data:

```
9520 PRINT X$
```

or

```
9520 INPUT X$
```

The computer writes the entire record (previously assigned to X\$ with a statement such as X\$ = "SALLY SUE") to the disk in the first instance, and retrieves it from the disk and assigns it to the variable X\$ in the second case.

Finally, you should close the file as soon as you have finished the information transfer. Too many programs open a file right away and leave it open throughout the session. This practice causes problems if something (such as lightning, pets, or kids) interferes with the session—your 25,000-name mailing list could be forever lost.

I use a "hit-and-run" approach. I open a file, transfer the data, then close the file immediately. The file stays open only a few milliseconds while the computer actually transfers the data. Close your file with a simple PRINT command:

```
9530 PRINT D$ + "CLOSE TEST DATA  
FILE"
```

or

```
9530 PRINT D$ + "CLOSE"
```

The first command closes only the specified file, while the second closes all files currently open.

You might ask, "You've shown me how to save records to a disk file and retrieve them, but how do you create a new data file in the first place?" Apple-soft BASIC automatically creates the file on your disk (and places its name in your disk directory as a text file) the first time you open the file and put data into it. The only situation you need to avoid is trying to retrieve a record that doesn't exist. You must WRITE to the disk all record numbers before you attempt to READ them.

A Sample Disk-I/O Program

The accompanying Figure depicts a hierarchy of modules for the simplest type of disk-I/O program. You need only four subroutines or modules: Two handle the computer's interaction with people, and two take care of data transfer to and from the disks.

Listing 1 contains a simple disk-I/O program that provides random access to the file called TEST DATA FILE. This

Listing continued.

```
9840 RETURN
9891 REM
9892 REM
9893 REM
9894 REM *****
9895 REM SUBROUTINE TO HANDLE
9896 REM INPUT FROM RANDOM
9897 REM ACCESS DATA FILES
9898 REM *****
9899 REM
9900 PRINT D$ + "OPEN TEST DATA FILE, L64"
9910 ONERR GOTO 9960
9920 PRINT D$ + "READ TEST DATA FILE, R" + STR$(RN)
9930 INPUT X$
9940 PRINT D$ + "CLOSE TEST DATA FILE"
9950 RETURN
9960 PRINT D$ + "CLOSE TEST DATA FILE"
9970 PRINT : PRINT "NO MESSAGE HAS BEEN SAVED TO"
9980 PRINT "RECORD "RN" YET. PRESS <RETURN>...";
9990 INPUT X$: POKE 216,0: GOTO 20
```

End of listing.

Listing 2. Generalized version of the sample program in Listing 1. Just one subroutine handles both output to (with variable IO equal to 0) and input from (IO = 1) random-access disk files. Note the use of variables, instead of specific file names and record lengths, in the subroutine beginning in line 9900.

```
10 GOSUB 300
20 HOME
30 PRINT "SAMPLE RANDOM ACCESS FILE"
40 PRINT " DEMONSTRATION PROGRAM"
50 PRINT "-----"
60 PRINT "SELECT A NUMBER: "
70 PRINT " <1> SAVE DATA TO DISK"
80 PRINT " <2> RETRIEVE DATA FROM DISK"
90 PRINT " <3> END THE PROGRAM."
100 PRINT : INPUT X
110 ON X GOSUB 1000,2000,200
120 GOTO 20
200 END
291 REM
292 REM
293 REM
294 REM *****
295 REM SUBROUTINE TO SET
296 REM INITIAL VALUES TO
297 REM FILE I/O VARIABLES
298 REM *****
299 REM
300 F$ = "TEST DATA FILE"
310 F = 64
320 IO$(0) = "WRITE "
330 IO$(1) = "READ "
340 D$ = CHR$(4)
350 RETURN
991 REM
992 REM
993 REM
994 REM *****
995 REM SUBROUTINE FOR SAVING
996 REM DATA TO DISK.
997 REM *****
998 REM
999 REM
1000 HOME
1010 PRINT "ENTER UP TO 63 CHARACTERS THAT YOU"
1020 PRINT " WISH TO SAVE TO DISK..."
1030 PRINT "-----"
1040 PRINT : INPUT X$
1050 PRINT : PRINT "WHAT RECORD NUMBER DO YOU WISH TO SAVE"
```

Listing continued.

program uses two separate subroutines for data storage (lines 9800 to 9840) and data retrieval (lines 9900 to 9990). You must have a similar pair of subroutines for each data file you want to use with your program, since the name of the specific data file is part of the command syntax.

Before calling either subroutine, you must tell the computer which file-record number you want to store or retrieve—you assign the desired record number to the variable RN. Note that lines 9810 and 9920 use this variable to access a specific record.

The program stores the data being transferred to and from the disk file in the variable X\$; you must give X\$ these data before the computer calls the subroutine at line 9900. And when the program retrieves a record from the file, the data from that record appear as X\$.

The program in **Listing 2** accomplishes the same task—but more efficiently. The computer uses the same subroutine (lines 9900 to 9990) for both storing data to disk and retrieving data from disk. This subroutine requires you to assign a value of zero or

one to the variable IO before your computer calls the subroutine. The value you select depends on whether the computer is using the subroutine for data storage or retrieval.

IO\$ is a simple array consisting of two elements: IO\$(0), which has the value WRITE, and IO\$(1), to which the computer assigns READ. This arrangement lets you use IO\$(IO) to specify either a write or a read operation by assigning the appropriate value to IO. Thus you need only one line of code (line 9920) to handle both data storage and retrieval.

To get around the problem of needing a separate disk I/O subroutine for each data file a program uses, the subroutine in **Listing 2** includes two additional variables. F\$ represents the name of the data file, while F stores its record length. Since we're using only one file in this program, the program assigns TEST DATA FILE to F\$ and a value of 64 to F. This procedure takes place only once at the beginning of the program (lines 300-350).

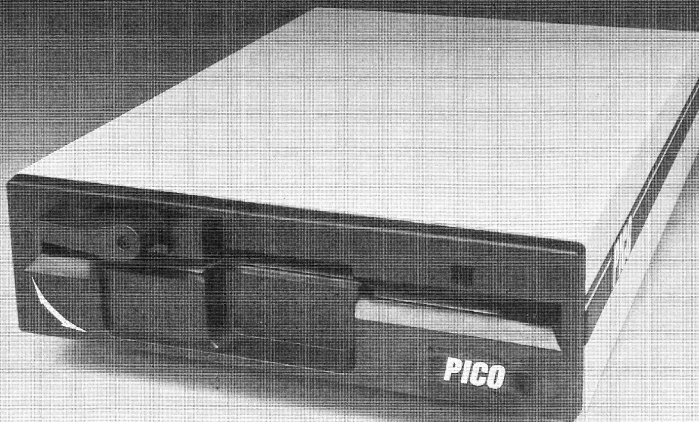
One last point: Since the program will crash if you attempt to retrieve a record you have not previously stored in your data file, both program listings incorporate a simple error-trapping function using the ONERR GOTO command. If you ask to retrieve record 33, for example, and record 33 doesn't exist, this error-trap will display the line NO MESSAGE HAS BEEN SAVED TO RECORD 33 YET, close the file, and return execution to the main program. The POKE 216,0 instruction cancels the ONERR command.

The programs presented here let you store only short (63-character) phrases in a disk file and retrieve them by record number. However, they set the stage for more useful applications. Next month's column will include a program listing for a trivia game in which several pairs of data files are maintained. Each pair corresponds to a category, with one file containing the questions and the second the answers. Using the concepts covered this month, take that hint and see if you can beat me to the draw—try writing your own trivia program before the next Apple-soft Adviser appears. ■

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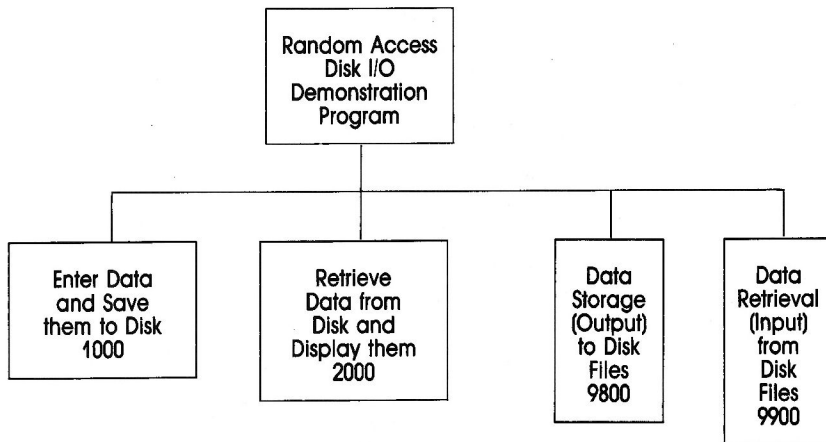
Listing continued.

```


1060 INPUT "THIS MESSAGE UNDER...";RN
1070 IF LEN (X$) > 63 THEN X$ = LEFT$ (X$,63)
1080 IO = 0: GOSUB 9900
1090 PRINT : PRINT "YOUR MESSAGE HAS BEEN SAVED IN"
1100 PRINT "RECORD "RN"."
1110 PRINT : INPUT "PRESS <RETURN> TO CONTINUE...";X$
1120 RETURN
1991 REM
1992 REM
1993 REM
1994 REM *****
1995 REM SUBROUTINE FOR DATA
1996 REM RETRIEVAL FROM DISK.
1997 REM *****
1998 REM
1999 REM
2000 HOME
2010 PRINT "ENTER THE RECORD NUMBER FOR THE MESSAGE"
2020 PRINT " THAT YOU WISH TO RETRIEVE..."
2030 PRINT "-----"
2040 PRINT : INPUT RN: PRINT
2050 IO = 1: GOSUB 9900
2060 PRINT "YOUR MESSAGE FROM RECORD "RN" IS..."
2070 PRINT : PRINT X$
2080 PRINT : INPUT "PRESS <RETURN> TO CONTINUE...";X$
2090 RETURN
9891 REM
9892 REM
9893 REM
9894 REM *****
9895 REM SUBROUTINE TO HANDLE
9896 REM ALL RANDOM ACCESS
9897 REM DISK I/O PROCEDURES
9898 REM *****
9899 REM
9900 PRINT D$ + "OPEN " + F$ + ", L" + STR$ (F)
9910 ONERR GOTO 9960
9920 PRINT D$ + IO$(IO) + F$ + ", R" + STR$ (RN)
9930 IF IO = 1 THEN INPUT X$
9935 IF IO = 0 THEN PRINT X$
9940 PRINT D$ + "CLOSE " + F$
9950 RETURN
9960 PRINT D$ + "CLOSE "
9970 PRINT : PRINT "NO MESSAGE HAS BEEN SAVED TO"
9980 PRINT "RECORD "RN" YET. PRESS <RETURN>...";
9990 INPUT X$: POKE 216,0: GOTO 20
    
```

End of listing.

Figure. Hierarchy of modules needed for access to disk data files.



Combined in Listing 2.

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EVALUATES FROM RACING FORM!

Age	Gender	Post (Today)
Class	Jockey (Today)	Post (Last)
Condition	Jockey (Last)	Speed
Consistency	Length	Trainer
Earnings	Time of Year	Workouts

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%	%	%
Age 5	Consistency 15	Speed 10
Class 15	Jockey 15	Workouts 0
Condition 10	Trainer 5	Time of Year 0
Earnings 5	Post 10	Consistency 5
100%	Is Everything OK (Y/N)	

Create program weight based on a particular track and fine tune it for maximum win percentage. This program is designed for "ease of use". The user needs **no programming experience.**

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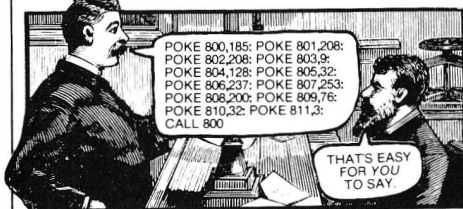
PLUS ALL-NEW APPLE TIPS

From the authors of DOS BOSS (Bert Kersey and Jack Cassidy)—page-after-page of juicy tips, experiments and inside info about your Apple. Learn secrets about Apple's new ProDOS operating system and Apple disk structure.

The latest official version of ProDOS (V1.1.1 with the new "Bye" command) is included on the Pro-Byter disk.



You get a **GOLD MINE** of tips, including: How to use memory like an extra disk drive (ProDOS lets you load & save files in RAM), How to disable the LIST command so it says "File Locked", How to disable or swap ANY command, How to change "Startup" to any name, How to personalize ProDOS catalogs...



POKE 800,185: POKE 801,208:
POKE 802,208: POKE 803,9:
POKE 804,128: POKE 805,32:
POKE 806,237: POKE 807,253:
POKE 808,200: POKE 809,78:
POKE 810,32: POKE 811,3:
CALL 800

THAT'S EASY FOR YOU TO SAY

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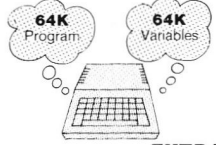
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Store all kinds of images in memory and display any one (all or part) instantly. Up to 7 hi-res pictures or 62 text screens can be stored at once. Call several pictures to the screen per second, opening up new Apple animation possibilities.



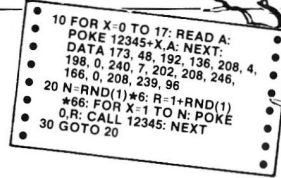
EXTRA K allows high-speed multi-screen switching.

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Change Catalog command to *Cat*, or "Syntax Error" to "Oops!", or anything you want. *Protect your programs:* An Unauthorized Save-attempt can print "Not Copyable". List Prevention, other useful tips and fascinating experiments. DOS Boss will teach you a ton about Apple programming!



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Automatically combine program lines, shorten variable names and/or remove REMarks. D CODE also uncovers wasted program lines that can't possibly be executed.

AUTO-PROOFREADER

Keyboard errors are caught as you type. If you enter an illegal program line, you are told immediately—before you (or worse—someone else) runs your program. Or you may simply type "CHECK" to scan an *entire program* in a couple of seconds and uncover potential crashes. If no mistakes are found, you get an immediate "NO ERRORS" message.

SUPER-TRACE

When a program stops or crashes, type "DUMP" to see the last 10-10,000 statements and line numbers that were executed, in the order executed—an instant program *history*.

D CODE features sophisticated "live" tracing too, with each executing statement, line number and selected variable values appearing in a window at the bottom of the screen.



Your program runs up here. Lines & VARIABLES traced down here.

BREAKPOINTS

D CODE lets you set up de-bugging "breakpoints" so your program stops when you want. For example, you can ask that your program be stopped the moment X gets set to 99, or the 3rd time a particular program statement is encountered.

LIGHTNING-FAST FIND!

D CODE lets you find strings and variables *fast*—even large programs can be searched in about 2 seconds! All lines with a specified word are automatically listed with the word highlighted. This feature alone is worth the price of D CODE.

GPLE COMPATIBLE

D CODE remains "transparent" to your programs and is fully-compatible with GPLE, Double-Take, ProntoDOS, etc.



- START OF PROGRAM POINTER
- HOME: HTAB 5: POKE 33,28: FOR C=1 TO 92: POKE 50,255-192* (C-4 OR C-64)
 - J=J+31*(J-31): PRINT CHR\$(9+(J-1)): SPC(2+(J<10)): J: NEXT: PRINT
 - POKE 33,1: PRINT "JULY..AUG..SEPT...."

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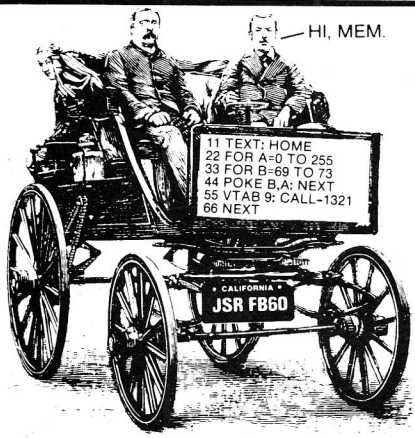
All kinds of images can be transferred to your printer with absolutely no programming knowledge. Or you can call Triple-Dump's routines from your own Applesoft Basic programs.

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You can update your Master Catalog at any time by simply letting FATCAT read in your new or altered disks.

ALPHABETIZE FILE NAMES

FATCAT will sort your ProDOS and 3.3 disks so they catalog in alphabetical order. Or you can re-arrange file names in any order. Compare any two files too, and find the differences.

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DISKQUIK makes your Apple IIc or 128K IIe think it has an extra drive connected to Slot 3. It's just like using a super-fast (hard-disk speed), silent drive. Catalog with a "CATALOG.S3" command. Save and load all kinds of files to and from RAM with normal commands (holds about half the data of a floppy).

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TRIPLE-SPEED DOS 3.3!

ProntoDOS lets you load & save files at triple speed. Hi-res pix, for example, load in under 3 seconds.

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Create high-speed bootable disks with 15 extra sectors of space. Move DOS 3.3 to your Language Card (64K req'd.) for an extra 10K of usable memory. Also: Pronto's new TYPE command instantly displays DOS 3.3 text file contents.

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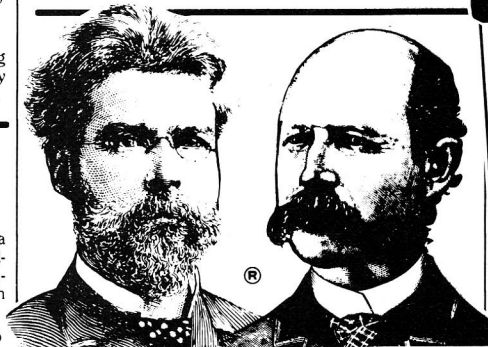
OR, AS A PROGRAMMER, you get 33 new commands for drawing, filling and manipulating double-res images. You can convert normal programs and pictures to double-res, save and load any image section, compress picture data to 1/3 disk space, produce double-res "slide shows" and more. EXCELLENT REVIEWS—see Jan-85 A-Plus Magazine.

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GPLE is Beagle Bros' "GLOBAL PROGRAM LINE EDITOR", the most popular, efficient way to edit Applesoft programs. GPLE works like a word processor for Basic program lines.

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Now you can quickly make changes to your programs. No more awkward "escape-editing" to make changes. No more hassles with extra spaces in quote statements. No more slow "cursor-tracing" to the end of a line before pressing Return.

SEARCH & REPLACE

Find every occurrence of a string or variable in your programs. Or replace any word with any other. For example, change all X's to ABC's, or all "HORSE" strings to "COW".

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Define your own Apple "function keys". For example, ESC-1 can Catalog drive 1, ESC-N can clear the screen and type your name and address, etc. Customize your Apple with a set of ESC functions that perform any set of tasks that you want.

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- X=3,14159
- Y=255
- AS: 5 10 150 ← CROSS-REFERENCE: Alphabetizes every variable your program uses, and displays them with their line numbers.
- X: 10 20 3000
- Y: 5 40 55 60
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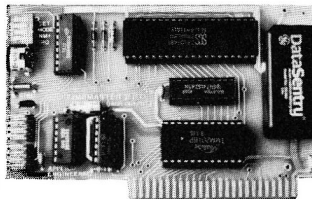
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- The only card recognized by both the DOS 3.3 and PRO-DOS versions of Apple Writer IIe.
- Appleworks will now time and date stamp all your data automatically.
- The only clock card that will display the time and date on the Appleworks screen.
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- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.
- Auto-recharging nickle-cadmium battery will last over 20 years.
- Two BSR/serial ports for future expansion.



H.O.	PRO-DOS COMPATIBLE	INCLUDES DOS DATER	MILLISECOND TIME	YEAR DATA	LARGEST SAMPLE SOFTWARE	REMOTE SET PORT	BSR PORT	EMULATES ALL OTHER CLOCKS
BRAND A	NO	NO	YES	NO	NO	NO	NO	NO
BRAND C	NO	NO	NO	NO	NO	NO	NO	NO
BRAND M	NO	NO	NO	NO	NO	NO	NO	NO
BRAND P	YES	YES	NO	YES	NO	NO	NO	NO
BRAND S	NO	NO	NO	YES	NO	NO	NO	NO
BRAND T	YES	NO	NO	NO	NO	NO	YES	NO

Full emulation of all other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the H.O. to emulate other clocks, we just drop off features. That's why the H.O. can emulate others, but none of the others emulate us. The Timemaster II H.O. will automatically emulate the correct clock card for the software you're using. Of course most programs will use the Timemaster II H.O. in its native mode, but it's comforting to know that you won't have to worry about compatibility problems. You can also give the H.O. a simple command to tell it which clock to emulate. This is great for writing programs for those poor unfortunates who bought some other clock card.

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There used to be about a dozen 80 column cards for the Apple. Now there is only ONE.

- TOTALLY Videx Compatible.
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- Fully compatible with ALL Apple languages and software—there are NO exceptions.
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- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

	PRICE	BUILT-IN SOFTSWITCH	LOW POWER DESIGN	80 COLUMN HOME	7X9 DOT MATRIX	LIGHT INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER	139	YES	YES	YES	YES	YES	YES	YES
SUPRTERM	MORE	NO	NO	NO	NO	NO	YES	YES
WIZARD 80	MORE	NO	NO	NO	YES	NO	YES	YES
VISION 80	MORE	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	NO	NO	NO	NO	YES	YES
VIEWMAX 80	MORE	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, Dollars and Sense, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

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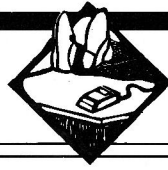
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Confessions of a Beta Tester

Outside, a nagging rain bullied the night. I sat, indoors, on a chair that long since should have been given over to the trash bin. It stayed only because it still greeted me with the comfort of an old friend. The strains of *Quiet Riot* poured out of the radio, teasing the colors in my wall-length light organ. Neon spears, thrown from the deli sign across the street, lanced through the bare windows, breaking against the walls.

The tiny green bulb on my Apple //c was the only constant in a universe so chaotic it verged on order. Someone told me that the light on the production models was actually labeled "On." But only an emerald glow leaked from the inside of my prototype machine.

I heard a scraping sound at the door, followed by three loud, slow knocks. My breath eased out as the echo of the last rap faded. Feeling my energy drain, filled with apprehension, I rose from the chair. I knew what to expect. The doorknob was putty, twisting easily in my hand.

No one was there—no one ever is. Tacked to the door was a large manila envelope, creased and greasy from the touch of many hands, the only sign of a visitor. I tore it down, closed the door, and retreated into my sanctuary.

I clicked open my knife and gouged a corner from the envelope. Dreading

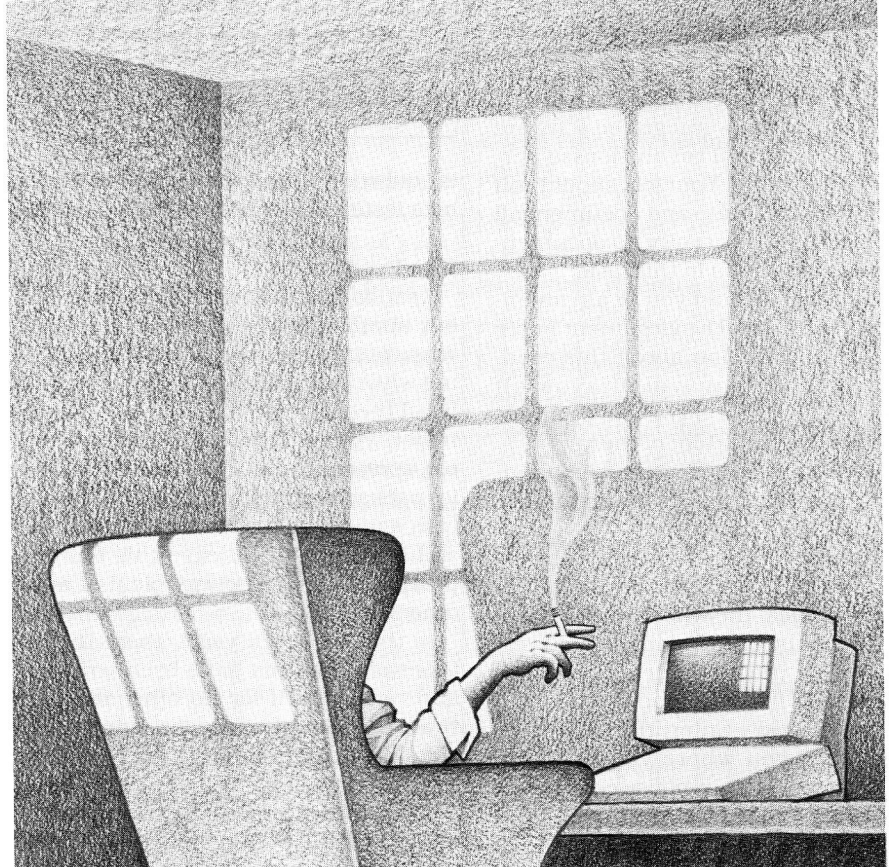


Illustration: Richard Coudrey

the contents, I slit the seam from side to side. There it was—the disk. No label, no markings—not even a manufacturer's tag. But I knew what to do. It was the same old pattern, repeated endlessly in the past, repeated this evening.

Poised at the keyboard, I shut down the apartment with a few deft jabs of my fingers. Darkness reigned, but for the small green light. The disk slid into the internal drive with the ease of a well-oiled .44 slipping into its holster. I thumbed the door down and three-fingered the reset keys. How many times had I almost written RESET across the face of that switch, but, blank as it was, it added an air of mystery to the nameless bone-white computer.

"Good evening, Mr. O'Brien. Your job, should you accept it, is to locate and document all flaws in this disk. Good luck, Bill. The tracks containing this message will be automatically overwritten in 15 seconds."

by Bill O'Brien

The drive spun, guided perhaps by the red light. The screen remained blank, but the internal speaker came alive with the sound of a sonata. I recognized the melody—Paul Lutus' *Electronic Duet*. The music disappeared, and from behind the //c a speech synthesizer started to talk.

The Assignment

"Good evening, Mr. O'Brien. The disk now in your computer holds a beta copy of a new integrated software package that will revolutionize personal computing. Your job, should you accept it, is to locate and document all flaws. There is currently no documentation to assist you in this task.

"As usual, should you or any member of your Digital Environment Force release information about this product, the company will disavow all knowledge of it, and you will be prosecuted to the full extent of the law.

"Good luck, Bill. The tracks containing this message will be automatically overwritten in 15 seconds."

I punched down on the synthesizer's off button. On a cold day that little box could heat the whole apartment—they fixed the problem in the final version, but a prototype never changes. The screen flickered and spit out the product's logo—Enterprise: Software that takes you where you've never gone before. That in-house code name would be changed by the time it hit the street.

My first thought was to reach for the D.E.F. files and hand this over to someone else. I was bone-tired, having just come off an alpha-release shakedown. My fingers were yellow with nicotine, and Samsonite had tried to patent the bags under my eyes. But that was all part of the job.

The Beta Tester

I belong to an elite cadre of individuals—beta test-site operators. Our names aren't published anywhere; we don't even know who the other testers are, outside of our own small group of associates. But we're here, protecting the free world from hair-pulling, fist-pounding hardware and software bugs. It's a lousy job. It pays nothing, not even gratification.

You don't volunteer for the job. If developers discover you know what you're talking about, they'll pop the fa-

"Beta testing is a lousy job. It pays nothing, not even gratification."

tal question: "How'd you like to be a beta tester for our product?"

The Product

I sat back in my chair and crushed out another butt. I watched the last wisps of smoke curl up toward the ceiling while I considered the assignment. In all the universe there are but three major types of software: word processor, spreadsheet, and data base. Graphics packages exist, but even the Macintosh's much-vaunted artistic talent is still raw enough to leave this fourth prospect in a supporting role. I lit another Raleigh.

In the last seven years, these three types of programs have been written and rewritten. If for no other reason than the law of averages, someone should have gotten it right by now. I couldn't help but feel that it took a cosmic effort to make the same mistakes over and over again.

They all start out the same. Somebody sits down with a pencil, a sheet of paper, and a concept. He or she roughs it out, does some preliminary coding—just to see how it "flows"—and calls it an alpha version (or a pre-alpha if the coding is really bare-bones).

I remember seeing a release copy of MacTerminal. It was hard to imagine that I had a pre-alpha version of it in my desk drawer. The differences outweighed the similarities four to one—for the better. The final version stood out like a class act next to a cheap imitation.

Beta-level software is supposed to be better, and usually is. At least it has a form, a shape. You watch it grow, see the version numbers creep up. One package started out at .46 and gradually made it through beta tests to .960. Finally, as the all-important version

1.0, it was released to the public.

And what does the public do when they get their grubby little mitts on it? They scream that it isn't perfect. What is? Would you like it any better if every time you used the FRE command, you knocked 20K off the available memory until you blew the top off the machine: Would you even think to try it to see what happens? That's the kind of stuff a beta tester has to wade through.

As a beta tester, you make up your own rules as you go along. You're supposed to try everything, anything. You test things that people might do, you poke your nose into things you know they'd never try. You're supposed to second-guess everyone—just in case.

Technical Support

I punched up the Pointer Sisters, let *Neutron Dance* bounce off the walls, and closed my eyes.

Most of the time, you get a great thrill testing a pre-release of a product. It's something nobody else has; you're part of a privileged few. And most companies bend over backwards for their beta testers. After all, we keep customers from screaming about a bad product. There are exceptions to every rule, though. I remember testing The Source on-line information service. The manufacturer ignored most of our suggestions, and the people screamed for months after they implemented the new system.

A few weeks back I received a final copy of some data-base software. (In lieu of payment, you get a free copy of the software—your reward for going through the mine fields.)

"Hello, Technical Support? Listen, I've been using your filing program for a couple of days now, and I think you still have a problem. I wrote it out to another file to get rid of the gaps left when I deleted some records. Then, when I called up the new file, the program lost the calculated field I had in there."

"I'm sorry, I'm not quite sure what you're saying. Could you be a little more specific?"

"Okay." Take a deep breath and exhale. "I have a field labeled Profit that's calculated by subtracting the field value of Cost from another field called Present Worth. When you write it out to a new file, Profit turns into a text field. It won't do the calculations

for any new entries, but it does retain all the old values."

"Could you hold on a second?"

"Sure." Put out one cigarette, light another. Anything to keep the annoyance out of your voice. Tap your fingers, punch the keyboard.

"Hello? We don't show that as a problem with the program. Are you sure. . .?" And then you hear a five-minute monologue on how to do all the things you already know how to do. Listen patiently, say "yeah" a lot, and nod your head. No matter what you've done for a company, the technical-support department remains the same. Either it's a great place full of helpful people, or the employees lock their brains away when they come to work in the morning.

"Well, yeah. I did all that, but it won't calculate in the new file."

"You're going to have to send us a copy of your file and document the problem." What the support person's really saying is: "I've got another idiot on the line who doesn't know what he's doing! Why do they always blame our program? Obviously he doesn't have a shred of intelligence!"

"Look, I really know the program; I was one of the people doing the beta work on it. I caught the same bug then. Just make a dummy file with a calculated field in it, fill in one record, and write it out to a new file. No, not in text format—that's only if you want to incorporate it into a word processor. Write it out as an honest-to-goodness data file and it won't calculate. I guarantee it."

"I'm sorry, but we'll need to see your data file and some documentation." Just say "yes" and hang up the phone. It's too much trouble. If they want stupid software, they can have it—and all the bad PR that goes with it. You tried—that's all you can do. Fill out the forms and the papers, send them in, and wait for the next version.

One of Apple's manuals summed it up great. The introduction on the cover had an excellent line: "If, while using this program, you come across something that doesn't behave exactly as it is stated in the manual, seriously question reality. The manual is correct." A technical writer with a sense of humor is a great asset when you're beta testing a program. It's one of the few reasons to smile.

The Sisters were just about finished burning when I was struck by the incongruity of it all. Crush out another cigarette and don't think. When it makes no sense, just don't think.

The Testing Equipment

I'm hesitating. The screen says to press the escape key to begin. My finger wants to, but I don't. My eyes are captured by the neon light bouncing off the white walls. My mind is somewhere else.

"Hey, Bill, you know that drive we've got for the VIC?"

"The one the spring fell out of yesterday?"

"Ah, yeah. The door came off in my hand when I tried to put a disk in."

"Now we know what the spring was there for. It probably held the tension on the door. Write it down and then crack open the drive. I've got a heavier spring left over from, from what? Well, it doesn't matter. It's in the top right-hand drawer. See if it'll fit in there. If not, call them up and tell them if they want us to keep running tests, they'll have to replace the drive. What is that, number two or three?"

"Two, but we've gone through three computers."

I punch in the light organ to catch the last refrain from *Life in the Fast Lane*. Someone I know has a T-shirt that says, "Life is tough. Then you die."

My finger finally makes the downward arc and lands squarely on the escape key. Past the fog of old memories and fantasies there's one firm bit of reality. If you agree to do something, you do it. And, since you only get paid when you're working, and no one pays

you to beta test a product, you must be having fun.

THE AWAITED NEWS

I promised you some earth-shaking news last month, and I rarely go back on a promise. *inCider*, like any good publication, is continually evolving with the needs of its audience in mind: This is my 31st and last column for *inCider*. Like an old, worn chair, it may still be comfortable, but that doesn't mean it fits into the scheme of things.

The past two and a half years (and one month) have been well-spent on Apple III's (yes, I still own and use one) and, more recently, on the celebrated Apple II family. I've enjoyed talking with you about the machines and the issues that affect all of us in computing. I'd appreciate hearing from you, especially from those of you who don't agree with my opinions.

LOOSE ENDS

There's one thought I'd like to leave you with. It's a mental image that sums up the frustration many of us feel when we use our computers. Picture Clint Eastwood as Dirty Harry. He stands, Magnum in hand, ready to fire. Before him, on a desk, is a computer. They stare at each other for a few seconds, each trying to anticipate what the other will do. Harry knows how this scene could end. He swallows once, looks straight at the screen, and utters those immortal words, "Go ahead, automate my day."

Aloha, people. ■

Write to Bill O'Brien at P.O. Box 1010A, Fort Lee, NJ 07024. Or call him up on CompuServe. His user ID is 74216,1215.

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TERMEXEC

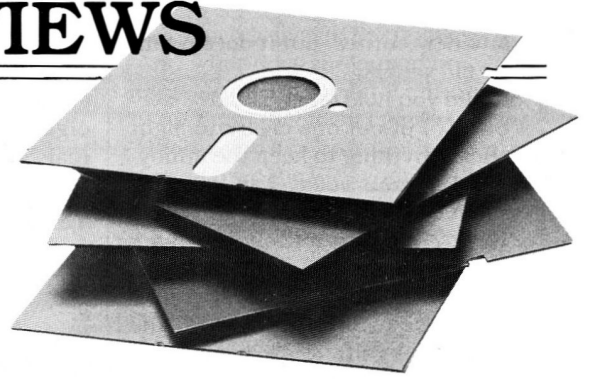
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SOFTWARE REVIEWS



inCider's Ratings

- ★★★★ Superlative
- ★★★ Above average
- ★★ Good
- ★ Not recommended
- Stay away

The Newsroom

Springboard Software

7807 CreekrIDGE Circle
Minneapolis, MN 55435

Printer utility

Any Apple II

Compatible with many dot-matrix
printers

\$49.95

★★

If you're involved in newsletter or school newspaper publication, check out a program called The Newsroom. Professional journalists may also be intrigued—at first.

Springboard Software's literature tells you that the company created The Newsroom "for journalists of all ages," that "experienced journalists will find it has the tools and flexibility to create...stylish, sophisticated publications." Although the program is suitable for students and entry-level publishing personnel, several limitations mean that long-time professionals will quickly tire of the novelty.

The Newsroom is relatively easy to use, but it's a good idea to at least look through the documentation before you begin. The manual contains a concise program tutorial and several other features newcomers to publishing will find particularly helpful: a glossary of

publishing terms, a list of proofreader's symbols with examples, an annotated bibliography, and tips for fledgling journalists.

The package consists of two floppies—a master disk containing the main part of The Newsroom program, and a "clip-art" disk with an extensive file of "canned" illustrations (beasts and bugs, for example). In addition, you must provide data disks to store the sections of your publication; the program's design lets you produce only one portion at a time. The manual suggests you store the elements of your page—banners, panels, simulated photos, and so on—on separate data disks. Remember to format them with DOS 3.3, Apple's earlier operating system—a requirement not mentioned in The Newsroom documentation.

You create your newspaper or news-

letter one section at a time. On 8½-by-11-inch paper, you can divide the page into eight panels (four on each side), or six panels and a banner for the paper's logo. On legal-sized paper, you have the option of creating eight panels plus banner, or ten panels.

A number of tools, including serif, sans-serif, and "English" type fonts, are available for banner and panel composition. Creation of text is simple and direct—just type it in; to make corrections, type over or delete characters. These two basic editing modes offer only limited word-processing capability. To add "photos" to your stories, you can choose pieces directly from the clip-art file, modify those selections, or create your own freehand or use standard geometric shapes.

Since the resolution of The Newsroom's printed product depends on that of your dot-matrix machine, its quality is not on a par with that of typeset, daisy-wheel, or laser-printed documents. The appearance of the copy, however, is reasonably attractive for amateur publications.

The Newsroom mimics Macintosh applications—to select a function, choose the appropriate icon from one of the menus. One symbol, a hand, lets you move objects around within a banner or panel. If you use the keyboard for this particular function, however, you'll find it frustratingly slow. To overcome keyboard catatonia, get ahold of a joystick. (A mouse won't work with this program.)

Another limitation shows up before you're ready to print your document. The Newsroom has no provision to let you see an entire page until you print it. To preview your page on screen, you have to be content with looking at one panel at a time.



The Newsroom—a tool for student journalists.

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An important consideration is the support Springboard Software furnishes Newsroom users. I called the company concerning the operating-system question mentioned above. After the manager of program development, Mark Dunn, solved the DOS dilemma, he provided a verbal tutorial that saved me from having to read the 85-page manual. That type of courtesy can be hard to find in the computer industry.

For students and novice journalists, The Newsroom is a worthwhile teaching tool. And at \$49.95, it's an excellent value. ■

John Barry
Redwood City, CA

Mr. Pixel's Cartoon Kit Programming Paint Set

Mindscape
3444 Dundee Road
Northbrook, IL 60062
Graphics for children
Any 64K Apple II
\$34.95 each

★★

Pixelwerks' Mr. Pixel's Cartoon Kit tells parents the program "can be as simple or as complicated as children want it to be." I wish one of my parents were around to show me how simple it is. I didn't find the Cartoon Kit or its counterpart, Mr. Pixel's Programming Paint Set, to be just an uncomplicated drawing program. I never ventured off without the manual for guidance, and I don't recommend these programs for children under 12.

The idea behind the Cartoon Kit is very appealing; you can play with cartoons provided on disk as well as create your own. But it's a mistake to believe the program is easy. You must read the manual even to translate the icons—they're not all self-explanatory. And when you see the on-screen message, "This character is out of memory. Press button to continue," don't panic. (As it is, I'm still not sure why it appeared.)

Granted, you can do some nifty things with the Cartoon Kit. You can control and change the movements of the cartoon characters frame by frame: turn them around, alter speed and direction, and change what they're wearing. You can also create characters and animate them. It takes a little know-how to draw each frame, however. You can follow the program's examples, but most users would appreciate additional information about the actual drawing theory.

It's possible to create backgrounds for your cartoons with the Programming Paint Set, but, as with the Cartoon Kit, it will take you a while. The "programming" aspect of the paint set lets you draw a picture without actually seeing it on screen. The program gives you directions for forming your pictures and a grid on which to plot colors. You can save these pictures and repeat them, make mirror images, control the size of a unit of color, and print your creation.

In both programs, the icon menus along the bottom of the screen are cumbersome. Using the arrow keys or a joystick, you move the cursor until it reaches the symbol you want. But since there are more than ten icons in each program, you must scroll some out of view to see the others. This procedure is time-consuming, especially when you have to cross the icons several times to accomplish a simple operation.

For instance, I wanted to put two predesigned shapes from the Programming Paint Set into my picture. I moved down to the Shape icon and chose the square. But before I could place a circle near it, I had to scroll back to activate the Move icon, a little man named Mr. Pixel. He appears on screen and you must place him in the spot where you'd like the next object. I got out of Move, scrolled back to Shape, and put the circle in Mr. Pixel's place.

The same awkward movements are necessary to draw freehand. Move the cursor to the color icon, a crayon, and press the joystick button or return key to place it on the drawing space. Instead of just moving the joystick handle, you must move the cursor to an on-screen directional arrow, then press the button to make a line of color ap-

pear. To change direction (as in a square), you must move the cursor to another directional arrow, then press the button. All this seems like a step backward considering the ease of drawing pads. So much for free and easy movement.

These programs are ambitious, but I'm not sure who will find them appealing. Unless a child is patient, he or she won't fiddle with the necessary details. And a more serious artist will opt for a drawing pad, such as the Koala-Pad. Although Mindscape includes fine software in its repertoire, I was disappointed with Pixelwerks' results. ■

Anita Malign
San Francisco, CA

Editor's note: Mindscape's Cheryl Oliver says, "Mr. Pixel's Programming Paint Set is meant primarily to help children develop an understanding of fundamental computer-programming concepts. Mr. Pixel's Cartoon Kit was designed to help children develop logical-thinking skills through creating characters and programming their actions in sequence. Neither program can or should be compared to other drawing programs or methods."

Mindscape also claims that "the suggested freehand-drawing approach would override the program's ability to record each step, and would not permit the child to edit or create a drawing from the LIST mode. The LIST mode, which lets the child work with a picture programming language, is the crux of the computer-literacy value of the product."

Creative Calc, Creative Writer, and Creative Filer

Creative Software
230 East Caribbean Drive
Sunnyvale, CA 94089

Integrated spreadsheet, word processor, and data base
Any Apple II, 64K
\$49.95 each

★★

Do you crunch numbers, words, files—or all three? Integrated software such as the Creative line—programs with the ability to share in-

formation—can be a convenient way to stay organized. But does every integrated package provide the ideal all-in-one solution? Creative Calc, Creative Writer, and Creative Filer are low-cost alternatives to completely unrelated packages, but they may not provide the level of integration you need.

Almost every spreadsheet or database package lets you send your output to a file instead of a printer; most word processors let you merge a file from another program into an existing document. Creative Writer (like certain other word processors) uses the "include" approach, which initiates a merge only when it prints the document. The two files, however, are never actually merged in memory. The advantage of this scheme is that you can edit the spreadsheet or database report and reprint the document quickly.

You can also find more powerful programs that share data to at least the same degree as the Creative series. But if you do want sophisticated functions, you may have to spend a little more than \$50 to come up with a program that suits your specific needs.

Calculating Functions

Similar in design to other spreadsheets, Creative Calc produces a 255-row-by-64-column layout. Columns are labeled AA, AB, and so on; rows are numbered from 1 to 255. On a 128K Apple IIe, 71,256 bytes of space are available for your work.

Creative Calc includes most of the common spreadsheet operations: copy, format, load, quit, disk, goto, new, recalc, erase, insert, print, and save. Conspicuously missing, though, are the ability to move rows or columns and a facility for creating "windows," which would let you view two parts of the same spreadsheet simultaneously while manipulating the data in either section. And Creative Calc doesn't sort rows—a handy feature found in Multiplan.

To specify a cell, you must type the column letter, a comma, and the row number (as in AB,23). I found this designation more confusing than the methods used by VisiCalc, MagiCalc, or Multiplan, especially when cells appear in formulas.

Control commands, not the //e's or //c's handy arrow keys, operate the

cursor. Control-J moves the cursor to the left, control-K to the right, control-O up, and control-L down. You can shift the screen up or down by 17 lines and right or left by one screen with the W, Z, A, and S control keys.

A spreadsheet's mathematical functions are an important measure of its usefulness. Creative Calc offers only sum, sine, cosine, arctangent, exponentiation, logarithms, and absolute value. There are no economic functions such as net present value, and no Boolean functions. On page 37, the documentation refers to an AVG function that computes an average, but when I tried AVG, Creative Calc didn't accept it.

When describing functions, Creative Calc uses a greater-than sign (>) to indicate a range of variables. For example, @SUM(AB,3>AB,10) tells the computer to add up rows 3 through 10 in column AB. Symbols such as the colon (:) and ellipsis (. . .) found in other spreadsheets, however, seem less confusing than the greater-than sign.

Regarding speed of performance, Creative Calc took a long six seconds to recalculate a sheet with only seven columns and 14 rows containing just entries—no functions.

Seeing Is Believing

Creative Writer is a RAM-limited word processor—each file can't be larger than the space available in memory at one time. You can link documents together when printing, however, to handle larger material. This word processor's most notable feature, creating a form letter and merging data from Creative Filer, lets you conduct a mail-merge.

What you see is *not* what you get with this program. On screen you can view only the straight text. Formatting options (such as page numbering, justification, or headers) appear only on the printed page, not on the screen as you edit your material. You can get some idea of what the text will look like with Creative Writer's "preview" option, which presents a hi-res "picture" of a single page (a la HomeWord).

Creative Writer's print-formatting features let you set margins and use right justification. While the program provides for underlining and boldface, I haven't figured out how to tell it which control characters initiate these func-

tions. The word processor appears to send default values that work with most printers, but the manual doesn't address this point. When printing, Creative Writer lets you chain files or include material generated by Creative Filer and Creative Calc.

A Simple Filing System

Creative Filer is a straightforward, single-record structure program. It defines a file; designs a screen entry form; enters, modifies, and searches records; and prepares summary listings of your records' subsets. Although not a fancy package, it's still easy to learn and use.

Each record can have up to 128 fields and 6400 characters. You'll find the limit imposed on fields per record, while fairly generous for small applications, to be more of a problem than the limit on characters per record. Since the program reads each record from the disk, the only limit on the number of records is the capacity of the disk. You can add fields, but not delete them, from an existing record format.

Creative Filer takes the first field as a "key" variable to order the records. The program automatically tracks the value of this field and stores each new record in the sort sequence using it. In a phone list, for example, if you make the first field "Last Name," Creative Filer will maintain the list in name order. When you search through the data base, the key will yield the quickest results, but you can search on any field or combinations of fields. For convenience, you can define an alternate key field, but once you've determined it, you can't change it.

Creative Filer's handy report-writing features create a document format you can store. You select the fields and the spacing, and you can produce fields of the report from the fields in your file. For example, you can derive the commission on each sale as the selling price times the commission rate (if these latter two fields are in your file). The program computes the commission on each sale when it reads each record and prints it in the report. The program doesn't store the results of such calculations in the file.

Creative Filer works well for simple problems of organization, but it can't handle hierarchical records (for exam-

ple, one record type per household and a second record type for each household member). Its single-record structure can't deal with complicated arrangements that require a relational data base—one that combines information from two or more files—for a solution. The manual thinks of a Creative Filer record as an index card in a filing system. For these limited data-base tasks, Creative Filer performs well.

The Creative package works without a hitch, and I found no errors. Keep in mind, however, that it's actually three separate programs. You can buy more powerful programs—or more integrated ones—but for some users, the simplicity of this affordably-priced trio may outweigh the inherent limitations. ■

David Morganstein
Germantown, MD

Perfect Software

Thorn EMI Computer Software
3187C Airway Avenue
Costa Mesa, CA 92626

Integrated family of products
Apple //e or //c, 64K, 80 columns
\$109 Perfect Link (communications)
\$139 Perfect Writer, Perfect Calc,
Perfect Filer

★ ★ ★

Thorn EMI's Perfect series of programs exudes a decided air of class. For this review, I used Perfect Writer, Perfect Calc, and Perfect Filer on an Apple //c. (Time did not permit more than a short examination of Perfect Link.) These programs make extensive use of virtual memory techniques, so a single-drive system really is a viable option. None of the software is copy-protected, and the manuals encourage the use of backups.

Perfect Writer

The Perfect Writer package, which includes a tutorial disk, spelling checker, and thesaurus, demonstrates the best features of the line. Nested pop-up menus display the commands available at any time; you may call the topmost menu with the escape key, and invoke a command by typing its first letter or by moving a cursor to it

and hitting the return key. Options are numerous, but everything hangs together in a logical fashion. The manual helps with a detailed explanation of each command, and a double-page "menu tree" illustrating the relationships between the various menus.

Included in the program is a full complement of choices for moving through a piece of text, deleting material, controlling the appearance of a document, and carrying out all the usual duties of a word processor. For example, you may move the cursor forward or backward by a single space or word, or you may jump to the beginning or end of the current line, sentence, paragraph, or marked piece of text. These options are best exercised through the keyboard; the //c's mouse is supported to a very limited extent, and in any case is not an ideal tool for working with text.

Perfect Writer's high points include its ability to generate an index, table of contents, or glossary for your writing. It can maintain a list of footnotes, changing the numbers automatically if you add or delete references. It can also split the screen into two windows, much like a spreadsheet, so that you can look at two sections of a piece of text. These are very professional word-processing features.

Low points? The program loads rather slowly—it takes roughly a minute to go from startup to being ready for text—and the display has an annoying habit of lagging behind anyone with decent typing speed. (Text doesn't actually get lost, however.) Marking a large block of text to be moved or deleted can also be time-consuming; you can watch the program paint every line in reverse video as it is marked.

And although page breaks are visible on screen, Perfect Writer does not tell you the current page number. It doesn't count words, either. As someone who does a lot of writing against magazines' tight space budgets, I consider those omissions significant.

Perfect Calc

Thorn EMI's spreadsheet resembles Perfect Writer in its use of pop-up menus, multiple options for moving the cursor, and dual display windows. Cut-and-paste operations like the word processor's are used to move and delete data, as well.

Important features include the ability to assign a descriptive name to the contents of any cell (so that you may use "EXPENSES" instead of something like "A9" in a formula, for instance), and a concept called the "swap field." This allows Perfect Calc to work on a large spreadsheet by breaking it into smaller pieces that will fit into the computer's memory. The program keeps track of segment organizations—when it should save one portion on disk and call the next one into RAM.

The program is equipped with numerous mathematical and logical functions to help with your calculations. Because I often use spreadsheets for scientific computation, I regret the omission of trigonometric functions. I have to admit they are not everyday tools of the business world, however; most of the material needed for business and finance is included.

Although Perfect Calc is quite satisfactory in most respects, it does have some flaws. In particular, formula replication and the recalculation of a spreadsheet are slow. One of my standard tests is a table of compound interest; I found that Perfect Calc required more than 39 seconds to recalculate a 17-row, seven-column compound-interest table. It also took nearly a minute to insert or delete a blank column in the middle of such a sheet.

These may not be enormous spans of time in the cosmic scheme of things, but they *seem* long. The program gives little indication of what is going on during these periods; the cursor may either freeze on screen or disappear completely. As a result, it is especially desirable to use manual (on-demand) recalculation, rather than the automatic mode, when asking "what if" questions of your spreadsheet.

Perfect Filer

The Perfect Filer data-base manager makes it fairly painless to design a video "form" on which to identify and enter the data you want to store. One unique feature is the "group entry"—a predefined collection of commonly used types of items. You may reserve space for a group entry with just a few keystrokes. Names (in last/first/middle format) constitute one group entry, addresses make up another, and so on. Menu-driven operation shines here; it

is much better than having to inform the program about whether each individual field is to contain an alphanumeric string, an integer, a date, or other types of data.

Once you have constructed a Perfect Filer data file (which may be as large as a disk's available storage space), you may use all manner of sorting and selection operations to work with portions of your data. You may sort a file on as many as nine fields, in either ascending or descending order. Selection criteria may be combined with the logical AND operator, although the program seems to have no ability to handle the OR.

I appreciated the way in which selections and sorts may be strung together to allow the user to examine more specific subsets of a file. Again, the only potential drawback is speed. Besides requiring some juggling of your data disk and the one containing the program's Merge/Sort routines, the program's operations are intrinsically slow. It took 48 seconds to prepare a 13-record file segment for sorting according to two fields, and another 21 seconds to carry out the sort. I also found that 25 seconds passed before the program found the first record that satisfied a simple search criterion. (It was only the seventh record in the set, by the way.) These times are really longer than they should be.

Perfect Filer can pass data back and forth to Perfect Writer and Perfect Calc for report preparation. The spreadsheet connection is particularly fortunate, because Filer has no computational abilities of its own; it cannot even add up a column of data. And you may use Perfect Writer to prepare form letters, complex business forms, and other documents to be fleshed out with data from Perfect Filer.

A Quick Summary

Thorn EMI's Perfect software is generally competent, the programs work well together, and the ample documentation is nicely done. Although each of the routines has its weak points (speed is a particular problem), as a whole the series may be a good bet for people intending to use their Apples for light-to-moderate doses of standard applications. ■

Scott L. Norman
Framingham, MA

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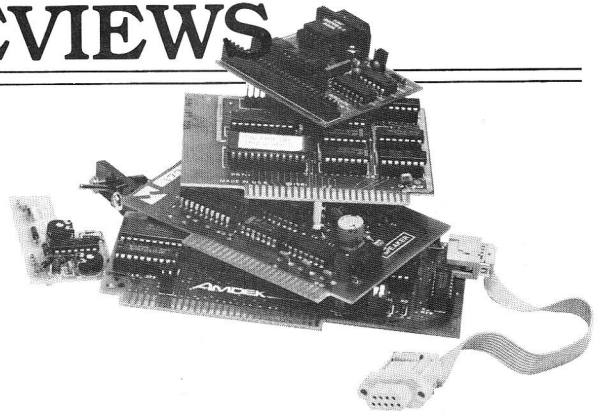


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- ★★★★ Superlative
- ★★★ Above average
- ★★ Good
- ★ Not recommended
- Stay away

Hush 80P

Ergo Systems

26254 Eden Landing Road
Hayward, CA 94545

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\$159.99

★★

If you've been watching the evolution of printers over the past few years, you've probably noticed two trends: To serve the home-computer market, printer manufacturers have decreased both the price and the size of their products. Ergo Systems has created a dot-matrix machine, the Hush 80P, that is certainly on the low end of the market on both counts. If you've been "priced out" of the printer trade, the Hush 80P offers an inexpensive way to get hard copy from your computer. And for those who need a truly portable printer, you can toss the Hush 80P in a suitcase and take it on the road. (For maximum convenience, Ergo Systems also offers a rechargeable battery-powered version.)

The Hush 80P is small, measuring 11.625 by 5.5 by 2.8 inches. Loaded with paper, it weighs only 36 ounces—just over two pounds. A 5-foot ribbon cable with 26-pin rectangular edge connectors, a power transformer, and

an 8½-inch-by-90-foot roll of thermal paper (no ribbon required) are included with the printer. The 80P is the Centronics-type parallel-interface version of the Hush 80 model. It's also available with an RS-232 serial interface.

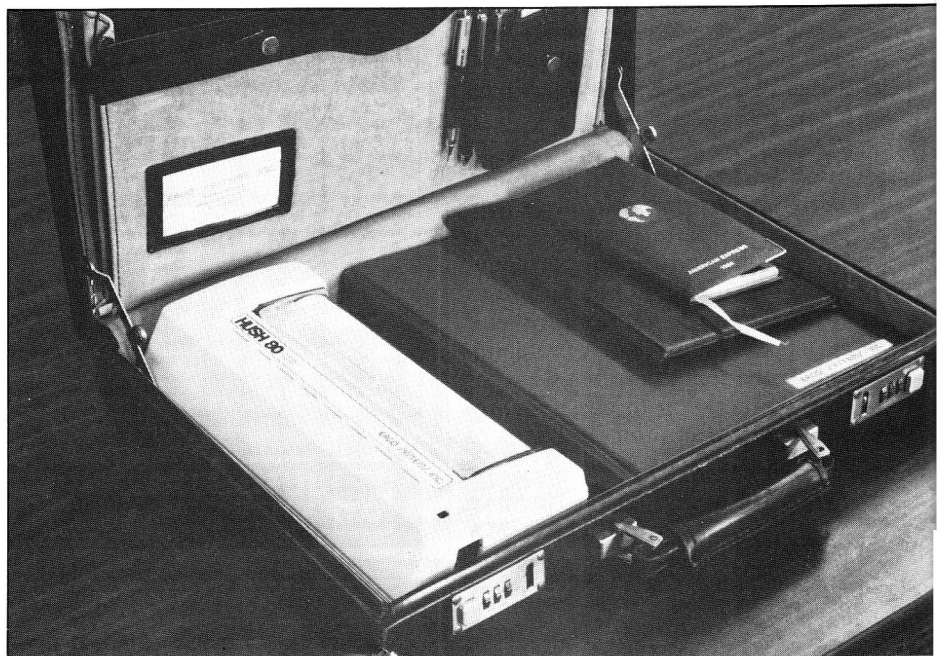
The printer is ready to operate as shipped. One of the things I liked most about the printer was its trouble-free operation. During the test period, the paper never jammed, and the only printing error I encountered was caused by a loose cable—a problem that was easily corrected.

The only maintenance normally required is the occasional installation of a new roll of paper. On the first try, it took me about five minutes to accomplish this task, and the manual devotes six pages to the topic. Keep in mind, however, that the roll is 90 feet long—you won't need to replace it too often. In addition, the thermal roll is the only kind of paper the Hush 80P can accept. You won't be swapping roll paper, letterhead stationery, and mailing labels, for example. (Thermal

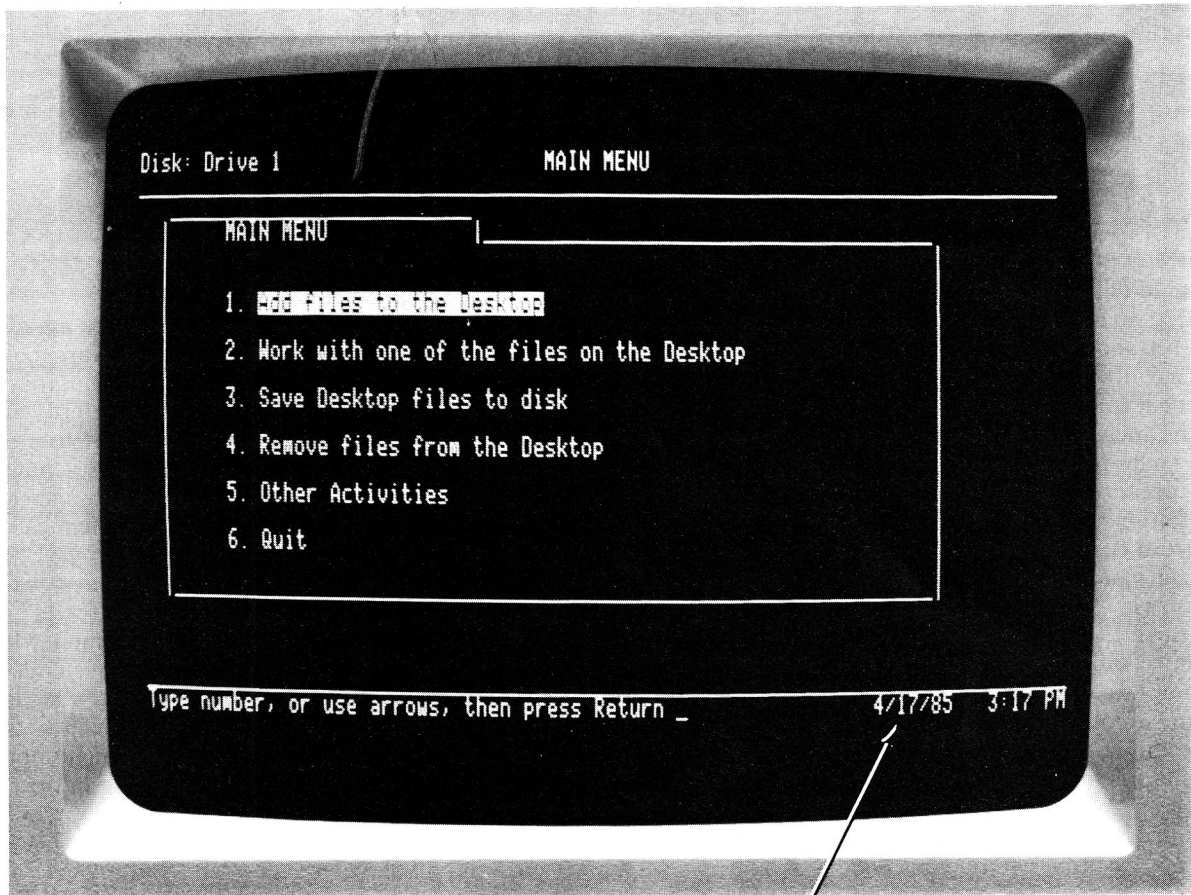
paper for the Hush 80P costs \$6.49 per roll, or \$35.99 for a package of six.)

Thermal printing is much quieter than impact technology. You can carry on a conversation in your usual tone of voice while the Hush 80P types along right next to you.

The character set includes 129 ASCII and international characters, the latter for printing text in French, German, Danish, Swedish, Italian, and Spanish. The Hush 80P forms characters from a 6-by-7 matrix of dots and prints text in any of three modes: standard (80 characters per line), double-sized (40 characters per line), and compressed (160 characters per line). Standard text is 13 characters per inch; most other dot-matrix printers produce 10 characters per inch. On an Epson MX-80, for instance, an 80-character line leaves about a ¼-inch margin on the left and right. The same line on the Hush 80P leaves a 1-inch margin on each side. The slightly smaller characters are very legible, even in compressed mode (25 characters per inch). Lowercase letters, how-



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 In Your Apple



Just Look Right Here

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In fact, you could put ALL the competitive cards in every slot in your Apple and you still wouldn't have all the features of the Timemaster H.O.

The Timemaster H.O. comes with a ton of fun and useful software. It has an easy to read yet detailed manual, a 20 year auto-recharging battery and a 3 year no hassle warranty.

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ever, do not have true descenders.

The Hush 80P's print speed, said to be 80 characters per second, is sluggish by today's standards. When compared to an Epson MX-80 (also rated at 80 cps), the Hush 80P came in second. Printing an identical 66-line page (80-character strings of text written as "aaa bbb ccc ddd. . .") took one minute 31.02 seconds with the Epson MX-80, and one minute 37.55 seconds with the Hush 80P. Printing a typical one-page business letter that included blank and partial lines required 41.77 seconds with the Epson MX-80 and 51.95 seconds with the Hush 80P. Although it's a little slow, the Hush 80P's print speed is adequate for most home uses.

The Hush 80P was designed to be compatible with Epson MX-100 control codes, so software configured for an MX-100 should run properly. However, ten control codes for the MX-100 were not implemented in the Hush 80P. The most significant omissions are the codes for producing underlining, superscripts, and subscripts. When you issue one of the omitted codes from the keyboard or include one within a program, the printer simply ignores it.

The Hush 80P also offers graphics capabilities, tabbing, inverse printing, control of line spacing, and bidirectional and unidirectional printing. The 43-page manual clearly describes all of the printer's features and how you can control them.

You can dump text to the Hush 80P, but except for proofreading your document, this is an unlikely application.

The lack of boldface, italics, underlining, and lowercase descenders severely restricts the Hush 80P's use for word processing. And, although the characters are quite legible, thermal paper is suitable only for informal correspondence.

The Hush 80P is not a substitute for some of the faster, near-letter-quality dot-matrix printers on the market, but Ergo Systems never intended it to be. Acceptable print quality, low noise, portability, and reasonable price make the Hush 80P an excellent choice. ■

Steven A. Schwartz
Pittsburgh, PA

Editor's Note:

George Sidline at Ergo Systems reports that the Hush 80P is now available in a "rechargeable battery-powered version, for both Centronics and RS-232C interfaces." The battery option costs an extra \$40.

ComputerEyes

Digital Vision

14 Oak Street
Suite 2
Needham, MA 02192

Video acquisition system
Any Apple II, 48K
\$129.95

★ ★ ★

Looking at all those pixels on the Apple screen, the artist in all of us aspires to create some unique work

Figure 1. The ComputerEyes Executive main menu.

COMPUTEREYES (TM) EXECUTIVE
VERSION 1.1

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DIGITAL VISION, INC.

SELECT FROM MAIN MENU:

HELP	SAVE TO DISK
ADJUST SYNC	LOAD FROM DISK
NORMAL CAPTURE	CATALOG
4-LEVEL CAPTURE	DEMO
8-LEVEL CAPTURE	EXIT
VIEW CURRENT IMAGE	

SELECTION:

of computer art. There are a number of hardware and software tools on the market that can help, but they usually require enormous dexterity and near-infinite patience, not to mention a healthy checkbook. But now there's an alternative—an image-capturing hardware/software system called ComputerEyes—and it's only \$129.95.

ComputerEyes is a new way to produce "computer portraits" on your Apple. You can experiment with visual recognition, security systems, product control, and so on. It's essentially a digitizing system: It "views" an actual image through video equipment and converts this analog information to digital signals the computer can understand. Digitizers have been around for years, but what makes ComputerEyes different (and significantly less

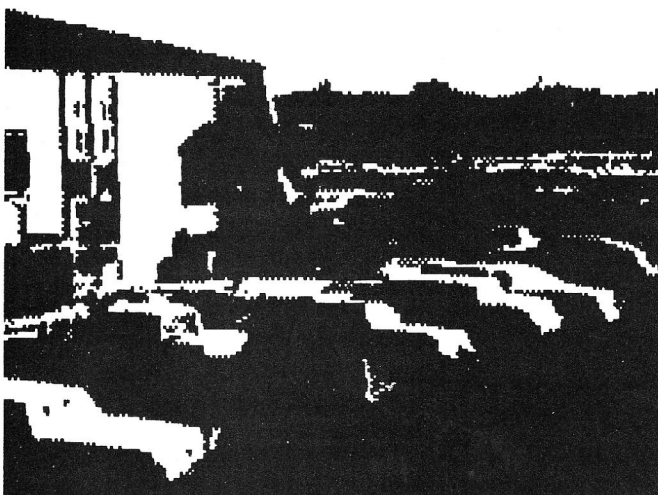


Figure 2. An image obtained in Normal Capture mode.

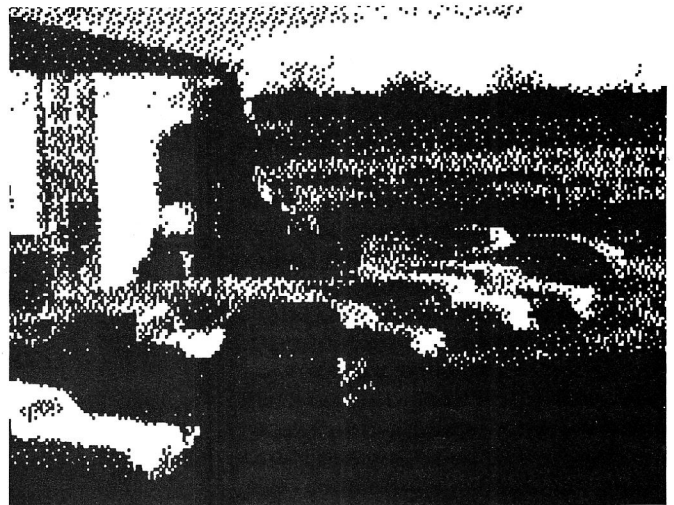


Figure 3. A sample 4-level capture image.

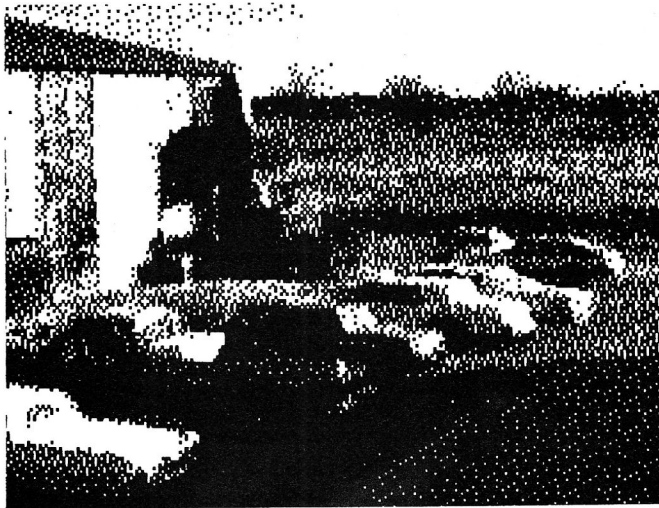


Figure 4. A sample 8-level capture image.



Figure 5. A double hi-res image.

expensive) is the method by which it collects and displays digital data.

Most video digitizing systems rely on a method of data acquisition called *frame grabbing*. The system receives a picture from a video source and processes the voltage levels with a fast analog-to-digital (A/D) converter. The resulting information is stored in a frame buffer, usually 8K of high-speed memory on an interface card. The whole process takes about 1/30 of a second, letting you acquire digital views in "real time." The extra memory and sophisticated electronics the system requires, however, make it quite costly—\$600 to \$10,000.

But ComputerEyes is designed to use a built-in, easily accessible A/D converter—the Apple's game I/O socket. Under the control of special software, the system converts a steady stream of analog voltages to digital signals and stores them in the Apple's hi-res page 1 memory. The designers at Digital Vision call it the *slow-scan* method. As the system processes a picture, it fills the hi-res screen one column at a time, beginning on the left side. It's slow—creating a high-contrast image takes five seconds—but the expense is minimal, and the results are well worth the wait.

The ComputerEyes system consists of a small black box with an RCA-type jack on the back (for attachment to a video source), and a ribbon cable and 16-pin plug connecting the inside circuitry to your Apple's game I/O socket. (An optional black-and-white closed-

circuit television camera with cable is also available.) Included in the package are a program disk and the ComputerEyes manual. The unprotected disk contains the ComputerEyes Executive, an Applesoft program that controls the module during image acquisition. The manual covers all aspects of operating the module, practical and theoretical. The troubleshooting section is particularly helpful.

Setting up the ComputerEyes system is straightforward. First be certain your computer is turned off. Pop the top off the Apple and remove anything that can be plugged into the game I/O socket. Then insert the ribbon cable from the ComputerEyes unit through any convenient slot on the Apple's rear panel and plug it into the game socket. Make sure the cable extends from the socket toward the center of the computer to ensure correct orientation of the electronic signals. Put the top back on your Apple and you're ready to go. Insert the ComputerEyes Executive disk into drive 1 and turn on your computer.

The disk contains a menu-driven Applesoft program for making computer pictures. It's convenient and well-organized, with accurate error-trapping—it's very difficult to crash the program. The Executive lets you access its machine-language subroutines, contained in one binary file called CEDRIVER, that control picture acquisition. For those who prefer to write their own programs, Digital Vision publishes all the necessary infor-

mation, including the addresses of CEDRIVER's routines.

Before you begin using the Executive, make a working copy (use COPYA from the System Master disk) and put the original in a safe place. Boot your working copy and you'll see the Executive's main-menu screen (**Figure 1**).

You can use virtually any video source that has an RCA-type plug, but a video camera is best. Because data acquisition is a slow process, other video sources must have some form of freeze-frame ability for optimum results.

Adjust the synchronization between your video source and the ComputerEyes module by selecting Adjust Sync on the main menu. Follow the directions in the manual: Rotate the sync knob on the module until the words IN SYNC appear on your monitor screen. Point your video camera at your subject (preferably a stationary one) and select Normal Capture from the main menu. Almost immediately, a high-contrast image will begin to form on the left side of your screen, one column at a time, finishing in about five seconds. If you've set the brightness control and focused the camera lens correctly, the image should be recognizable (**Figure 2**). If it isn't, press the space bar, adjust the focus or brightness, and try again.

The images obtained in Normal Capture mode are interesting, but if they don't appeal to you, try 4-level or 8-level capture, which build a complete image by averaging the light values

during a series of exposures. These methods take longer to produce an image (25 seconds for 4-level, 50 seconds for 8-level), but the results are much more detailed (**Figures 3 and 4**).

From the Executive program, you can also catalog a disk, save or load an image (packed or unpacked), and get on-line help whenever you need it. And for Apple IIe owners with extended 80-column cards and Revision B (or later) motherboards, Digital Vision has recently introduced an enhanced version of the Executive that allows for double hi-res image captures (**Figure 5**).

If you're interested in capturing actual images with your computer, the ComputerEyes system is an excellent alternative. Its only limitation is speed of image acquisition, but the low cost of the system far outweighs that drawback. The list of ComputerEyes applications is practically endless. As for myself—well, I always did want to be a portrait artist. ■

Terry Johnston
Wichita Falls, TX

Graphics Tool Kit

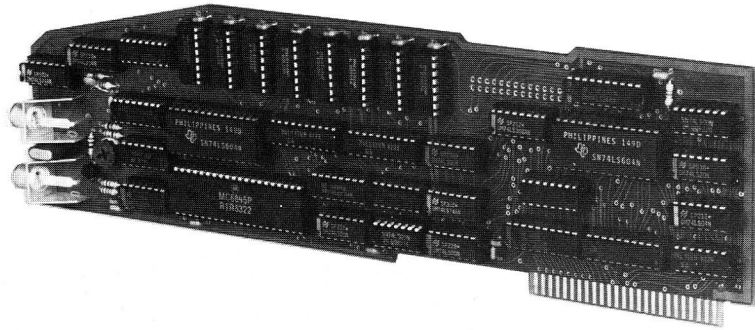
Demco Electronics
10516 Grevillea Avenue
Inglewood, CA 90304

Graphics card and software
Apple II, II Plus, IIe
Supports many popular
dot-matrix printers
\$595

★★★

Expensive, but potent. That's the Graphics Tool Kit—not your ordinary graphics drawing package. Designed to provide a unique graphics display with printing capabilities, the Kit's features will be more valuable to industrial and scientific users than to home hobbyists. The package's hi-res graphics makes it ideal for industrial processes, laboratory instrument data recording, or display applications requiring printed copies of charts and graphs.

The Graphics Tool Kit increases your Apple's total addressable graphics memory nine times, from its original 280 by 192 pixels to 640 by 768 pixels. In hi-res mode, the Apple's



The Graphics Tool Kit offers unique graphics display with printing capabilities.

monitor can display 640 points horizontally, but it can't accommodate 768 points vertically. It can, however, display 384 (half of 768), and the Graphics Tool Kit software lets you focus on the top, bottom, or middle of the image in memory at any time.

Since the 640-by-768 dimensions approximate the printed-page format, the Graphics Tool Kit produces an 8-by-10½-inch hi-res printed image using a dot-matrix printer. (Hi-res, in this instance, is a print resolution of 640 by 768 dots per page.) In standard pica mode, printing is 80 dots per inch on any of 15 models, including the Apple Imagewriter, Apple Dot-Matrix, Pro-writer, Epson FX/RX series, and NEC 8023. The Kit also supports 24 printer-interface boards.

The Graphics Tool Kit consists of an add-on SHG-640 circuit card and two disks containing system software, programming software, applications software, data files for type fonts and shape tables, demonstration graphics, and programs. The circuit card provides the memory necessary to store and process the enlarged graphics images.

Screen, printer, and mouse I/O drivers comprise the system software. Programming software includes standard Apple DOS 3.3, but several commands have been added, so that Applesoft BASIC programmers can save a picture from the SHG-640's memory to disk, load a file from disk to memory, clear or scroll the screen, or dump the picture from the SHG-640 memory to a printer.

Editors in Control

Applications software includes a menu-driven graphics editor, shape-table maker/editor, and a font maker/editor. With the graphics editor, you can draw on screen while addressing the entire 640-by-768 graphics space.

Cursor movement is controlled by the keyboard or an Apple Mouse. Through the graphics editor's menus, you can load shape tables and fonts, clear the hi-res screen, load and save pictures to disk, display the graphics memory, and output a picture to the printer. Use the draw command to position vector shapes, insert text, draw lines, and plot various size points. You can perform cut-and-paste operations on any rectangular subset of an image. Sixteen monochrome tones and patterns are available for area-fill operations, toning characters, or erasing.

You can produce graphics and elaborate-font text documents on single sheets of 8½-by-11-inch paper. The graphics editor provides a useful set of drawing commands, but you can't view more than half of the image while designing it.

The font maker/editor lets you create new fonts or edit the 31 fonts provided. You can design fonts up to 1 inch high with proportionally spaced characters.

To develop new shape tables or to insert, delete, or replace a shape in the eight existing tables, the Graphics Tool Kit offers the vector shape-table maker/editor. Be warned, though, that shape tables prepared with other software will appear only one half their original size because of the difference in graphics memory size between the standard Apple environment and the SHG-640.

Taxing the Limits

It's possible the Graphics Tool Kit may stress certain hardware components within the Apple computer, and the documentation warns that the SHG-640 circuit card may tax the Apple's power supply if used with several other add-on cards. You may need larger power supplies, or fans, if the heat generated by the SHG-640 or

other cards causes intermittent operating problems. To minimize heat build-up in the dot-matrix print head, you can also slow the printer speed by using a different configuration setting.

To display an image produced by the Graphics Tool Kit, your monitor should have a high-persistence phosphor that reduces the picture's flicker caused by operating the SHG-640 in an interlaced video mode. Instructions tell you how to adjust the Apple's video output potentiometer, a potentiometer on the SHG-640, and the monitor's vertical height and linearity controls to achieve an optimum screen image.

The Graphics Tool Kit is a powerful Apple accessory. Its developers, however, seem to have assumed that someone will either write or modify software to take advantage of the package's ability to address graphics coordinates. (Alterations would include extending the limits on Applesoft BASIC commands, such as H PLOT, from zero to 639 on the x-axis and zero to 767 on the y-axis.)

Companies, such as system integrators, that create turnkey systems for industrial and business markets will find the Graphics Tool Kit pertinent; it's common to write or modify software for highly specialized applications in these markets. The Graphics Tool Kit could be a valuable component in a low-cost system designed to produce hard-copy hi-res graphics. But since the Graphics Tool Kit displays only half the Apple's graphics memory at a time, it may not be a significant package for hard-copy graphics applications. ■

**Allan Schmidt
Concord, MA**

Editor's Note:

According to Darrell Hoblack at Demco Electronics, "we will be supplying support for the Apple Graphics Tablet in August. We have worked out a relationship with Digital Vision, and they have adapted Computer-Eyes to work with the Graphics Tool Kit at 640 x 384 resolution. Bringing out the Tool Kit was like bringing out a new computer: we are working with third parties, as well as internally, to develop software." Hoblack also looks forward to C and Pascal drivers, and a ProDOS version.

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A reprise of the reviews that have appeared in inCider in the last three months. Prices subject to change without notice.

- | | |
|------|-----------------|
| ★★★★ | Superlative |
| ★★★ | Above average |
| ★★ | Good |
| ★ | Not recommended |
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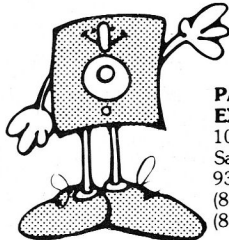
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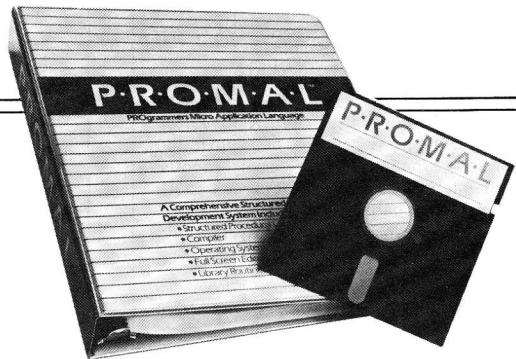
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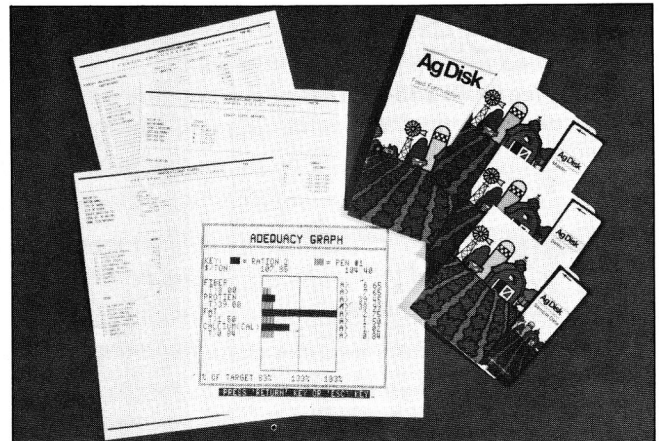
24th product in the Harris AgDisk agricultural line, sells for \$300 from Harris Technical Systems, 624 Peach Street, P.O. Box 80837, Lincoln, NE 68501, (800) 228-4091. For more information circle number 470 on the Reader Service card.

Apple Astronomy

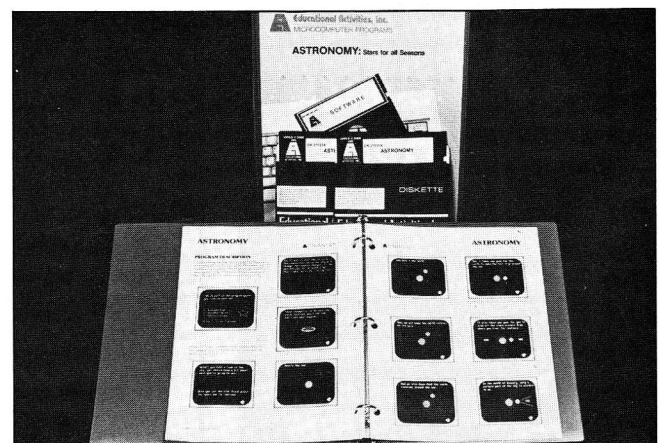
Astronomy: Stars for All Seasons lets students view easily observed constellations as they would appear from any latitude in the northern hemisphere. They can also examine seasonal changes in the skies by viewing monthly star maps of a particular latitude. Any of 34 constellations can be observed close up, as well. A tutorial provides an explanation of the mysteries of the heavens. Astronomy sells for \$59.95 from Educational Activities, P.O. Box 392, Freeport, NY 11520, (516) 223-4666. For more information circle number 476 on the Reader Service card.

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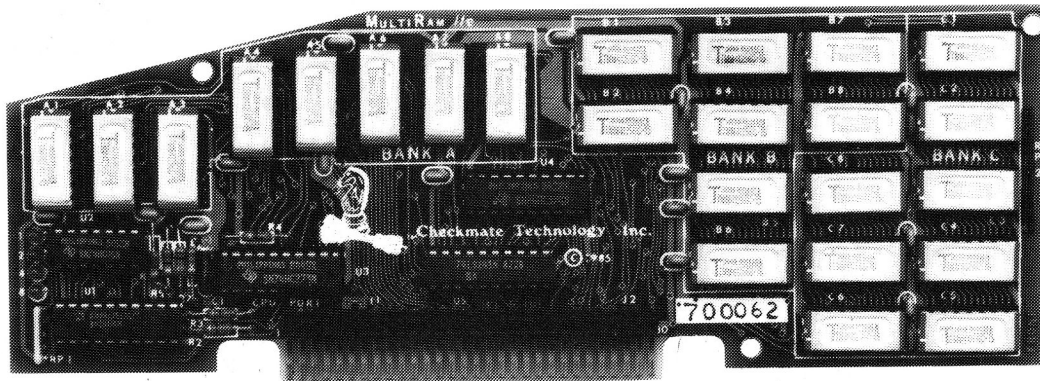


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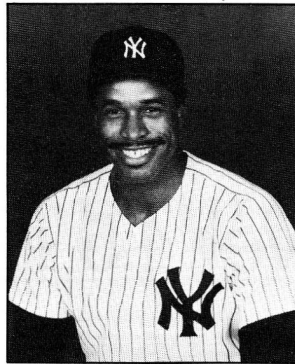
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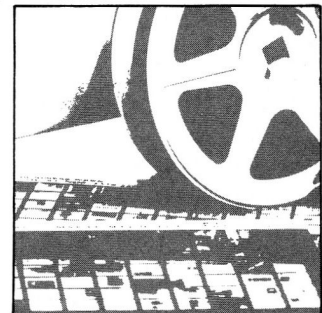
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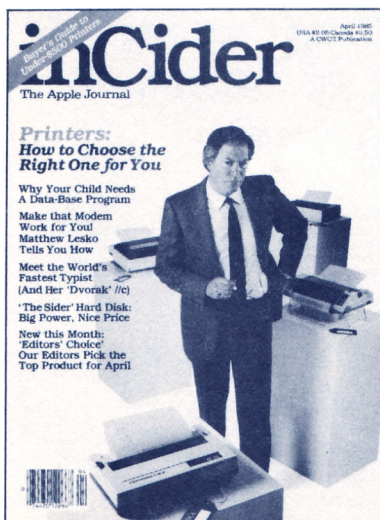
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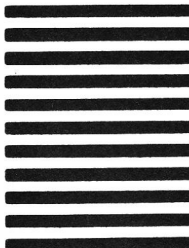
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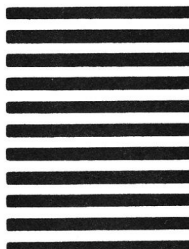
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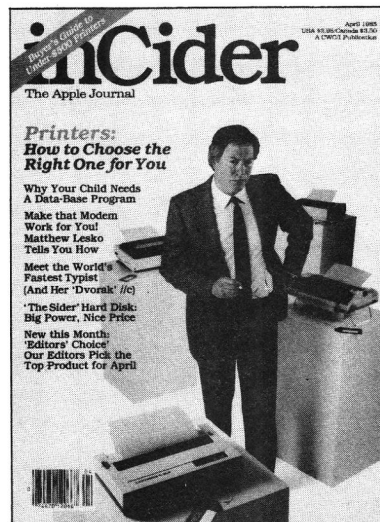
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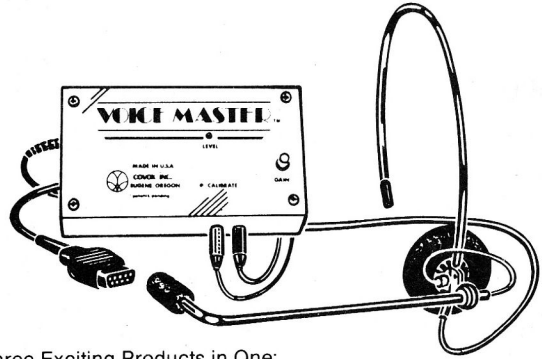
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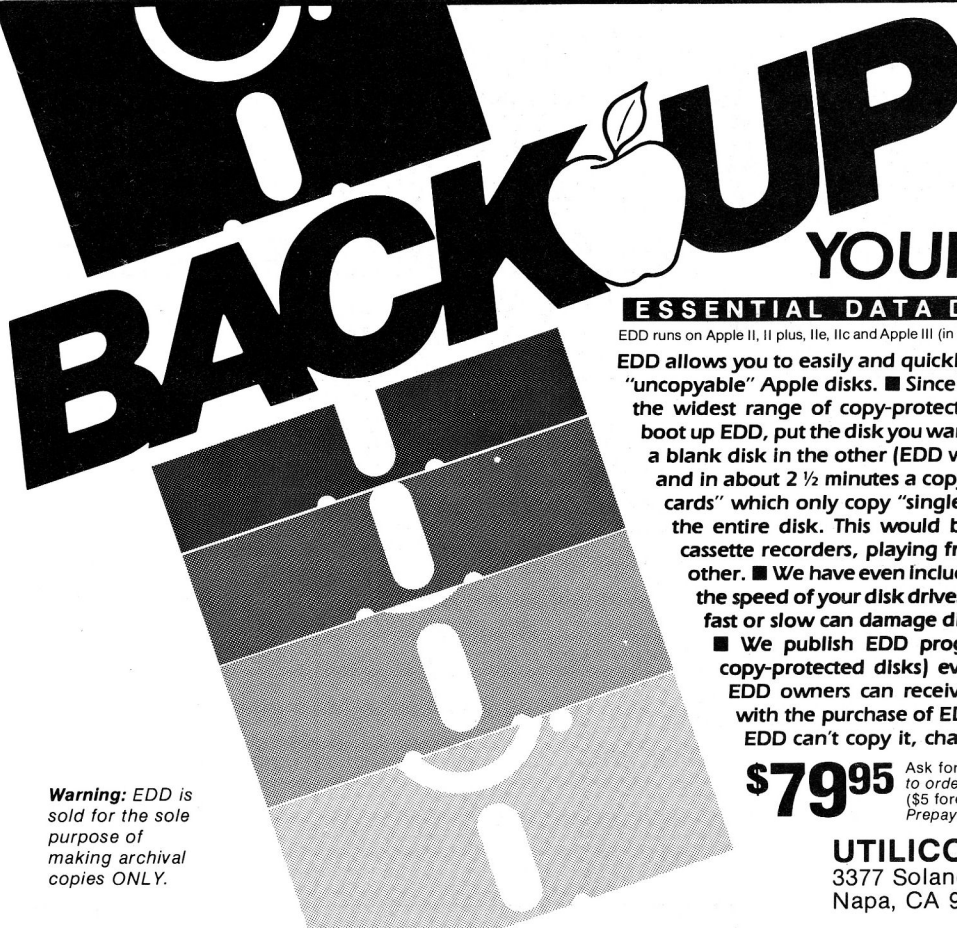
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Six Gun Shootout is a simulation of hand-to-hand combat in the Old West. Players can slay each other with knives, tomahawks, rifles, shot-guns, or pistols. Shootout sells for \$39.95. Both programs are from Strategic Simulations, 883 Stierlin Road, Building A-200, Mountain View, CA 94043, (415) 964-1353. Circle number 481 on the Reader Service card.

Learning Adventure

In **Willy Byte in the Digital Dimension**, your mission is to guide your coded message from the Keyboard Room to the RAM (Random Access Memory) Room and save the data successfully in the Disk Drive Room. But keep your eye on the power supply and system clock. Is this an arcade adventure or a sneaky initiation into the innards of the Apple? Don't let the kids know. Willy Byte speaks to you with the Mocking-board—music, speech, and special sound effects—if you have one. You'll find some fun and learn something too. Willy Byte costs \$39.95 from Data Trek, 621 Second Street, Encinitas, CA 92024, (619) 436-5055. For more information circle number 485 on the Reader Service card.

Apple Engine

Injured Engine presents weekend mechanics with a cutaway view of the internal workings of a typical automobile at work. Gauges at the bottom of the screen indicate speed, temperature, voltage, oil pressure, RPM, MPG, and exhaust emissions. On-screen tutorials demonstrate how each part and system of the engine works and relates to the others. The "Trouble-Shooter Challenge" drives a damaged engine onto the screen—you inspect and repair as you see fit. Beginners and experts both have lots to learn with Injured Engine, for \$34.95 from Imagic, 2400 Bayshore Frontage Road, Mountain View, CA 94043, (415) 940-6030. For more information circle number 488 on the Reader Service card.

Choo-Choo Apple

The Railroad Works is a model railroad you can set up on your Apple. Plan and build a railroad empire—trucks, bridges, depots, and countryside—in either the Age of the Iron Horse or the modern era of the diesel locomotive. Scenery can be as varied as the landscape of your mind. Save your layouts and put them to the test in the Train Game, where successful transport of freight and passengers depends on efficient track configuration and clever scheduling. Railroad buffs will enjoy The Train Game. The Railroad Works includes a Railmaster Guide, for \$34.95, from CBS Software, One Fawcett Place, Greenwich, CT 06836, (203) 622-2500. For more information circle number 483 on the Reader Service card.



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*Sensible Speller ProDOS works with the following word processors, AppleWriter-ProDOS version, AppleWorks (Apple Computer, Inc.), Format II Enhanced-ProDOS (Kensington Microware), and others. Sensible Speller IV works with DOS 3.2 and DOS 3.3-AppleWriter (Apple Computers, Inc.), Bank Street Writer (Brodensburg), Format II (Kensington Microware); HomeWord & Screen Writer (Sierra On-Line Inc.); PFS: WRITE (Software Publishing, Inc.); Word Handler (Silicon Valley Systems); CP/M-Wordstar (Digital Research Corp.-Micropro International), and others. All features are not available with CP/M, PFS:WRITE & Word Handler. Owners of trademarks indicated in parentheses.

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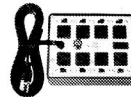
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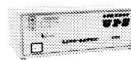
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- 8 channels D/A
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- Very easy programming
- Many analog ranges
- Manual contains sample applications

A/D SPECIFICATIONS

- 0.3% accuracy
- On-board memory
- Fast conversion (.078 MS per channel)
- A/D process totally transparent to Apple (looks like memory)
- User programmable input ranges are 0 to 10 volts, 0 to 5, -5 to +5, -2.5 to +2.5, -5 to 0, -10 to 0.

The A/D process takes place on a continuous, channel sequencing basis. Data is automatically transferred to its proper location in the on-board RAM. No A/D converter could be easier to use.

D/A SPECIFICATIONS

- 0.3% accuracy
- On-board memory
- On-board output buffer amps can drive 5 mA
- D/A process is totally transparent to the Apple (just poke the data)
- Fast conversion (.003 MS per channel)
- User programmable output ranges are 0 to 5 volts and 0 to 10 volts

The D/A section contains 8 digital to analog converters, with output buffer amplifiers and all interface logic on a single card. On-card latches are provided for each of the eight D/A converters. No D/A converter could be easier to use. The on-board amplifiers are laser-trimmed during manufacture, thereby eliminating any requirement for off-set nulling.

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The signal conditioner's outputs are on a high quality 16 pin gold I.C. socket that matches the one on the A/D's so a simple ribbon cable connects the two. The signal conditioner can be powered by your Apple or from an external supply.

FEATURES

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10509 Walnut #325, Boulder, CO 80302, (303) 621-8385. For more information circle number 474 on the Reader Service card.

Wheel of Wisdom

The earth faces certain destruction. You can save it, but that means a mind-bending telepathic trip back to the beginnings of civilization. Your quest for the wheel of wisdom is the story of **Mindwheel**. The mind adventurer—that's you—must come intact through a labyrinth of four powerful minds. Mindwheel (\$44.95), written by

Robert Pinsky, a widely known American poet, is the first of several electronic novels from Broderbund's Synapse Division, 17 Paul Drive, San Rafael, CA 94903, (415) 479-1170. For more information circle number 472 on the Reader Service card.

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The **Universal Bulletin Board** system puts everything you need to install and run your own BBS in one convenient package. The system supports most hardware configurations, including

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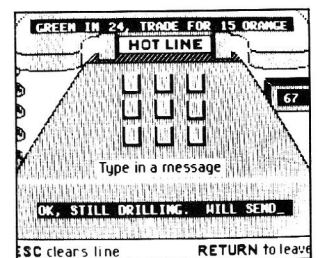
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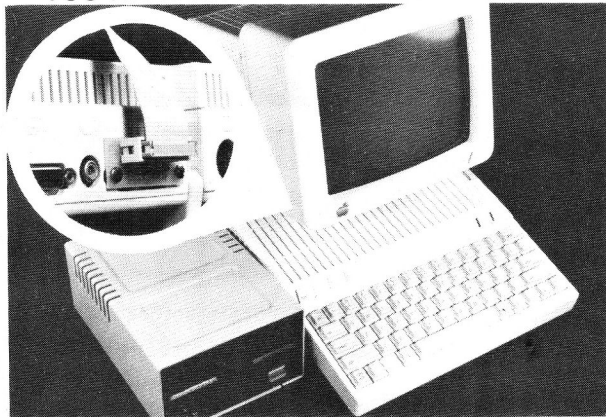


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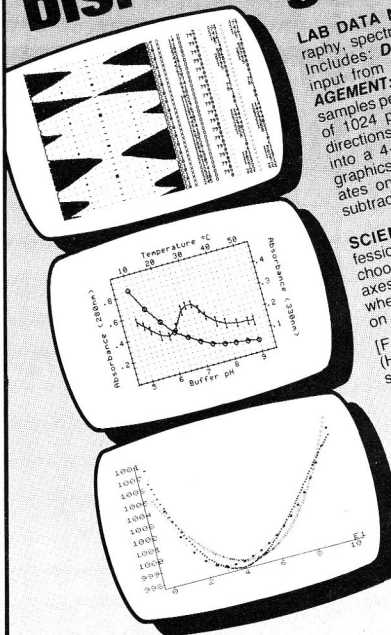
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NEW PRODUCTS



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Mouse Moves

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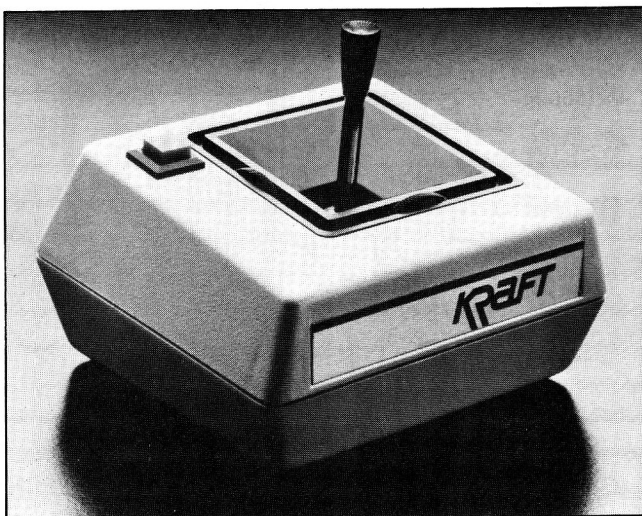
Product descriptions contained in this section are based on information supplied to us by the respective manufacturers. These announcements are provided solely as a service to our readers and do not constitute endorsement by inCider of any given product.

mode, and your QuickStick controls cursor motion the way a mouse does—the cursor goes where you point the stick. In joystick mode, the QuickStick IIc offers spring-centered or free-floating motion, depending on preference or software requirements. The QuickStick IIc is available for \$79.95 from Kraft Systems, P.O. Box 1268, Vista, CA 92083, (619) 724-7146. For more information circle number 452 on the Reader Service card.

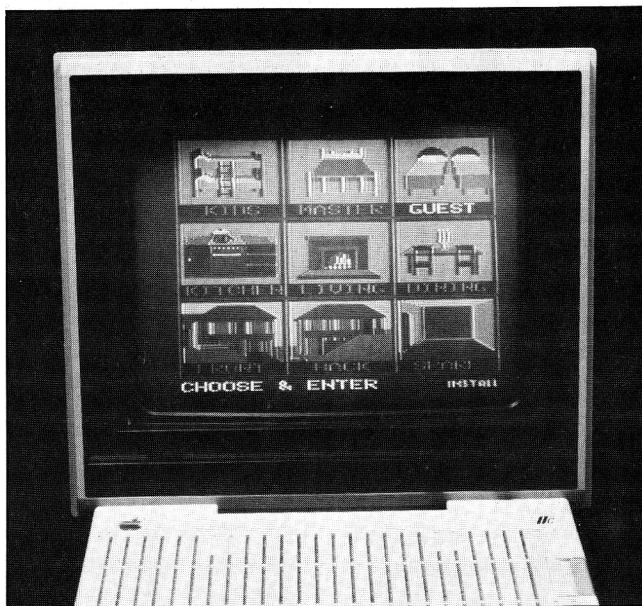
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The ESTeem Model 84 wireless modem.



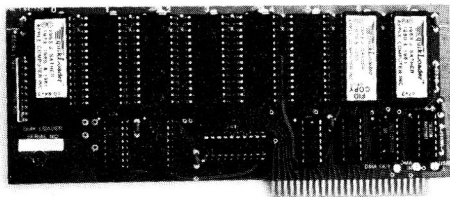
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- Commercial programs available.
- Includes DOS, FID, COPYA, and Integer.

The benefits of quikLoader™ start when you turn on the computer. Standard DOS is *instantly* loaded. You may then catalog the programs available on the card by pressing **Q-reset**. Typing the index letter that appears on the left of the program name causes that program to be *immediately* loaded. We start your library of programs with the most popular utilities on EPROM, 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 powering on.

Saving your own programs onto EPROM (Erasable Programmable Read Only Memory) is easily done, using a separate EPROM programmer, (such as the PROMGRAMER™). For APPLESOFT™, Integer, or single machine language files, no programming knowledge is necessary. You will need experience if you want to save copy-protected or complex programs. The amount of experience necessary depends on the complexity of the program.

SYSTEM REQUIREMENTS

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

\$179.50

DOS, Integer basic, FID, and COPYA are copyrighted programs of APPLE COMPUTER INC. licensed to SOUTHERN CALIFORNIA RESEARCH GROUP to distribute for use only in combination with quikLoader.

9-16 Adapter

For Apple //e and //c

This product permits the use of most 16 pin I/O devices with the APPLE //c or //e. By plugging this adapter into the sub-miniature 'D' connector, (in back of the computer), you can plug in a 16-pin device, such as the PADDLE-ADAPPLE, paddles, joystick, KOALA PAD™, etc. The only limitations are those devices that use the annunciators or the C040 strobe, such as the POWER PAD™. Please note that the //c does not support 2-joystick games.

\$14.95



16-9 Adapter

For Apple][+ or //e

This product permits the use of all 9-pin game I/O devices with the APPLE][+. By plugging this adapter into the internal 16-pin connector, you can plug in any 9-pin game device, such as paddles, joysticks, KOALA PAD™, Muppet Learning Keys™, etc.

\$14.95

PROMGRAMER

designed by Bob Brice

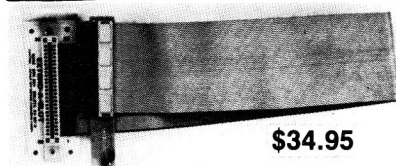
software by Bob Sander-Cederlof

The PROMGRAMER will read or program any of the standard single voltage EPROMS, from the 2708 to the 27512. Features include:

- Slot independent operation for the APPLE // family of computers.
- Zero-insertion force sockets accepts 24 or 28 pin devices.
- Choice of standard or fast programming algorithms.
- Disk-based software allows easy customization of software
- Source code included.
- Complete instructions for loading software into quikLoader™.

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EXTEND-A-SLOT

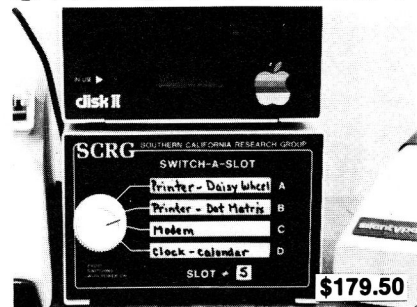


\$34.95

The **EXTEND-A-SLOT** brings a slot outside your APPLE™, allowing an easy change of cards. The 18" flex cable is long enough to allow placement of the card in a convenient location. The high quality connectors are gold plated for reliability.

EASY TO USE—just plug it in as you would any expansion card, then plug your card in. When you want to change cards, do it easily outside the computer, without the wear and tear on the computer expansion slot.

SWITCH-A-SLOT



designed by Joy George

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.

- User selects desired card by front panel rotary switch.
- Plugs into any peripheral slot
- Saves wear and tear on delicate connectors.
- 18" cable connects SWITCH-A-SLOT to computer.
- Resistive terminations for better response.

SWITCH-A-SLOT and **EXTEND-A-SLOT** work well with most slow to medium speed cards, such as Modems, Printers, Clock, 80 Column, Music, etc. They are not recommended for high speed data transfer devices such as disk drive controllers, alternate processor, and memory cards. We cannot guarantee that these products will work with a particular system. We do have a money-back guarantee if it does not work for you. The **SWITCH-A-SLOT** is not recommended for use with the APPLE™ Mouse.

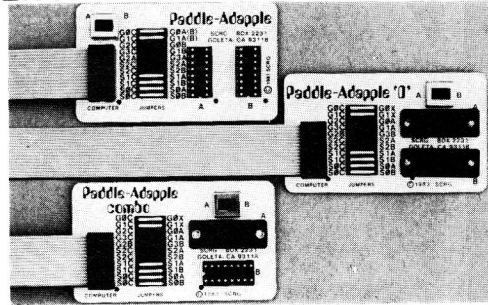
Paddle-Adapple

GAME I/O ADAPTER AND EXTENDER



- Works with all APPLE™ compatible joysticks, paddles, and most other I/O devices.
- Select one of two devices or...
- Use two joysticks simultaneously
- Suggested for **One-on-One™**, **Archon™**, etc.
- Unique "JUMPERS" socket allows you to configure to meet your needs.
- Plugs into internal 16-pin game I/O port.
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- Supplied with 18" cable.

\$29.95



The **PADDLE-ADAPPLE** has two 16-pin sockets.

The **PADDLE-ADAPPLE 'D'** has two 'D' sub-miniature connectors.

The **PADDLE-ADAPPLE COMBO** has one 16-pin socket, and one sub-miniature connector.

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for APPLE //e and enhanced //e.

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designed by Chuck Shaffer

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NEW PRODUCTS



The Omnisen system for data logging and process control.

Makes Sense

The **Omnisen** data-logging and process-control system for the Apple II displays, monitors, and records the measurement of physical quantities in metric or English engineering units. The system

can collect data from any sensor that produces DC current or voltage—thermocouples, IC temperature transducers, pressure transducers—and display them on text or graphics screens. The software calibrates hardware components and sensors. No

programming knowledge is necessary to operate Omnisen. In addition, **Omnisen Plus** lets you monitor more than one device. Omnisen sells for \$250, and Omnisen Plus is \$350, from Interactive Microware, P.O. Box 139, State College, PA 16804, (814) 238-8294. For more information circle number 459 on the Reader Service card.

Parallel Pair

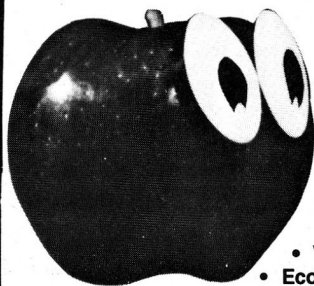
The **Hotlink** provides complete serial-to-parallel conversion, allowing most popular printers to run with the Apple II/c. Using low-power CMOS technology, the Hotlink needs no external power source to print text or graphics. A text/graphics switch ensures compatibility with any printer driver, for \$69.

The intelligent **Grappler C** performs the same

serial-to-parallel conversions as the Hotlink, and adds special Grappler software, which lets you dump graphics screens to your printer. You can produce hi-res and double-hi-res pictures in inverse, rotated, double-sized, or emphasized format. The Grappler C sells for \$119. Both devices are from Orange Micro, 1400 North Lakeview Avenue, Anaheim, CA 92807, (714) 779-2772. For more information circle number 455 on the Reader Service card.

Printer Pair

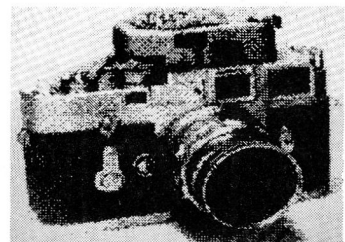
The **DMP-120EX** dot-matrix printer offers 80 columns in pica, 96 in elite, and 136 in compressed type. It uses a high-speed, low-energy, 9-by-9-dot head at 120 characters per second on fan-fold, roll, or cut-sheet



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- **Economy** — A professional tool priced for the hobbyist



HI-RES PICTURE USING THE DS-65 AND PICTURE SCANNER SOFTWARE

The DS-65 is an intelligent peripheral card with on-board software in 2708 EPROM. Check these software features:

- Full screen scans directly to Apple Hi-Res screen
- Easy random access digitizing by Basic programs
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- Utility functions for clearing and copying the Hi-Res screen

Use the DS-65 for precision security systems; computer portraiture; robotics; fast to slow scan conversion; moving target indicators; reading UPC codes, musical scores and paper tape and more! **GIVE YOUR APPLE THE GIFT OF SIGHT!** DS-65 Price: \$349.95 RCA 1500 Series Camera w/6:1 zoom lens Price: \$399.90/Combination Price: \$729.95

ADDITIONAL SOFTWARE FOR THE DS-65

— **Picture Scanner:** An applications tool for processing video images for display on the Hi-Res screen. A variety of dithering algorithms are provided, for compressing the digitized image into the Hi-Res screen and simulating grey scales. Price: \$39.95

— **Superscan:** Enables you to enhance the DS-65's Hi-Res pictures with colors! Choose from 21 different colors and assign them to grey scale values, modify pictures, zoom, enhance contrast, etc. Includes print routines for Anadex 9500 or 9501; Epson MX-80GFT and MX-100; and IDS 460 Paper Tiger*. Written for The Micro Works by Magna Soft. Price: \$99.95

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The **LQ-18** offers a choice of serial or parallel interfaces in a low-cost, letter-quality printer. Its speed is 18 cps, with either unidirectional incremental or logic-seeking bidirectional movement. Its noise level is 60 decibels. The LQ-18 prints up to 180 characters per line.

The DMP-120EX sells for \$399, the LQ-18 for \$499 parallel, \$599 serial, from CrossTech, 2720B Aiello Drive, San Jose, CA 95111, (408) 972-0400. For more information circle number 460 on the Reader Service card.

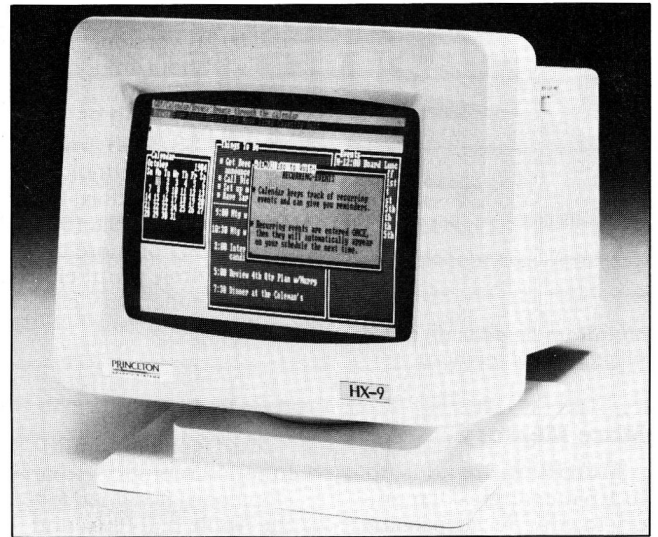
Printer Package

The single solution to printer problems is the **CrossTech CTI-7180**. This one machine offers seven-color graphics with

120-by-120-pixel resolution, near-letter-quality type with a 13-by-17 matrix at 90 cps, and 180 cps with 7-by-9-dot characters. A 3-kilobyte buffer is built in. The 7180 accepts any type of paper and supports font styles from subscript to superscript. The printer costs only \$1145 with a parallel interface, \$1295 with serial, from CrossTech, 2720B Aiello Drive, San Jose, CA 95111, (408) 972-0400. For more information circle number 461 on the Reader Service card.

A Little Color

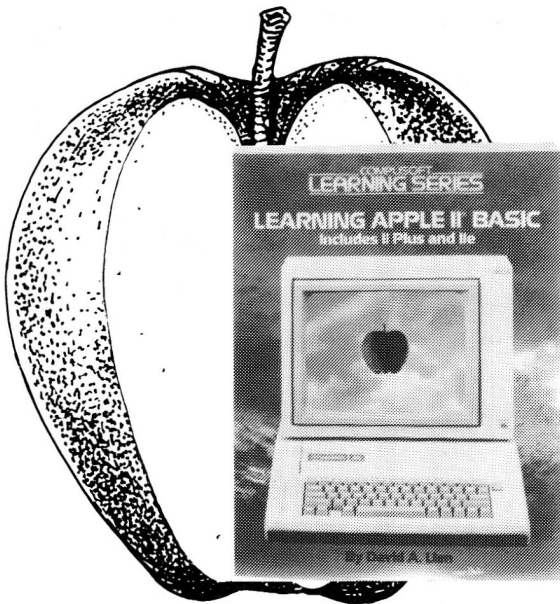
The 9-inch **HX-9** is a color monitor for Apple computers with RGB capability. A black-matrix non-glare screen with .28mm dot pitch produces the display. Sixteen full colors are available in Apple mode—an Apple color



The HX-9 RGB monitor from Princeton Graphic Systems.

switch is built in, along with a green-amber text switch. Operating at 15.75 kHz, the HX-9 RGB color monitor offers a resolution of 640 by 200 dots, or 80 columns by 25 lines of text. It's available in 120-

or 220/240-volt versions for \$650, from Princeton Graphic Systems, 601 Ewing Street, Princeton, NJ 08540, (800) 221-1490. For more information circle number 451 on the Reader Service card.



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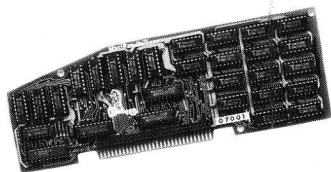
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NEW PRODUCTS



MultiRam IIe adds up to 1.5 megabytes of memory.

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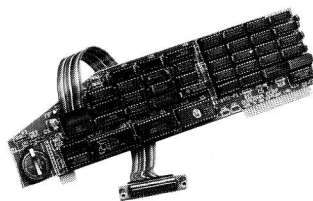
MultiRam IIe adds up to 1.5 megabytes of memory to your //e, surpassing ordinary 64K fixed-memory expansion cards. You can expand MultiRam from 64K to 3/4 of a megabyte with 64K or 256K RAM chips. A 3/4-megabyte card that offers RGB video moves MultiRam up to the full 1.5 megabytes. **MultiRam C**, for the Ap-

ple //c, is available in 256K and 512K versions. It installs without soldering or jumpers. The MultiRam IIe starts at \$159.95, the C starts at \$329.95, from Checkmate Technology, 509 South Rockford Drive, Tempe, AZ 85281, (602) 966-5802. For more information circle number 453 on the Reader Service card.

Apple Core

Multicore is a multi-function memory-expansion board designed for the Apple II, II Plus, and //e. It provides serial and parallel interfaces and is equipped with a ProDOS-compatible clock/calendar. Multicore's jumperless set-up lets you set baud rate, data format, parity, and other parameters from a menu. Protocols are stored on the

board in non-volatile memory. Multicore retails for \$219 for the board with no additional memory, \$329 for 128K, and \$399 for 256K, from Quadram, 4355 International Boulevard, Norcross, GA 30093, (404) 923-6666. Quadram also sells a number of other expansion boards that add memory and more to the II series. For more information circle number 450 on the Reader Service card.



The Multicore expansion board provides interfaces, a clock/calendar, and extra memory.

Inside Job

The **ProModem 1200A** is an internal 1200-baud modem for the Apple II series that includes terminal communications software in ROM—you won't need to find that communications disk again. The intelligent auto-dial modem card fits into any slot except 0. It features tone and pulse dial, help menus, Hayes commands, two phone jacks, automatic redial on busy signals, full- and half-duplex operation, and a speaker with volume control to monitor calls. Including software and a telephone cord, the ProModem 1200A sells for \$449 from Prometheus Products, 4545 Cushing Parkway, Fremont, CA 94538, (415) 490-2370. For more information circle number 458 on the Reader Service card.

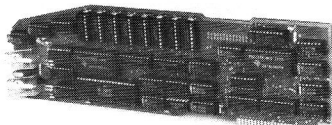


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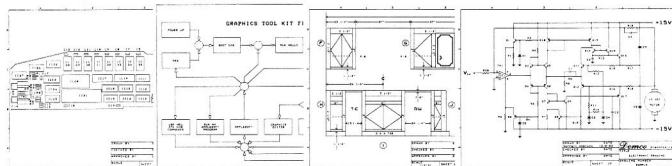
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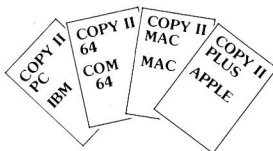
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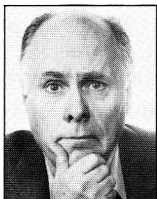
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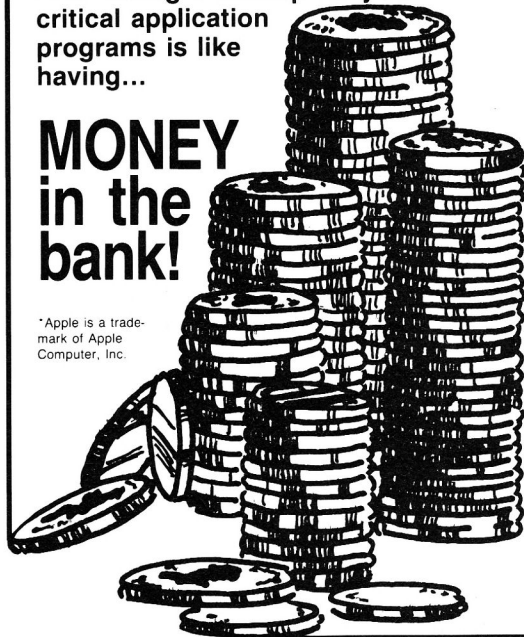
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Beginner's Cookbook

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How to Type in inCider Program Listings

The purpose of these pages is to give beginners the know-how they need to type in and enjoy the programs *inCider* publishes. It presents information in recipe form, with the number of potentially confusing explanations kept to a minimum.

The instructions assume that you have an Apple II, II Plus, //e, or //c computer with one disk drive and either DOS 3.3 or ProDOS. You also need one blank, 5¼-inch disk. To type in and run *inCider's* programs, just follow the specific instructions for your computer-operating system combination.

CREATING A BASIC PROGRAMS DISK

The first step is to prepare a disk on which to save your programs. This process is called *formatting*. In addition, ProDOS requires you to copy two files to create a startup disk.

ProDOS, version 1.0.2—Apple //c

- 1) Put your System Utilities disk into the internal drive.
- 2) Turn on your monitor or TV set.
- 3) Turn on your computer.
- 4) After the disk-use light goes out and the main System Utilities menu appears, type 6 and hit return.
- 5) At each of the next two menus, type 1 and hit the return key.
- 6) Accept the default volume name by pressing the return key.
- 7) Remove the System Utilities disk from the internal drive.
- 8) Insert the blank, unformatted disk into the drive and hit the return key.
- 9) After about 30 seconds, the message "Formatting. . .Done!" will appear. Hit the escape key.

Although formatted, the disk needs two files—PRODOS and BASIC.SYSTEM, both on the System Utilities disk—to be useful as a place to store programs. To copy them to your programs disk, continue with

the following instructions:

- 10) Type 1 and hit the return key. (Do this three times.)
- 11) Remove your programs disk from the drive and insert the System Utilities disk.
- 12) Type S and hit the return key.
- 13) Press the down-arrow key until PRODOS is highlighted.
- 14) Hit the right-arrow key.
- 15) Hit the down-arrow key until the brackets surround the words BASIC.SYSTEM.
- 16) Hit the right-arrow key, then press the return key.
- 17) When prompted, remove the System Utilities disk and insert your programs disk (the destination disk). Then hit the return key.
- 18) When prompted, remove the programs disk and insert the System Utilities disk (the source disk). Again, hit the return key.
- 19) When prompted, remove the System Utilities disk and insert your programs disk. Hit the return key.
- 20) The message "Copying PRODOS. . .Done!" will appear, followed by "Copying BASIC.SYSTEM. . . ." When prompted, remove the programs disk and insert System Utilities. After that, hit the return key.
- 21) When prompted, remove the System Utilities disk and insert your programs disk. Hit the return key.
- 22) When copying is done, remove the disk, label it "inCider programs disk #1," and turn your computer off.

Note: You can avoid disk swapping if you have an external drive, but, for the sake of uniformity, that method isn't shown here. See page 20 of the *System Utilities Manual*.

ProDOS, version 1.0.1—Apple //e or II Plus with 64K RAM

- 1) Insert the ProDOS User's Disk into drive 1.
- 2) Turn on your monitor or TV set.
- 3) Turn on your computer.

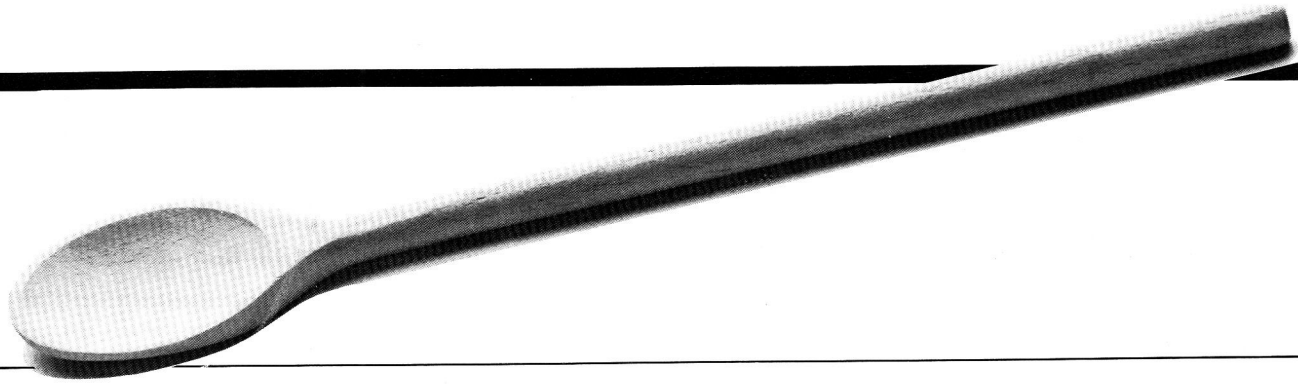
- 4) When the first menu comes up (after the disk stops working), hit the F key.
- 5) At the next menu, tap the V key.
- 6) Hit the F key, then press the return key twice.
- 7) Remove the User's Disk.
- 8) Insert a blank, unformatted disk into drive 1 and hit the return key.
- 9) When formatting is complete, hit the escape key twice.

You now have to copy PRODOS and BASIC.SYSTEM onto your newly formatted disk. To do so, follow these instructions. You should be at the Filer menu.

- 10) Hit the F key, then hit the C key.
- 11) Type PRODOS and hit return.
- 12) Type /BLANK00/PRODOS and hit the return key.
- 13) Remove the formatted disk (your programs disk) from drive 1.
- 14) Insert the User's Disk into drive 1. Now hit the return key.
- 15) At the prompt, remove the User's Disk (the source disk) and insert your programs disk (the destination disk) into drive 1. Hit the return key.

Note: If you have a two-drive system, drive 2 will spin for a while before you get the prompt to insert the destination disk. If you want to take advantage of your second drive in the copying process, see page 80 of the *ProDOS User's Manual*.

- 16) When you see the "Copy Complete" message, type in BASIC.SYSTEM and press the return key.
- 17) Type in /BLANK00/BASIC.SYSTEM and hit the return key.
- 18) Remove your programs disk from the drive and insert the User's Disk. Now hit the return key.
- 19) At the prompt, remove the User's Disk and insert your programs disk. Hit the return key.
- 20) When copying is complete, remove the programs disk, label it



"inCider programs disk #1," and turn off your computer.

DOS 3.3—Apple II Series

- 1) Insert the DOS 3.3 System Master disk into drive 1.
- 2) Turn on your monitor or TV and your computer.
- 3) If you have a //e, make sure the caps lock key is down.
- 4) When the disk stops and the Applesoft prompt "J" appears, type in NEW and hit the return key.
- 5) Type in 10 HOME and hit return.
- 6) Remove the System Master disk from drive 1 and insert a blank, unformatted disk there.
- 7) Type in INIT HELLO and press the return key.
- 8) When the disk stops working and the cursor appears, remove the disk from the drive, label it "inCider programs disk #1," and turn your computer off.

TYPING IN APPLESOFT BASIC PROGRAMS

Instructions for typing in BASIC programs can't be as detailed as the instructions for formatting a disk because every program is different. In general, however, you should follow the guidelines given below.

- When you find a program you'd like to type in, put your programs disk into drive 1 (the internal drive on the //c) and turn on your computer. After the disk stops, the Applesoft prompt "J" appears near the upper-left corner of the screen. At this point, type in NEW and press return.

- Having cleared memory with the NEW command, you are now ready to enter the first line of the BASIC program. First, type in the line number (most BASIC programs begin with line 10), and then type the rest of the line exactly as it appears in the magazine. Don't worry if the line is longer than the width of your screen

display. The program line will automatically jump to the next line on your screen. Once you have entered the entire program line, hit return.

- Continue to enter program lines in this manner until the entire program is in memory. Now, even before you run the program, save it to disk so that all of your work won't accidentally be lost. The SAVE command copies a program from main memory (RAM) to disk. Just type SAVE filename (where filename is the name of the program) and press return.

- Since the program is still in (RAM) memory, you can run it with the RUN command. Unless you are a very careful typist, you now face the task of removing syntax errors from the program. For example, if, when you run the program, you get a message saying SYNTAX ERROR IN 1050, it's a good bet that you made a typing error in line 1050. The simplest way to correct it is to retype the entire line. The computer will automatically delete the old line and replace it with the new one.

- When you have the program running properly, save the corrected version by typing SAVE filename again. This command overwrites the old version of the program with the corrected version.

TYPING IN MACHINE-LANGUAGE PROGRAMS AND SHAPE TABLES

Many programs in *inCider* use machine-language routines and shape tables. The listings for machine code consist of hexadecimal RAM addresses followed by the hex code (5E00—A9 04 30 65 FA 8C 1B 09, for example). To type in such a listing, follow the guidelines below:

- Turn on your computer with your programs disk in drive 1.

- From the Applesoft prompt, type in CALL -151 (the dash is a minus

sign) and hit the return key.

- An asterisk, the Monitor prompt, now replaces the Applesoft prompt.

- At this point, get the first address of the machine-language program from the listing. This address is the first four characters in the listing.

- Type in this address, followed by a colon (not a minus sign!). Now type in the hex numbers as they appear in the magazine. For example, if the hex line shown above were the first line of a hex program, you would enter:

```
5E00:A9 04 30 65 FA 8C 1B 09
```

and then hit the return key.

- For subsequent lines in the machine-language listing, you don't have to type in the address. Just type in a colon at the start of each line and then the hex bytes, followed by a return.

- To check your typing before you save the listing, type in the starting address of the program and hit the return key. Hitting it again produces the rest of the first program line on the screen. Subsequent returns make additional program lines appear for your inspection. If any line requires changing, just retype that line, being sure to include the address, and using a colon in place of the minus sign.

- Once the entire listing is correct, you have to save it. First, type in 3DOG and hit the return key to return to the Applesoft prompt.

- Now type BSAVE filename,Aa,Ll (where a is the starting address of the routine and l is the length). If these are hexadecimal instead of decimal values, then a \$ will precede them. Don't worry about having to figure out the address and length parameters yourself; these are always published with the program.

You now know what it takes to type in and use the programs published by *inCider*. Consult your manuals for more detailed information. ■

inCider's Index to Advertisers

Reader Service	Page
26 Action Research NW	80
168 Addmaster	77
22 Advanced Logic Systems	26
23 Advanced Logic Systems	103
48 American Mitac	84
* Applied Engineering	27, 35, 60, 71, 83
216 AST Research	1
340 BASF	17
* Batteries Included	3
159 Baudville	31
179 Beagle Bros	58, 59
20 Borg Industries	77
* Business Computers of Peterborough	69
361 Central Point Software	91
227 Checkmate Technology	79
Classified Ads	92
316 CMA Micro Computer Div.	85
59 Compusoft Publishing	89
56 Computer Accents	85
89 Consistent Software	93
163 Core Concepts	19
207 Covox	81
* Curtis Manufacturing	CII
101 Data Technology	108
240 Demco Electronics	90
108 Diversified Software	77
510 First Class Peripherals	41
83 Funk Software	2
146 Golem Computer	110
66 H & E Computronics	111
427 Hardcore COMPUTIST	93
51 Hayes Micro Computer Products	7
* Human Systems Dynamics	40
inCider Magazine Foreign dealer	93
hotCider Ad	48
inCider Sub Ad	32
University Microfilms	80
351 Instant Software	81

Reader Service	Page
12 Interactive Microware	85
157 International Apple Core	104
536 Jameco Electronics	100
62 Kalglo Electronics	83
18 Kelor	101
91 Kyan Software	83
6 Mannesmann Tally	34
208 Micro City	75
204 Micro Works	88
380 Nibble Notch	21
57 Nicholas Services	77
310 Northeastern Software	52
31 Pacific Exchanges	77
52 PBI	CIII
352 Pico Magazine	93
49 Prof. Jones	57
521 Programs Plus	65
268 Prometheus Products	CIV
234 Quadram	39
16 Quinsept	91
281 Quinsept	63
41 Quorum	90
189 Ring King Visibles	18
250 Roger Wagner Publishing	25
46 Russ Systems	51
223 Sav-Soft Products	91
353 Sensible Software	82
143 Silicon Express	45
356 Softkey Publishing	91
* Southern California Research Group	87
99 Spectrum Holobyte	106
67 Stellation II	77
355 Street Electronics	9
156 Sublogic	42
80 Systems Manufacturing	85
32 Thirdware	37
129 Thunderware	10
15 Uptime	11
264 Utilico Microware	81
152 Video-7	47
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4 9 14 19 24	154 159 164 169 174	304 309 314 319 324	454 459 464 469 474
5 10 15 20 25	155 160 165 170 175	305 310 315 320 325	455 460 465 470 475
26 31 36 41 46	176 181 186 191 196	326 331 336 341 346	476 481 486 491 496
27 32 37 42 47	177 182 187 192 197	327 332 337 342 347	477 482 487 492 497
28 33 38 43 48	178 183 188 193 198	328 333 338 343 348	478 483 488 493 498
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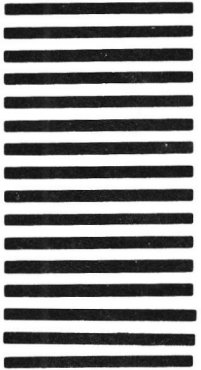
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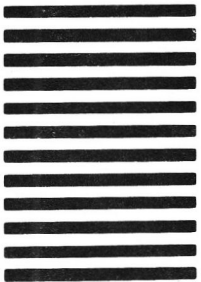
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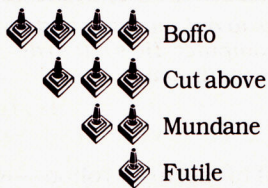
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In *The Game Reserve*, Brian Murphy reviews six to eight of the most recent Apple games to hit the market. Look here for inCider's scoop on the latest fun.

Game Ratings



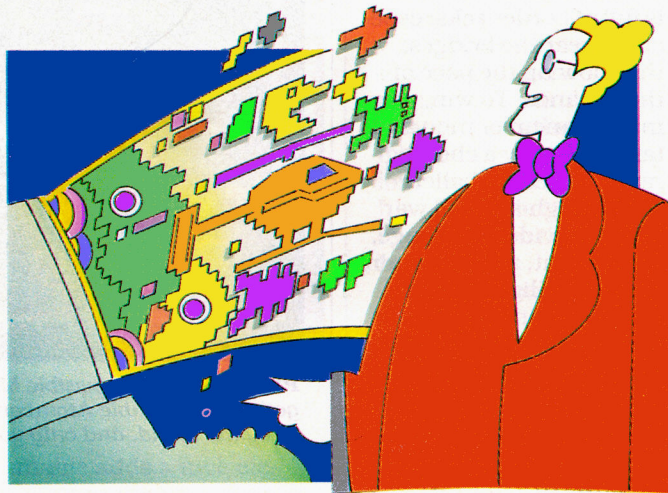
Gemstone Warrior



Strategic Simulations
883 Stierlin Road
Bldg. A-200
Mountain View, CA
94043-1983
\$34.95
Any Apple II, 64K,
disk drive, Applesoft
Joystick optional

SI is finally making exciting, entertaining games with fantasy themes. **Gemstone Warrior** offers action and miles of mysterious terrain to explore.

The game doesn't require the deep strategic thinking of *Lord British*/*Ultima* or *Wizardry*. You won't dicker with traders, cover trackless territory, or worry about food and transportation. Once you get the hang of the arcade techniques and master a few points of strategy, you can last a long time. This is beginners' fantasy gam-



ing, good for the kiddies and light-hearted fun for an adult who can't spare three months for fantasy.

Your goal is to guide a warrior through an underworld labyrinth, in search of five fragments of a gemstone the gods gave to mankind—instant software mythology. Demons have stolen the gem—the hero must confront and defeat them.



Photo 1. *Gemstone Warrior's* caverns may conceal treasure chest.

You begin the battle with a crossbow and fireballs. You can replenish your ammunition, but those fireballs can be as dangerous as the monsters you're attacking. If you stand too close when one explodes, you will

lose some of your life force. The best strategy is to fire from as far away as possible.



Photo 2. A series of corridors and rooms awaits you in *Gemstone Warrior*.

Two kinds of mazes confront you. Explore caverns carefully (**Photo 1**); treasure chests and coffins containing gold and magic charms crop up where you don't expect them—and where you do. Take time to examine each one. It may contain weapons, spells, or potions to restore life and limb. It may also conceal a part of the gemstone.

The second maze is a series of corridors and rooms (**Photo 2**). The monsters are densely packed; hit them at long

range with fireballs and kill them in batches. When you kill a monster, search the body—treasure and magic spells may cling to the dead demons.

I find magic objects the most interesting facet of a fantasy game, especially when their functions are unspecified. In *Gemstone Warrior*, potions, wands, daggers, and even floppy disks can help or hurt you. Discovering the purpose of each and its place in your strategy is fun.

Gemstone Warrior's color graphics are as good as any fantasy game's (**Photo 3**). The sound effects are adequate. You can use a joystick or keyboard commands, but the joystick's easier. You'll have better control over the action even if movement is a little jerky. It makes combat more fun, too.



Photo 3. Outstanding color graphics from *Strategic Simulations*.

Gemstone Warrior is a good—not a great—fantasy game. The color is fantastic and the action quick. The suspense won't keep you up late, but it's a good night's entertainment and a light bit of addictive escapism.

by Brian J. Murphy

Breakthrough in the Ardennes



Strategic Simulations
883 Stierlin Road
Bldg. A-200
Mountain View, CA
94043-1983
\$59.95
Any Apple II

If you mastered Tigers in the Snow, SSI's first Battle of the Bulge game, **Breakthrough in the Ardennes** offers a more complex scenario and a greater challenge.

In the solitaire mode you direct Nazi Germany's last-ditch offensive on the Western Front. Tanks and infantry await your orders.

As you move your forces to the attack, you encounter the first isolated signs of American resistance. The U.S. forces are weak and will retreat or surrender easily. You also run into a few surprises. At Neufchâtel on the right flank of your advance, an American corps is entrenched and waiting. As the hours and days pass, the Yanks will hold out stubbornly against your elite armored spearheads.

Two villages held by Americans are bottlenecks in the center of your advance. You race the Yanks to Bastogne on the left. In World War II the Nazis surrounded the town, but it held out; I have proved, however, that the Germans can oust the Americans and resist—at least temporarily—Patton's forces.

Just as all seems quiet, the Germans face the supreme challenge. With the Nazi flank scattered along the road to the left, Patton's Third Army suddenly counterattacks. The U.S. forces slice through the Nazis like a knife through butter.

The simulation is realistic. Commanders have to

reckon with enemy air power. Engineer units must blow up bridges in the face of the enemy's advance and build them again when it is time to counterattack. The forest is full of bottlenecks, especially near the bridges, that slow up the pace of the advance. To win, you must maneuver men and tanks the way a choreographer directs a ballet.

This high-spirited war game provides challenge, excitement, and entertainment. Intelligence and skillful planning are equally necessary for victory in the Ardennes.

Impossible Mission



Epyx Software
1043 Kiel Court
Sunnyvale, CA 94089
\$30
Any Apple II, 64K,
disk drive

The 64K game has arrived, quietly, with additional complexity and action. Isn't it ironic? As the market for games dwindles, the games themselves become better.

Impossible Mission—the most original title in history—is a game of platforms and levels, like 2049er, Beer Run, Apple Panic, and so on. You don't have to tackle these rooms in a specific order—fortunately—because

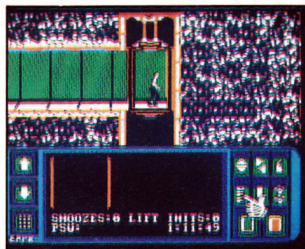


Photo 4. *Impossible Mission's* spy rides the elevator through Dr. Atombender's hideout. On-screen icons let you put the password puzzle together.

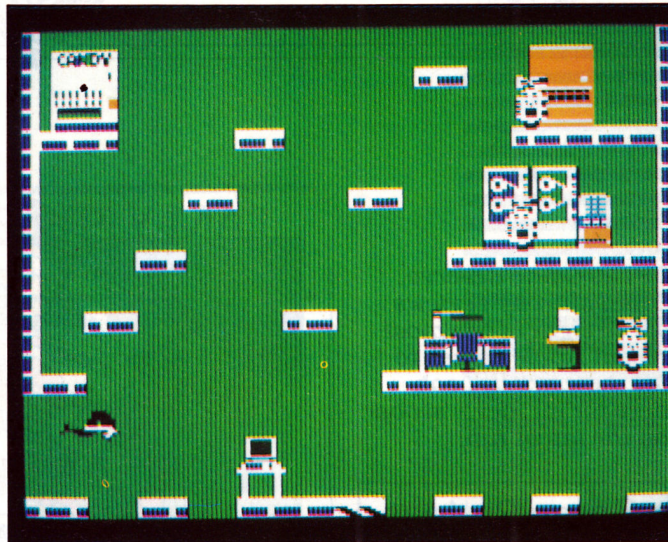


Photo 5. *Your Impossible Mission* is to put the password together and disable Atombender's computer. He's out to destroy the world, and only you stand in his way.

these chambers make the pits of Miner 2049er look simple. Other rooms are ridiculously easy to beat. What's going on?

In this game you control a spy who rides an elevator (Photo 4, top) through the underground lair of the evil Dr. Elvin Atombender. Atombender wants to destroy the world. Only you stand in his way—a real no-pressure situation. You will have to avoid the clutches

of his security robots—R2-D2's gone wrong—and search several dozen rooms.

With the password to Atombender's computer (Photo 5) you can "hack" it to death. Pieces of the password are hidden in the furniture of Atombender's laboratory, guarded by the naughty androids. You fit the pieces together like a puzzle to decipher the password. After you've solved that conundrum

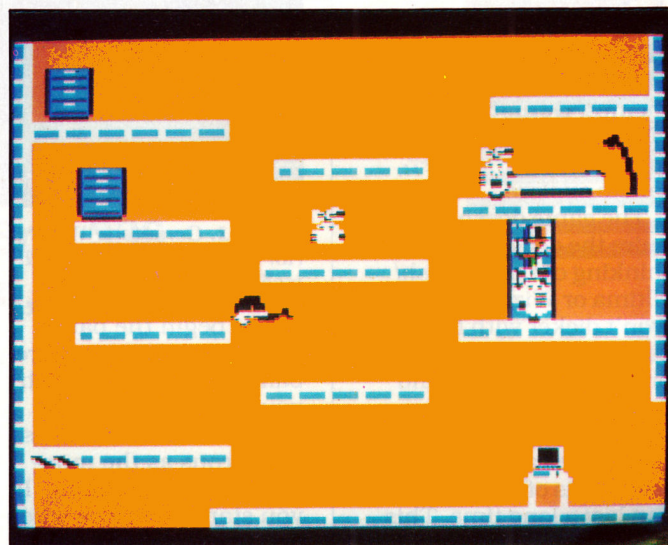


Photo 6. *Somersaults* are part of the fun in *Impossible Mission*.

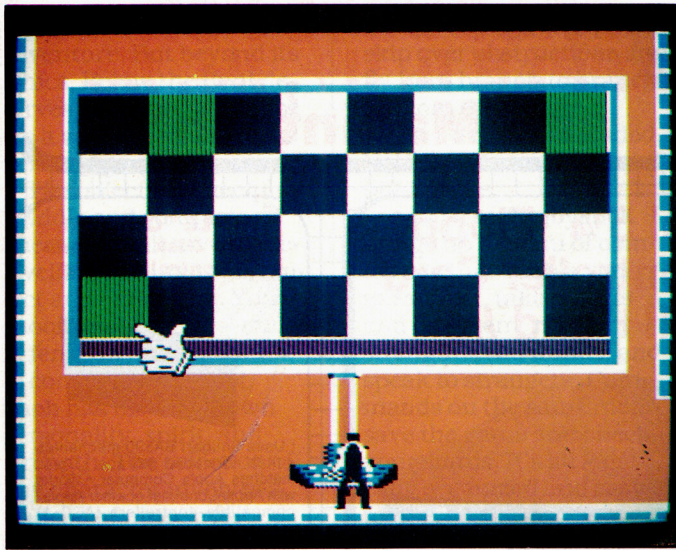


Photo 7. Solving a musical puzzle in *Impossible Mission*.

you still have to find the evil doctor's control room.

The trick is to search all the rooms. Sometimes you turn up "snooze" passwords that turn off the robots—temporarily. While the metal men nap, you can search the furniture in peace. Without the snooze command the search will be harder.

The lifts are moving platforms that transport you up and down between levels. Careful examination of the elevators can help you develop a strategy to avoid the very worst of the robots.

On-screen icons (Photo 4, bottom) (visible only between rooms) allow you to look at puzzle pieces, turn them in various directions, and match them. A help icon correctly orients the pieces and determines if you've found enough to complete the puzzle.

Coordinating the action of this game is fun. Mid-air somersaults (Photo 6) carry you over chasms or hostile robots. Timing your jumps is a treat, as is the puzzle room. If you solve a musical puzzle—something like the electronic memory test "Simon" (Photo 7)—you earn additional snooze and lift passwords. The

music adds a nice element to the mix.

Impossible Mission isn't impossible, just very tough. The mental challenge is considerable, but your reflexes had better be quick, too, if you expect to defeat Atombender.

Adventures in Narnia

No rating

Word Publishing

P.O. Box 1790

Waco, TX 76796

\$39.95

Any Apple II, 48K,

one disk drive

Joystick optional

Adventures in Narnia—if you believe the package prose—was designed for children aged 8 and up. Some 8-year-olds may find this arcade adventure challenging—more will be a little bored by it.

Narnia has been frozen by a wicked witch. Your character appears in the wardrobe (your adventure is very loosely based on C.S. Lewis' book *The Lion, the Witch and the Wardrobe*, included in the package). You earn points by winning at dice against the witch's evil dwarves,

who guard Narnia. You must touch a beaver to build your strength, represented by a heart icon. The plot sounds as thin as an Italian opera's. Bear with us.

The first adventure ends when you collect ten hearts. It also ends if a computer-controlled opponent touches the witch or if time runs out. Win or lose, the adventure is over. It's hard to distinguish the rewards from the penalties in Narnia.

In the second adventure you're in an ice maze trying to capture Aslan the lion. Crystals of ice, controlled by the witch, move through the maze. The ice saps your strength when it touches you. You can get stuck on escalators, pick flowers for points, or open doors. When you open a door you pick a card from a deck. Codes on the cards correspond to throws of the dice for extra points and outright gains or losses of strength.

It's almost impossible not to cheat after a few minutes of play. Instead of a foolproof random-number generator (maybe three or four lines of code), you use real dice. You type in the result, knowing what you need to win—that's an open invitation to cheat.

The Monopoly-style event cards with their computer codes are another temptation. Once you learn that you only have to hit the letter A for the "gain one strength" card, why not type A every time a door pops up?

If you negotiate the maze and meet the lion, the game ends. If all your strength ebbs away or if time expires, the game ends. Win or lose, nothing happens. No victory flags fly. That's curious; children like to know who won. Narnia rewards the victors and the vanquished with the same un-

satisfying laurels.

This is hardly character-building material. If Narnia teaches anything, it teaches that you win by cheating. Do programmers and manufacturers think kids are stupid, or like boring games? Do users under 10 years old deserve only second- and third-rate games?

Kids in elementary school can be sharp-witted—they demand more challenge than this game offers.

Below the Root



Windham Classics
(Spinnaker Software)
One Kendall Square
Cambridge, MA 02139
\$26.95

Any Apple II,

Applesoft, disk drive

Joystick optional

Below the Root is a fantasy adventure that's creative, beautiful, and nonviolent.

This game is an adaptation of one of the Green-Sky children's fantasies of Zilpha Keatley Snyder, and it's extremely gentle. The machismo and sexism of adventure games have no place here. It's no innovation that women as well as men can play the heroes, but even children can play the lead role in this quest.

The atmosphere of the game is different from the shock and conflict of *Wizardry* and *Ultima*. No grisly surprises, no startling jolts, no terror, no tension. My ten hours with the game raised not one fight. That pacifism alone sets *Below the Root* apart from the usual fantasy.

The ethos of nonviolence is attractive, but swords and sorcery have propelled fantasy games to the top of the charts. It took courage to gamble

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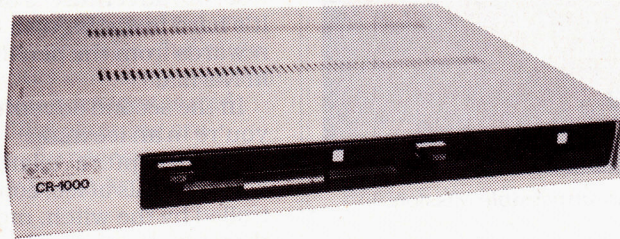
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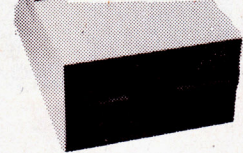
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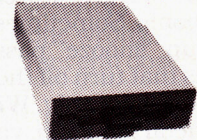


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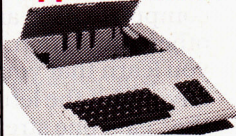
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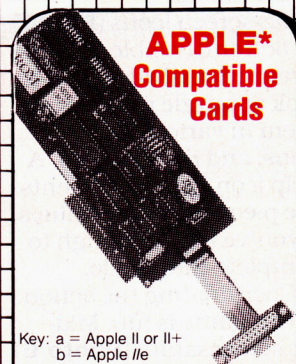


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time and energy that non-violence can work in an adventure. But beyond its ethics, *Below the Root* deserves to succeed because it's a well-constructed, fascinating game.

The object is to decipher a riddle and complete a quest that will save a tree-dwelling culture from conflict and extinction. You choose a character—male or female, child or adult—to complete the quest. Each has his or her own personality, spirit, and strength. The selection of any character involves a tradeoff of muscle for spirit, spirit for impulsiveness, patience for stamina, and so forth.

You may use keyboard or joystick to travel through this arboreal world. You can walk, crawl, climb, and jump. Wearing a magic garment, you can glide if you fall off a branch—a frequent occurrence.

You need food, rest, and equipment—a cutter for chopping undergrowth, a silken cord to swing on. Merchants will trade for coin, or perhaps a generous fellow-traveler can meet your needs.

You may also meet evil characters from time to time, servants of those who would bring conflict to the quiet forest. They will kidnap and imprison you. Sometimes they are subtle, offering food and shelter. If you have well-developed spiritual faculties, you can read their emotions and sense hidden meaning in their words. Use that psi power on everyone you meet. You'll avoid traps and pick up clues.

Explore everywhere. Your travels will take you into every tree leaf and branch, and deep into mysterious passages "*Below the Root*." You must visit every location to win.

Art and animation are outstanding. The screen looks as gentle and invit-

ing as the promise of its theme. It's fun to hop and skip over obstructions and fly from branch to branch. Explore this arboreal world—a map is included, but adventurous souls will put it aside.

A twist of the joystick brings up a menu of commands that enable you to eat, rest, take objects and use them, restore strength, read minds, and speak to strangers. Commands on the same menu save the game and check your status. It's all logically organized and easy to use.

Below the Root may be simple to play, but winning takes persistence, patience, and time. The puzzle is tricky—and there's so much leg work. But the delight of the game is this wondrous world to explore. Children and adults will treasure this one.

Avoiding the Losers

Recently more reviews of poorly designed games have been appearing in *The Game Reserve*. This hasn't come about by accident, but by design. I think that it's just as important to warn you about the worthless ones as to inform you about the worthy. Bad games cost as much as great ones.

So expect to see more news about games to avoid. Who knows? Maybe we can improve the quality of all games by demanding higher standards of technical accomplishment, creativity, and entertainment value. Until next time, aloha. ■

Brian Murphy is anxious to learn what you think of the present state of computer games. Write him at inCider magazine, 80 Pine Street, Peterborough, NH 03458.

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Dear inCider:

I have two questions that no one seems to be able to answer. Please see what you can do.

I own an Apple //c and an Apple Imagewriter printer, and am currently using the PFS:Write word-processing system. The PFS manual states that I can send control characters to the printer (to change from elite to condensed type, for example) by embedding them in my text. The manual claims that anything following *PRINTER (or *P) will not be printed but will be sent to the printer as a control code. PFS expects the codes to be in decimal form. Quite simply, I can't get my Imagewriter to react to any embedded codes from PFS:Write. For example, when I put *P 27 88* into my text to underline, no underlining appears in the printed document. Instead, random letters appear in the spots where I put the embedded commands into the text.

The Imagewriter will accept commands from BASIC programs, so I know that it's connected properly and is in working condition. I just can't seem to get it to work correctly with PFS:Write.

I haven't received a response from Software Publishing. Can you figure out the difficulty?

My second question reflects the fact that I am a beginner in computing and have a hard time deciding whether a problem is caused by hardware or software. I bought MasterType a while ago and had intermittent problems booting the disk. Finally, it stopped booting altogether, and my //c kept giving me the message "Check Disk Drive."

About that time, I brought the computer in for service and had a new motherboard installed. When I tested the computer with MasterType in the store, it worked just fine. When I got it home, however, the same old problem arose. I checked the MasterType disk on a friend's //c and it worked, so I can't help but think that the problem is with my computer—even though I had it fixed.

Can you think of what might be wrong with my setup? Also, do you know of a user group in the northern Virginia area? Thanks.

Stephani Cochran
2915 Hunter Mill Road
Oakton, VA 22124

Dear Stephani:

In looking over the examples of PFS:Write/Imagewriter output you sent, I noticed that you had not embedded the codes exactly as the PFS manual specifies. The manual gives the format for embedding printer codes as follows:

**PRINTER code1, code2, etc.* (or *P code1, code2, etc.*)*

*In the example you sent me, you used *P 27 88*, *P 27 99*, and *P 27 113*. Your *P 27 88* should read *P 27,88*. A comma is necessary after each individual code. If you want to send two commands at once, separate all the decimal numbers with commas. For example, your *P 27 99*, *P 27 113* should read *P 27,99, 27,113*.*

Be certain that a space separates the P from the first code, and try to fit an embedded code on one line. Follow the format I outlined and you should have no problem controlling your printer from PFS:Write.

We also have had a number of problems with our office //c. I've swapped the motherboard once, and had the external drive in for service on a number of occasions.

The first thing you should try is separating your computer and video monitor. I've noticed that I get more

consistent performance from the drives in our //c when I move them away from the monitor. I don't know whether the //c is particularly susceptible to RF interference, or the //c monitor just gives off more interference. In either case, separating the two is a good idea.

Falling that, my advice to you is to hound your dealer until the problem is fixed or until he or she replaces your computer. The problem isn't your dealer's fault, but he or she is responsible for seeing that the computer you bought is not defective.

There's a very large, active user group close to Oakton. It's called Washington Apple Pi. You can contact them at P.O. Box 34511, Bethesda, MD 20817.

Trap It

Dear inCider:

Can you tell me how to annul the effect of control-C when a program is running on an Apple //e?

Erik Chuang
216 21st Avenue, N.E.
Aberdeen, SD 57401

Dear Erik:

You can disable the effect of control-C by using an error-trapping routine. When you enter control-C, it generates error code 255. You must have a routine in your program that checks to see if you've pressed control-C. When a control-C is encountered, the program must ignore it and continue running.

Inserting the following routine (or some variation of it) into your program will negate the effect of control-C:

```
5 ONERR GOTO 1000
1000 POKE 216,0:ONERR GOTO1000
1010 IF PEEK(222) = 255 THEN
RESUME
1020 PRINT "ERROR CODE "
;PEEK(222);" OCCURRED"
1030 PRINT "AT LINE ";PEEK(218) +
```

Down in the Dumps

Dear *inCider*:

I have a problem with binary picture files. I can't seem to get graphics from the screen to the printer. I can print graphics if they're on disk, but I can't get my own graphics from my Apple to my Gemini-10X. Can you give me any help?

Tim Duncan
3208 West Fort Street
Seattle, WA 98199

Dear Tim:

Since you are able to print graphics from disk files (I assume you have a utility for this), but are unable to print the current contents of high-resolution screens, I suggest you save your pictures to disk instead of trying to print them directly from the screen. If the picture is on hi-res screen 1, save it by entering BSAVE file name,A\$2000,L\$2000. If the picture is on page 2, save it with BSAVE file name,A\$4000,L\$2000. Now all you have to do is print the disk file.

Z-80 Confusion

Dear *inCider*:

I was a bit confused after reading a question in the April 1985 *Ask inCider*. A reader asked if there were an "external" Z-80 microprocessor for the //c, and you stated there were none as yet. On page 39 of the same issue, Applied Engineering advertised a Z-80 that mounts within the //c.

It seems to me that it would be far better to run an internal Z-80, allowing the external disk port to be used normally. Would you please clarify this point?

Dale Sigrist
8213 North 120th East Avenue
Owasso, OK 75055

Dear Dale:

The advantages of using an internal Z-80 card on the //c, as opposed to an external one, are not as great as you might expect—in fact, the drawbacks may outweigh any positive effects. Most important, install-

ing an internal Z-80 voids your computer's warranty. Also, an internal Z-80 is limited to the 1-MHz clock speed of the //c motherboard, while an externally mounted one can be clocked much faster. In addition, using the disk-drive port would not necessarily be a disadvantage—such a product should allow you to daisy-chain the external drive from the Z-80 box.

The benefits of an internally mounted Z-80 are mainly convenience and price. You don't have to worry about

another appendage dangling from your computer, and you don't have to pay to duplicate any of the memory or 80-column circuitry of your //c. An internal Z-80 uses the //c motherboard components.

It's unclear if internal is better than external, but the question is academic. For now, you can buy only an internal Z-80 for your //c (that situation may change by the time this column sees print), so the only decision you have to make is "to CP/M, or not to CP/M." ■

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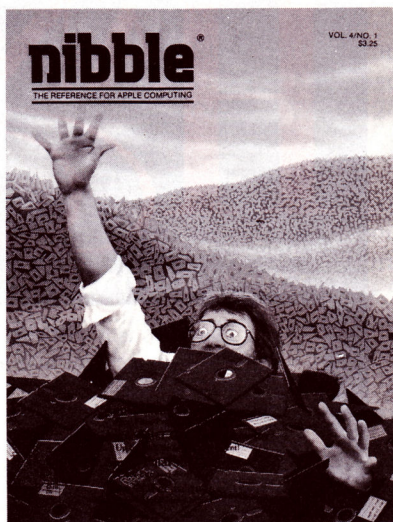
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The Apple Clinic is a forum for discussing Apple II hardware and related subjects. If you have questions or answers, or want to make a statement, write to Jim Sather. His recent book, *Understanding the Apple IIe*, published by Quality Software, may also help you. Address correspondence to Jim c/o Apple Clinic, inCider, 80 Pine Street, Peterborough, NH 03458.

Uneven Graphics Dump

I've owned my Apple IIe for almost a year and haven't had any problems. But whenever I use the Print Shop with my Gemini 10X printer, gaps appear within letters, numbers, and pictures (see the **Figure** below). If you can diagnose the problem and find a solution, I'd be grateful.

Also, I have a tip that could save printer owners a lot of money. If the ribbon is dried out, spraying a small amount of WD-40 onto the ribbon will relubricate it.

David Pieczkiewicz
Canton, MI

Figure. Line-feed gaps produced by printer graphics dumps.

DAVID PIECZKIEWICZ

The gaps in your printer graphics dumps are line-feed gaps. In printing Apple graphics, seven vertical dot positions are, normally printed with each horizontal pass of the print head—even if the print head has nine pins as the Gemini 10X does. Standard text printing uses all nine pins, though.

The tractor should pull the paper forward exactly the height of seven pins after each horizontal pass; but no printer is perfect, so you can usually detect some gap or overlap. This

effect doesn't show up in text because one line of text is printed per horizontal pass, and there is always some space between lines of text.

The line-feed gap is really noticeable in your printer, David, and isn't constant. An unusual printer and paper-supply arrangement could be increasing the backlash in the paper feed. For more uniform paper feeding, you might try increasing the vertical distance between the printer and the paper supply, so there is more weight resisting the tractor. If that fails, set the printer friction/tractor lever to friction when you're performing graphics dumps. Some members of my user group say that's a good way to tame a printer with a lot of line-feed slop.

I'm skeptical about your suggestion to spray printer ribbons with WD-40, but some readers may be brave enough and broke enough to try it. Is saving a few bucks worth inferior print quality and ink on your hands and clothes? When my printer ribbons dry out, I buy new ones.

Clobbered Disk

I've been using a recipe program successfully for the past year and now have three disks full of recipes. Last week when I tried to access volume 2 (from both the original disk and the back-up copy), I got an I/O error—even when I tried to catalog the disk. The problem seems to be the VTOC, since a disk-zap program cannot access track \$11, sector 0. Even if I could read the VTOC track, I'm not sure I'd know what to do.

Can you help me with my problem or send me in the right direction? I don't have any hard copies of the recipes.

Kim T. Peterson
Kewaskum, WI

Wow! That's scary. No data or program is as valuable as one you've laboriously entered yourself. If a

personal disk is truly clobbered, there's no replacement unless you have a valid back-up. If only track \$11 is unreadable, however, you can probably reconstruct the catalog information and salvage the disk.

I recommend that you buy two products from Quality Software—Beneath Apple DOS (a book that clearly explains DOS 3.3 VTOC's, catalog records, and track/sector lists) and Bag of Tricks (a utility that, among other things, scans a disk for track/sector lists and constructs corresponding VTOC and Catalog entries).

Bob Christiansen of Quality Software passed along the following tips for using Bag of Tricks in your situation. First, back up the clobbered disk using the patch to COPYA from the system master described on pages A4 and A5. (This patch works only on older versions of the system master.) Then reconstruct the VTOC and catalog with the FIXCAT utility. If it's necessary, you can format track \$11 using the INIT utility. Never work with your original damaged disk; always use a back-up.

BASIC Information

I need a book that details how the Apple II BASIC interpreter works. It'd be nice to have flowcharts, hex listings, and the whole memory map. Do you know of such a book?

Charles E. Cook
Refugio, TX

I can help with a memory map and a listing, but I doubt that a flowchart is available. For a highly detailed Apple II memory map that includes a lot of information about Applesoft BASIC, buy William F. Luebbert's What's Where in the Apple? For a source/object listing of Applesoft, get ahold of Glenn Bredon's Merlin (Apple II) or Merlin Pro (Apple IIe, //c) 6502 assembler. Both assemblers come with a disk utility that

by Jim Sather

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disassembles the Applesoft code in an Apple and lists the result—including comments—to your printer. You might also be interested in All About Applesoft (edited by Val Golding). This book contains articles and programs that deal with the structure of Applesoft.

Computer Training

I own an Apple IIe and have a fair amount of experience programming in BASIC, but not in any other language. I've become interested in model railroading and would like to have my computer control the model. I plan on sensing and controlling up to 100 different devices. I have a certain amount of experience in electronics (as a hobby), but none in digital circuits.

Are there interfaces on the market that can accomplish my tasks, or are there circuit diagrams or books available that could teach me how to build such an interface? Possibly some of your readers have designed one and would like to share their knowledge. Any assistance would be appreciated.

C. de Gier
Moncton, New Brunswick

One hundred devices, you say? If you get that thing running, you can probably get a job with George Lucas. I've never done any model railroading, but the sheer size of your project is going to present some real logistics problems. Although there are many books on Apple interfacing, I've never seen a network for controlling 100 devices; you may have to design your own.

As I see it, you'll have four tasks: building a 100-device digital communications network, providing power to 100 devices, interfacing digital control voltages to the electrical/electronic devices, and writing the control program. The power-supply and device-interface requirements will depend on the nature of the devices, and the program will depend on the nature of the communications network and the devices.

I have two proposals for a communications network. First, you can wire 12 octal shift registers in series, clocked by the Apple \$C040 STROBE' input. The input to the se-

rial register chain is one of the Apple annunciators, and the output is connected to one of the Apple pushbutton inputs. Power to the registers comes from an external power supply. Some of the registers have eight parallel inputs and some have eight parallel outputs. The registers thus form an I/O ring that can be circulated under program control to send out outputs and bring in inputs.

Second, you can design and build a 96-channel parallel I/O card made up of six 6522 VIA's (versatile interface adapters). These VIA's are accessed at the I/O SELECT' range of the Apple slot in which the card resides. Buy a John Bell Engineering 32-channel parallel interface card and look at the schematic for design ideas. It wouldn't be difficult to add a 74LS138 to the John Bell design to expand it to 96 channels; you'd simply have to figure out how to get 100 wires through the back of an Apple. This parallel interface, however, would be easier to program than the serial ring described above.

There are two companies I know of that make some fairly nice general-purpose interface cards. I suggest you write John Bell Engineering and Rogers Labs for their brochures.

Upside-Down Floppies

Will my floppy-disk drives still perform correctly if I stand them on end so the slot is vertical instead of horizontal?

Greg Hitchings
Torrance, CA 90504

Floppy drives work fine on their sides, front side up, or even upside down. I wouldn't operate them front side up, though, because too much dust would enter the drive through the disk opening. You can see a number of computers with side-mounted floppy-disk drives at any computer show.

Enhancing the Franklin

I own a Franklin Ace 1200 with a dual interface card, 80-column card, Z-80 card, and disk controller installed in slots 1, 3, 4, and 6, respectively. I'd like to increase the processing speed

and add RAM by putting a Titan Accelerator IIe board in slot 0 and a 128K RAMWORKS card in place of the Franklin extended 80-column card in slot 3. I'd also like to unplug the 64K RAM chips from the existing card and plug them into sockets on the 128K RAMWORKS card.

If installed this way, would both cards work to give me 256K at 3.6 times the normal speed of the Franklin? If so, would the combination work in CP/M mode with WordStar?

Alan S. Phillips
Monsey, NY

No, no, and no! RAMWORKS is an Apple IIe auxiliary slot card. It won't fit into slot 3 or in any other slot on a Franklin. To extend your Franklin RAM, you must stick to peripheral slot designs. Unfortunately, peripheral slot cards combining RAM expansion and 80-column functions are rare.

The Titan Accelerator is a fast 6502 card that contains its own RAM. It cannot access RAM on the motherboard or other peripheral slots any faster than the motherboard 6502 can. Once a program is resident in the accelerator RAM, however, it can be executed at 3.6 MHz. I understand that the Titan card can access RAM on other peripheral cards at 1 MHz, but I'm not certain that commercial software residing in the accelerator card could locate the RAM cards. The situation with accelerators is that you buy the accelerator, and it speeds up some of your software. Most owners seem happy with the speed-up, but the cost of accelerators is just too high for genuine tightwads like me.

The Titan Accelerator won't speed up WordStar or other CP/M programs. Your CP/M programs are executed by the Z-80 on your Z-80 card. Neither the 6502 on the motherboard nor the 6502 on the accelerator can execute Z-80 programs.

Correction

There is a minor error in the table of unused 6502 op codes that appeared in the April 1985 Apple Clinic (p. 121). The STY abs,X at op code \$9C (row \$9, column \$C) should be shaded. ■

Product Information

All About Applesoft

A.P.P.L.E.
290 S.W. 43rd Street
Renton, WA 98055
(206) 251-5222
\$7 book, \$16.50 disk
available to members

Reader Service Number 440

Bag of Tricks

Quality Software
21601 Marilla Street
Chatsworth, CA 91311
(818) 709-1721
\$39.95

Reader Service Number 441

Beneath Apple DOS

by Don Worth and Pieter Lechner
Quality Software
21601 Marilla Street
Chatsworth, CA 91311
(818) 709-1721
\$19.95

Reader Service Number 442

Interface cards*

John Bell Engineering
P.O. Box 338
Dept. C881
Redwood City, CA 94064
(415) 367-1137

Reader Service Number 443

Interface cards*

Rogers Labs
2710 South Croddy Way
Santa Ana, CA 92704
(714) 751-0442

Reader Service Number 444

Merlin

Roger Wagner Publishing
10761 Woodside Avenue
Suite E
Santee, CA 92071
(619) 562-3670
\$64.95

Reader Service Number 445

Merlin Pro

Roger Wagner Publishing
10761 Woodside Avenue
Suite E
Santee, CA 92071
(619) 562-3670
\$99.95

Reader Service Number 446

What's Where in the Apple?

Micro Ink
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P.O. Box 6502
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Reader Service Number 447

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TM 2213	\$1695	\$1441	\$1356
TM 2232	\$2195	\$1866	\$1756
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Corrections

The PROCAT program listing ("More than Meets the Eye," April 1985, p. 34) contains an error in line 5. The line should read:

5 PRINT CHR\$(12);HOME

Instead of clearing the screen, PRINT CHR\$(21) deactivates the 80-column card on the //e. PRINT CHR\$(12) clears the screen if you have a Videx 80-column card.

You should save the violin program (Listing 2) in the June Fudge It! at memory address \$1D00 with a length of \$48 (not \$43 as was incorrectly stated on p. 54).

The phone numbers given in *inCider's On-line Sampler* (June, p. 15) are *voice* lines. Do not try to access them with your modem. Use the numbers only to obtain access information about the data bases.

Microcomputer Information mentioned in the *On-line Sampler* in June has changed its name to Microcomputer Index Company. You can contact the company at P.O. Box 50545, Palo Alto, CA 94303, or call (415) 948-8304.

Attention crime fighters! Those hot on the trail of CRIME BYTES, a bulletin-board system mentioned in "On-line Cops" (May 1985, p. 22), should call the BBS at (409) 779-2936. CRIME BYTES is based in Bryan, TX.

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➔ Bike Banter

Cyclists looking for biking information can call a San Francisco bicycle shop's 24-hour bulletin board. The modem number is (415) 366-9171. For details, contact Chain Reaction Bike Shop, 1036 El Camino Real, Redwood City, CA 94063, (415) 366-7130.

➔ Greased Lightning

When you want it so fast that you wanted it yesterday, use Western Union's Easylink. The service lets you send documents to 30 major U.S. cities within two hours and to 25,000 other communities overnight.

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Two-hour delivery costs \$20 for the first five pages, plus 50 cents per additional page. Overnight charge for five pages is \$7.75, plus 25 cents per additional page. In addition, there is an annual \$25 fee or monthly \$25 minimum usage charge. For details, contact Western Union, 1 Lake Street, Upper Saddle River, NJ 07458, (800) 527-5184 or (201) 825-5000.

➔ Adoption Search

The National Adoption Exchange finds homes for youngsters with mild to severe disabilities. This centralized data bank stores the names of 2500 special children and prospective parents. Adoption agencies and adoptive parent groups can use GTE Telenet to access its electronic mail feature, then scan listings.

Membership costs \$150, and the service charges \$20 a month in addition to an \$18-per-hour connect-time charge. Once people receive agency approval, they can request a free in-house search, and their names will be entered into the data bank. If interested, write or call Phyllis Tusler, The National Adoption Exchange, 1218 Chestnut Street, Philadelphia, PA 19107, (215) 925-0200.

Editor's note: If you can't connect with one of these data bases, it may be temporarily—or permanently—off the air. Many data bases are non-commercial ventures and can encounter financial difficulties. Feel free to contact Matthew Lesko if you continue to run into obstacles. ■

Matthew Lesko is the founder and president of Information USA, Inc., a computer data-base consulting and publishing company. He is the author of seven information books—two of which made the New York Times best-seller list. For a free copy of his newsletter on computer data bases, write to Information USA, Inc., 4701 Willard Avenue, #1707, Chevy Chase, MD 20815, or call (301) 657-1200.

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inCider

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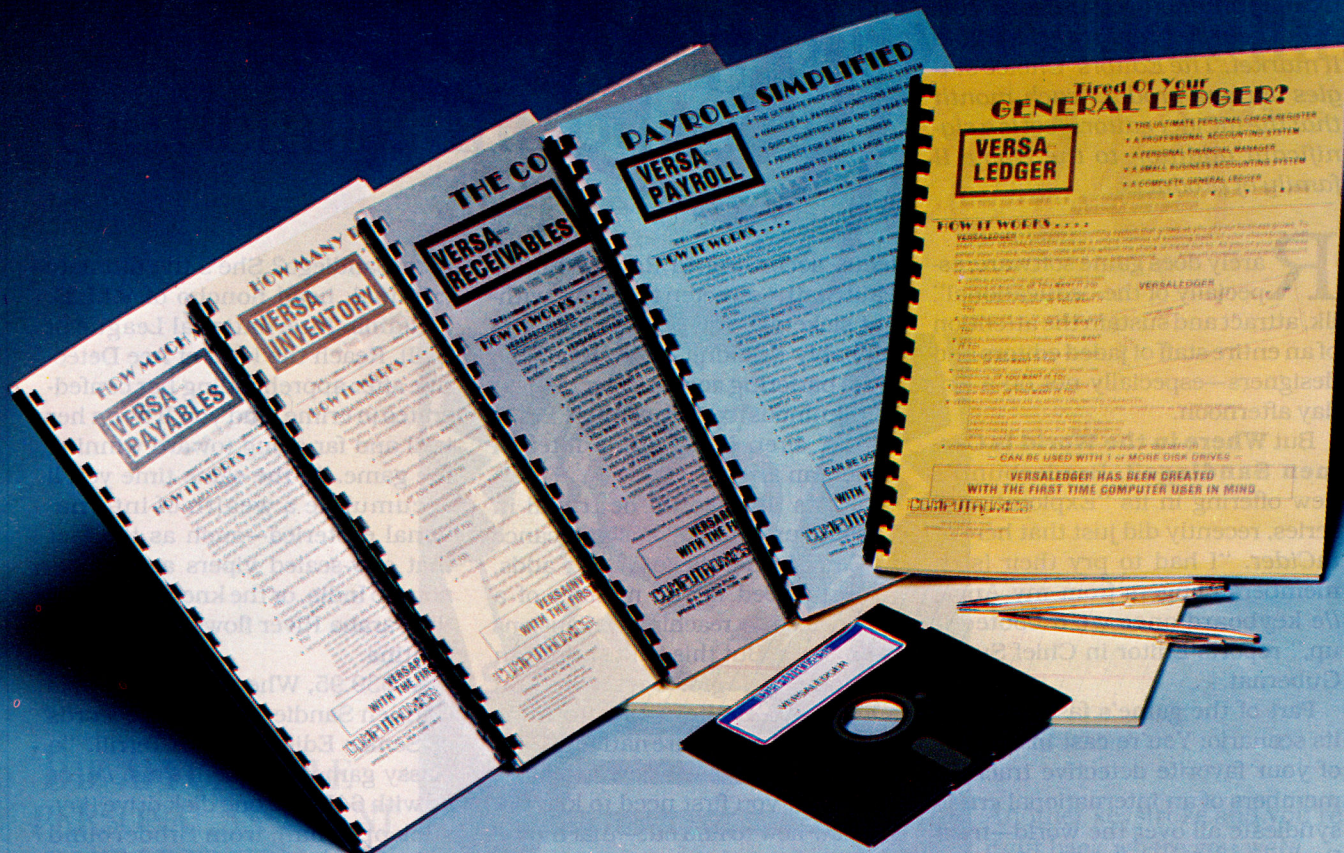
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Editors'



Every month, hardware and software manufacturers release dozens of new products into the Apple II market. The Editors' Choice singles out one product each month that the inCider editors feel is a significant addition to the Apple II family of products.

Rarely does game software, especially of the "educational" ilk, attract and sustain the attention of an entire staff of jaded editors and designers—especially not on a Friday afternoon.

But **Where in the World Is Carmen Sandiego?**, Broderbund's new offering in its "Explorations" series, recently did just that here at inCider. "I had to pry their [staff members'] fingers from my Apple //e keyboard once we'd booted it up," reports Editor in Chief Susan Gubernat.

Part of the game's fascination is its scenario: You're cast in the role of your favorite detective tracking members of an international crime syndicate all over the world—from Budapest to Kathmandu to Sydney. "Where in the World Is Carmen Sandiego? combines the fun of amateur sleuthing with a solid, but far from boring, geography lesson," Gubernat says.

You finger the thief from among a roster of blackguards like Fast Eddie B., Ihor Ihorovitch, and Katherine "Boom-Boom" Drib. To eliminate irrelevant suspects and zero in on the culprit, you must analyze facts from the criminals' dossiers and combine them with tips from reliable "sources" you encounter during your travels.

"I fell in love with this program the minute I opened the box and a copy of *The World Almanac* came tumbling out—I've been a fan of almanacs since I was a kid," comments Technical Editor Bob Ryan. "I've never seen a more entertaining way to teach deductive reasoning and elementary research methods. It sure beats Logic 101."

Clever graphics and sound ef-

fects, according to Review Editor Paul Statt, "sweeten the game without sickening the players." He was probably thinking of the Keystone Cops pattering across the screen, or the ominous sound of the "Black Maria" siren going off as Interpol makes an arrest.

"Facts that would be trivial in Trivial Pursuit take on significance in Carmen Sandiego," Statt adds. "You proceed in the manner of a true detective, reaching conclusions from clues. But this isn't simply an exercise in logic. Certainly you learn that 'If she wants to hunt moose, and moose are native to Canada, she must have flown to Montreal.' But you first need to know—or know how to find out—that moose do indeed roam Canada."

Here's where players of all ages can enhance their research skills: Your quests may take you not only from one foreign country to another as depicted on the monitor, but also through the almanac's sections on topography, world flags, commodities, and natural resources.

And just who in the world is Car-

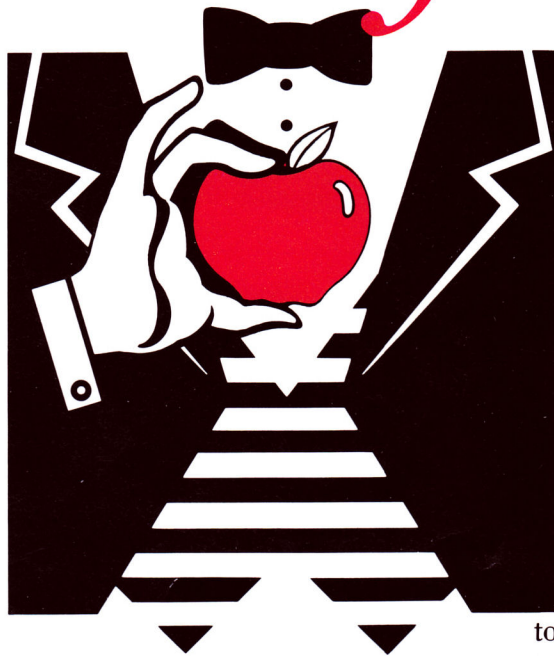
men Sandiego? She's the ultimate criminal, head honcho of V.I.L.E. (Villains' International League of Evil). Reach the level of Ace Detective after apprehending her confederates in crime, and you'll be on her trail and far along toward winning the game. At the same time you'll accumulate a wealth of international esoterica—such as the fact that saw-scaled vipers are indigenous to India, or the knowledge that the Parana River flows through Argentina.

At \$39.95, *Where in the World Is Carmen Sandiego?* is, in the words of Senior Editor Eileen Terrill, "a classy game" for the II Plus, //e, or //c with 64K and one disk drive (joystick optional), from Broderbund Software, 17 Paul Drive, San Rafael, CA 94903, (415) 479-1170.

While the manufacturer doesn't suggest a target age group, we'd say that *Where in the World Is Carmen Sandiego?* is a great way to turn kids aged 11 and up (and their more precocious siblings) on to world geography—if you can get it away from their parents. ■



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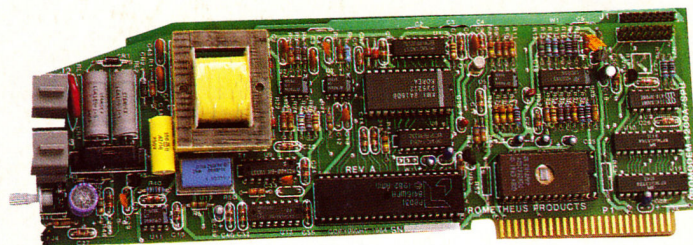
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